

**Race to the Top
Application for Initial Funding
Phase 2
CFDA Number: 84.395A**

APPENDIX

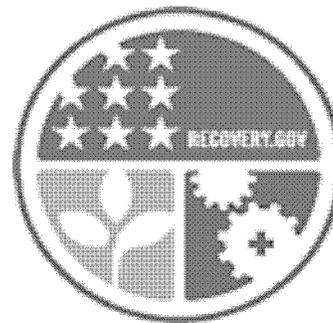
Pennsylvania: *Ready to Go! Reaching Beyond!*

**Submitted by:
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**Submitted to:
U.S. Department of Education**

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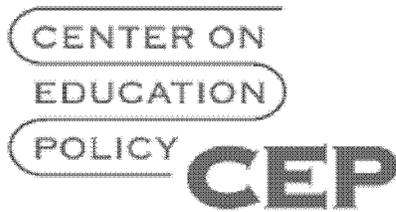


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Pennsylvania Shows Broad, Consistent Improvement in Test Scores Only State with Rising Test Scores Across the Board

HARRISBURG, PA—August 19, 2009—Student achievement has risen across the board in Pennsylvania according to a 50-state study of test results by the Center on Education Policy (CEP), an independent nonprofit organization. From as early as 2002 to 2008, Pennsylvania showed gains on its state reading and mathematics tests at grades 4, 8 and 11, the Washington, D.C.-based group found. Pennsylvania also made improvements at the basic, proficient and advanced levels of student achievement.

Pennsylvania was the only state in the CEP study with rising test scores across the board—at all three grade levels and all three achievement levels in both reading and math. Twenty-five states, including Pennsylvania, had the three or more years of comparable test data needed to analyze trends at all the grades, achievement levels, and subjects covered by the study. The other 25 states did not have as complete a set of trends because they had made changes in their testing programs within the past three years that affected the comparability of their data.

“Not only is it impressive that Pennsylvania’s schools have made such consistent improvement since 2002, but they also show gains at the high school level where nationally there is a serious problem,” said Jack Jennings, president and chief executive officer of CEP.

While many states showed across-the-board gains at the elementary and middle school levels, Pennsylvania was one of only five states to demonstrate gains in high school at all three achievement levels and both subjects (out of 25 states with necessary data). Among all states, gains were less prevalent at the high school level.

“The most important point of this analysis is that Pennsylvania has made solid progress in test scores between 2002 and 2008,” emphasized Jennings. “Pennsylvania’s results look good in our study, and the state is also in the top tier of states in its performance on the National Assessment of Educational Progress.” Comparisons with other states have to be done carefully and include information in addition to test results, Jennings noted, because “every state has a different test, different cut scores, different curriculum standards, and different demographics.”

For three years, CEP has been conducting a unique study of all 50 states’ test results in reading/English language arts and math. This multi-year research, supported by charitable foundations and advised by a diverse panel of national experts, is the most comprehensive analysis ever done of state test results.

The full report from CEP and profiles of test score trends for all 50 states are available on CEP's Web site at cep-dc.org. The report, the first in a series of CEP publications on achievement trends to be released this year, is titled, *State Test Score Trends Through 2007-08, Part 1: Is the Emphasis on "Proficiency" Shortchanging Higher- and Lower-Achieving Students?*

To request a copy of the report or to speak with Jack Jennings, head of CEP, please contact Chloe Louvouezo at 202-955-9450 ext. 320 or at clouvouezo@communicationworks.com.

STANDARDS ALIGNED SYSTEMS (SAS) IN PENNSYLVANIA

www.pdesas.org

The Pennsylvania Standards Aligned System (SAS) is a collaborative product of research and good practice that identifies six distinct elements which, if utilized together, will provide schools and districts a common framework for continuous school and district enhancement and improvement. Much research has been conducted as to what makes a great school. There are many intangible components; however, research supports the notion that great schools and school systems tend to have six common elements that ensure Student Achievement: Clear Standards, Fair Assessments, Curriculum Framework, Instruction, Materials & Resources, and Interventions.



Clear Standards

Pennsylvania Standards describe what students should know and be able to do; they increase in complexity and sophistication as students progress through school. The Assessment Anchors clarify the Standards assessed on the Pennsylvania System of School Assessment (PSSA) and can be used by educators to help prepare students for the PSSA. The metaphor of an anchor signals that the Assessment

Anchors clarify the relationship between state Standards and our assessment system. Assessment Anchors are further elaborated with Eligible Content. Eligible Content identifies how deeply an Anchor should be covered and specifies the range of the content to best prepare students for the PSSA. Not all of the Eligible Content is assessed on the PSSA, but it shows the range of knowledge from which we design the test.

Fair Assessments

Fair Assessment is a process used by teachers and students before, during, and after instruction to provide feedback and adjust ongoing teaching and learning to improve student achievement. In Pennsylvania the four types of assessment are summative, formative, benchmark, and diagnostic.

Summative Assessment: Seeks to make an overall judgment of progress made at the end of a defined period of instruction. They may occur at the end of a school level, grade, or course, or are administered at certain grades for purposes of state or local accountability. These are considered high-stakes assessments and the results are often used in conjunction with No Child Left Behind (NCLB) and Adequate Yearly Progress (AYP). They are designed to produce clear data on the student's accomplishments at key points in his or her academic career.

Formative Assessment: Used by teachers and students during instruction to provide feedback to adjust ongoing teaching and learning to improve students' achievement of intended instructional outcomes. In Pennsylvania we are defining forma-

tive assessment as classroom based assessments that allow teachers to monitor and adjust their instructional practices in order to meet the individual needs of their students.

Diagnostic Assessment: Ascertains, prior to instruction, each student's strengths, weaknesses, knowledge, and skills. Establishing these permits the instructor to remediate students and adjust the curriculum to meet their unique needs.

Benchmark Assessment: Measures achievement of important grade level content periodically during the year in order to provide feedback about how students are progressing toward demonstrating proficiency.

Curriculum Framework

The Curriculum Framework specifies what is to be taught for each subject in the curriculum. In Pennsylvania, Curriculum Frameworks include Big Ideas, Concepts, Competencies, Essen-

tial Questions, Vocabulary, and Exemplars aligned to Standards and Assessment Anchors and, where appropriate, Eligible Content.

Curriculum Framework Components:

- **Big Ideas:** Declarative statements that describe concepts that transcend grade levels. Big Ideas are essential to provide focus on specific content for all students.
- **Concepts:** Describe what students should know (key knowledge) as a result of this instruction specific to grade level.
- **Competencies:** Describe what students should be able to do, key skills, as a result of this instruction, specific to grade level.
- **Essential Questions:** Questions connected to the SAS framework and are specifically linked to the Big Ideas. They

should frame student inquiry, promote critical thinking, and assist in learning transfer.

- **Vocabulary:** Key terminology linked to the Standards, Big Ideas, Concepts and Competencies in a specific content area and grade level.
- **Exemplars:** Performance tasks that can be used for assessment and instruction as well as professional development. An Exemplar is an example of student work that meets the identified criteria for the task. Exemplars provide educators with a concrete example of assessing students' understanding of the Big Ideas, Concepts and Competencies.

Instruction

Aligned Instruction comprises the following activities:

- Teaching topics aligned with the Standards.
- Ensuring the right level of challenge.
- Focusing teaching based on the learning needs of each student.

- Implementing instructional strategies to increase student achievement.

Materials and Resources

- Materials and Resources includes Voluntary Model Curriculum (VMC) incorporating learning progressions, units, lesson plans, and content resources aligned to the Pennsylvania Standards in curriculum frameworks for the four major content areas (mathematics, science, social studies, reading-writing-speaking-listening).
- Learning progressions span grades K-12 and include what all students should know and be able to do as a result of successfully moving through grades K-8 and by taking specific courses in grades 9-12.

- The courses are Algebra I, Algebra II, Geometry, Biology, Chemistry, Physics, World History (1450 – present), US History (1890 – present), Civics and Government, English Composition and Literature.

Interventions

Interventions ensure students are provided with supports they need to meet/exceed grade level Standards. A comprehensive system of Interventions involves a graduated

set of safety nets aligned to specific student needs and Standards.

Standards Aligned System Contact Information:

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More information on the Standards Aligned System can be found on the Education Hub on the PDE website at: www.education.state.pa.us



pennsylvania
DEPARTMENT OF EDUCATION

Updated November 17, 2009

www.pdesas.org

The PA Standards Aligned System portal is the vehicle delivering PA's Standards Aligned System (SAS) framework, our Instructional Management System, to the desktop of all educational stakeholders in PA and beyond! The portal is operational and highly utilized by PA educators, as well as many others interested in effective practices for ALL students.

Through the SAS portal, teachers have access to:

- All PA academic standards, updated and revised in 'real-time', via a searchable database, with the ability to drill down on each standard to the related eligible content to strategically align all classroom activities;
- Searchable PA curriculum frameworks, linked to the academic standards, which include the Big Ideas and related Concepts and Competencies;
- *ePortfolio*: a tool to organize all digital resources for curriculum and instruction providing anywhere/anytime access for ALL educators in PA;
- *Teacher Website Builder*: a "point and click" website builder that allows teachers to create their own website promoting communication between school and home. The website builder can also be used as an instructional delivery tool in classrooms to integrate web-based resources within SAS;
- *Assessment Creator*: a resource providing teachers with the ability to produce customized assessments using a bank of aligned, released assessment items;
- The Response to Instruction and Intervention (RTII) framework: a multi-tiered standards-aligned model that enables teachers to identify and intervene with students at academic or behavioral risk; and
- An online Professional Learning Community (PLC) where PA teachers, parents, and administrators can collaborate and share ideas, resources, and information.

Through the SAS portal, teachers are able to individualize instruction by using student diagnostic assessment data to identify specific areas of students' strength and need linked to aligned resources and tools. Because this information is recorded using unique student identifiers (*PA SecureID*), the level of educational performance, progress demonstrated, and effective interventions used are available from year to year as long as the child remains in PA.

The portal is operational and highly utilized by PA educators and many others interested in maximizing the effectiveness of educational programs for ALL students.

Current use data includes:

- 31,475 registered users representing PA educational stakeholders;
- 174,509 unique, non-duplicated visitors to the SAS portal;
- 431,355 visits originating from 79 countries including: US; Canada; UK; India; Brazil; Germany; Spain; France; Japan; Mexico; Australia; Thailand; Bosnia & Herzegovina; Egypt; Qatar; Austria; etc.

Appendix A-3

PENNSYLVANIA DEPARTMENT OF EDUCATION
 A Framework for Continuous School Improvement Planning
 (Summer 2009)

GETTING RESULTS

Continuous School Improvement Plan Gen 6 - 2 Year Plan

Required for Schools in School Improvement I, Corrective Action I,
 Corrective Action II (2nd Year and Beyond),
 Making Progress in School Improvement II,
 Making Progress in Corrective Action II
 Optional for Schools in Warning and Met AYP

SCHOOL:	
DISTRICT:	
INTERMEDIATE UNIT (IU):	
PRINCIPAL:	
ADDRESS:	
CITY:	ZIP CODE:
PHONE:	FAX:
EMAIL:	DATE:
TITLE I SCHOOL? (check one): <input type="checkbox"/> Yes <input type="checkbox"/> No	

Please indicate your school's most recent NCLB/AYP status:

- Met AYP
 School Improvement I
 Corrective Action II (2nd year and beyond)
 Making Progress in Corrective Action II
 Warning
 Corrective Action I
 Making Progress in School Improvement II

Commonwealth of Pennsylvania
Edward G. Rendell, Governor
Department of Education
Dr. Gerald L. Zahorchak, Secretary
Office of Elementary and Secondary Education
Diane Castelbuono, Deputy Secretary
Bureau of Assessment and Accountability
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If you have any questions about this publication, please contact:

Department of Education
Bureau of Teaching and Learning Support
Division of School District Planning and Continuous Improvement
333 Market Street, 8th Floor
Harrisburg, PA 17126-0333

The following persons have been designated to handle inquiries regarding the non-discrimination policies:

Complaints regarding discrimination in schools:

Human Relations Representative, Intake Division, PA Human Relations Commission
Harrisburg Regional Office (717) 787-9784
Pittsburgh Regional Office (412) 565-5395
Philadelphia Regional Office (215) 560-2496

Complaints against a Pennsylvania Department of Education employee:

Pennsylvania Department of Education, Equal Employment Opportunity Representative
Bureau of Human Resources
11th Floor, 333 Market Street
Harrisburg, PA 17126-0333
Voice Telephone: (717) 787-4417 Fax: (717) 783-9348 Text Telephone TTY: (717) 783-8445

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General questions regarding educational law or issues:

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INTRODUCTION

GETTING RESULTS is the continuous school improvement planning framework uniquely customized for the Commonwealth of Pennsylvania. This version of **GETTING RESULTS** builds on the experiences and recommendations of Pennsylvania schools, districts, and Intermediate Units since it was first released in fall 2003. It incorporates current thinking and priorities of the Pennsylvania Department of Education regarding continuous school improvement.

GETTING RESULTS outlines the phases vital to developing a results-focused continuous school improvement plan (Figure 1).

Phase 1 – **ORGANIZE and REVIEW DATA** – emphasizes the need for multiple data sources, including summative, formative, and perceptual.

Phase 2 – **ANALYZE DATA and DISCOVER Root Cause** – offers worksheets for analyzing data from multiple data sources and finding the underlying causes of the state of student achievement. This phase is based on the **six components of Pennsylvania’s Standard Aligned System** (Figure 2) - Clear Standards, Fair Assessments, Curriculum Framework, Instruction, Materials and Resources, Interventions.

Phase 3 – **PLAN SOLUTION** – aligns analysis of data and root cause with strategic action planning.

Phase 4 – **IMPLEMENT the PLAN** – The school improvement plan must be a living, breathing document that is routinely revisited and monitored by the administration and leadership team of the school.

Phase 5 – **ANALYZE EVIDENCE of EFFECTIVENESS** – guides reflection of plan implementation. How was the plan implemented? How do you know if it was effective?

Phase 6 – **REVISE the PLAN** – makes refinements and revisions after a status review of the two year plan.

Phase 7 – **IMPLEMENT the REVISION** – The revised school improvement plan is an addendum to your two year plan and refines and focuses school improvement efforts.

We welcome your comments and suggestions for improvement. Please send them to: Division of School District Planning and Continuous Improvement, Pennsylvania Department of Education at ra-sip@state.pa.us.

Year
1

Year
2

Figure 1: The Phases of Continuous Improvement Planning For a Two Year Plan

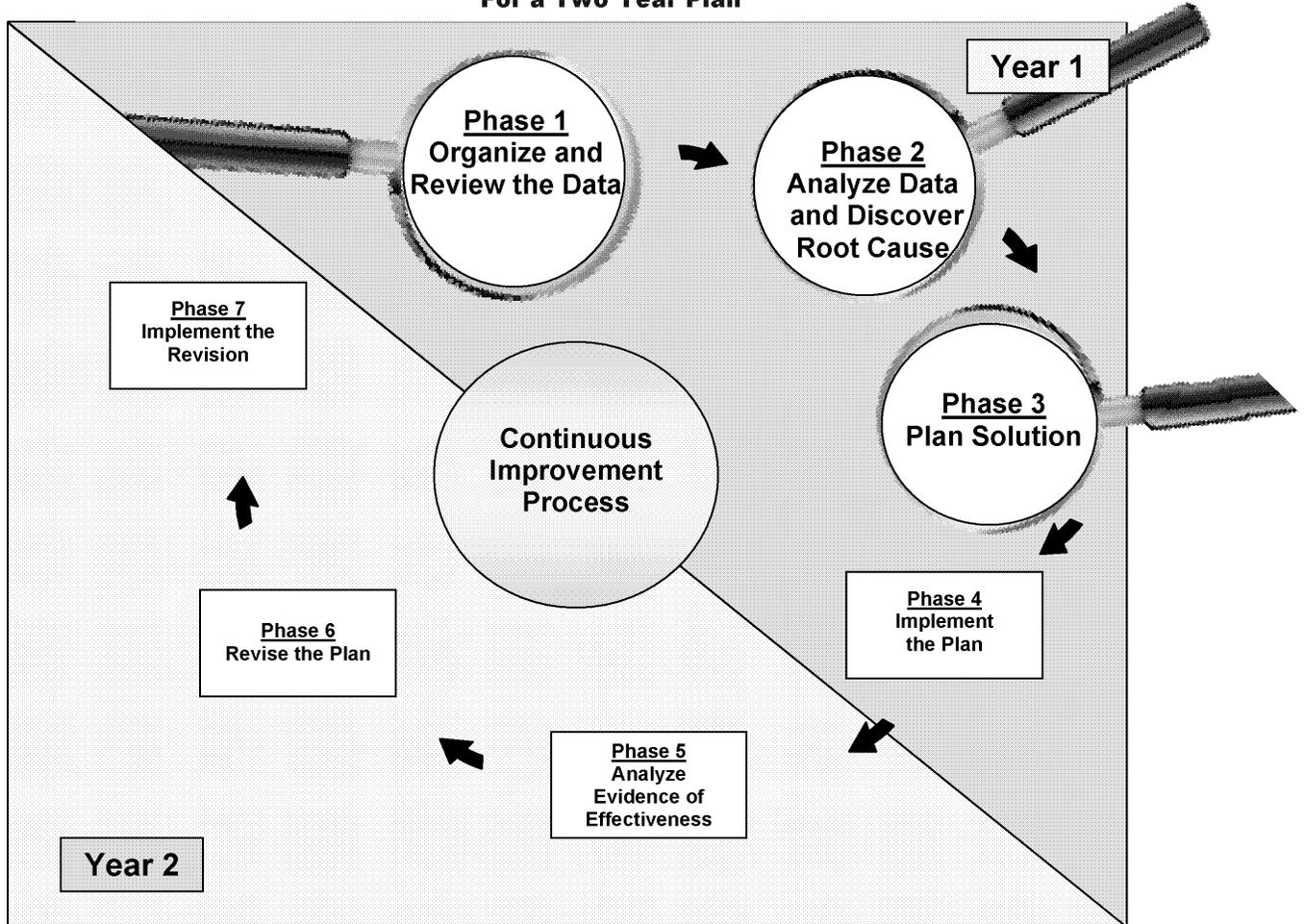
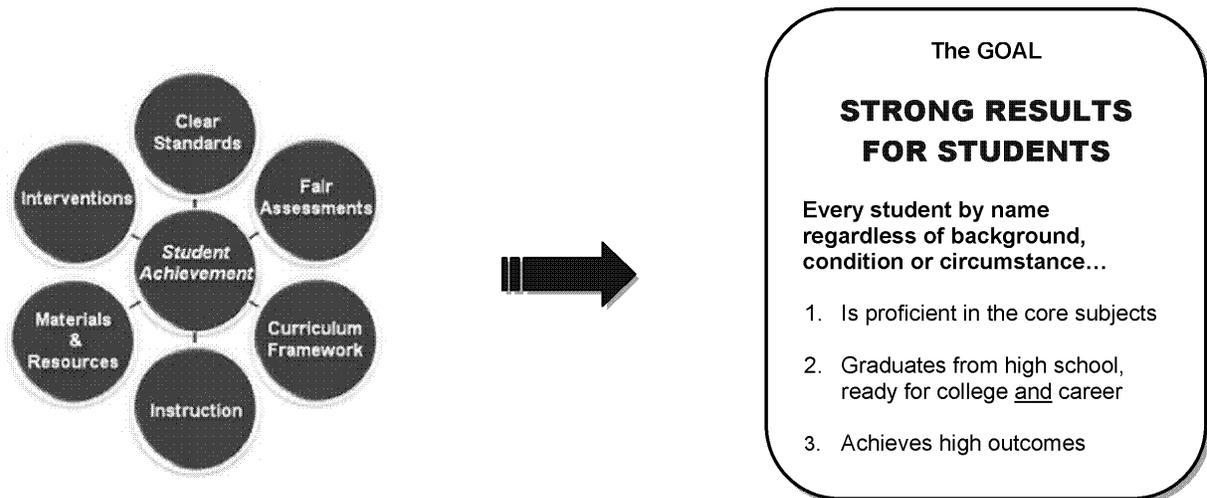


Figure 2: Pennsylvania’s Design for Continuous School Improvement

Pennsylvania’s design for continuous school improvement focuses on six core components of a standards aligned system which are required to provide a consistent environment in which comprehensive student achievement is possible. The design provides a common framework for work at all levels: school, district, Intermediate Unit (IU), and state levels. This common set of “organizers” ensures state-wide consistency and coherence in the design of programs, tools, technical assistance, and targeted supports.



For additional information about Pennsylvania’s Standard Aligned System visit the Education Hub located at: <http://www.edportal.ed.state.pa.us/>

TABLE OF CONTENTS

INTRODUCTION

PHASE 1: ORGANIZE and REVIEW DATA - The goal of Phase 1 is to identify, organize and review the student achievement data you will consider as you develop your continuous improvement plan.

- ◆ Worksheet 1: Identify School Improvement Team Members
- ◆ Worksheet 2: AYP Results – Plan Requirements

PHASE 2: ANALYZE DATA and DISCOVER ROOT CAUSE - The goal of Phase 2 consists of two critical exercises: 1) Analyzing the current state of student achievement, using data from multiple sources. 2) Finding the underlying causes (root cause) of the current state of student achievement.

- ◆ Worksheet 3 – Analyze Locally Relevant Data
- ◆ Worksheet 4 – Synthesize Locally Relevant Data
- ◆ Worksheet 5 – Analyze Reading Data
- ◆ Worksheet 6 – Synthesize Reading Data
- ◆ Worksheet 7 – Find Root Cause Using Foundational Guiding Questions for Reading
- ◆ Worksheet 8 – Analyze Math Data
- ◆ Worksheet 9 – Synthesize Math Data
- ◆ Worksheet 10 – Find Root Cause Using Foundational Guiding Questions for Math

PHASE 3: Plan Solution - The goal of Phase 3 is to “pull everything all together” by compiling a detailed action plan to be implemented by the school. Phase 3 begins with setting student achievement improvement goals for this planning cycle, followed by the specific tasks that must be completed to meet those goals.

- ◆ Worksheet 11 – Set Student Achievement Improvement Goals
- ◆ Worksheet 12 – Set Locally Relevant Improvement Goals
- ◆ Action Sequences – Reading
- ◆ Action Sequences – Math
- ◆ Action Sequences – Attendance/Graduation/Other
- ◆ Action Sequence – Parental Involvement
- ◆ Action Sequence – Professional Development

PHASE 4 – The goal of Phase 4 is to implement the Action Plan.

- ◆ Action Sequence – Student Achievement Monitoring Tool

ASSURANCES

- ◆ Title I Assurances – NCLB Requirements
- ◆ Assurances of Quality & Accountability

PHASES 5, 6, and 7 can be found in the Getting Results – Revision Tool.

Phase 1 - Organize and Review Data

Worksheet 2

AYP RESULTS – PLAN REQUIREMENTS

Directions: This worksheet helps schools identify what must be addressed in Phase 3 – Plan Solution. If the school met all target areas without special provision, proceed to Worksheet 3, Locally Relevant Data Analysis. This information was gathered from <http://paayp.emetric.net/>.

Academic Performance

- The school must address academic performance for any relevant subgroup (N≥ 40) in any area where the school failed to make AYP (**X**).
- The school must address academic performance for any relevant subgroup (N≥ 40) in any area where the school met AYP through one of Pennsylvania's special provisions. (ie. Safe Harbor, Confidence Interval, etc.)

ACADEMIC PERFORMANCE	Did Not Make AYP	Made AYP By Special Provision	Made AYP	Special Provisions	
				Legend	
Reading				<input checked="" type="checkbox"/> Group met target <input type="checkbox"/> Group met target using Confidence Interval <input type="checkbox"/> SH Group met target using Safe Harbor <input type="checkbox"/> SHC Group met target using Safe Harbor with Confidence Interval <input type="checkbox"/> GM Group met target using Growth Model <input type="checkbox"/> PPI Group met target using Pennsylvania Performance Index (2008 only) <input type="checkbox"/> A Group met target using an Appeal <input type="checkbox"/> PKY Group met target using Proxy <input checked="" type="checkbox"/> Group did not meet target <input type="checkbox"/> Fewer than 40 students tested	
Math					

Test Participation, Attendance (K-8 Only), Graduation (High Schools Only)

- The school must address participation if the school did not (**X**) make the 95% AYP target. Participation data needs to be analyzed and addressed in the Action Sequence.
- The school must address attendance if the school did not make the AYP target (**X**). Attendance data needs to be analyzed and addressed in the Action Sequence.
- The school must address graduation if the school did not make the AYP target (**X**). Graduation data needs to be analyzed and addressed in the Action Sequence.

OTHER TARGET AREAS	Test Participation		Attendance/Graduation	

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 3

ANALYZE LOCALLY RELEVANT STUDENT DATA

What you need to do:

- ◆ As a team, answer the Guiding Questions below relative to locally relevant data and provide evidence to support your answer.
- ◆ Use the data analysis from this worksheet to summarize areas of strength or concern on Worksheet 4.

		DATA & INQUIRY	No	Yes	SUPPORTING EVIDENCE
			<input type="checkbox"/>	<input type="checkbox"/>	
Whole School	1	The school met the AYP target for Attendance. (K-8 Only) Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	2	The school met the AYP target for Graduation. (High School Only) Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	3	There is evidence that behavior referrals occur equally from all times of day and locations in the school.	<input type="checkbox"/>	<input type="checkbox"/>	
	4	There is evidence that students are actively engaged in instruction in all curricular areas and at all times throughout the day.	<input type="checkbox"/>	<input type="checkbox"/>	
	5	There is evidence that students who are new to the school score similarly on the PSSA to those students who are not new.	<input type="checkbox"/>	<input type="checkbox"/>	

		DATA & INQUIRY	No ↓	Yes ↑	SUPPORTING EVIDENCE
Grade Level	6	There is evidence that students in all grades have a similar absentee rate.	<input type="checkbox"/>	<input type="checkbox"/>	
	7	There is evidence that students in all grades have a similar dropout rate. (High Schools Only)	<input type="checkbox"/>	<input type="checkbox"/>	
	8	There is evidence that students in all grades have a similar behavior referral rate.	<input type="checkbox"/>	<input type="checkbox"/>	
Subgroup Level	9	There is evidence that students in all relevant subgroups have a similar absentee rate.	<input type="checkbox"/>	<input type="checkbox"/>	
	10	There is evidence that students of all relevant subgroups have a similar graduation rate. (High Schools Only)	<input type="checkbox"/>	<input type="checkbox"/>	
	11	There is evidence that all relevant subgroups have an equally representative rate of behavior referrals.	<input type="checkbox"/>	<input type="checkbox"/>	

Worksheet 3 (optional)

ANALYZE LOCALLY RELEVANT STUDENT DATA – OTHER CONTENT AREAS

- What you need to do:**
- ◆ Identify other locally relevant data to be included in your analysis of the current state of student achievement (ie. writing, science, etc.).
 - ◆ Use the data analysis from this worksheet to summarize areas of strength or concern on Worksheet 4.

Local Assessments Content & Data Source	Data Statement What do you see in the data?
(Please describe)	
(Please describe)	

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 4

SYNTHESIZE LOCALLY RELEVANT DATA

- What you need to do:**
- ◆ Compile below the areas of strength and concern identified from the locally relevant data sets.
 - ◆ If the school did not meet the target for graduation or attendance, this must be addressed in the Action Sequence.

	AREAS OF STRENGTH	AREAS OF CONCERN
Attendance/ Graduation/Behavior	1.	1.
	2.	2.
	3.	3.
Other (Optional)	1.	1.
	2.	2.
	3.	3.

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 5

ANALYZE READING DATA

What you need to do:

- ◆ Read through the analysis of your READING data.
- ◆ Use this analysis to identify READING areas of strength and concern on Worksheet 6.

		DATA INQUIRY	No ☐	Yes ☐	DATA STATEMENTS
Whole School	R1	At least 63% of the students in the school were advanced or proficient in READING. Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	R2	The school made AYP in READING in all target areas without special provisions. Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	R3	The school met or exceeded a year's worth of growth in READING. Data source: PVAAS School Value Added Report, Mean Gain over Grades Relative to Growth Standard (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	R4	The school-wide trend for the past 3 years reflects an increase each year in the percent of proficient or advanced students in READING. Data source: eMetric (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	

		DATA INQUIRY	No ?	Yes ✓	DATA STATEMENTS
Grade Level	R5	The school met the AYP target for Participation in READING for all relevant student groups. Data Source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	R6	Every grade in the school met or exceeded the NCLB READING target of 63% proficient or advanced. Data Source: eMetric – 3 Year Portrait (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	R7	Every grade in the school met or exceeded a year's worth of growth in READING. Data Source: PVAAS - School Value Added Report (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	R8	Every grade that did NOT meet the proficiency target met or exceeded a year's worth of growth in READING. Data Source: eMetric & PVAAS School Value-added Report (pssa.emetric.net) and (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	R9	Every predicted proficiency group (below basic, basic, proficient, advanced) in each grade met or exceeded a year's worth of growth in READING. Data Source: PVAAS – School Performance Diagnostic Summary (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	

		DATA INQUIRY	No ?	Yes ✓	DATA STATEMENTS
	R10	Each tested grade has at least 63% of the students in the 70% -100% probability range of reaching proficiency in READING at the next tested grade. Data Source: PVAAS Grade Projection Summary for Reading (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	R11	Every grade level trend for the past 3 years reflects an increase each year in the percent of proficient or advanced students in READING. Data source: eMetric (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
Subgroup Level	R12	Each relevant subgroup (N≥ 40) closed the achievement gap in READING between itself and the overall student group. Data source: eMetric – 3 Year Portrait (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	R13	Every relevant subgroup (N≥ 40) met or exceeded the NCLB READING target of 63% proficient or advanced. Data Source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	

OTHER LOCALLY RELEVANT READING DATA (OPTIONAL)

Directions: Enter data from local relevant READING assessments that provide additional information about student achievement.

Reading Assessments	Data Statement What do you see in the data?

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 6

SYNTHESIZE READING DATA

- What you need to do:**
- ◆ Prioritize areas of strength and areas of concern identified from the analysis of READING achievement and growth data into the chart below.
 - ◆ Identify only the “vital few” for root cause analysis.

SUMMARIZE AND PRIORITIZE AREAS OF STRENGTH AND AREAS OF CONCERN		
	AREAS OF STRENGTH	AREAS OF CONCERN
Reading	1.	1.
	2.	2.
	3.	3.

Read each statement, check yes or no, and support with data from Worksheet 5.

Issue	Yes	No	Supporting Evidence
Does the data point to a whole school, weakness in READING?	<input type="checkbox"/>	<input type="checkbox"/>	
Does the data point to a grade level weakness in READING?	<input type="checkbox"/>	<input type="checkbox"/>	
Does the data point to a subgroup weakness in READING?	<input type="checkbox"/>	<input type="checkbox"/>	

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 7

FIND ROOT CAUSE USING FOUNDATIONAL GUIDING QUESTIONS for READING

What you need to do:

- ◆ Answer the Foundational Guiding Questions below relative to the student achievement Areas of Concern for READING from Worksheet 6.
- ◆ For each response to a Foundational Guiding Question, provide evidence to support your answer.
- ◆ Each NO answer points to a Root Cause, and each YES points to a success.

	FOUNDATIONAL GUIDING QUESTIONS	Content Area	No ↓	Yes ↓	SUPPORTING EVIDENCE
1	Is there strong, observable evidence that the <i>standards-aligned curriculum and instructional practices are consistently implemented across all classrooms?</i>	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
2	Is there strong, observable evidence that school staff regularly uses <i>standards-aligned benchmark assessments to monitor and adjust instructional practices?</i>	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
3	Is there strong, observable evidence that struggling students <i>are identified early and are supported by an intervention infrastructure with a system for monitoring effectiveness?</i>	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
4	Is there strong, observable evidence that <i>all</i> students (e.g. English Language Learners, students with disabilities etc.) have <i>access to challenging, on-standard curriculum and rigorous assignments?</i>	Reading	<input type="checkbox"/>	<input type="checkbox"/>	

FOUNDATIONAL GUIDING QUESTIONS		Content Area	No ☐	Yes ☐	SUPPORTING EVIDENCE
5	Is there strong, observable evidence that the effectiveness and experience of the teacher are matched to the needs of students as equitably as possible?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
6	Is there strong, observable evidence that professional development is linked directly to the school's instructional priorities; is standards-based; and is differentiated to meet the continuous learning needs of school staff?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
7	Is there strong, observable evidence that school staff and administrators meet regularly to reflect on their professional practice and the progress of student learning, through an on-going review and analysis of a variety of data and a sharing of best practices?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
8	Is there strong, observable evidence that new and/or "struggling" teachers, staff, and administrators receive timely, effective support and intervention?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
9	Is there strong, observable evidence that a significant proportion of the school's resources (e.g., money, people, time) is directed toward strategies that enhance professional practice and the core instructional program?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	
10	Is there strong, observable evidence that the principal is proactively involved in aligning the components of a standards-aligned system?	Reading	<input type="checkbox"/>	<input type="checkbox"/>	

**Phase 2 -Analyze Data/
Discover Root Cause**

Worksheet 8

ANALYZE MATH DATA

What you need to do:

- ◆ Read through the analysis of your MATH data.
- ◆ Use this analysis to identify MATH areas of strength and concern on Worksheet 9.

		DATA INQUIRY	No ↓	Yes ↓	DATA STATEMENTS
Whole School	M1	At least 56% of the students in the school were advanced or proficient in MATH. Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	M2	The school made AYP in MATH in all target areas without special provisions. Data source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	M3	The school met or exceeded a year's worth of growth in MATH. Data source: PVAAS School Value Added Report, Mean Gain over Grades Relative to Growth Standard (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	M4	The school-wide trend for the past 3 years reflects an increase each year in the percent of proficient or advanced students in MATH. Data source: eMetric (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	

		DATA INQUIRY	No ?	Yes ✓	DATA STATEMENTS
Grade Level	M5	The school met the AYP target for Participation in MATH for all relevant student groups. Data Source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	M6	Every grade in the school met or exceeded the NCLB MATH target of 56% proficient or advanced. Data Source: eMetric – 3 Year Portrait (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	M7	Every grade in the school met or exceeded a year's worth of growth in MATH. Data Source: PVAAS - School Value Added Report (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	M8	Every grade that did NOT meet the proficiency target met or exceeded a year's worth of growth in MATH. Data Source: eMetric & PVAAS School Value-added Report (pssa.emetric.net) and (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	M9	Every predicted proficiency group (below basic, basic, proficient, advanced) in each grade met or exceeded a year's worth of growth in MATH. Data Source: PVAAS – School Performance Diagnostic Summary (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	

		DATA INQUIRY	No ?	Yes ✓	DATA STATEMENTS
	M10	Each tested grade has at least 56% of the students in the 70% -100% probability range of reaching proficiency in MATH at the next tested grade. Data Source: PVAAS Grade Projection Summary for Math (pvaas.sas.com)	<input type="checkbox"/>	<input type="checkbox"/>	
	M11	Every grade level trend for the past 3 years reflects an increase each year in the percent of proficient or advanced students in MATH. Data source: eMetric (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
	M12	Each relevant subgroup (N≥ 40) closed the achievement gap in MATH between itself and the overall student group. Data source: eMetric – 3 Year Portrait (pssa.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	
Subgroup Level	M13	Every relevant subgroup (N≥ 40) met or exceeded the NCLB MATH target of 56% proficient or advanced. Data Source: (paayp.emetric.net)	<input type="checkbox"/>	<input type="checkbox"/>	

OTHER LOCALLY RELEVANT MATH DATA (OPTIONAL)

Directions: Enter data from locally relevant MATH assessments that provide additional information about student achievement.

Math Assessments	Data Statement What do you see in the data?

Phase 2 - Analyze Data/

Discover Root Cause

Worksheet 9

SYNTHESIZE MATH DATA

- What you need to do:**
- ◆ Prioritize areas of strength and areas of concern identified from the analysis of MATH achievement and growth data into the chart below.
 - ◆ Identify only the “vital few” for root cause analysis.

SUMMARIZE AND PRIORITIZE AREAS OF STRENGTH AND AREAS OF CONCERN		
	AREAS OF STRENGTH	AREAS OF CONCERN
Math	1.	1.
	2.	2.
	3.	3.

Read each statement, check yes or no, and support with data from Worksheet 8.

Issue	Yes	No	Supporting Evidence
Does the data point to a whole school, weakness in MATH?	<input type="checkbox"/>	<input type="checkbox"/>	
Does the data point to a grade level weakness in MATH?	<input type="checkbox"/>	<input type="checkbox"/>	
Does the data point to a subgroup weakness in MATH?	<input type="checkbox"/>	<input type="checkbox"/>	

**Phase 2 - Analyze Data/
Discover Root Cause**

Worksheet 10

FIND ROOT CAUSE USING FOUNDATIONAL GUIDING QUESTIONS for MATH

What you need to do:

- ◆ Answer the Foundational Guiding Questions below relative to the student achievement Areas of Concern for MATH from Worksheet 9.
- ◆ For each response to a Foundational Guiding Question, provide evidence to support your answer.
- ◆ Each NO answer points to a “Root Cause” and each YES points to a success.

	FOUNDATIONAL GUIDING QUESTIONS	Content Area	No ⬇	Yes ⬆	SUPPORTING EVIDENCE
1	Is there strong, observable evidence that the <i>standards-aligned curriculum and instructional practices are consistently implemented across all classrooms?</i>	Math	<input type="checkbox"/>	<input type="checkbox"/>	
2	Is there strong, observable evidence that school staff regularly uses <i>standards-aligned benchmark assessments to monitor and adjust instructional practices?</i>	Math	<input type="checkbox"/>	<input type="checkbox"/>	
3	Is there strong, observable evidence that struggling students <i>are identified early and are supported by an intervention infrastructure with a system for monitoring effectiveness?</i>	Math	<input type="checkbox"/>	<input type="checkbox"/>	
4	Is there strong, observable evidence that <u>all</u> students (e.g. English Language Learners, students with disabilities etc.) have <i>access to challenging, on-standard curriculum and rigorous assignments?</i>	Math	<input type="checkbox"/>	<input type="checkbox"/>	

	FOUNDATIONAL GUIDING QUESTIONS	Content Area	No <input type="checkbox"/>	Yes <input type="checkbox"/>	SUPPORTING EVIDENCE
5	Is there strong, observable evidence that the effectiveness and experience of the teacher are matched to the needs of students as equitably as possible?	Math	<input type="checkbox"/>	<input type="checkbox"/>	
6	Is there strong, observable evidence that professional development is linked directly to the school's instructional priorities; is standards-based; and is differentiated to meet the continuous learning needs of school staff?	Math	<input type="checkbox"/>	<input type="checkbox"/>	
7	Is there strong, observable evidence that school staff and administrators meet regularly to reflect on their professional practice and the progress of student learning, through an on-going review and analysis of a variety of data and a sharing of best practices?	Math	<input type="checkbox"/>	<input type="checkbox"/>	
8	Is there strong, observable evidence that new and/or "struggling" teachers, staff, and administrators receive timely, effective support and intervention?	Math	<input type="checkbox"/>	<input type="checkbox"/>	
9	Is there strong, observable evidence that a significant proportion of the school's resources (e.g., money, people, time) is directed toward strategies that enhance professional practice and the core instructional program?	Math	<input type="checkbox"/>	<input type="checkbox"/>	
10	Is there strong, observable evidence that the principal is proactively involved in aligning the components of a standards-aligned system?	Math	<input type="checkbox"/>	<input type="checkbox"/>	

Phase 3 - Plan Solution

Worksheet 11

SET STUDENT ACHIEVEMENT IMPROVEMENT GOALS

Directions: Set student achievement improvement goals in reading and math for each grade level and all relevant subgroups. You are setting goals for the **first year** of the two year plan. These interim goals should be rigorous and attainable with the intent of moving ALL students to proficiency.

	Student Group	Grade __					
		Goal-Year 1					
READING 2008-2010 NCLB/AYP Target 63%	Students Overall						
	White						
	Black						
	Latino/Hispanic						
	Asian/Pacific Islander						
	American Indian/Native Alaskan						
	Multi-racial/ethnic						
	IEP-Special Education						
	English Language Learners						
Economically Disadvantaged							
Reading Participation 2008-2010 NCLB/AYP Target 95%	Set a school-wide goal for reading participation						

	Student Group	Grade __					
		Goal-Year 1					
MATH 2008-2010 NCLB/AYP Target 56%	Students Overall						
	White						
	Black						
	Latino/Hispanic						
	Asian/Pacific Islander						
	American Indian/Native Alaskan						
	Multi-racial/ethnic						
	IEP-Special Education						
	English Language Learners						
Economically Disadvantaged							
Math Participation 2008-2010 NCLB/AYP Target 95%	Set a school-wide goal for math participation						

Phase 3 - Plan Solution

Worksheet 12

SET LOCALLY RELEVANT IMPROVEMENT GOALS

Directions: Refer back to Worksheet 4 – Locally Relevant Data to identify a strength or concern for attendance/graduation and behavior. Set a goal based upon the strength or concern.

	STRENGTH/CONCERN (Worksheet 4)	SET A GOAL
ATTENDANCE (K-8 Only) 2008-2010 NCLB/AYP Target 90%		
4 YEAR GRADUATION RATE (HS Only) 2008-2010 NCLB/AYP Target 80%		
Other Locally Relevant Data (Optional)		
WRITING, SCIENCE (Optional)		

Phase 3 - Plan Solution

Action Sequence

READING ACTION SEQUENCE

STEP 1: What is the problem?		STEP 2: What will you do?	
Student Achievement Area of Concern: Enter the highest priority area of concern for READING from Worksheet 6	Underlying Root Cause: Enter the root cause aligned to this concern from Worksheet 7	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause**	
1.	1.	1.	
STEP 3: How will you get there?			
What Needs to Be Done: Describe "What needs to be done" to implement this research based strategy/best practice.	By Whom?	By When?	What Resources?
1.A			
1.B			
1.C			
STEP 4: How will you know you are doing what you planned?		Step 5: What will you look for to determine if it is working?	
Indicators of Implementation		Indicators of Effectiveness	

**Best Evidence Encyclopedia – high-quality evaluations of educational programs. www.bestevidence.org
 **What Works Clearinghouse – source of scientific evidence for what works in education. ies.ed.gov/ncee/wwc

Phase 3 - Plan Solution

Action Sequence

READING ACTION SEQUENCE

STEP 1: What is the problem?		STEP 2: What will you do?																	
Student Achievement Area of Concern: Enter the next highest priority area of concern for READING from Worksheet 6	Underlying Root Cause: Enter the root cause aligned to this concern from Worksheet 7	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause**																	
2.	2.	2.																	
<p>STEP 3: How will you get there?</p> <table border="1"> <thead> <tr> <th>What Needs to Be Done: Describe "What needs to be done" to implement this research based strategy/best practice.</th> <th>By Whom?</th> <th>By When?</th> <th>What Resources?</th> </tr> </thead> <tbody> <tr> <td>2.A</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.B</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.C</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				What Needs to Be Done: Describe "What needs to be done" to implement this research based strategy/best practice.	By Whom?	By When?	What Resources?	2.A				2.B				2.C			
What Needs to Be Done: Describe "What needs to be done" to implement this research based strategy/best practice.	By Whom?	By When?	What Resources?																
2.A																			
2.B																			
2.C																			
STEP 4: How will you know you are doing what you planned? Indicators of Implementation		Step 5: What will you look for to determine if it is working? Indicators of Effectiveness																	

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Phase 3 - Plan Solution

Action Sequence

MATH ACTION SEQUENCE

STEP 1: What is the problem?		STEP 2: What will you do?	
Student Achievement Area of Concern: Enter the highest priority area of concern for MATH from Worksheet 9 1.	Underlying Root Cause: Enter the root cause aligned to this concern from Worksheet 10 1.	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause** 1.	
STEP 3: How will you get there?			
What Needs to Be Done: Describe "What needs to be done" to implement this research based strategy/best practice.	By Whom?	By When?	What Resources?
1.A			
1.B			
1.C			
STEP 4: How will you know you are doing what you planned?	Step 5: What will you look for to determine if it is working?		
Indicators of Implementation	Indicators of Effectiveness		

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Phase 3 - Plan Solution

Action Sequence

MATH ACTION SEQUENCE

STEP 1: What is the problem?		STEP 2: What will you do?	
Student Achievement Area of Concern: Enter the next highest priority area of concern for MATH from Worksheet 9 2.	Underlying Root Cause: Enter the root cause aligned to this concern from Worksheet 10 2.	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause** 2.	
STEP 3: How will you get there?			
What Needs to Be Done: <i>Describe "What needs to be done" to implement this research based strategy/best practice.</i>	By Whom?	By When?	What Resources?
2.A			
2.B			
2.C			
STEP 4: How will you know you are doing what you planned?		Step 5: What will you look for to determine if it is working?	
Indicators of Implementation		Indicators of Effectiveness	

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Phase 3 - Plan Solution

Action Sequence

ATTENDANCE/GRADUATION/PARTICIPATION/OTHER

STEP 1: What is the problem?		STEP 2: What will you do?	
Student Achievement Area of Concern: Enter the area of concern from Worksheet 4	Underlying Root Cause: Enter the root cause aligned to this concern	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause**	
1.	1.	1.	
STEP 3: How will you get there?			
What Needs to Be Done: <i>Describe "What needs to be done" to implement this research based strategy/best practice.</i>	By Whom?	By When?	What Resources?
1.A			
1.B			
1.C			
STEP 4: How will you know you are doing what you planned?		Step 5: What will you look for to determine if it is working?	
Indicators of Implementation		Indicators of Effectiveness	

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Phase 3 - Plan Solution

Action Sequence

ATTENDANCE/GRADUATION/OTHER

STEP 1: What is the problem?		STEP 2: What will you do?	
Student Achievement Area of Concern: Enter the area of concern from Worksheet 4 2.	Underlying Root Cause: Enter the root cause aligned to this concern 2.	Research Based Strategies/Best Practices: Enter what will be done to address this Root Cause** 2.	
STEP 3: How will you get there?			
What Needs to Be Done: <i>Describe "What needs to be done" to implement this research based strategy/best practice.</i>	By Whom?	By When?	What Resources?
2.A			
2.B			
2.C			
STEP 4: How will you know you are doing what you planned?		Step 5: What will you look for to determine if it is working?	
Indicators of Implementation		Indicators of Effectiveness	

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Phase 3 - Plan Solution

Action Sequence

PROFESSIONAL DEVELOPMENT

List the Professional Development needed to implement the planned Action Sequences. Indicate whether the professional development is for Reading, Math, or Other by checking the appropriate column. Complete the remaining columns.

STEP 6: <i>What professional development is needed for implementation?</i>						
Date/Time <i>When?</i>	Topic/Focus/Purpose	Reading	Math	Other	Facilitator/Provider <i>By whom?</i>	What changes in practice do you expect to see as a result of the Professional Development?
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

STEP 6: What professional development is needed for implementation?

Date/Time <i>When?</i>	Topic/Focus/Purpose	Reading	Math	Other	Facilitator/Provider <i>By whom?</i>	<i>What changes in practice do you expect to see as a result of the Professional Development?</i>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Phase 3 - Plan Solution

Action Sequence

PARENTAL INVOLVEMENT

Directions: The School Improvement Plan must address parental involvement in the following ways:

FAMILY/PARENT NOTIFICATION

Describe the processes used for notifying parents of the school's AYP status. §1116(b)(3)(A)(vi) NCLB Requirements

COMMUNICATION

Describe how school improvement efforts will be communicated to parents and the community. §1116(b)(3)(A)

FAMILY SUPPORT & PARTNERSHIPS

Describe strategies to engage parents in supporting teachers to educate their children. §1116(b)(3)(A)(vi) and (viii)

Phase 4 – Implement the Plan

Action Sequence

STUDENT ACHIEVEMENT MONITORING TOOL

Directions: Document how the effectiveness of the plan will be monitored using benchmark assessments (e.g-4Sight), formative assessments, or other student data sources. Prior to plan submission, enter the monitoring tool and established checkpoint dates. Throughout implementation, enter data and look for improvement at each checkpoint.

Reading

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
Monitoring tool:	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
Monitoring tool:	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
Monitoring tool:	Enter % or #				

Math

How will you measure effectiveness?	Checkpoint 1 <small>Enter date</small>	Checkpoint 2 <small>Enter date</small>	Checkpoint 3 <small>Enter date</small>	Checkpoint 4 <small>Enter date</small>	Who will monitor? <small>Name, Role</small>
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 <small>Enter date</small>	Checkpoint 2 <small>Enter date</small>	Checkpoint 3 <small>Enter date</small>	Checkpoint 4 <small>Enter date</small>	Who will monitor? <small>Name, Role</small>
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 <small>Enter date</small>	Checkpoint 2 <small>Enter date</small>	Checkpoint 3 <small>Enter date</small>	Checkpoint 4 <small>Enter date</small>	Who will monitor? <small>Name, Role</small>
<i>Monitoring tool:</i>	Enter % or #				

Attendance or Graduation/Participation

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

Other

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

How will you measure effectiveness?	Checkpoint 1 Enter date	Checkpoint 2 Enter date	Checkpoint 3 Enter date	Checkpoint 4 Enter date	Who will monitor? Name, Role
<i>Monitoring tool:</i>	Enter % or #				

Assurance for Additional NCLB Requirements for Title I School Improvement Plan *

The No Child Left Behind Act of 2001 requires that schools identified for Title I School Improvement include the items listed below in their school improvement plan(s). This is a checklist to help Title I schools incorporate NCLB requirements into **Getting Results!**, the state's framework for school improvement planning. It is recommended that these components be built into the Design and Delivery components of your school improvement plan.

The _____ School District assures that the additional NCLB requirements for Title I School Improvement Plans are included as indicated in the checklist below.

School District Superintendent / Designee

Date

The School Improvement Plan for this Title I School, includes the following:

1. Incorporate strategies based on scientifically based research that will strengthen the core academic subjects in the school and address the specific academic issues that caused the school to be identified for school improvement;
2. Adopt policies and practices concerning the school's core academic subjects that have the greatest likelihood of ensuring that all groups of students specified in Section 1111(b)(2)(C)(v) and enrolled in the school will meet the State's proficiency level of achievement;
3. Provide an assurance that the identified school will spend not less than 10% of the Title I funds made available to the school on professional development activities;
4. Directly addresses the academic achievement problem that caused the school to be identified for school improvement;
5. Establish how funds will be used to remove schools from school improvement status;
6. Establish specific, annual, measurable objectives for continuous and substantial progress by each group of students specified in Section 1111(b)(2)(C)(v) and enrolled in the school;
7. Describe how the school will provide written notice about the school improvement identification to parents of each student enrolled in the school;
8. Specify the responsibilities of the school, the local educational agency and the State educational agency serving the school under the plan;
9. Include strategies to promote effective parental involvement in the school;
10. Incorporate, as appropriate, activities before school, after school, during the summer, and during the extension of the school year;
11. Incorporate a teacher mentoring program.

Assurance of Quality & Accountability

We (the undersigned) hereby certify that the school improvement plan for _____ (school name) in _____ (school district name) has been duly reviewed by a *Quality Review Team* convened by the Superintendent of Schools and the Executive Director of our Intermediate Unit (IU___), and formally approved by the district’s Board of Education, per guidelines required by the Pennsylvania Department of Education.

We hereby assure the Secretary of Education that the school improvement plan:

- Addresses all the required components prescribed by PDE;
- Reflects sound educational practices;
- Has local leadership at all levels to ensure successful implementation;
- Has a high probability of improving student performance and educational practices.

With this *Assurance of Quality & Accountability* declaration, we, therefore, recommend that the Secretary of Education and PDE grant formal approval of the school improvement plan for _____ (school name) _____ (school district name) for _____ school-year.

Superintendent of Schools/CEO

President, District Board of Education

Executive Director, IU__

Date_____

Date_____

Date_____

Scientifically Rigorous Study Links Leadership Program to Improved Student Learning

Pennsylvania Schools Led by NISL-Trained Principals Surpass Other Schools in Student Achievement

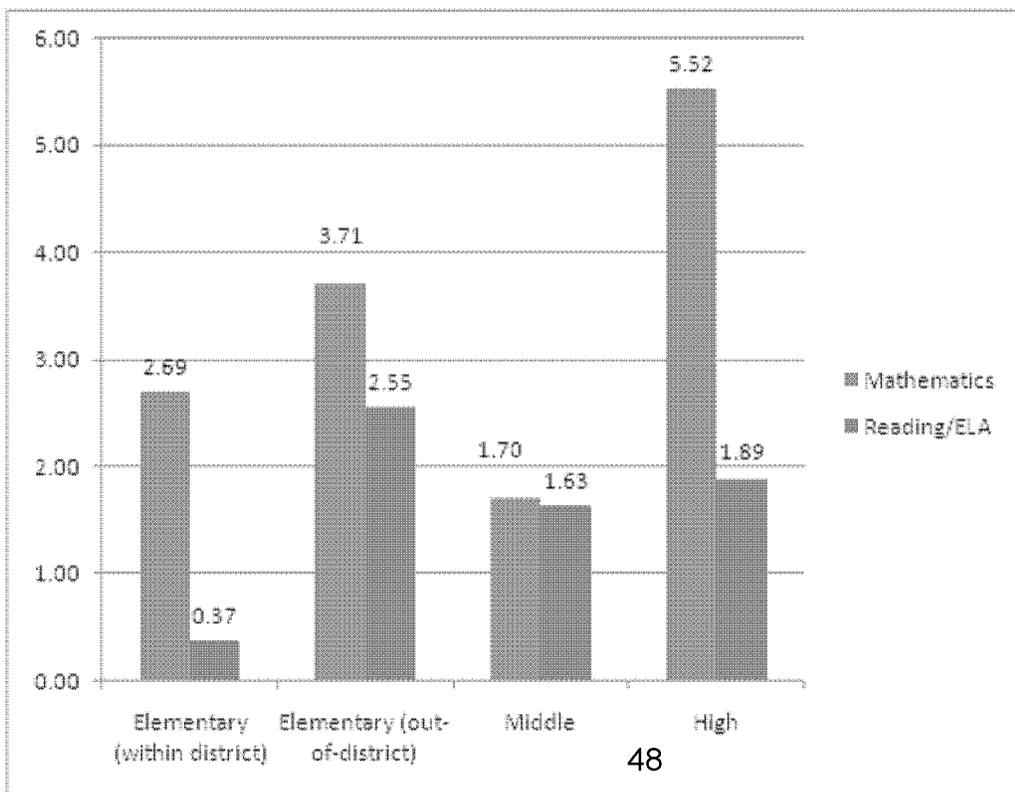
The Effect of the National Institute for School Leadership's Executive Development Program on School Performance Trends in Pennsylvania

In 2010, Old Dominion University released "The Effect of the National Institute for School Leadership's Executive Development Program on School Performance Trends in Pennsylvania." A quasi-experimental study conducted by Dr. John Nunnery and colleagues, this report assesses the effect of NISL's Executive Development Program in 99 Pennsylvania schools. The Executive Development Program provides job-embedded training for principals at all stages of their careers. Researchers studied how schools led by NISL-trained principals compared to other schools with similar school performance and demographic profiles in mathematics and reading/English language arts across a three-year period from 2005-06 to 2008-09. The proportion of tested students in NISL and comparison schools that are economically disadvantaged ranged from 15.82% to 27.90%. To read the full report, visit <http://www.nisl.net/pa-old-dominion-study-mar10.pdf>

*"There are no good schools
without good principals. It
simply does not happen."*

**- U.S. Secretary of Education
Arne Duncan**

Key Findings



**NISL Effects: 2009
Differences in
Percentages of Students
Achieving Proficiency
Relative to Comparison
(Control) Schools.**

NATIONAL INSTITUTE FOR SCHOOL LEADERSHIP

- **Schools led by NISL-trained principals outperform other schools in Pennsylvania.** Researchers found that the NISL schools had significantly higher proficiency rates in both mathematics and reading/English language arts. For the 2008-09 school year:

Of the 68 NISL **elementary schools**: the percentage of students achieving proficiency averaged **2.69** and **3.71** percentage points in mathematics, and **0.37** and **2.55** percentage points in reading/English language arts, above comparison schools.

Estimated: 679 more students proficient at NISL schools.

Of the 19 NISL **middle schools**: the percentage of students achieving proficiency averaged **1.70** and **1.63** percentage points above comparison students in mathematics and reading/English language arts, respectively.

Estimated: 249 more students proficient at NISL schools.

Of the 12 NISL **high schools**: the percentage of students achieving proficiency averaged **5.52** and **1.89** percentage points above comparison students in mathematics and reading/English language arts, respectively.

Estimated: 180 more students proficient at NISL schools.

- **Program effects tend to accelerate over time.** Increases in student proficiency were greater in the final year of the analysis. Since half of the principals completed the program in 2007-08 and the other half not until 2008-09, the impact on student achievement is likely to be even greater in subsequent years.

About NISL in Pennsylvania

To date, more than 1,500 principals have completed the program in Pennsylvania. This study looked at the first 99 principals to complete the program. NISL is a critical component of Pennsylvania's Inspired Leadership Program, which is a statewide, standards-based continuing education program for school and system leaders.

About NISL's Executive Development Program

To date, more than 4,500 school leaders have completed NISL's Executive Development Program in 14 states. Through online and face-to-face instruction over a 12- to 18-month period, the program emphasizes the role of principals as strategic thinkers, instructional leaders, and creators of a just, fair, and caring culture in which all students meet high standards. Its primary goal is to ensure that the participating school leaders have the knowledge, skills, and tools to be turnaround artists in low-performing schools or to be able to lead good schools to great performance. Statewide programs are currently in place in **Massachusetts, Minnesota, Mississippi** and **Pennsylvania**. District programs are currently in place in **New Hampshire, Maryland, Texas, Colorado** and **Missouri**. For more information about NISL, visit <http://www.nisl.net/about/>.



Dear Superintendents:

Pennsylvania is ready to compete in the next round of Race to the Top to secure up to \$400 million for our students and our schools. While the U.S. Department of Education chose to make just two state awards in Phase 1, Pennsylvania's application was extraordinarily well received. We were one of 16 states selected as finalists and invited to Washington, D.C. to present our plan, and our proposal was ranked 7th among the 41 states that competed.

Pennsylvania is well positioned to win a Race to the Top award in Phase 2. Our strength comes from your dedication and hard work that has produced great results for students, and your willingness to commit to a bold agenda to deepen and accelerate our progress. We have carefully analyzed the comments of our peer reviewers as well those of other state applications to identify ways we can strengthen our position in Phase 2. If we work well and closely together over the coming weeks, we can put Pennsylvania at the top of the Race to Top list and secure resources that will make a tremendous difference in the lives of our students.

Pennsylvania's Race to the Top Phase 2 application must be submitted by June 1, 2010. As you did this past winter, I am asking that you again lead a conversation in your community about the opportunities Race to the Top offers.

(b)(6)

(b)(6)

The requirements and expectations for participating districts in Phase 2 will be identical to those in our Phase 1 application. The 120 participating districts from Phase 1 will not need to submit a new MOU to evidence participation in Phase 2.

For districts which did not participate in Phase 1 by submitting an MOU with all required signatures, we hope you will choose to join us. The information attached explains the expectations and requirements for participating districts. In order for us to demonstrate to the U.S. Department of Education that we can deliver on our commitments, MOUs for Phase 2 participation

will again require the signatures of the superintendent, school board president and local teachers' union president.

Since the district requirements are identical in Phase 1 as in Phase 2, there are no changes to the addenda (including the MOU) sent to you originally on January 5, 2010.

- continued

– continued from previous page

You will see them attached again for your use and reference.

This document outlines important next steps for new districts that wish to join to our Race to the Top application; here is a quick overview:

- Fully review this document including the expectations for participating districts outlined in Addendum 1 (see page 9);
- Set up meetings as soon as possible with your school board and teachers' union leadership to discuss these expectations;
- Attend and encourage your school board and union leader to participate in one or all of the Race to the Top webinars (see schedule on page 7);
- Contact your PDE contact and/or local IU to ensure that your questions are answered and that you fully understand the expectations (see PDE contacts on page 8);
- Submit your fully executed MOU to PDE for a participating district by May 21 (since Pennsylvania's application must be submitted to the U.S. Department of Education by June 1, 2010).

In our on-going conversations with districts, we have found that many of you have already begun planning for the reform efforts outlined in our proposal. We know that this is the right work to do on behalf of Pennsylvania's children. Let's make the most of this opportunity and take the critical next steps to expand and accelerate the exceptional work underway.

Sincerely,



Thomas E. Gluck
Executive Deputy Secretary

(b)(6)

Our Vision for Race to the Top

Race to the Top is an unprecedented opportunity to accelerate our academic gains and deliver on our commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills, globally-competitive, and knowledge-based economy. Pennsylvania will utilize these dramatic new resources to implement school-based improvements never before possible on such a broad scale and we are prepared to hold ourselves accountable for the results that really matter—greater student achievement.

Pennsylvania's Race to the Top application builds upon the strategies and practices we have been using in our schools that have resulted in the important and significant gains in student achievement in recent years. While we have learned that there is no silver bullet in education reform, we know from our own work that when specific behaviors and practices are implemented and aligned in a comprehensive manner, the result will be success for every child.

Pennsylvania's Race to the Top proposal is built around five objectives:

- Strengthening and expanding the standards-aligned system (SAS) and developing data systems capable of supporting reform
- Developing a world-class human pipeline for teachers and leaders
- Developing a multi-measure evaluation system for teachers and leaders
- Creating a coherent approach to professional development
- Turning around the lowest performing schools

(b)(6)

District Checklist for Race to the Top:

- Fully review this document including the expectations for participating districts outlined in Addendum 1 (see page 9)
- Set up meetings as soon as possible with your school board and teachers' union leadership to discuss these expectations
- Attend and encourage your school board and union representative to participate in one or all of the Race to the Top webinars (see schedule on page 7)
- Contact your PDE contact and/or local IU to ensure that your questions are answered and that you fully understand the expectations for participating districts (see PDE contacts on page 8)
- Submit your fully executed MOU to PDE for a participating district by May 21 (since Pennsylvania's application must be submitted to the U.S. Department of Education by June 1, 2010)

Commitment to Raising Student Achievement

NOTE: Participating Districts from Phase 1 will not need to resubmit a new MOU for Phase 2.

School districts that choose to participate in Pennsylvania’s Race to the Top application must commit to implementing the set of activities and reforms outlined in Addendum 1 (see page 9).

Most importantly, participating districts also commit to delivering results--significant gains in student achievement that will be measured and for which districts will be held accountable. Pennsylvania has set specific performance targets for schools and districts to achieve by 2014. Targets for participating districts were developed by extrapolating from the achievement gains of the top 10 percent of districts in each of the performance bands outlined below (see Table 1). This table also shows the levels of achievement that participating districts will be expected to achieve. For example, if a school district’s achievement is greater

than 50 percent advanced in math, its achievement goal would be 66-90 percent. While these targets are bold and will require significant reform efforts, they are achievable and have been reached by many of our districts.

Addendum 4 (see page 35) provides specific district achievement targets. In addition, schools will be expected to meet the school-level targets posted on the PDE website at: <http://www.portal.state.pa.us/portal/server.pt/community/arra/17696/rttt/613085>.

Upon receiving Race to the Top funds, the participating districts will have 90 days from the date of the award to submit a detailed, final scope of work (SOW) describing how the district will implement RTTT MOU requirements. It must include a detailed budget, timeline and implementation plan. The SOW must also outline your process for addressing changes which might be required to your collective bargaining agreement.

Table 1 : Delivering Results: Expected Student Achievement Improvement by 2014

Expected Improvement – Math

	If today your achievement level is*...	In 2014, your achievement level will be...
Advanced	>50% advanced	66-90%
	20-50% advanced	53-69%
	<20% advanced	45-53%
Above proficient**	>70% proficient	86-99%
	50-70% proficient	79-92%
	<50% proficient	70-81%
Below basic	<10% below basic	0-3%
	10-20% below basic	2-6%
	>20% below basic	5-15%

Expected Improvement – Reading

	If today your achievement level is*...	In 2014, your achievement level will be...
Advanced	>50% advanced	67-80%
	35-50% advanced	56-68%
	<35% advanced	34-57%
Above proficient**	>70% proficient	86-99%
	60-70% proficient	82-87%
	<60% proficient	66-78%
Below basic	<10% below basic	0-4%
	10-20% below basic	3-7%
	>20% below basic	3-21%

* Based on the district average for the 2009 PSSA
 ** Above proficient includes both proficient and advanced

The Next Steps for Participating Districts

NOTE: Participating Districts from Phase 1 will not need to resubmit a new MOU for Phase 2.

Superintendents of participating districts need to work closely with the school board president and the local teachers’ union president to review the state’s Race to the Top goals so that these local education leaders clearly understand the commitment that is being made and the results that are expected.

This review should go beyond simply discussing the mechanics of selected reforms and should also include the academic gains that are expected as a result of the reforms. The bottom line for our efforts must be raising student achievement. (see district goals in Addendum 4, page 35)

The Race to the Top proposal has outlined initiatives and reforms that will be implemented at the state-level and also requires activities to be implemented by:

- Participating districts; and
- Participating districts with schools in the turnaround initiative.

While all participating districts must agree to implement the set of reforms outlined in Addendum I, you will note that participating districts with schools in the turnaround initiative are required to implement an additional set of activities outlined in Objective 5: Turning Around the Lowest Performing Schools (Addendum I, see page 20).

Participating districts with one or more schools in the turnaround initiative must agree to select and implement one of the four school intervention models for each of their schools in the turnaround initiative (see Table 2 below). These models are defined in the Race to the Top guidelines and include: (1) turnaround; (2) transformation; (3) restart (4) school closure (see Table 2 below).

The final scope of work for participating districts with schools in the turnaround initiative must include in the SOW the process and timeline to be used for selecting the specific intervention model for each of the schools in the turnaround initiative as well as the plan for implementation.

Table 2 : Districts with Schools in the turnaround initiative must select one of four models for turning around these schools

	Overview of the required elements
Turnaround	Hire a new principal and replace at least 50% of the staff with highly effective teachers Hire a Chief Turnaround Officer to support the principal Implement a multi-measure evaluation system Implement a rigorous, research-based curricula Increase learning time Use student data to inform and differentiate instruction Provide appropriate socio-emotional supports
Transformation	Similar to the turnaround model without the requirement of 50% staff turnover Districts must agree to evaluate teachers using a multi-measure evaluation tool, reward school leaders, teachers and staff who have increased student achievement and remove those who have not
Restart	Convert the school or close and reopen the school under a charter school operator, charter management organization (CMO) or an education management organization (EMO) Require the operator to meet most of the requirements under the turnaround model
School closure	Close the school and send the students to a higher-performing school in the LEA Monitor the performance of affected students

The Benefits of Being a Participating District

Each of Pennsylvania’s 500 school districts will benefit from the resources and tools PDE will make available using Race to the Top grant funding, but only participating districts will share directly in Race to the Top funding in exchange for implementing certain reforms.

Should Pennsylvania receive \$400 million in Race to the Top funding, at least \$200 million will be shared among participating districts, with allocations based

upon the Title I Part A funding formula and ranging from hundreds of thousands of dollars for smaller districts to millions of dollars for larger ones.

The table below outlines the possible range of funding available to participating school districts, based upon the assumption that 150 districts will formally join Pennsylvania’s application:

Table 3 : Potential award to districts if 150 districts participate, and PDE receives a total RTTT award of \$400 million

Estimated allocation to districts based on size and Title I allocation formula

Number of students in district	District Title I Part A grant levels (current year only)		
	Basic, Targeted, EFIG, Concentration	Basic, Targeted, EFIG only	Basic only
Greater than 10,000	\$3 million to \$8 million	\$1 million to \$4 million	\$300,000 to \$1 million
5,000 – 10,000	\$1 million to \$3 million	\$500,000 to \$1 million	\$150,000 to \$500,000
2,500 – 5,000	\$500,000 to \$1.5 million	\$200,000 to \$500,000	\$100,000 to \$200,000
Less than 2,500	\$200,000 to \$600,000	\$100,000 to \$300,000	\$100,000 to \$150,000

Schools in the turnaround initiative will receive an additional \$700 - \$900 per student not included in this table³

¹ Allocations are based on assumptions about the number of participating districts, the potential award amount to Pennsylvania and the method PDE will use to distribute funds; allocation levels are preliminary and are subject to change
² This table does not apply for Philadelphia and Pittsburgh
³ Districts with schools in the turnaround initiative that receive school improvement funds are expected to supplement RTTT funding with SI funding to pay for initiatives in turnaround schools

In addition to the funding received through Race to the Top, school districts will also be expected to leverage other federal and state funding sources available for the same and/or complementary reform strategies targeted in the Race to the Top. In particular, districts that receive funds from Pennsylvania’s ARRA Title I School Improvement

allocation are expected to supplement Race to the Top funding to pay for reform efforts in schools in the RTTT turnaround initiative. Other funds which can be leveraged to support Race to the Top activities include Pennsylvania’s Accountability Block Grant program and the Education Assistance Program.

Mandatory Information Sessions

NOTE: Participating districts from Phase 1 will not need to resubmit a new MOU for Phase 2 and therefore are NOT required to attend the information sessions.

The requirements for participating districts are serious and extensive. To ensure that districts are fully aware of these requirements, the superintendent of a district that wants to participate in Race to the Top **MUST** attend one of the following:

Superintendents of districts with schools in the turnaround initiative:

Attend an in-person session on Wednesday, May 12, 2010. This meeting will include a detailed review of the requirements for districts with schools in the turnaround initiative. Location and specific time will be determined based upon the districts interested. You may want consider inviting your teachers' union as well as the school board president to attend as well. Send an email to RA-RaceMOU@state.pa.us by Monday, May 10 so that we can schedule for the May 12 session.

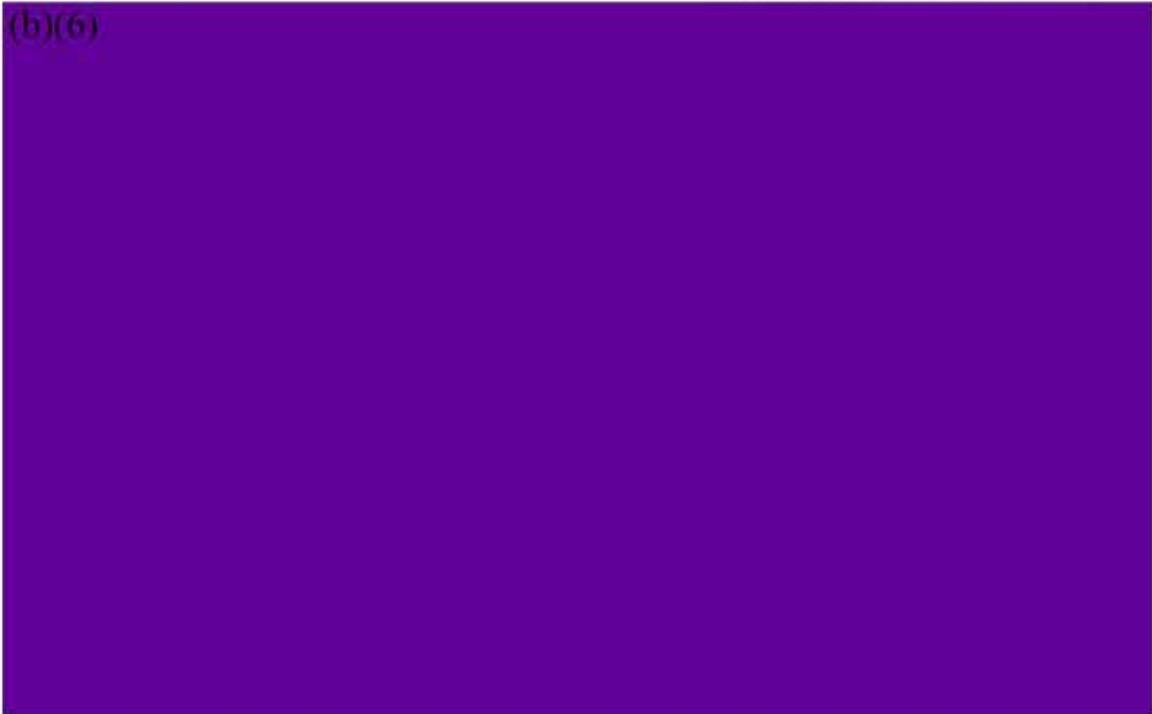
Superintendents of all other districts considering RTTT participation:

Participate in one of the following two webinar sessions. You will access the webinars through www.pdwebinars.org. Locate the event entitled "Race to the Top – School District Session," click on the Webinar Description button, and then click on the Register button. Advanced registration is not necessary.

Webinar #1 : May 5, 2010, 12 - 1 PM

Webinar #2: May 6, 2010, 2:30 - 3:30 PM

(b)(6)



Memorandum of Understanding

NOTE: Participating districts from Phase 1 will not need to resubmit a new MOU for Phase 2.

Districts wishing to participate in Race to the Top must submit a formal memorandum of understanding (MOU) no later than 5 PM on May 21. This MOU is Addendum 2 (see page 24) for participating districts and Addendum 3 (see page 29) for participating districts with schools in the turnaround initiative (see page 29). All MOUs must be signed by the superintendent, the local school board president and the local teachers' union president.

The MOU includes a preliminary scope of work that outlines the specific areas of reform the district is committed to pursuing. For districts with schools in the turnaround initiative, this is work described in Exhibit 1 to Addendum 3 (see page 32). For all other participating districts, this work is described in detail in Exhibit 1 to Addendum 2 (see page 28).

The U.S. Department of Education has set a firm deadline of Tuesday, June 1 for states to file their Race to the Top applications. Each participating district's memorandum of understanding must be included in the formal state application.

Remember, MOUs must be received by PDE no later than 5 PM on May 21, 2010. The MOU can be received by e-mail (please scan and send), postal service or private delivery service (FedEx, UPS, etc.).

MOUs can be e-mailed to RA-RaceMOU@state.pa.us or mailed to:

Jackie Achey, RTTT
PA Department of Education
333 Market Street, 10th Floor
Harrisburg, PA 17126-0333

Because of this, it is critically important that you submit your MOU to the Pennsylvania Department of Education no later than 5 PM on May 21. There will be no extension of this deadline.

While the Department is committed to working with any interested districts in having them become a part of Pennsylvania's Race to the Top application, we will not be able to accommodate any requests to join as a participating district after May 21. Moreover, because the time frame between May 21 and June 1 includes the Memorial Day holiday weekend, districts are encouraged to submit their MOUs as far in advance of the May 21 deadline as possible.

Have Questions about Race to the Top?

The Pennsylvania Department of Education stands ready to provide assistance as districts engage in local conversations to determine whether your district will take advantage of this tremendous opportunity. Please call upon us with questions and let us know any way that we can be helpful to you.

Please e-mail ra-pde@state.pa.us or call:

IUs 1 through 15: Jennifer Cleghorn at #717.214.5433

IUs 16 through 29: Beth Olanoff at #717.783.6828

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts

Objective 1: SAS and the Use of Data

Pennsylvania will further strengthen and expand the use and understanding of the standards-aligned system (SAS) and the data systems to support it. Such a system will enable district leaders, educators and classroom teachers to utilize and develop a coherent set of well aligned tools to directly target instruction to meet the academic and the social-emotional needs of individual students.

Effective use of SAS and a system of real time student level data promotes educational achievement because:

- ⊕ Students and their parents will have an accurate picture of students' academic and social-emotional strengths and weaknesses;
- ⊕ Teachers will know exactly where to target additional instructional and social-emotional support and have access to high-quality tools and resources;
- ⊕ Leaders will understand if there is a school-, district-, or postsecondary institution-wide issue that needs attention or promote an effective practice that could be spread more broadly;
- ⊕ PDE and IUs will be able to provide direct support and resources where they need to be deployed; and
- ⊕ Policymakers will clearly understand where spending is having the most impact.

The state will take appropriate action to align the model system of assessments to the final common core standards when adopted in Pennsylvania and will also develop and institute a system for appropriate assessment of all kindergarten children through the Pennsylvania Kindergarten Early Learning Network.

The following provides the specific required activities for participating districts to ensure that teachers and leaders are expanding the use of SAS and making the best use of an appropriate data system and the data available to them.

Required Activity 1: Implement a high quality curriculum that is aligned with standards, assessments, curriculum framework, instruction, materials and interventions.

Participating districts will be responsible for:

- ⊕ Crafting a strategic and coherent approach to these six elements of the standards aligned system that is consistent with the definitions and descriptions of these elements on the SAS portal at www.pdesas.org.
- ⊕ Aligning all district instructional materials and resources to the most granular level available (eligible content in the assessed content areas and standards-level in the non-assessment content areas).
- ⊕ Building time into the schedule for teachers to participate in collaborative learning such as peer-to-peer observations and teaming within and across grade levels that includes the use of SAS online tools; and
- ⊕ Providing additional supports to teachers in the use of SAS activities such as assigning mentors to staff needing additional assistance.

The Pennsylvania Department of Education will create voluntary training for district staff in curriculum mapping, delivery and evaluation of the alignment of all resources.

Required Activity 2: Implement a system of assessments with capacity to inform instruction on timely and regular basis.

Participating districts will utilize a coherent multi-level system of assessments that is fully aligned with standards and informs instruction on a regular basis. Levels of assessment must include summative assessment, including but not limited to the PSSA and Keystone Exams, when available, formative, benchmark and diagnostic assessments. Examples of benchmark assessments include 4Sight, Acuity, and Assess2Know. Examples of diagnostic assessments include DRAs, running records, GRADE and GMADE. Districts may

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 1: SAS and the Use of Data – *continued*

utilize the tools and resources as part of their system of assessments, which are available at PDE's Standards Aligned System portal or develop their own system so long as it meets the same requirements.

Participating districts will be required to describe their system of assessments and how data from assessment will be collected, reviewed and used by teachers to inform and differentiate instruction and implement aligned interventions.

Required Activity 3: Implement a system to use real time student data to identify students at academic risk in grade 6 and above.

The state will develop a model Early Warning System that collects various elements of data which are predictive indicators of students who may be at risk for academic failure. Participating districts may adopt the state model or develop their own model which meets required standards. An early warning system must do the following:

- ⊕ Collect diagnostic, benchmark and summative assessment data as well as data on attendance, discipline, grades and credit accumulation;
- ⊕ Generate a "watch list" of students with at-risk indicators before school starts in September each year;
- ⊕ Update the "watch list" on a quarterly basis with progress of students on the list and addition of new students with at-risk indicators;
- ⊕ Identify and implement interventions for students on the "watch list" to address the problems identified by the at-risk indicators with particular emphasis on credit recovery interventions for high school students who fall behind in credit accumulation;
- ⊕ Monitor the performance of each school in the district at improving the performance of students identified with at-risk indicators and identify schools having success and schools that need additional help;

- ⊕ Generate automatic alerts e.g. e-mails, text messages or phone calls to parents, teachers and administrators when at risk indicators occur such as specified number of unexcused absences, string of poor test scores, second behavioral report, falling behind in credit accumulation;
- ⊕ Generate weekly reports for teachers and administrators of students showing early signs of risk of academic failure; and
- ⊕ Connect output from the early warning system to the state's Response to Intervention (RTII) framework to assist teachers in identifying the most appropriate interventions based on the reported data.

Required Activity 4: Implement a SIS that provides real time student data and can communicate with PIMS.

Pennsylvania will establish a **voluntary statewide, real-time model Student Information System (SIS)** which will enable efficient and effective communication with the Pennsylvania Information Management System (PIMS). PDE will convene a steering committee of PDE staff, identified state-wide organizations, and participating district representatives to identify system requirements, assist in drafting an RFP through which a vendor will be selected for system development as well as training of schools, districts and IUs on the use of the SIS. PDE will allocate Race to the Top state funds for the one-time design and purchasing costs of the voluntary SIS, school and district data cleaning and conversion, and school and district staff training. Schools and districts who choose to adopt the voluntary SIS will be responsible for the annual maintenance costs and service level agreements.

Required Activity 5: Provide collaborative time for teachers to review real time student data to drive instruction.

In addition to developing a model early warning system, the state will also develop a set of model routines and tools that facilitate review of data and data informed decision making at the classroom, school and district level and identification and implementation

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 1: SAS and the Use of Data – *continued*

of appropriate interventions. Data routines and tools are for the purpose of assisting teachers to differentiate instruction and help advanced students accelerate their learning and help struggling students catch up. Participating schools and districts must adopt these model data routines and tools or develop their own routines and tools that accomplish the same purpose of providing teachers and leaders with collaborative time to review student data and then to use that data to identify and implement appropriate, targeted interventions. These routines will include:

- ✦ **Conduct staff data review meeting one week before the new school year** facilitated by the leadership data team. During the meeting teachers will:
 - Review the prior-year’s summative assessment data for their incoming students, segment their students by performance and identify high-need students
 - Be trained on the use of the diagnostic reports on the SAS portal so that diagnostic assessments can be administered within the first week of school and be used to customize instruction for each student segment by integrating the appropriate instructional strategies, learning progressions, and academic interventions
 - Be trained in the appropriate instructional interventions to respond to specific deficiencies or needs identified by the data;
 - Collectively review school-level and grade-level data to identify issues and devise and implement action plans to address the issues.
- ✦ **Conduct staff data review** meetings with all staff at least quarterly during the school year led by the school’s leadership team. The meetings will be seminars organized each quarter (or after the release of interim assessment results) and time for these meetings will qualify as an ACT 80 activity. During the meetings staff will:
 - Discuss the previous quarter’s data and evaluate the outcomes of various action plans/ interventions;
 - Review the quarterly early warning system report to assess the effectiveness of interventions in helping at-risk students;
 - Devise new action plans for newly identified and previously identified at-risk students;
 - Review and discuss the school’s goals articulated in its school improvement plan, and use data to assess whether the school is on track to achieving the goals; and
 - Identify new targets and share strategies for the upcoming quarter
- ✦ **Conduct bi-weekly leadership data team** meetings where the school leadership team and instructional coaches will:
 - Use the early warning system data to identify at-risk students and devise strategies and interventions to respond to student specific needs;
 - Focus on school-wide issues identified during the quarterly reviews by using school-level data to track performance; and
 - Develop agendas and materials that will guide teacher collaborative planning time and make the time spent more effective
- ✦ **Provide for weekly teacher collaborative planning time** facilitated by instructional coaches or data facilitators where:
 - Grade-level teachers review at-risk students flagged by the early warning system, discuss the specific needs of such students and collaborate in the development of appropriate intervention strategies;
 - Subject matter teachers discuss common challenges they face with teaching specific portions of the curriculum;
 - Coaches help teachers with instructional strategies for specific objectives and share effective classroom practices that help improve outcomes

PDE will work with a vendor that specializes in developing tools for utilizing data in this manner. The vendor will be identified through an RFP process.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 2: Human Capital Pipeline

Pennsylvania's strategy for ensuring the equitable distribution of effective teachers includes activities at both the state level and within participating districts and charter schools. At the state level, activities will be directed to increase the number of effective teachers, especially in subject matter shortage areas and in high need schools. Participating districts and charter schools will need to ensure they have human capital plans to attract and retain effective teachers and principals and to distribute them equitably across all schools and classrooms.

Required Activity 1: Develop a human capital plan to identify strategies based on district or school needs to attract and retain effective teachers, limit teacher vacancies, staff hard-to-staff subjects, and address the equitable distribution of highly effective teachers.

Participating districts and charter schools will be required to develop a human capital plan that identifies the district or charter school's strategies for attracting and retaining effective teachers and leaders and to report the distribution of effective teachers across their schools and classrooms. In addition, schools and districts which are determined to lack equity in distribution of effective teachers among their lowest performing schools and schools that are high minority and high poverty will be required to develop Teacher Equity Plans as part of their RTTT Implementation Plan and also part of their Strategic Plan.

The human capital plan will be required to include specific elements described in guidance to be issued by the state, developed in collaboration with appropriate stakeholders including representatives of teachers unions, which elements may include:

- ✦ Identification of the specific skills and competencies incoming teachers should be able to demonstrate;
- ✦ Induction strategies for new teachers and for teachers new to the district;
- ✦ Plans to develop a career ladder and/or compensation incentives, if any;
- ✦ The hiring and placement of teams of teachers together in a cohort model;

- ✦ Assisting teachers in taking advantage of state-provided professional development opportunities in hard to staff and high rigor subjects;
- ✦ Incentives for teachers and leaders who pursue specific types of professional advancement linked to increased student achievement (e.g. National Board Certification, Advanced Placement certification, Reading Recovery teacher or teacher/leader certification)
- ✦ Partnerships with IHE teacher preparation programs for districts or schools to offer enhanced student teacher placements with highly effective supervising teachers; and
- ✦ Measurable outcomes of plan elements.

In addition, participating districts and schools will be required to adopt a common application for prospective teachers in order to facilitate the state wide online marketplace to be developed by the state. (See below under State level Activities).

Required Activity 2 (optional): Provide signing and retention bonuses for effective teachers and principals in hard to staff schools and subject areas.

Strategies available to districts to enhance equitable distribution of effective teachers include paying bonuses to teachers in hard-to-staff subjects and for moving to high need schools. Bonus payments can be back loaded to the end of four or five years to facilitate teacher retention.

Required Activity 3 (optional): Adopt a career ladder for promotion, compensation, and advancement of teachers based upon responsibility and other factors including student growth.

Development of a career ladders allows teachers to pursue a variety of positions throughout their careers – teacher, mentor and master teacher – depending upon their interests, abilities and accomplishments. As teachers move up the ranks, their qualifications, roles and responsibilities increase – and so does their compensation. This allows good teachers to advance

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 2: Human Capital Pipeline – *continued*

professionally without having to leave the classroom. It also creates expert teacher leaders within schools to provide support to other teachers.

Participating districts and charter schools, in collaboration with local unions as appropriate, may use teacher and principal evaluation results to develop individual goals and learning plans for all educators and link them to professional opportunities and additional compensation along a well-specified career ladder.

PDE will assist participating districts and charter schools by creating a model career ladder in collaboration with appropriate stakeholders that will include traditional rungs, such as advancement to team leaders, coaches, and district positions. The model will also include non-traditional rungs such as induction mentor, student teacher supervisor and master teacher.

State level activities:

A key strategy at the state level will be to develop statewide recruitment and alternative certification initiatives. The state will implement *Teach for PA*, a statewide centralized program to provide schools and districts with high-quality teachers for high-need subjects and schools through statewide marketing, a centralized application process, matching teachers with schools and districts, and facilitation of certification and program evaluation. *Teach for PA* will provide seed money to the following alternative certification programs:

- **Add-on certification:** For certified teachers needing additional certifications (e.g., English teacher moving to Special Education).
- **Residency certification:** For candidates with more than 5 years of work experience who meet content requirements (e.g., BA in Biology). Candidate completes 4 months of coursework and spends one year in residence with a highly effective teacher.

- **Internship Certification:** For candidates with less than 5 years of work experience or without content coursework. Candidates are in classroom full-time while earning their certification through one of 37 IHE programs around the state. Includes rural intern certification comprised of virtual coursework with on-site field component.
- **Turnaround Academies:** For certified and uncertified teachers wanting to teach in turnaround schools. Candidates are trained through a rigorous one-year residency program in a turnaround school.
- **Scholarship Program:** For high performing high school students from high-need schools who become certified to teach and agree to teach in high-need schools for 4 years in exchange for college tuition support.

Participating districts will have an opportunity to partner with the state to implement these activities in their district, including development of local turnaround academies.

In addition, the state will also streamline the certification process for out of state teachers by making requirements more relevant, using an interactive on-line program to guide teachers through requirements, and expediting the process for out-of-state teachers wanting to teach in high needs schools and subjects.

The state will also develop a state wide online marketplace where teaching applicants can fill out one standard application and easily apply for multiple positions. School and district staff will be able to view the statewide applicant pool and search by specific requirements as positions open. The state will also monitor the distribution of highly effective teachers and principals and deploy supports as appropriate.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 3: Multi-measure Evaluation

Addendum 1 to Secretary Zahorchak’s letter to superintendents on December 4, 2009 listed four specific “proposed activities” for participating districts relating to the primary objective of “multi-measure evaluation.” Set forth below is additional detail about each of these activities so participating districts and charter schools can understand exactly what is required by taking part in Pennsylvania’s Race to the Top application.

Multi-measure Teacher Evaluations

Required Activity 1. Develop and implement a multi-measure evaluation system for teachers that takes into account data on student growth as a significant factor and is designed and developed with teacher involvement.

Upon the awarding of a Race to the Top grant, the state will convene a steering committee to develop a model teacher evaluation system which is expected to be ready for a pilot by January 1, 2011. The steering committee will include representation of district leadership, Intermediate Units, teachers’ unions and other appropriate stakeholders.

Participating districts and charter schools may choose to adopt the state model, or adapt it with variations; participating districts and charter schools may also choose to develop their own evaluation system which must be approved by PDE. In the spring of the 2010-2011 school year, the state model evaluation system will be piloted in select districts. Professional development on the implementation of the new evaluation system will begin statewide for all participating districts and charter schools in the summer of 2011.

All participating districts and charter schools must begin implementation of a Race to the Top teacher evaluation system beginning in September 2011, using either the state model or a district developed model that has been approved by PDE.

Both the state model and district specific systems must meet the standards for teacher evaluation systems set forth in our Race to the Top application. For teachers, these standards include:

- ⊕ Utilizing multiple measures for evaluation that include at least the following:
 - Planning and Preparation (e.g., Setting instructional Outcomes, knowledge of resources and planning coherent instruction)
 - Classroom Environment (e.g., establishing a culture for learning, managing classroom procedures and managing student behavior)
 - Instruction (e.g., engaging students in learning, using assessments to inform instruction and demonstrating flexibility and responsiveness)
 - Professional Responsibilities (e.g., reflecting on teaching and student learning, keeping accurate records and appropriate communications with families)
 - Student Growth (student achievement gains through a range of assessments both quantitative and qualitative)
- ⊕ For each measure in the evaluation system, creating a transparent rubric by which teachers’ progress will be evaluated.
- ⊕ Providing for five levels of evaluation ratings. The ratings will be aligned with years of experience and expected performance as defined in the evaluation system. Educators will receive one of the following five ratings:
 - Entry
 - Emerging
 - Achieving
 - Highly Effective 1
 - Highly Effective 2

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Required Activity 2. Conduct annual evaluations of teachers that include timely and constructive feedback and provide data on student growth for students, classes and schools.

As part of the formal evaluation, teachers will be rated as described above, and placed in one of two tracks for the following review period: the growth track or the improvement track.

The purpose of the growth track is to collect information which will result in professional growth by allowing the teacher to progress toward mutually developed goals. For teachers in the growth track, principals or other trained evaluators will conduct at least two formal observations per year and complete an annual summative evaluation. The principal and the teacher will prepare and sign a development plan for the teacher. As part of creating and informing the development plan, principals will provide and discuss appropriate student growth data with teachers.

Teachers who have underperformed the effectiveness level expected based on their years of experience and qualifications are put into the *improvement track*. For teachers placed in the improvement track, the principal will design an improvement plan for the teacher with specific goals and benchmarks. For teachers in the improvement track, principals or other trained evaluators will conduct two formal evaluations per year. Each evaluation period will include two formal observations as well as informal observations as needed.

Teachers in the improvement track will earn ratings of “Satisfactory,” “Shows Improvement” or “Unsatisfactory” as required in the school code. A “Satisfactory” rating means the individual has attained the level expected in the growth track and satisfactorily completed their improvement plan and will return to the appropriate growth status. If the teacher receives two consecutive “Unsatisfactory” ratings after being placed in the improvement track, they may be dismissed according to State statute and collective bargaining contracts using fair and transparent procedures.

Required Activity 3. Provide training to all teachers on effective use of the evaluation system.

During the school year 2010-11, the state led evaluation steering committee will work with Intermediate Units to design and implement a statewide roll out of the model evaluation systems for teachers and principals including professional development at state expense for teachers, principals and superintendents in how best to implement and utilize the model system. Participating districts and charter schools that develop their own plan must also provide teachers and principals with professional development on how best to implement and use their evaluation system. The training plans will provide for ongoing coaching and development in addition to initial training.

Required Activity 4. Use evaluations to inform decisions regarding professional development, compensation, promotion and retention, tenure and removal of ineffective teachers after ample opportunity to improve.

Results of evaluations are to be used to inform the professional development of teachers both individually and in teams or groups. Evaluations will highlight *what* skills need improvement; targeted professional development can then focus on *how* to improve those specific skills.

As described above, principals will work with teachers in the growth track to create an annual development plan, and principals will work with teachers in the improvement track to develop an annual improvement plan.

Districts must develop a plan for how the teacher evaluation process will be used to identify highly effective teachers for additional responsibilities and/or additional compensation.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Specific opportunities and compensation levels for teachers designated highly effective must be collectively bargained at the local level but may include:

- Pay supplements or increases for highly effective I teachers and highly effective II teachers who choose to take on additional responsibilities, or highly effective teachers who work in high needs schools
- Group performance compensation (e.g., grade level, school)

Multi-measure Principal Evaluation

Required Activity 1. Develop and implement a multi-measure evaluation system for principals that takes into account data on student growth as a significant factor and is designed and developed with principal involvement.

Upon the awarding of a Race to the Top grant, the state will convene a steering committee that includes principals and teachers to develop a model principal evaluation system that is expected to be completed by January 1, 2011. Participating districts may choose to adopt the state model, or adapt it with variations; participating districts may also choose to develop their own evaluation system which must be approved by PDE. School year 2010-11 will be a time for training and professional development on implementation of a principal evaluation system. All participating districts must begin implementation of a Race to the Top principal evaluation system beginning in September 2011, using either the state model or a district developed model that has been approved by PDE.

Both the state model and district specific Principal evaluation systems must meet include the following:

Core Standards:

- The leader has the knowledge and skills to think and plan strategically, creating an organizational vision around personalized student success.
- The leader has an understanding of standards-based systems theory and design and the ability to transfer that knowledge to the leader's job as the architect of standards-based reform in the school.

- The leader has the ability to access and use appropriate data to inform decision-making at all levels of the system.

Corollary Standards:

- The leader knows how to create a culture of teaching and learning with an emphasis on learning.
- The leader knows how to manage resources for effective results.
- The leader knows how to collaborate, communicate, engage and empower others inside and outside of the organization to pursue excellence in learning.
- The leader knows how to operate in a fair and equitable manner with personal and professional integrity.
- The leader knows how to advocate for children and public education in the larger political, social, economic, legal and cultural context.
- The leader knows how to support professional growth of self and others through practice and inquiry.

Required Activity 2. Conduct annual evaluations of principals that include timely and constructive feedback and provide data on student growth for students, classes and schools.

The model system and any district developed systems will provide for at least annual formal evaluations of principals. For principals working on an Administrative I certificate, evaluations shall be at least twice annually. Principal evaluations are to be conducted by their superintendent or direct supervisor, e.g. regional supervisor and will be based on competencies included in the Pennsylvania Inspired Leadership Program as well as student growth data. Evaluation input will include progress against an individual's annual performance plan and goals developed jointly between principal and superintendent, superintendent observations, student achievement, teacher surveys and self-assessment. Student Growth Data will include student achievement gains through a range of assessments both quantitative and qualitative for the principal's school.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Like the teacher evaluation system, the principal evaluation system will have multiple ratings that can be used to identify ineffective principals as well as highly effective principals for additional responsibilities, e.g. leading high needs school, acting as PIL facilitators, principal mentors and, potentially, earning higher compensation. Evaluation will result in identification of one of five levels of principal “effectiveness”:

- ⊕ Residency
- ⊕ Induction
- ⊕ Emerging
- ⊕ Achieving
- ⊕ Highly effective

Principals who have underperformed the effectiveness level expected of them are put into the *improvement track*. They will receive an improvement plan with specific goals and benchmarks. If the principal receives two unsatisfactory ratings, they may be dismissed according to State Statute using fair and transparent procedures.

Required Activity 3. Provide training to all principals on effective use of the evaluation system.

During the school year 2010-11, the state led evaluation steering committee will work with Intermediate Units to design and implement a statewide roll out of the model evaluation systems for teachers and principals including professional development for teachers, principals and superintendents in how best to implement and utilize the model system. The training plan will provide for ongoing coaching and development in addition to initial training.

Required Activity 4. Use evaluations to inform decisions regarding professional development, compensation, promotion and retention.

Principals will be evaluated each year by the superintendent, have post-evaluation conversations with their superintendent and be required to submit an individualized development plan. Effectiveness levels will be based on achievement of the performance plan,

which includes student growth objectives, and yearly goals. Principals identified as “ineffective” will have an improvement plan designed by their superintendent with semi-annual goals. Principals will have quarterly reviews and semi-annual evaluations. Principals identified as “unsatisfactory” for two consecutive evaluations can be dismissed. Principals working on an Administrative I certificate whose schools fail to show improved student growth for two consecutive years will not be recommended for an Administrative II certificate.

State Collection and Publication of Teacher Evaluation Data

Reporting requirements of the ARRA State Fiscal Stabilization Fund grant require the state to collect data on the evaluation systems **of all LEAs** and make the following information “publicly available”:

- ⊕ A description of the systems used to evaluate the performance of teachers and the use of results from those systems in decisions regarding teacher development, compensation, promotion, retention and removal (This will be summary data. No data that could identify any individual will be made publicly available.)
- ⊕ Whether the systems used to evaluate the performance of teachers include student achievement outcomes or student growth data as an evaluation criterion.
- ⊕ If the district’s teachers receive performance ratings or levels through an evaluation system, the number and percentage of teachers rated at each performance rating or level.
- ⊕ If the district’s teachers receive performance ratings or levels through an evaluation system, whether the number and percentage of teachers rated at each performance rating or level are publicly reported for each school in the LEA.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 4: Professional Development and Training

Pennsylvania has identified the knowledge and skills that successful teachers, principals and other school leaders need to improve student achievement, and the Department of Education has created a comprehensive system of preparation, induction, and continuing professional education to build those competencies. Building on the success of the Pennsylvania Inspired Leadership Program, the commonwealth will create a coherent approach to professional development for teachers as well as leaders. Recognizing that the best professional development is job-embedded and designed to change practice, Pennsylvania's system will ensure that all professional development activities for teachers are linked to classroom practice and the needs of teachers both individually and in groups as identified by the evaluation system. Likewise, professional development activities for principals will be linked to those needed leadership practices identified in the evaluations.

Required Activity 1: Provide professional development to teachers and principals based upon the needs evidenced by teacher and principal evaluation results

Through the multi-measure evaluation system described in Primary Objective 3, principals in participating district schools and charter schools will:

- In collaboration with teachers on the growth track, create an individual development plan for teachers on the growth track based on the results of the teacher's evaluation;
- Create an individual improvement plan for teachers on the improvement track based on the results of the teacher's evaluation;
- Establish school-wide professional development based upon the needs of the teachers as identified in the individual development/improvement plans;

- Create a system of supports that provides teachers with the opportunity to learn new skills and practice them in the classroom with guidance from the principal, mentors, master teachers or coaches;
- Ensure that the professional development and training opportunities detailed in the plans of individual teachers and the group plan directly meet the teachers' needs as described in evaluations;
- Be responsible for ensuring that the professional development plans of individual teachers and the group plan are fully implemented; and
- To the extent possible, identify effects on student achievement, engagement or other student related factors or particular professional development activities.

PDE will develop an online rubric to assist teachers and principals in matching professional development opportunities to specific individual needs and interests as identified in teacher professional development plans. For principals, Act 45 core and corollary standards are mapped to Pennsylvania Inspired Leadership (PIL) programs via an electronic rubric, so principals can clearly see what professional development is suited to specific needs identified through the evaluation process. Principals identified as "in need of improvement" will have an improvement plan designed by their superintendent with semi-annual goals and a professional development plan set forth. All professional development programs will include job-embedded activities that are designed to address the specific areas of improvement identified through the evaluation. Mentors may be assigned by the district to guide and support the principal in implementing identified improvements.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 4: Professional Development and Training – *continued*

Required Activity 2: Provide professional development to all district instructional staff on effective instructional practices including: the use of data and systems of assessment to differentiate instruction; providing high rigor coursework; SAS tools and resources; Response to Instruction and Intervention; systems to identify students at risk; and development of Individual Learning Plans.

Participating districts and charter schools will:

- ⊕ Provide training to their instructional staff on their systems of assessment and their use in differentiating and customizing instruction based upon student needs and integrating the appropriate instructional strategies, learning progressions, and academic interventions;
- ⊕ Provide training to their instructional staff on the SAS (including the SAS portal);
- ⊕ Build time into the schedule for collaborative learning such as peer-to-peer observations and teaming within and across grade levels that includes the use of model SAS online tools or a similar instructional improvement system;
- ⊕ Provide supports such as assigning mentors to staff needing additional assistance in utilizing the instructional improvement system;
- ⊕ Implement systems to identify students at risk and align student needs with high quality intervention such as the Response to Instruction and Intervention (RTII) framework;
- ⊕ Provide professional development to high school teachers in providing high rigor coursework; and
- ⊕ Train on the development of Individual Learning Plans.

Required Activity 3: Ensure that district professional development plans and policies align with Race to the Top strategies and requirements.

- ⊕ Professional development expenditures of all participating districts will be aligned with the Race to the Top activities and the district professional development plan.
- ⊕ Review the district professional development plan and policies to ensure there are no barriers to teachers and principals participating in professional development that addresses needs identified in teacher and principal evaluations and individual development or improvement plans and revise as necessary;
- ⊕ District-sponsored professional development beginning in the 2010-2011 school year must focus on the implementation of Race to the Top activities including but not limited to the use and understanding of the standards-aligned system (SAS) to improve student achievement and the use of data to improve instruction based on student needs;
- ⊕ The plan must ensure that all Race to the Top professional development activities are included in district oversight of professional development activities; and
- ⊕ All school district leadership including school board members will receive training to assure that all district plans and policies align with Race to the Top strategies and requirements.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 5: Turn Around the Lowest Performing Schools

Turning around struggling schools is one of the four key reform reforms of the educational initiatives and investments of the American Recovery and Reinvestment Act. Pennsylvania has identified these schools and they will qualify for additional funds from a Race to the Top award if their districts commit to be participating districts and to implement additional reform activities in these struggling schools. The following requirements are for **turnaround schools** in participating districts only. Participating districts without turnaround schools specifically identified by PDE are NOT required to implement these activities. These requirements must be implemented in addition to all of the other required activities outlined within Objectives 1 to 4.

These required activities for turnaround schools are intensive, tightly targeted and evidenced based. For these reasons, we expect to double the rate of student achievement in these most challenged school buildings with focused, faithful implementation of these rigorous reform activities.

Upon receipt of a Race to the Top award, the state will develop the following tools and resources to support these districts and schools. These tools and resources include the following:

- Updated, aligned and internationally benchmarked standards
- A voluntary curriculum framework aligned to the standards
- A comprehensive model system of assessments aligned to the standards
- A model multi-measure teacher and principal evaluation system (created in collaboration with appropriate stakeholders including teachers' unions)
- A model School Information System (SIS)
- A model Early Warning System
- A model career ladder
- Professional development on
 - the SAS instructional improvement system,
 - the teacher and principal model evaluation systems
 - the model Student Information System.

- Technical assistance to turnaround schools in the development and implementation of their plans.
- Office of School Turnarounds to coordinate technical assistance to turnaround schools and to oversee development and implementation of district turnaround plans.

Once the Race to the Top award is announced, districts will have 90 days to develop a plan for each of these turnaround schools. In the development of their school turnaround plans, participating districts with turnaround schools will need to consider and incorporate the required activities described below. The plan will begin with a root cause analysis that is also used in the Getting Results School Improvement plans.

Selection of an Intervention Model

Four school intervention models are set forth in extensive detail in the Race to the Top guidance. These same four school intervention models are also described in the recently released guidance for the Title I School Improvement funds; Title I SI funds and state school improvement funds will only be made available to eligible schools in participating districts. These districts will be expected to leverage these funds to help finance Race to the Top required activities. The four school intervention models are:

- Turnaround – hire new principal and replace at least 50% of staff
- Transformation – hire new principal and “transform” staff in place
- Restart as a charter school or under contract with an EMO
- School closure

New Leadership

- Replace any principal who has been at the school longer than 3 years
 - The state must approve the retention of any existing principal at a turnaround school and will consider evidence that the existing principal is already engaged in implementation of reforms that advance the goals of the State plan.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 5: Turn Around the Lowest Performing Schools – *continued*

- The state will provide assistance and support to participating districts with turnaround schools by locating highly effective principals through a nationwide recruitment and through a state-funded Urban Principal Academy.
- ⊕ Provide principals with flexibility in hiring and retention of staff, scheduling and budget. This would include site-based selection of teachers, flexibility in determining the master schedule and the ability to adjust the allocation of funds within school budgets.
- ⊕ Require all principals of turnaround schools to take the PDE Teaching Matters coursework within the first year of the turnaround plan or the first year of their hiring whichever is sooner.
- ⊕ Hire a Chief Turnaround Officer for each turnaround school to report directly to and support the principal in implementing required activities. Responsibilities include (depending on the need of the principals):
 - Providing oversight for school-level required activities with a school-level leadership team and report progress;
 - Ensuring that all required activities have clear implementation plans and timelines;
 - Assisting the principal in defining roles and responsibilities for staff;
 - Working with the principal to ensure effective, trust-based relationships are developed between staff member and students;
 - Ensuring that staff are receiving the right training, developing the right skills, and receiving timely feedback and evaluations; and
 - Monitoring early warning indicators such as attendance, student behavior, and benchmark assessment data.
 - State will provide support and technical assistance including
 - Development of detailed CTO job description
 - Conduct national search and recruitment for CTO candidates
 - Provide ongoing coordination, coaching and technical assistance to CTOs.
- ⊕ In districts with more than three turnaround schools, identify a district director of school turnarounds, reporting directly to the superintendent
- ⊕ Provide signing bonuses or additional compensation, as appropriate, to attract highly effective principals, back-loaded over four year commitment. (optional)

Effective Teachers

- ⊕ Develop a plan for hiring and retaining effective teachers going forward
 - The state will provide assistance and support to participating districts with turnaround schools in locating highly effective teachers with nationwide recruitment support, and establishing new sources of effective teachers within Pennsylvania including a Teach for PA initiative and an Urban Teachers Academy.
- ⊕ If Turnaround strategy is selected as school intervention model, replace at least 50% of the instructional staff
- ⊕ Ensure that new teacher induction includes side-by-side mentoring by a highly effective teacher for a period of at least one school year
 - The state will provide technical assistance and guidance clarifying the requirements of side by side mentoring and identification of mentor teachers.
- ⊕ Provide signing bonuses and/or additional compensation to attract and retain highly effective teachers, back-loaded over a multi year commitment. (optional)
- ⊕ Recruit and retain highly effective teachers using the cohort model, with signing bonuses and/or additional compensation, back-loaded over a multi year commitment.
 - The state will assist in the creation of cohorts of highly effective teachers to be placed as a group in high-needs schools.

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 5: Turn Around the Lowest Performing Schools – *continued*

- ⊕ Adopt a career ladder for promotion, additional compensation, and advancement of effective teachers based on responsibility and other factors including student growth to be developed in collaboration with local teachers' union as appropriate.
 - State will develop a model career ladder as well as provide guidance on requirements for alternate models; participating districts with turnaround schools may adopt the state model or may develop their own model in accord with the state guidance.
- ⊕ Implement PDE's Response to Instruction and Intervention (RTII) to address learning gaps and provide RTII professional development to all instructional staff
- ⊕ Provide a summer academy for teachers of seven to ten days during the months immediately preceding the opening of the turnaround school with intense professional development in core instructional practices, RTII, student data analysis and individual learning plans.
 - The state will fund technical assistance support to turnaround schools to implement data related reform activities.
- ⊕ Backward map district math and literacy curricula to ensure coherence from grade level to grade level
 - Align curriculum and lesson plans to standards and instruction across grade levels to ensure continuity of content and instruction
- ⊕ Implement the Adolescent Literacy Academy model based on TALA (For further description, see <http://ritter.tea.state.tx.us/tala/about/about.html>.) in middle and high school turnaround schools (optional)
 - Training and professional development for ELA academy for English and reading teachers in grades 6–8 and 9–12 (as appropriate) and content area academy for mathematics, science, and social studies teachers in grades 6–8 and 9–12.

Use student data to inform and differentiate instruction

- ⊕ Implement the state model school information system (SIS) with capability to provide real time student level data to teachers and administrators
 - Train leaders and instructional staff in effective use of real time data
 - Provide at least twice weekly collaborative time for teachers to review real-time student data to drive instruction
- ⊕ Implement the state model Early Warning System
 - An Early Warning System is a technology-based tool that uses assessment and rapid-time student-level data, e.g., number of unexcused absences, behavior referrals, missed homework or tests, or other indicators, to identify at-risk students in elementary, middle and high schools who need both academic and socio-emotional interventions/support
- ⊕ The state will provide technical assistance through data facilitators to turnaround schools to provide support for a period of six months to assist schools in how to use the SAS instructional improvement system, and the model Early Warning System (ratio of approximately one data facilitator to 10 turnaround schools)

Rigorous curriculum

- ⊕ Implement a rigorous research based curriculum aligned with Pennsylvania standards, curriculum framework, instruction, materials and interventions (e.g., for high schools: High Schools that Work; Talent Development; or Project Grad; elementary and middle schools: Success for All and America's Choice). See also other evidence-based curricula at What Works Clearinghouse (see <http://ies.ed.gov/ncee/wwc/>).
- ⊕ Implement SAS as an instructional improvement system that aligns with the curriculum selected above
 - The state will fund/supply professional development on SAS to all leadership and instructional staff; if another system is used, the district must provide comparable professional development to all leadership and instructional staff

Addendum 1 – Pennsylvania Race to the Top Requirements for Participating Districts – *continued*

Objective 5: Turn Around the Lowest Performing Schools – *continued*

Provide increased learning time and curriculum opportunities

- ✦ Increase learning time by adopting one or more of the following:
 - Extending the school day by 30 minutes of learning time
 - Extending the school year by at least 15 days of learning time
 - Extending the school year for teachers for professional development or developing/sharing Individual Learning Plans
- ✦ All ninth grade students entering an turnaround high school to attend a preparatory summer academy to build basic skills (modeled on Project Grad or GEAR UP programs)
- ✦ Ensure that students entering elementary turnaround schools are prepared for a rigorous curriculum by providing that all students have been enrolled in a high-quality pre-kindergarten and full day kindergarten
 - Create partnerships with childcare and early learning providers to help ensure that all children entering kindergarten have access to state supported Head Start, Pre-K Counts or a Keystone Stars 3 pre-school

Required programs in turnaround schools

- ✦ Implement Reading Recovery or comparable elementary reading intervention model for all students below grade level in grades 1 through 3
 - State will increase the number of training sites for Reading Recovery teachers and teacher leaders
 - Provide professional development to support model
- ✦ Implement Science It's Elementary or other evidence based elementary science program in all turnaround elementary schools
- ✦ Increase the number of advanced, high rigor courses offered in turnaround high schools and the number of students taking such coursework
 - The state will provide professional development for AP teacher certification

Social/emotional and community oriented supports for students

- ✦ Create strong supports for students at high risk transitions
 - Develop a system to transfer comprehensive student information from one school to the next at transitions, i.e. elementary to middle, middle to high, and for new students.
 - Create a Freshman Academy for all ninth grade students entering turnaround high schools with small teams of teachers who teach the same students and have collaborative planning and data review time together every day
 - Provide a three day orientation to all incoming midyear transfer students including an opportunity to meet all relevant adults, diagnostic assessment, creation of an ILP (optional), and on boarding to local data system
- ✦ Connect students identified as at-risk to needed social/emotional and community based supports
- ✦ In turnaround high schools, provide multiple opportunities for students to earn credits towards graduation (e.g., double dosing, summer school, after-school, twilight school)
- ✦ Develop Individual Learning Plans (ILP) for all students, updated three times per year (optional)

Addendum 2

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts

This Memorandum of Understanding (“MOU”) is entered into by and between the Commonwealth of Pennsylvania (“State”) and _____ (“Participating District”). The purpose of this agreement is to establish a framework of collaboration, as well as articulate specific roles and responsibilities in support of the State in its implementation of an approved Race to the Top grant project.

I. SCOPE OF WORK

Exhibit 1, the Preliminary Scope of Work, indicates the Required Activities consistent with the State’s proposed reform plans (“State Plan”), which the Participating District is agreeing to implement.

II. PROJECT ADMINISTRATION

A. PARTICIPATING DISTRICT RESPONSIBILITIES

In assisting the State in implementing the tasks and activities described in the State’s Race to the Top application, the Participating District subgrantee will:

- 1) Implement the District plan as identified in Exhibit I of this agreement;
- 2) Actively participate in all relevant convenings, communities of practice, or other practice-sharing events that are organized or sponsored by the State or by the U.S. Department of Education (“ED”);
- 3) Post to any website specified by the State or ED, in a timely manner, all non-proprietary products and lessons learned developed using funds associated with the Race to the Top grant;
- 4) Participate, as requested, in any evaluations of this grant conducted by the State or ED;
- 5) Be responsive to State or ED requests for information including on the status of the project, project implementation, outcomes, and any problems anticipated or encountered;
- 6) Participate in meetings and telephone conferences with the State to discuss (a) progress of the project, (b) potential dissemination of resulting non-proprietary products and lessons learned, (c) plans for subsequent years of the Race to the Top grant period, and (d) other matters related to the Race to the Top grant and associated plans.

B. STATE RESPONSIBILITIES

In assisting Participating Districts in implementing their tasks and activities described in the State’s Race to the Top application, the State grantee will:

- 1) Work collaboratively with, and support the Participating District in carrying out the District Plan as identified in Exhibit I of this agreement;
- 2) Timely distribute the District’s portion of Race to the Top grant funds during the course of the project period and in accordance with the District Plan identified in Exhibit I;
- 3) Provide feedback on the District’s status updates, annual reports, any interim reports, and project plans and products; and
- 4) Identify sources of technical assistance for the project:

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts – *continued*

C. JOINT RESPONSIBILITIES

- 1) The State and the Participating District will each appoint a key contact person for the Race to the Top grant.
- 2) These key contacts from the State and the Participating District will maintain frequent communication to facilitate cooperation under this MOU.
- 3) State and Participating District grant personnel will work together to determine appropriate timelines for project updates and status reports throughout the whole grant period.
- 4) State and Participating District grant personnel will negotiate in good faith to continue to achieve the overall goals of the State's Race to the Top grant, even when the State Plan requires modifications that affect the Participating District, or when the District Plan requires modifications.
- 5) Nothing in this MOU shall be construed to alter or otherwise affect the rights, remedies, and procedures afforded under federal, state, or local laws (including applicable regulations or court orders) or under the terms of collective bargaining agreements. By way of the signatures below, the Participating District and local teachers' union agree that if the State's application is funded they will bargain in good faith regarding those elements of the Participating District's plan in Exhibit I that are mandatory subjects of collective bargaining or are contrary to any provision of the collective bargaining agreement between the Participating District and the union; and further agree that those portions of Exhibit I that are mandatory subjects of bargaining, as provided by the Public Employee Relations Act and decisions of the PA Labor Relations Board or courts, or are contrary to any provision of the collective bargaining agreement shall be implemented only upon agreement of the Participating District and the union.

D. STATE RECOURSE FOR DISTRICT NON-PERFORMANCE

The State intends to conduct reviews of Participating District progress in plan implementation three times per year. If the State determines that the District is not meeting its goals, timelines, budget, or annual targets or is not fulfilling other applicable requirements, the State grantee will take appropriate enforcement action, which could include a collaborative process between the State and the District, or any of the enforcement measures that are detailed in 34 CFR section 80.43 including putting the District on reimbursement payment status, temporarily withholding funds, disallowing costs or terminating this MOU for non-compliance.

III. ASSURANCES

The Participating District hereby certifies and represents that it:

- 1) Has all requisite power and authority to execute this MOU;
- 2) Is familiar with the State's Race to the Top grant application and is supportive of and committed to working on all or significant portions of the State Plan;
- 3) Agrees to be a Participating District and will implement those portions of the State Plan indicated in Exhibit I, if the State application is funded;

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts – *continued*

- 4) Will provide a Final Scope of Work in a form to be prescribed by the State only if the State’s application is funded; will do so in a timely fashion but no later than 90 days after a grant is awarded; and will describe in the Final Scope of Work the District’s specific goals, activities, timelines, budgets including budget detail by line item, key personnel, and annual targets for key performance measures attached as an Addendum to that certain letter from Pennsylvania Secretary of Education Gerald Zahorchak to District dated January 5, 2010 which is incorporated herein by reference (“District Plan”) in a manner that is consistent with (i) the Preliminary Scope of Work (Exhibit I) and (ii) the State Plan; and which Final Scope of Work will be subject to State approval and will be incorporated by reference into this MOU; and
- 5) Will comply with all of the terms of the Grant, the State’s subgrant, and all applicable Federal and State laws and regulations, including laws and regulations applicable to the Program, and the applicable provisions of EDGAR (34 CFR Parts 75, 77, 79, 80, 82, 84, 85, 86, 97, 98 and 99).

IV. MODIFICATIONS

This Memorandum of Understanding may be amended only by written agreement signed by each of the parties involved, and in consultation with ED. In particular, the approval of State shall be required for changes in any budget line items once a Final Scope of Work has been approved including shifting of costs between or among line items.

V. DURATION/TERMINATION

This Memorandum of Understanding shall be effective, beginning with the date of the last signature hereon and, if a grant is received, ending upon the expiration of the grant project period, or upon mutual agreement of the parties, whichever occurs first.

VI. SIGNATURES

District Superintendent:

Signature/Date

Print Name/Title

President of Local School Board:

Signature/Date

Print Name/Title

Local Teachers’ Union Leader:

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the District as a Participating District.

Signature/Date

Print Name/Title

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts – *continued*

Participating District hereby agrees to participate in implementing the State Plan in each of the areas identified below. The terms and conditions of Addendum 1 of that certain Letter from Secretary of Education Gerald Zahorchak to superintendents of Pennsylvania School Districts dated January 5, 2010 which provides additional detail on the required activities under the Primary Objectives set forth below are hereby incorporated by reference and made a part of this Exhibit I.

EXHIBIT I PRELIMINARY SCOPE OF WORK for Participating Districts

District hereby agrees to participate in implementing the State Plan in each of the areas identified below.

Primary Objective	Required Activity
Strengthen and expand the standards-aligned system (SAS) and develop data systems capable of supporting reform	<p>Implement a high quality curriculum that is aligned with standards, assessments, curriculum framework, instruction, materials and interventions (B)(3)</p> <p>Implement a system of assessments with capacity to inform instruction on timely and regular basis (B)(3)</p> <p>Implement a system to use real-time student data to identify students at academic risk in grade 6 and above. (C)(3)</p> <p>Implement a SIS that provides real-time student data and can communicate with PIMS (C)(3)(i)</p> <p>Provide collaborative time for teachers to review real-time student data to drive instruction</p>
Develop a world-class human capital pipeline for teachers and leaders	<p>Develop a human capital plan to identify strategies based on district needs to attract and retain effective teachers, limit teacher vacancies, staff hard-to-staff subjects, and address the equitable distribution of highly effective teachers (D)(3)(i) and (ii)</p> <p>Adopt the state-developed standard application for prospective teachers.</p> <p>Provide signing and retention bonuses for effective teachers and principals in hard-to-staff schools and subject areas (optional activity)</p>
Develop a robust multi-measure evaluation system	<p>Implement a multi-measure evaluation system for teachers and principals that takes into account data on student growth as a significant factor and is designed and developed with teacher and principal involvement</p> <p>Conduct annual evaluations of teachers and principals that include timely and constructive feedback and provide data on student growth for students, classes and schools</p> <p>Provide training to all principals and teachers on effective use of the evaluation system</p> <p>Use evaluations to inform decisions regarding professional development, compensation, promotion and retention, tenure and removal of ineffective teachers after ample opportunity to improve</p>
<p>Initials: Superintendent _____ School Board President _____ Union President _____ State Official _____</p>	

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts – *continued*

EXHIBIT I PRELIMINARY SCOPE OF WORK for Participating Districts – *continued*

Primary Objective	Required Activity
Create a coherent approach to professional development	<p>Adopt a career ladder for promotion, additional compensation and advancement of teachers based on responsibility and other factors including student growth (optional activity)</p> <p>Provide professional development to teachers based on the needs evidenced by teacher evaluation results (D)(5)(i)</p> <p>Provide professional development to all district instructional staff on effective instructional practices including:</p> <ul style="list-style-type: none"> – The use of data including diagnostic and formative assessment tools to differentiate classroom instruction (C)(3)(ii) – SAS tools and resources – Response to Instruction and Intervention (RtII) – Systems to identify students at risk – Development of Individual Learning Plans (D)(5)(i) <p>Provide professional development to high school teachers in providing high-rigor coursework (e.g., AP, IB or Dual Enrollment).</p>
Turn around the lowest performing schools	N/A
Evaluate programs and identify and spread best practices	<p>Provide data and access to PDE to evaluate and study RTTT strategies and activities (C)(3)(iii); (D)(5)(ii)</p> <p>Review available research and evaluations when developing school reform plans and work with PDE and the State’s technical assistance network to implement best-practices</p>
<p>Initials: Superintendent _____ School Board President _____ Union President _____ State Official _____</p>	

VII. SIGNATURES:

District Superintendent:

Signature/Date

Print Name/Title

President of Local School Board:

Signature/Date

Print Name/Title

Local Teachers’ Union Leader:

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the District as a Participating District.

Signature/Date

Print Name/Title

Addendum 3

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative

This Memorandum of Understanding (“MOU”) is entered into by and between the Commonwealth of Pennsylvania (“State”) and _____ (“Participating District”). The purpose of this agreement is to establish a framework of collaboration, as well as to articulate specific roles and responsibilities in support of the State in its implementation of an approved Race to the Top grant project.

I. SCOPE OF WORK

Exhibit 1, the Preliminary Scope of Work, indicates the Required Activities consistent with the State’s proposed reform plans (“State Plan”), which the Participating District is agreeing to implement.

II. PROJECT ADMINISTRATION

A. PARTICIPATING DISTRICT RESPONSIBILITIES

In assisting the State in implementing the tasks and activities described in the State’s Race to the Top application, the Participating District subgrantee will:

- 1) Implement the District plan as identified in Exhibit I of this agreement;
- 2) Actively participate in all relevant convenings, communities of practice, or other practice-sharing events that are organized or sponsored by the State or by the U.S. Department of Education (“ED”);
- 3) Post to any website specified by the State or ED, in a timely manner, all non-proprietary products and lessons learned developed using funds associated with the Race to the Top grant;
- 4) Participate, as requested, in any evaluations of this grant conducted by the State or ED;
- 5) Be responsive to State or ED requests for information including on the status of the project, project implementation, outcomes, and any problems anticipated or encountered;
- 6) Participate in meetings and telephone conferences with the State to discuss (a) progress of the project, (b) potential dissemination of resulting non-proprietary products and lessons learned, (c) plans for subsequent years of the Race to the Top grant period, and (d) other matters related to the Race to the Top grant and associated plans.

B. STATE RESPONSIBILITIES

In assisting Participating Districts in implementing their tasks and activities described in the State’s Race to the Top application, the State grantee will:

- 1) Work collaboratively with, and support the Participating District in carrying out the District Plan as identified in Exhibit I of this agreement;
- 2) Timely distribute the District’s portion of Race to the Top grant funds during the course of the project period and in accordance with the District Plan identified in Exhibit I;
- 3) Provide feedback on the District’s status updates, annual reports, any interim reports, and project plans and products; and
- 4) Identify sources of technical assistance for the project.

Addendum 3 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative – *continued*

C. JOINT RESPONSIBILITIES

- 1) The State and the Participating District will each appoint a key contact person for the Race to the Top grant.
- 2) These key contacts from the State and the Participating District will maintain frequent communication to facilitate cooperation under this MOU.
- 3) State and Participating District grant personnel will work together to determine appropriate timelines for project updates and status reports throughout the whole grant period.
- 4) State and Participating District grant personnel will negotiate in good faith to continue to achieve the overall goals of the State's Race to the Top grant, even when the State Plan requires modifications that affect the Participating District, or when the District Plan requires modifications.
- 5) Nothing in this MOU shall be construed to alter or otherwise affect the rights, remedies, and procedures afforded under federal, state, or local laws (including applicable regulations or court orders) or under the terms of collective bargaining agreements. By way of the signatures below, the Participating District and local teachers' union agree that if the State's application is funded they will bargain in good faith regarding those elements of the Participating District's plan in Exhibit I that are mandatory subjects of collective bargaining or are contrary to any provision of the collective bargaining agreement between the Participating District and the union; and further agree that those portions of Exhibit I that are mandatory subjects of bargaining, as provided by the Public Employee Relations Act and decisions of the PA Labor Relations Board or courts, or are contrary to any provision of the collective bargaining agreement shall be implemented only upon agreement of the Participating District and the union.

D. STATE RECOURSE FOR DISTRICT NON-PERFORMANCE

The State intends to conduct reviews of Participating District progress in plan implementation three times per year. If the State determines that the District is not meeting its goals, timelines, budget, or annual targets or is not fulfilling other applicable requirements, the State grantee will take appropriate enforcement action, which could include a collaborative process between the State and the District, or any of the enforcement measures that are detailed in 34 CFR section 80.43 including putting the District on reimbursement payment status, temporarily withholding funds, disallowing costs or terminating this MOU for non-compliance.

III. ASSURANCES

The Participating District hereby certifies and represents that it:

- 1) Has all requisite power and authority to execute this MOU;
- 2) Is familiar with the State's Race to the Top grant application and is supportive of and committed to working on all or significant portions of the State Plan;
- 3) Agrees to be a Participating District and will implement those portions of the State Plan indicated in Exhibit I, if the State application is funded,
- 4) Will provide a Final Scope of Work in a form to be prescribed by the State only if the State's application is funded; will do so in a timely fashion but no later than 90 days after a grant is awarded; and will describe in the Final Scope of Work the District's specific goals, activities, timelines, budgets including budget detail by line item, key personnel, and annual targets for key performance measures attached as an Addendum to that certain letter from Pennsylvania Secretary of Education Gerald Zahorchak to District dated January 5, 2010 which is incorporated herein by reference ("District Plan ") in a manner that is consistent with (i) the Preliminary Scope of Work (Exhibit I) and (ii) the State Plan; and which Final Scope of Work will be subject to State approval and will be incorporated by reference into this MOU; and

Addendum 3 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative – *continued*

- 5) Will comply with all of the terms of the Grant, the State’s subgrant, and all applicable Federal and State laws and regulations, including laws and regulations applicable to the Program, and the applicable provisions of EDGAR (34 CFR Parts 75, 77, 79, 80, 82, 84, 85, 86, 97, 98 and 99).

IV. MODIFICATIONS

This Memorandum of Understanding may be amended only by written agreement signed by each of the parties involved, and in consultation with ED. In particular, the approval of State shall be required for changes in any budget line items once a Final Scope of Work has been approved including shifting of costs between or among line items.

V. DURATION/TERMINATION

This Memorandum of Understanding shall be effective, beginning with the date of the last signature hereon and, if a grant is received, ending upon the expiration of the grant project period, or upon mutual agreement of the parties, whichever occurs first.

VI. SIGNATURES

District Superintendent:

Signature/Date

Print Name/Title

President of Local School Board:

Signature/Date

Print Name/Title

Local Teachers’ Union Leader:

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the District as a Participating District.

Signature/Date

Print Name/Title

Addendum 3 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative– *continued*

Participating District hereby agrees to participate in implementing the State Plan in each of the areas identified below. The terms and conditions of Addendum 1 of that certain Letter from Secretary of Education Gerald Zahorchak to superintendents of Pennsylvania School Districts dated January 5, 2010 which provides additional detail on the required activities under the Primary Objectives set forth below are hereby incorporated by reference and made a part of this Exhibit I.

EXHIBIT I – PRELIMINARY SCOPE OF WORK for Participating Districts with Turnaround Schools

District hereby agrees to participate in implementing the State Plan in each of the areas identified below.

Primary Objective	Required Activity
Strengthen and expand the standards-aligned system (SAS) and develop data systems capable of supporting reform.	<ul style="list-style-type: none"> Implement a rigorous research based curriculum aligned with standards, assessments, curriculum framework, instruction, materials and interventions (B)(3) Implement the model system of assessments (B)(3) Backward map district math and literacy curricula to ensure coherence from grade level to grade level Implement the model Early Warning System for grades 6 and above that uses real-time student data (C)(3) Implement the model SIS (C)(3)(i) Provide at least twice weekly collaborative time for teachers to review real-time student data to drive instruction
Develop a world-class human capital pipeline for teachers and leaders	<ul style="list-style-type: none"> Develop a human capital plan identifying strategies based on district needs to attract and retain effective teachers, limit teacher vacancies, staff hard-to-staff subjects, and address the equitable distribution of highly effective teachers (D)(3)(i) and (ii) Provide signing and retention bonuses for effective teachers and principals in hard-to-staff schools and subject areas (optional activity) Provide new teacher induction that includes side-by-side mentoring by highly effective teachers
Develop a multi-measure evaluation system	<ul style="list-style-type: none"> Implement the model multi-measure evaluation system for teachers and principals that takes into account data on student growth as a significant factor (D)(2)(i), (ii) Conduct annual evaluations of teachers and principals that include timely and constructive feedback and provide data on student growth for students, classes and schools (D)(2)(iii) Provide training to all principals and teachers on effective use of the evaluation system Use evaluations to inform decisions regarding professional development, additional compensation, promotion and retention, tenure and removal of ineffective teachers after ample opportunity to improve (D)(2)(iv)(a – d)
Initials: Superintendent _____ School Board President _____ Union President _____ State Official _____	

Addendum 3 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative – *continued*

EXHIBIT I – PRELIMINARY SCOPE OF WORK for Participating Districts with Turnaround Schools – *continued*

Primary Objective	Required Activity
Create a coherent approach to professional development	<p>Adopt a career ladder for promotion, additional compensation and advancement of teachers based on responsibility and other factors including student growth</p> <p>Provide professional development to all district instructional staff based on the needs evidenced by teacher evaluation results (D)(5)(i)</p> <p>Provide PD to all district instructional staff on effective instructional practices including:</p> <ul style="list-style-type: none"> – The use of data including diagnostic and formative assessment tools to differentiate classroom instruction (C)(3)(ii) – SAS tools and resources – Response to Instruction and Intervention (RTII) – Early Warning System – Development of Individual Learning Plans (D)(5)(i) <p>Provide professional development to high school teachers in providing high rigor coursework (e.g., AP, IB or dual enrollment)</p>
Turn around the lowest performing schools	<p>Agree to select and implement one of four school intervention models for each turnaround school identified by the State and implement required detailed reform activities</p> <p>In districts with more than three turnaround schools, identify a district turnaround leader who reports to the superintendent</p> <p>Build high quality early childhood programs in partnership with local early childhood providers</p>
Evaluate programs and identify and spread best practices	<p>Provide data and access to PDE to evaluate and study RTTT strategies and activities (C)(3)(iii); (D)(5)(ii)</p> <p>Review available research and evaluations when developing school reform plans and work with PDE and the State’s technical assistance network to implement best practices</p>
<p>Initials: Superintendent _____ School Board President _____ Union President _____ State Official _____</p>	

Addendum 3 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Participating Districts with Schools in the Turnaround Initiative – *continued*

VI. SIGNATURES

District Superintendent:

Signature/Date

Print Name/Title

President of Local School Board:

Signature/Date

Print Name/Title

Local Teachers' Union Leader:

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the District as a Participating District.

Signature/Date

Print Name/Title

Addendum 4

Pennsylvania Race to the Top Expected Impact and District Performance Targets

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
ABINGTON HEIGHTS SD	75%	95%	1%	73%	95%	1%
ABINGTON SD	77%	95%	1%	68%	94%	1%
ALBERT GALLATIN AREA SD	59%	87%	4%	50%	84%	7%
ALIQUIPPA SD	53%	79%	8%	37%	74%	9%
ALLEGHENY VALLEY SD	59%	88%	3%	58%	88%	6%
ALLEGHENY-CLARION VALLEY SD	57%	85%	4%	48%	83%	6%
ALLENTOWN CITY SD	56%	83%	5%	42%	78%	9%
ALTOONA AREA SD	64%	90%	3%	55%	87%	5%
AMBRIDGE AREA SD	66%	90%	2%	57%	90%	4%
ANNVILLE-CLEONA SD	68%	94%	1%	60%	91%	2%
ANTIETAM SD	56%	86%	4%	44%	82%	6%
APOLLO-RIDGE SD	56%	87%	4%	50%	85%	6%
ARMSTRONG SD	66%	91%	2%	58%	89%	4%
ATHENS AREA SD	62%	89%	3%	51%	85%	6%
AUSTIN AREA SD	63%	89%	4%	58%	83%	9%
AVELLA AREA SD	59%	86%	4%	58%	89%	5%
AVON GROVE SD	80%	96%	1%	70%	93%	3%
AVONWORTH SD	73%	95%	1%	72%	95%	1%
BALD EAGLE AREA SD	62%	89%	3%	55%	88%	4%
BALDWIN-WHITEHALL SD	66%	91%	3%	56%	87%	5%
BANGOR AREA SD	60%	86%	4%	55%	87%	5%
BEAVER AREA SD	76%	96%	0%	67%	95%	1%
BEDFORD AREA SD	63%	89%	3%	55%	87%	5%
BELLE VERNON AREA SD	63%	90%	3%	57%	88%	4%
BELLEFONTE AREA SD	63%	90%	3%	59%	89%	4%
BELLWOOD-ANTIS SD	71%	92%	2%	63%	91%	3%
BENSALEM TOWNSHIP SD	61%	88%	3%	52%	86%	5%
BENTON AREA SD	66%	91%	2%	55%	89%	3%
BENTWORTH SD	61%	88%	3%	53%	85%	6%
BERLIN BROTHERSVALLEY SD	72%	94%	1%	59%	89%	5%
BERMUDIAN SPRINGS SD	64%	88%	3%	54%	86%	5%
BERWICK AREA SD	63%	89%	3%	54%	86%	5%
BETHEL PARK SD	72%	96%	1%	68%	95%	1%
BETHLEHEM AREA SD	63%	88%	4%	55%	86%	5%
BETHLEHEM-CENTER SD	59%	87%	3%	54%	87%	5%
BIG BEAVER FALLS AREA SD	68%	91%	3%	55%	87%	5%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
BIG SPRING SD	62%	90%	3%	53%	86%	6%
BLACKHAWK SD	73%	95%	1%	64%	93%	2%
BLACKLICK VALLEY SD	60%	86%	4%	49%	83%	7%
BLAIRSVILLE-SALTSBURG SD	68%	91%	2%	58%	88%	5%
BLOOMSBURG AREA SD	72%	93%	2%	62%	91%	3%
BLUE MOUNTAIN SD	65%	90%	2%	62%	92%	2%
BLUE RIDGE SD	59%	87%	3%	54%	86%	5%
BOYERTOWN AREA SD	73%	95%	1%	63%	92%	2%
BRADFORD AREA SD	63%	87%	3%	56%	86%	6%
BRANDYWINE HEIGHTS AREA SD	64%	90%	2%	59%	89%	4%
BRENTWOOD BOROUGH SD	63%	90%	3%	59%	90%	3%
BRISTOL BOROUGH SD	62%	89%	3%	49%	84%	7%
BRISTOL TOWNSHIP SD	61%	89%	3%	50%	84%	6%
BROCKWAY AREA SD	61%	89%	3%	52%	85%	5%
BROOKVILLE AREA SD	57%	87%	3%	55%	87%	6%
BROWNSVILLE AREA SD	54%	84%	4%	46%	81%	8%
BURGETTSTOWN AREA SD	62%	91%	2%	52%	87%	5%
BURRELL SD	63%	91%	1%	61%	92%	3%
BUTLER AREA SD	65%	91%	2%	56%	90%	4%
CALIFORNIA AREA SD	62%	91%	2%	57%	87%	4%
CAMBRIA HEIGHTS SD	64%	90%	2%	61%	91%	3%
CAMERON COUNTY SD	57%	88%	4%	52%	88%	5%
CAMP HILL SD	70%	93%	0%	67%	94%	1%
CANON-MCMILLAN SD	69%	93%	2%	66%	93%	2%
CANTON AREA SD	58%	84%	4%	50%	84%	6%
CARBONDALE AREA SD	69%	92%	2%	62%	90%	3%
CARLISLE AREA SD	67%	91%	3%	62%	90%	4%
CARLYNTON SD	63%	89%	4%	54%	87%	5%
CARMICHAELS AREA SD	62%	88%	4%	50%	86%	6%
CATASAUQUA AREA SD	61%	87%	3%	51%	85%	6%
CENTENNIAL SD	66%	92%	1%	61%	91%	3%
CENTER AREA SD	69%	93%	1%	65%	94%	2%
CENTRAL BUCKS SD	84%	98%	0%	75%	97%	1%
CENTRAL CAMBRIA SD	63%	91%	3%	60%	90%	4%
CENTRAL COLUMBIA SD	69%	93%	2%	62%	89%	4%
CENTRAL DAUPHIN SD	67%	90%	3%	56%	87%	5%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
CENTRAL FULTON SD	67%	92%	2%	54%	85%	6%
CENTRAL GREENE SD	62%	88%	5%	52%	84%	6%
CENTRAL YORK SD	70%	94%	1%	67%	94%	2%
CHAMBERSBURG AREA SD	60%	87%	4%	53%	86%	6%
CHARLEROI SD	59%	87%	4%	51%	85%	6%
CHARTIERS VALLEY SD	65%	90%	3%	61%	89%	4%
CHARTIERS-HOUSTON SD	63%	89%	3%	59%	88%	4%
CHELTENHAM TOWNSHIP SD	72%	92%	1%	68%	92%	2%
CHESTER-UPLAND SD	46%	71%	15%	34%	68%	17%
CHESTNUT RIDGE SD	64%	90%	3%	55%	88%	5%
CHICHESTER SD	58%	84%	5%	50%	84%	6%
CLAIRTON CITY SD	50%	79%	7%	39%	73%	11%
CLARION AREA SD	67%	92%	1%	60%	92%	2%
CLARION-LIMESTONE AREA SD	65%	91%	2%	59%	90%	4%
CLAYSBURG-KIMMEL SD	61%	89%	3%	53%	87%	5%
CLEARFIELD AREA SD	61%	88%	4%	53%	85%	6%
COATESVILLE AREA SD	60%	87%	3%	54%	85%	6%
COCALICO SD	67%	92%	1%	63%	91%	3%
COLONIAL SD	80%	97%	1%	74%	96%	1%
COLUMBIA BOROUGH SD	58%	86%	4%	49%	82%	7%
COMMODORE PERRY SD	60%	90%	2%	61%	91%	3%
CONEMAUGH TOWNSHIP AREA SD	75%	95%	1%	64%	91%	3%
CONEMAUGH VALLEY SD	67%	91%	2%	57%	87%	4%
CONESTOGA VALLEY SD	65%	91%	2%	60%	90%	3%
CONEWAGO VALLEY SD	65%	90%	2%	54%	85%	5%
CONNEAUT SD	61%	88%	4%	54%	85%	5%
CONNELLSVILLE AREA SD	58%	86%	4%	50%	83%	7%
CONRAD WEISER AREA SD	65%	89%	3%	54%	87%	5%
CORNELL SD	64%	90%	4%	49%	86%	5%
CORNWALL-LEBANON SD	68%	94%	1%	63%	92%	2%
CORRY AREA SD	57%	86%	5%	48%	83%	7%
COUDERSPORT AREA SD	62%	89%	2%	58%	89%	4%
COUNCIL ROCK SD	73%	95%	1%	69%	95%	2%
CRANBERRY AREA SD	65%	91%	2%	58%	88%	5%
CRAWFORD CENTRAL SD	57%	84%	4%	53%	85%	6%
CRESTWOOD SD	67%	91%	2%	62%	93%	2%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
CUMBERLAND VALLEY SD	78%	96%	1%	71%	94%	2%
CURWENSVILLE AREA SD	68%	92%	2%	60%	90%	4%
DALLAS SD	75%	96%	1%	67%	95%	1%
DALLASTOWN AREA SD	68%	93%	1%	67%	93%	2%
DANIEL BOONE AREA SD	62%	90%	2%	54%	89%	4%
DANVILLE AREA SD	69%	92%	2%	63%	92%	3%
DEER LAKES SD	63%	90%	2%	63%	91%	4%
DELAWARE VALLEY SD	74%	96%	1%	70%	95%	1%
DERRY AREA SD	68%	92%	2%	62%	91%	3%
DERRY TOWNSHIP SD	78%	96%	1%	68%	93%	2%
DONEGAL SD	63%	89%	2%	53%	87%	5%
DOVER AREA SD	59%	89%	2%	56%	88%	4%
DOWNINGTOWN AREA SD	74%	94%	1%	71%	95%	1%
DUBOIS AREA SD	66%	90%	2%	57%	88%	5%
DUNMORE SD	65%	92%	1%	60%	93%	2%
DUQUESNE CITY SD	51%	76%	12%	34%	66%	21%
EAST ALLEGHENY SD	58%	86%	3%	50%	85%	5%
EAST LYCOMING SD	77%	95%	1%	65%	91%	3%
EAST PENN SD	70%	94%	1%	65%	93%	2%
EAST PENNSBORO AREA SD	67%	92%	2%	58%	90%	3%
EAST STROUDSBURG AREA SD	60%	87%	3%	55%	87%	4%
EASTERN LANCASTER CO SD	68%	92%	2%	60%	90%	3%
EASTERN LEBANON CO SD	61%	87%	3%	54%	86%	5%
EASTERN YORK SD	64%	90%	3%	53%	88%	5%
EASTON AREA SD	64%	90%	3%	54%	85%	6%
ELIZABETH FORWARD SD	66%	92%	2%	57%	89%	4%
ELIZABETHTOWN AREA SD	66%	92%	2%	59%	90%	4%
ELK LAKE SD	65%	90%	2%	57%	89%	4%
ELLWOOD CITY AREA SD	64%	90%	3%	56%	89%	4%
EPHRATA AREA SD	67%	90%	2%	58%	88%	5%
ERIE CITY SD	66%	92%	2%	54%	89%	3%
EVERETT AREA SD	62%	89%	2%	52%	87%	5%
EXETER TOWNSHIP SD	65%	91%	2%	61%	92%	3%
FAIRFIELD AREA SD	63%	88%	3%	55%	87%	5%
FAIRVIEW SD	66%	92%	2%	73%	95%	2%
FANNETT-METAL SD	58%	88%	3%	44%	82%	7%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
FARRELL AREA SD	50%	80%	8%	40%	75%	10%
FERNDALE AREA SD	64%	92%	2%	51%	88%	5%
FLEETWOOD AREA SD	63%	91%	2%	57%	90%	3%
FORBES ROAD SD	62%	87%	4%	54%	83%	8%
FOREST AREA SD	57%	86%	5%	52%	87%	6%
FOREST CITY REGIONAL SD	57%	85%	4%	58%	89%	4%
FOREST HILLS SD	66%	91%	2%	56%	88%	5%
FORT CHERRY SD	60%	90%	3%	58%	91%	4%
FORT LEOEUF SD	67%	92%	1%	63%	92%	3%
FOX CHAPEL AREA SD	80%	96%	0%	75%	96%	1%
FRANKLIN AREA SD	62%	88%	3%	52%	85%	6%
FRANKLIN REGIONAL SD	73%	97%	1%	75%	97%	2%
FRAZIER SD	71%	93%	2%	58%	91%	4%
FREEDOM AREA SD	73%	95%	0%	60%	92%	3%
FREEPORT AREA SD	68%	92%	1%	62%	94%	2%
GALETON AREA SD	66%	92%	2%	50%	87%	3%
GARNET VALLEY SD	77%	95%	1%	74%	97%	0%
GATEWAY SD	67%	91%	3%	62%	90%	4%
GENERAL MCLANE SD	65%	91%	1%	59%	90%	4%
GETTYSBURG AREA SD	66%	92%	2%	60%	88%	4%
GIRARD SD	75%	95%	1%	57%	90%	3%
GLENDALE SD	57%	87%	4%	48%	83%	5%
GOVERNOR MIFFLIN SD	62%	89%	2%	60%	92%	3%
GREAT VALLEY SD	79%	96%	1%	77%	97%	1%
GREATER JOHNSTOWN SD	56%	85%	4%	44%	81%	7%
GREATER LATROBE SD	76%	96%	1%	66%	93%	2%
GREATER NANTICOKE AREA SD	61%	87%	4%	52%	84%	7%
GREENCASTLE-ANTRIM SD	64%	89%	3%	59%	89%	4%
GREENSBURG SALEM SD	78%	96%	1%	64%	93%	2%
GREENVILLE AREA SD	61%	89%	3%	55%	87%	5%
GREENWOOD SD	59%	89%	3%	53%	88%	4%
GROVE CITY AREA SD	71%	92%	1%	64%	92%	3%
HALIFAX AREA SD	59%	88%	2%	59%	89%	4%
HAMBURG AREA SD	64%	90%	2%	53%	87%	5%
HAMPTON TOWNSHIP SD	81%	96%	0%	78%	98%	1%
HANOVER AREA SD	58%	86%	3%	53%	84%	5%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
HANOVER PUBLIC SD	60%	87%	4%	52%	86%	5%
HARBOR CREEK SD	67%	95%	1%	62%	93%	3%
HARMONY AREA SD	58%	86%	4%	50%	82%	8%
HARRISBURG CITY SD	45%	70%	15%	35%	66%	19%
HATBORO-HORSHAM SD	80%	97%	1%	69%	95%	1%
HAVERFORD TOWNSHIP SD	73%	94%	2%	65%	93%	2%
HAZLETON AREA SD	62%	88%	3%	56%	86%	6%
HEMPFIELD SD	71%	93%	1%	65%	93%	3%
HEMPFIELD AREA SD	66%	92%	2%	63%	93%	3%
HERMITAGE SD	70%	93%	1%	64%	91%	3%
HIGHLANDS SD	64%	90%	3%	52%	87%	5%
HOLLIDAYSBURG AREA SD	69%	93%	2%	64%	92%	4%
HOMER-CENTER SD	64%	91%	2%	55%	88%	5%
HOPEWELL AREA SD	69%	94%	1%	60%	91%	3%
HUNTINGDON AREA SD	65%	90%	3%	56%	87%	5%
INDIANA AREA SD	64%	89%	3%	63%	90%	4%
INTERBORO SD	61%	90%	3%	55%	87%	4%
IROQUOIS SD	60%	89%	3%	50%	83%	6%
JAMESTOWN AREA SD	71%	93%	1%	63%	94%	2%
JEANNETTE CITY SD	58%	88%	3%	54%	87%	5%
JEFFERSON-MORGAN SD	56%	86%	5%	47%	84%	6%
JENKINTOWN SD	77%	95%	1%	75%	96%	1%
JERSEY SHORE AREA SD	67%	92%	2%	55%	88%	5%
JIM THORPE AREA SD	59%	89%	3%	53%	87%	5%
JOHNSONBURG AREA SD	64%	89%	3%	55%	87%	4%
JUNIATA COUNTY SD	61%	89%	3%	53%	86%	6%
JUNIATA VALLEY SD	62%	90%	1%	55%	86%	5%
KANE AREA SD	60%	88%	2%	55%	87%	5%
KARNS CITY AREA SD	63%	90%	2%	57%	91%	3%
KENNETT CONSOLIDATED SD	67%	90%	3%	62%	89%	5%
KEYSTONE CENTRAL SD	61%	88%	3%	51%	85%	6%
KEYSTONE OAKS SD	66%	92%	3%	58%	89%	4%
KEYSTONE SD	62%	92%	2%	59%	91%	4%
KISKI AREA SD	67%	92%	2%	64%	93%	3%
KUTZTOWN AREA SD	66%	90%	2%	60%	90%	4%
LACKAWANNA TRAIL SD	64%	90%	3%	58%	88%	4%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
LAKELAND SD	61%	90%	2%	58%	89%	3%
LAKE-LEHMAN SD	65%	90%	3%	63%	91%	3%
LAKEVIEW SD	63%	91%	2%	54%	89%	4%
LAMPETER-STRASBURG SD	73%	95%	1%	69%	95%	2%
LANCASTER SD	55%	82%	6%	42%	77%	10%
LAUREL SD	61%	88%	3%	54%	87%	4%
LAUREL HIGHLANDS SD	60%	86%	4%	54%	85%	7%
LEBANON SD	55%	84%	6%	42%	78%	9%
LEECHBURG AREA SD	60%	88%	3%	51%	86%	5%
LEHIGHTON AREA SD	64%	89%	2%	56%	89%	4%
LEWISBURG AREA SD	75%	96%	1%	73%	93%	3%
LIGONIER VALLEY SD	72%	94%	1%	63%	91%	2%
LINE MOUNTAIN SD	66%	91%	3%	58%	87%	5%
LITTLESTOWN AREA SD	60%	88%	3%	52%	86%	5%
LOWER DAUPHIN SD	72%	94%	1%	64%	92%	3%
LOWER MERION SD	83%	97%	1%	79%	98%	1%
LOWER MORELAND TOWNSHIP SD	81%	98%	0%	74%	97%	1%
LOYALSOCK TOWNSHIP SD	73%	95%	1%	62%	89%	5%
MAHANAY AREA SD	65%	90%	3%	56%	86%	5%
MANHEIM CENTRAL SD	67%	91%	2%	58%	90%	4%
MANHEIM TOWNSHIP SD	73%	94%	1%	68%	93%	3%
MARION CENTER AREA SD	65%	93%	2%	58%	89%	5%
MARPLE NEWTOWN SD	70%	94%	1%	66%	94%	1%
MARS AREA SD	70%	95%	1%	66%	95%	1%
MCGUFFEY SD	61%	89%	3%	57%	88%	5%
MCKEESPORT AREA SD	56%	83%	6%	46%	80%	8%
MECHANICSBURG AREA SD	71%	95%	1%	63%	92%	3%
MERCER AREA SD	67%	92%	1%	64%	92%	4%
METHACTON SD	78%	95%	1%	72%	96%	1%
MEYERSDALE AREA SD	60%	87%	3%	54%	87%	5%
MID VALLEY SD	62%	89%	3%	49%	85%	6%
MIDDLETOWN AREA SD	63%	90%	2%	51%	87%	5%
MIDD-WEST SD	62%	90%	2%	54%	87%	4%
MIDLAND BOROUGH SD	73%	93%	1%	57%	91%	4%
MIFFLIN COUNTY SD	62%	89%	2%	51%	85%	5%
MIFFLINBURG AREA SD	71%	92%	2%	62%	90%	4%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
MILLCREEK TOWNSHIP SD	65%	91%	2%	61%	90%	4%
MILLERSBURG AREA SD	60%	90%	3%	57%	88%	5%
MILLVILLE AREA SD	63%	89%	3%	62%	89%	4%
MILTON AREA SD	61%	87%	4%	51%	85%	6%
MINERSVILLE AREA SD	63%	88%	4%	57%	88%	4%
MOHAWK AREA SD	62%	88%	2%	51%	85%	6%
MONACA SD	58%	90%	3%	49%	86%	5%
MONESSEN CITY SD	64%	89%	3%	47%	83%	6%
MONITEAU SD	63%	90%	2%	55%	88%	4%
MONTGOMERY AREA SD	77%	95%	1%	61%	93%	2%
MONTOUR SD	68%	92%	2%	64%	92%	3%
MONTOURSVILLE AREA SD	74%	94%	1%	64%	93%	2%
MONTROSE AREA SD	62%	89%	3%	58%	88%	4%
MOON AREA SD	73%	94%	1%	65%	95%	2%
MORRISVILLE BOROUGH SD	60%	87%	3%	52%	86%	6%
MOSHANNON VALLEY SD	58%	88%	3%	52%	87%	5%
MOUNT CARMEL AREA SD	61%	88%	3%	53%	86%	6%
MOUNT PLEASANT AREA SD	61%	88%	3%	59%	89%	5%
MOUNT UNION AREA SD	62%	88%	3%	48%	83%	7%
MOUNTAIN VIEW SD	56%	85%	3%	53%	86%	5%
MT LEBANON SD	76%	96%	0%	78%	98%	1%
MUHLENBERG SD	62%	89%	3%	54%	85%	5%
MUNCY SD	64%	89%	2%	57%	88%	4%
NAZARETH AREA SD	67%	92%	2%	61%	91%	3%
NESHAMINY SD	69%	93%	1%	62%	92%	2%
NESHANNOCK TOWNSHIP SD	70%	94%	1%	60%	93%	3%
NEW BRIGHTON AREA SD	57%	86%	4%	52%	85%	5%
NEW CASTLE AREA SD	62%	88%	3%	51%	85%	6%
NEW HOPE-SOLEBURY SD	76%	96%	1%	72%	95%	2%
NEW KENSINGTON-ARNOLD SD	61%	87%	3%	52%	84%	7%
NEWPORT SD	59%	85%	4%	50%	85%	6%
NORRISTOWN SD	62%	87%	4%	48%	83%	8%
NORTH ALLEGHENY SD	83%	98%	0%	77%	98%	1%
NORTH CLARION COUNTY SD	63%	92%	2%	58%	90%	4%
NORTH EAST SD	66%	90%	2%	60%	90%	5%
NORTH HILLS SD	70%	94%	2%	65%	93%	2%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
NORTH PENN SD	76%	96%	1%	67%	94%	2%
NORTH POCONO SD	61%	90%	2%	59%	89%	4%
NORTH SCHUYLKILL SD	61%	89%	2%	50%	85%	5%
NORTH STAR SD	64%	91%	3%	57%	87%	5%
NORTHAMPTON AREA SD	63%	90%	2%	56%	90%	4%
NORTHEAST BRADFORD SD	60%	87%	4%	48%	83%	7%
NORTHEASTERN YORK SD	65%	91%	2%	53%	88%	4%
NORTHERN BEDFORD COUNTY SD	61%	89%	2%	55%	85%	5%
NORTHERN CAMBRIA SD	66%	90%	2%	55%	87%	4%
NORTHERN LEBANON SD	54%	84%	5%	50%	85%	6%
NORTHERN LEHIGH SD	60%	87%	3%	53%	85%	5%
NORTHERN POTTER SD	63%	88%	4%	48%	83%	6%
NORTHERN TIOGA SD	61%	90%	3%	53%	85%	5%
NORTHERN YORK CO SD	67%	91%	2%	59%	91%	3%
NORTHGATE SD	65%	91%	2%	57%	90%	5%
NORTHWEST AREA SD	57%	84%	5%	54%	85%	6%
NORTHWESTERN LEHIGH SD	66%	91%	1%	64%	91%	3%
NORTHWESTERN SD	61%	88%	4%	54%	85%	6%
NORWIN SD	77%	97%	1%	69%	93%	2%
OCTORARA AREA SD	65%	91%	2%	57%	88%	4%
OIL CITY AREA SD	58%	87%	4%	47%	83%	7%
OLD FORGE SD	64%	90%	2%	56%	88%	5%
OLEY VALLEY SD	63%	91%	2%	63%	92%	3%
OSWAYO VALLEY SD	63%	88%	4%	53%	86%	7%
OTTO-ELDRED SD	65%	90%	2%	58%	90%	4%
OWEN J ROBERTS SD	74%	94%	1%	68%	95%	1%
OXFORD AREA SD	65%	89%	2%	60%	89%	5%
PALISADES SD	68%	93%	2%	64%	92%	3%
PALMERTON AREA SD	66%	90%	3%	58%	90%	3%
PALMYRA AREA SD	65%	91%	2%	60%	91%	3%
PANTHER VALLEY SD	53%	81%	7%	43%	79%	8%
PARKLAND SD	77%	96%	1%	68%	94%	2%
PEN ARGYL AREA SD	65%	92%	1%	59%	89%	4%
PENN CAMBRIA SD	64%	89%	3%	56%	88%	5%
PENN HILLS SD	54%	84%	5%	48%	82%	7%
PENN MANOR SD	63%	90%	3%	56%	88%	4%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
PENNCREST SD	63%	88%	3%	56%	87%	6%
PENN-DELCO SD	70%	94%	1%	64%	93%	2%
PENNRIDGE SD	66%	93%	1%	63%	93%	2%
PENNS MANOR AREA SD	56%	85%	4%	50%	86%	5%
PENNS VALLEY AREA SD	69%	93%	1%	62%	91%	3%
PENNSBURY SD	69%	92%	2%	66%	93%	2%
PENN-TRAFFORD SD	78%	97%	1%	70%	96%	1%
PEQUEA VALLEY SD	63%	89%	3%	56%	87%	5%
PERKIOMEN VALLEY SD	76%	96%	1%	69%	96%	1%
PETERS TOWNSHIP SD	79%	97%	0%	73%	97%	1%
PHILADELPHIA CITY SD	55%	81%	8%	43%	76%	11%
PHILIPSBURG-OSCEOLA AREA SD	57%	86%	4%	52%	85%	6%
PHOENIXVILLE AREA SD	75%	95%	1%	67%	94%	2%
PINE GROVE AREA SD	65%	91%	2%	53%	87%	4%
PINE-RICHLAND SD	72%	94%	1%	67%	94%	2%
PITTSBURGH SD	57%	84%	5%	47%	80%	8%
PITTSTON AREA SD	65%	90%	2%	58%	88%	5%
PLEASANT VALLEY SD	59%	88%	3%	55%	88%	4%
PLUM BOROUGH SD	64%	91%	1%	64%	93%	2%
POCONO MOUNTAIN SD	62%	89%	3%	52%	86%	5%
PORT ALLEGANY SD	60%	87%	4%	52%	84%	7%
PORTAGE AREA SD	61%	89%	3%	55%	86%	6%
POTTSGROVE SD	64%	90%	3%	54%	88%	5%
POTTSTOWN SD	60%	87%	3%	47%	85%	6%
POTTSVILLE AREA SD	59%	89%	3%	55%	87%	5%
PUNXSUTAWNEY AREA SD	62%	89%	3%	56%	87%	5%
PURCHASE LINE SD	63%	87%	5%	52%	86%	6%
QUAKER VALLEY SD	76%	95%	0%	75%	95%	2%
QUAKERTOWN COMMUNITY SD	78%	95%	1%	66%	93%	2%
RADNOR TOWNSHIP SD	84%	98%	0%	80%	98%	1%
READING SD	56%	84%	5%	41%	77%	9%
RED LION AREA SD	67%	91%	2%	55%	88%	5%
REDBANK VALLEY SD	64%	90%	3%	54%	88%	4%
REYNOLDS SD	62%	91%	3%	59%	87%	4%
RICHLAND SD	69%	94%	1%	67%	94%	2%
RIDGWAY AREA SD	62%	89%	2%	54%	86%	6%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
RIDLEY SD	63%	89%	3%	54%	87%	5%
RINGGOLD SD	59%	87%	4%	53%	86%	6%
RIVERSIDE SD	61%	88%	4%	53%	86%	6%
RIVERSIDE BEAVER COUNTY SD	66%	91%	2%	58%	89%	3%
RIVERVIEW SD	71%	91%	3%	64%	91%	3%
ROCHESTER AREA SD	60%	88%	3%	50%	85%	4%
ROCKWOOD AREA SD	65%	92%	3%	56%	90%	4%
ROSE TREE MEDIA SD	77%	95%	1%	73%	95%	1%
SAINT CLAIR AREA SD	60%	87%	3%	52%	87%	4%
SAINT MARYS AREA SD	70%	96%	1%	58%	90%	3%
SALISBURY TOWNSHIP SD	66%	92%	2%	66%	93%	2%
SALISBURY-ELK LICK SD	65%	90%	3%	50%	88%	5%
SAUCON VALLEY SD	74%	96%	1%	63%	94%	2%
SAYRE AREA SD	69%	93%	1%	59%	91%	2%
SCHUYLKILL HAVEN AREA SD	63%	91%	2%	54%	88%	5%
SCHUYLKILL VALLEY SD	66%	91%	1%	63%	91%	2%
SCRANTON SD	64%	90%	3%	56%	87%	5%
SELINGROVE AREA SD	71%	94%	1%	65%	91%	3%
SENECA VALLEY SD	72%	95%	1%	66%	93%	2%
SHADE-CENTRAL CITY SD	61%	88%	3%	52%	86%	6%
SHALER AREA SD	63%	88%	3%	56%	88%	5%
SHAMOKIN AREA SD	59%	89%	3%	52%	86%	6%
SHANKSVILLE-STONYCREEK SD	64%	92%	1%	56%	88%	4%
SHARON CITY SD	62%	88%	3%	51%	84%	6%
SHARPSVILLE AREA SD	57%	87%	4%	55%	87%	5%
SHENANDOAH VALLEY SD	59%	87%	4%	50%	85%	6%
SHENANGO AREA SD	68%	94%	2%	60%	91%	3%
SHIKELLAMY SD	59%	86%	3%	52%	85%	6%
SHIPPENSBURG AREA SD	63%	88%	3%	54%	85%	6%
SLIPPERY ROCK AREA SD	64%	90%	3%	57%	88%	5%
SMETHPORT AREA SD	65%	91%	2%	52%	84%	7%
SOLANCO SD	67%	91%	2%	60%	90%	3%
SOMERSET AREA SD	60%	87%	4%	51%	84%	6%
SOUDERTON AREA SD	76%	95%	1%	68%	94%	2%
SOUTH ALLEGHENY SD	61%	87%	4%	52%	85%	6%
SOUTH BUTLER COUNTY SD	66%	92%	1%	61%	91%	4%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
SOUTH EASTERN SD	64%	90%	2%	58%	89%	4%
SOUTH FAYETTE TOWNSHIP SD	90%	98%	0%	77%	97%	1%
SOUTH MIDDLETON SD	64%	91%	2%	61%	91%	4%
SOUTH PARK SD	67%	91%	2%	63%	91%	4%
SOUTH SIDE AREA SD	62%	90%	3%	57%	90%	3%
SOUTH WESTERN SD	68%	92%	2%	57%	89%	5%
SOUTH WILLIAMSPORT AREA SD	69%	94%	1%	61%	92%	2%
SOUTHEAST DELCO SD	54%	83%	5%	43%	79%	8%
SOUTHEASTERN GREENE SD	58%	88%	4%	49%	83%	7%
SOUTHERN COLUMBIA AREA SD	67%	92%	2%	59%	90%	4%
SOUTHERN FULTON SD	78%	96%	1%	68%	92%	2%
SOUTHERN HUNTINGDON COUNTY SD	59%	87%	4%	48%	83%	7%
SOUTHERN LEHIGH SD	72%	94%	1%	65%	95%	2%
SOUTHERN TIOGA SD	60%	89%	3%	53%	87%	5%
SOUTHERN YORK CO SD	69%	94%	1%	65%	93%	2%
SOUTHMORELAND SD	68%	93%	2%	58%	89%	5%
SPRING COVE SD	62%	88%	3%	57%	88%	5%
SPRING GROVE AREA SD	65%	91%	2%	56%	88%	4%
SPRINGFIELD SD	76%	95%	1%	67%	94%	2%
SPRINGFIELD TOWNSHIP SD	70%	92%	2%	65%	92%	3%
SPRING-FORD AREA SD	80%	97%	1%	67%	94%	2%
STATE COLLEGE AREA SD	73%	92%	2%	72%	94%	2%
STEEL VALLEY SD	63%	89%	3%	52%	84%	6%
STEELTON-HIGHSPIRE SD	53%	80%	7%	39%	75%	10%
STO-ROX SD	55%	84%	6%	42%	76%	9%
STROUDSBURG AREA SD	63%	88%	3%	58%	88%	5%
SULLIVAN COUNTY SD	65%	89%	2%	59%	92%	3%
SUSQUEHANNA COMM SD	69%	92%	3%	59%	88%	4%
SUSQUEHANNA TOWNSHIP SD	65%	89%	3%	55%	86%	5%
SUSQUENITA SD	62%	89%	3%	54%	85%	5%
TAMAQUA AREA SD	61%	90%	2%	55%	89%	4%
TITUSVILLE AREA SD	64%	90%	2%	54%	88%	3%
TOWANDA AREA SD	61%	88%	3%	50%	86%	6%
TREDYFFRIN-EASTTOWN SD	80%	97%	0%	80%	98%	0%
TRINITY AREA SD	65%	90%	2%	62%	90%	4%
TRI-VALLEY SD	66%	92%	2%	57%	89%	4%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
TROY AREA SD	69%	92%	2%	57%	88%	4%
TULPEHOCKEN AREA SD	70%	93%	3%	57%	88%	5%
TUNKHANNOCK AREA SD	64%	90%	3%	59%	88%	4%
TURKEYFOOT VALLEY AREA SD	54%	82%	7%	41%	77%	9%
TUSCARORA SD	58%	86%	4%	51%	84%	6%
TUSSEY MOUNTAIN SD	57%	88%	3%	48%	82%	6%
TWIN VALLEY SD	72%	94%	0%	62%	91%	3%
TYRONE AREA SD	61%	88%	3%	61%	89%	5%
UNION SD	62%	88%	3%	53%	85%	5%
UNION AREA SD	63%	89%	3%	58%	88%	3%
UNION CITY AREA SD	61%	87%	4%	49%	83%	7%
UNIONTOWN AREA SD	61%	88%	4%	55%	85%	6%
UNIONVILLE-CHADDS FORD SD	87%	99%	0%	79%	99%	0%
UNITED SD	65%	90%	3%	57%	88%	5%
UPPER ADAMS SD	65%	89%	3%	57%	87%	5%
UPPER DARBY SD	62%	88%	4%	50%	84%	6%
UPPER DAUPHIN AREA SD	64%	90%	2%	53%	88%	5%
UPPER DUBLIN SD	82%	97%	1%	75%	95%	1%
UPPER MERION AREA SD	73%	95%	1%	65%	93%	2%
UPPER MORELAND TOWNSHIP SD	69%	95%	1%	64%	93%	2%
UPPER PERKIOMEN SD	64%	92%	2%	59%	90%	3%
UPPER SAINT CLAIR SD	86%	99%	0%	80%	99%	0%
VALLEY GROVE SD	55%	86%	4%	44%	84%	5%
VALLEY VIEW SD	65%	91%	1%	58%	91%	3%
WALLENPAUPACK AREA SD	65%	91%	2%	63%	91%	2%
WALLINGFORD-SWARTHMORE SD	81%	96%	1%	78%	97%	1%
WARREN COUNTY SD	61%	88%	3%	53%	87%	5%
WARRIOR RUN SD	66%	91%	2%	54%	89%	4%
WARWICK SD	66%	92%	2%	62%	91%	3%
WASHINGTON SD	60%	86%	5%	47%	83%	7%
WATTSBURG AREA SD	60%	88%	1%	58%	89%	4%
WAYNE HIGHLANDS SD	69%	92%	1%	60%	90%	4%
WAYNESBORO AREA SD	65%	90%	2%	55%	87%	5%
WEATHERLY AREA SD	72%	93%	2%	63%	90%	3%
WELLSBORO AREA SD	62%	89%	2%	55%	87%	4%
WEST ALLEGHENY SD	67%	92%	1%	62%	93%	2%

Addendum 4 – continued

Pennsylvania Race to the Top Expected Impact and District Performance Targets – continued

District	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
WEST BRANCH AREA SD	56%	84%	5%	48%	83%	7%
WEST CHESTER AREA SD	74%	95%	1%	72%	96%	2%
WEST GREENE SD	56%	85%	6%	48%	81%	8%
WEST JEFFERSON HILLS SD	67%	93%	1%	69%	95%	1%
WEST MIDDLESEX AREA SD	62%	89%	1%	55%	86%	5%
WEST MIFFLIN AREA SD	63%	89%	3%	54%	86%	5%
WEST PERRY SD	55%	85%	4%	52%	84%	6%
WEST SHORE SD	61%	88%	3%	58%	88%	5%
WEST YORK AREA SD	69%	92%	1%	60%	89%	4%
WESTERN BEAVER COUNTY SD	66%	92%	2%	58%	88%	5%
WESTERN WAYNE SD	65%	89%	2%	59%	89%	4%
WESTMONT HILLTOP SD	71%	96%	0%	67%	94%	1%
WHITEHALL-COPLAY SD	64%	91%	2%	57%	89%	4%
WILKES-BARRE AREA SD	59%	87%	3%	51%	85%	6%
WILKINSBURG BOROUGH SD	50%	77%	8%	35%	72%	11%
WILLIAM PENN SD	51%	80%	7%	40%	75%	11%
WILLIAMS VALLEY SD	54%	86%	5%	49%	83%	6%
WILLIAMSBURG COMMUNITY SD	56%	87%	4%	49%	84%	7%
WILLIAMSPORT AREA SD	66%	90%	3%	52%	86%	5%
WILMINGTON AREA SD	66%	91%	2%	61%	91%	4%
WILSON AREA SD	69%	93%	1%	61%	90%	4%
WILSON SD	75%	95%	1%	67%	94%	1%
WINDBER AREA SD	68%	89%	3%	66%	92%	4%
WISSAHICKON SD	77%	95%	1%	72%	94%	2%
WOODLAND HILLS SD	54%	83%	6%	45%	80%	8%
WYALUSING AREA SD	60%	88%	4%	54%	86%	5%
WYOMING AREA SD	72%	94%	1%	62%	92%	2%
WYOMING VALLEY WEST SD	59%	87%	3%	53%	86%	5%
WYOMISSING AREA SD	73%	92%	2%	66%	91%	4%
YORK CITY SD	54%	81%	7%	38%	74%	11%
YORK SUBURBAN SD	75%	95%	1%	69%	93%	2%
YOUGH SD	58%	87%	4%	54%	88%	5%



Dear Charter School Leader:

Pennsylvania is ready to compete in the next round of Race to the Top to secure up to \$400 million for our students and our schools. While the U.S. Department of Education chose to make just two state awards in Phase 1, Pennsylvania's application was extraordinarily well received. We were one of 16 states selected as finalists and invited to Washington, D.C. to present our plan, and our proposal was ranked 7th among the 41 states that competed.

Pennsylvania is well positioned to win a Race to the Top award in Phase 2. Our strength comes from the willingness of both districts and charters to commit to a bold agenda to deepen and accelerate our progress. We have carefully analyzed the comments of our peer reviewers as well those of other state applications to identify ways we can strengthen our position in Phase 2. If we all work well and closely together over the coming weeks, we can put Pennsylvania at the top of the Race to Top list and secure resources that will make a tremendous difference in the lives of our students.

Pennsylvania's Race to the Top Phase 2 application must be submitted by June 1, 2010. As you did this past winter, I am asking that you again lead a conversation in your school and community about the opportunities Race to the Top offers.

The requirements and expectations for Phase 2 will be identical to those in our Phase 1 application. Charters from Phase 1 will not need to submit a new MOU to evidence participation in Phase 2.

For charters which did not submit an MOU with the required signatures in Phase 1, we hope you will choose to join us. The information attached explains the expectations and requirements for charter schools.

As in Phase 1, Pennsylvania will support charter schools that are, or have the potential to be, highly effective in improving student achievement. Charter schools that currently have "Met AYP" status or have the ability to meet AYP by being in Making Progress, Warning, School Improvement 1 or School Improvement 2, will be eligible to join in Pennsylvania's Race to the Top application. This document includes a chart that provides a sense of the potential Race to the Top funding your school

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would receive (see page xx). As in Phase 1, this amount is calculated in the same manner as Pennsylvania calculates the estimated allocations for districts and are predicated on the following assumptions: (1) Pennsylvania receives a \$400 million award; (2) 150 school districts choose to participate; and (3) 100 percent of eligible charter schools choose to participate.

Since the requirements are identical in Phase 1 as in Phase 2, there are no changes to the addenda (including the MOU) sent to you originally on January 5, 2010. You will see them attached again for your use and reference.

This document outlines important next steps for charters that wish to add themselves to the list of chart schools in Pennsylvania's Race to the Top Phase 2 application; here is a quick overview:

- Fully review this document including the expectations for charter schools outlined in Addendum 1 (see page 9);
- Set up meetings as soon as possible with your board president and teachers' union leadership (if applicable) to discuss these expectations;
- Attend and encourage your board president and union leader (if applicable) to participate in one or both of the Race to the Top webinars (see schedule on page 5);
- Contact your PDE contact to ensure that your questions are answered and that you fully understand the expectations (see PDE contact on page 6)
- Submit your fully executed MOU for charters to PDE by May 21 (since Pennsylvania's application must be submitted to the U.S. Department of Education by June 1, 2010).

Charters play an integral role in our statewide strategy to improve public education and therefore Pennsylvania has a strong interest in supporting effective charters through our Race to the Top application. Through our collective efforts, we know that we will continue to build a world-class education system benefiting all of Pennsylvania's children.

Sincerely,



Thomas E. Gluck
Executive Deputy Secretary

Our Vision for Race To The Top

Race to the Top is an unprecedented opportunity to accelerate our academic gains and deliver on our commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills, globally-competitive, and knowledge-based economy. Pennsylvania will utilize these dramatic new resources to implement school-based improvements never before possible on such a broad scale and we are prepared to hold ourselves accountable for the results that really matter—greater student achievement.

Pennsylvania's Race to the Top application builds upon the strategies and practices we have been using in our schools that have resulted in the important and significant gains in student achievement in recent years. While we have learned that there is no silver bullet in education reform, we know from our own work that when specific behaviors and practices are implemented and aligned in a comprehensive manner, the result will be success for every child.

Pennsylvania's Race to the Top proposal is built around five objectives:

- Strengthening and expanding the standards-aligned system (SAS) and developing data systems capable of supporting reform
- Developing a world-class human pipeline for teachers and leaders
- Developing a multi-measure evaluation system for teachers and leaders
- Creating a coherent approach to professional development
- Turning around the lowest performing schools

Charter Checklist for Race To The Top

- Fully review this document including the expectations for charter schools outlined in Addendum 1 (see page 9)
- Set up meetings as soon as possible with your board president and teachers' union leadership (if applicable) to discuss these expectations
- Attend and encourage your board president and union leader (if applicable) to participate in one or both of the Race to the Top webinars (see schedule on page 5)
- Contact your PDE contact to ensure that your questions are answered and that you fully understand the expectations (see PDE contact on page 6)
- Submit your fully executed MOU for charters to PDE by May 21 (since Pennsylvania's application must be submitted to the U.S. Department of Education by June 1, 2010)

Commitment to Raising Student Achievement

NOTE: Charters that submitted an MOU in Phase 1 will not need to resubmit a new MOU for Phase 2.

Charter schools that choose to participate in Pennsylvania’s Race to the Top application must commit to implementing the set of activities and reforms outlined in Addendum 1 (see page 9).

Most importantly, charter schools also commit to delivering results--significant gains in student achievement that will be measured and for which charter schools will be held accountable.

Pennsylvania has set specific performance targets for schools to achieve by 2014. Table 1 describes the levels of student achievement charter schools will be expected to reach based on where student achievement is today in each school. Addendum 3 (see page 25) provides specific charter school achievement targets.

Table 1: Delivering Results: Expected Student Achievement Improvement by 2014

Expected Improvement – Math

	If today your achievement level is*...	In 2014, your achievement level will be...
Advanced	>50% advanced	66-90%
	20-50% advanced	53-69%
	<20% advanced	45-53%
Above proficient**	>70% proficient	86-99%
	50-70% proficient	79-92%
	<50% proficient	70-81%
Below basic	<10% below basic	0-3%
	10-20% below basic	2-6%
	>20% below basic	5-15%

Expected Improvement – Reading

	If today your achievement level is*...	In 2014, your achievement level will be...
Advanced	>50% advanced	67-80%
	35-50% advanced	56-68%
	<35% advanced	34-57%
Above proficient**	>70% proficient	86-99%
	60-70% proficient	82-87%
	<60% proficient	66-78%
Below basic	<10% below basic	0-4%
	10-20% below basic	3-7%
	>20% below basic	3-21%

* Based on the district average for the 2009 PSSA

** Above proficient includes both proficient and advanced

Charter schools that only serve grades 9-12 may have slightly lower 2014 performance targets and should refer to the school-level performance targets in Addendum 3.

Upon receiving Race to the Top funds, charter schools will have 90 days from the date of the award to submit a detailed, final scope of work (SOW) describing how the charter school will implement RTTT MOU requirements. It must include a detailed budget, timeline and implementation plan.

The Next Steps for Charter Schools

NOTE: Charters that submitted an MOU in Phase 1 will not need to resubmit a new MOU for Phase 2.

Charter school administrators need to work closely with the president of the school's board and the teachers' union leaders (if applicable) to review the state's Race to the Top goals so that these local education leaders clearly understand the commitment that is being made and the results that are expected.

This review should go beyond simply discussing the mechanics of selected reforms and should also include the academic gains that are expected as a result of the reforms. The bottom line for our efforts must be raising student achievement (see charter school goals in Addendum 3, page 25).

Charter schools that join in Pennsylvania's Race to the Top application and receive funding must agree to implement a set of reforms that are detailed in Addendum 1. If Pennsylvania receives a Race to the Top award, these schools will have up to 90 days from the date of the award to submit a detailed, final scope of work, along with a detailed budget and implementation plan.

Mandatory Information Sessions

NOTE: Charters that submitted an MOU in Phase 1 will not need to resubmit a new MOU for Phase 2 and therefore do not need to attend the information sessions.

The requirements for charter schools are serious and extensive. To ensure that charter schools are fully aware of these requirements, the charter school administrator considering participation in Race to the Top **MUST** attend a PDE webinar on one of the following days:

May 5, 3:30 p.m. – 4:30 p.m.

OR

May 10, 11 a.m. – 12 noon

You may access the webinars through www.pdewebinars.org. Locate the event entitled "Race to the Top – Charters," click on the Webinar Description button, and then click on the Register button. Advanced registration is not necessary.

The Next Steps for Charter Schools – *continued*

Memorandum of Understanding

NOTE: Charters that submitted an MOU in Phase 1 will not need to resubmit a new MOU for Phase 2.

Any charter school wishing to join in PA's Phase 2 Race to the Top application must submit a formal memorandum of understanding (MOU) no later than 5 PM on May 21. This MOU is Addendum 2 (see page 20). The MOU includes a preliminary scope of work that outlines the specific areas of reform the charter school is committed to pursuing.

This MOU must be signed by the charter school administrator, the president of the school's board of directors, and the local teacher's union leader (if applicable).

Remember, MOUs must be received by PDE no later than 5 PM on May 21, 2010. The MOU can be received by e-mail (please scan and send), postal service, or private delivery service (FedEx, UPS, etc.).

MOUs can be e-mailed to RA-RaceMOU@state.pa.us or mailed to:

MOUs can be e-mailed to:
RA-RaceMOU@state.pa.us or mailed to:

Jackie Achey, RTTT

PA Department of Education
333 Market Street 10th Floor
Harrisburg, PA 17126-0333

The U.S. Department of Education has set a firm deadline of Tuesday, June 1 for states to file their Race to the Top applications. All memoranda of understanding must be included in the formal state application. Because of this, it is critically important that you submit your MOU to the Pennsylvania Department of Education no later than 5 PM on May 21. There will be no extension of this deadline.

Please note that because of the time frame between May 21 and June 1 includes the Memorial Day holiday weekend, districts are encouraged to submit their MOUs as far in advance of the May 21 deadline as possible.

Have questions about Race to the Top?

The Pennsylvania Department of Education stands ready to provide assistance as charter schools engage in local conversations to determine whether your charter school will take advantage of this tremendous opportunity.

Please call upon us with questions and let us know any way that we can be helpful to you.

Please e-mail ra-pde@state.pa.us or call:

Jennifer Waltz at #717.214.5708

Dedicated Charter School Funding

While every charter school will benefit from the resources and tools that PDE will make available using the Race to the Top grant funding, only charter schools that submit an MOU as part of the Race to the Top application will share directly in Race to the Top funding in exchange for implementing the reforms detailed in Addendum 1. The chart below represents the approximate award levels if (1) Pennsylvania

receives a \$400 million award; (2) 150 school districts choose to participate; and (3) 100 percent of eligible charter schools choose to participate. All allocations are based on the Title I Part A funding that a school receives. Award amounts will vary depending on which, and how many charter schools submit and MOU. These estimates are preliminary and subject to change.

Table 2: Potential Award to Pennsylvania Charter Schools

Charter School	Low	High	Charter School	Low	High
Academy CS	\$26,988	\$35,422	Graystone Academy CS	\$26,710	\$35,056
Achievement House CS	\$25,495	\$33,462	Green Woods CS	\$51,218	\$67,223
Ad Prima CS	\$50,918	\$66,829	Imani Education Circle CS	\$131,082	\$172,046
Alliance for Progress CS	\$87,678	\$115,077	Independence CS	\$209,213	\$274,592
Antonia Pantoja Community CS	\$214,421	\$281,427	Khepera CS	\$94,623	\$124,193
Avon Grove CS	\$44,932	\$58,973	KIPP Academy Charter School	\$91,150	\$119,635
Bear Creek Community CS	\$40,255	\$52,835	Lehigh Valley Academy CS	\$64,678	\$84,890
Belmont CS	\$105,908	\$139,004	Lehigh Valley CHS for Performing Arts	\$20,399	\$26,774
Boys Latin of Philadelphia CS	\$69,448	\$91,151	Lincoln CS	\$206,670	\$271,254
Career Connections CHS	\$46,912	\$61,572	Lincoln Park Performing Arts CS	\$35,882	\$47,095
Charter High School for Architecture and Design	\$156,251	\$205,080	Manchester Academic CS	\$35,607	\$46,734
Chester Community CS	\$619,613	\$813,242	Maritime Academy Charter School	\$229,178	\$300,797
Christopher Columbus CS	\$226,574	\$297,378	Mastery Charter High School	\$124,138	\$162,932
City CHS	\$93,443	\$122,644	Mastery CS-Pickett Campus	\$103,304	\$135,587
Collegium CS	\$49,287	\$64,689	Mastery CS-Shoemaker Campus	\$132,819	\$174,325
Commonwealth Connections Academy CS	\$232,721	\$305,446	Mastery CS-Thomas Campus	\$135,424	\$177,744
Crispus Attucks Youthbuild CS	\$23,362	\$30,663	Math, Civics and Sciences CS	\$261,298	\$342,954
Delaware Valley CHS	\$180,565	\$236,991	Math, Science, Technology CS	\$336,990	\$442,300
Discovery Charter School	\$137,153	\$180,013	Montessori Regional CS	\$25,634	\$33,644
Eugenio Maria De Hostos CS	\$62,503	\$82,035	Multi-Cultural Academy CS	\$41,669	\$54,690
Family CS	\$32,120	\$42,158	New Foundations CS	\$157,994	\$207,368
Fell CS	\$21,613	\$28,367	New Hope Academy CS	\$83,566	\$109,680
First Phila CS For Literacy	\$227,442	\$298,518	New Media Technology CS	\$138,896	\$182,301
Folk Arts-Cultural Treasures CS	\$125,006	\$164,071	Northside Urban Pathways CS	\$49,695	\$65,225
Franklin Towne CHS	\$289,946	\$380,554	Northwood Academy CS	\$216,157	\$283,706
Freire CS	\$118,062	\$154,956	Nueva Esperanza Academy CS	\$204,871	\$268,893
Global Leadership Academy CS	\$157,126	\$206,227	Pan American Academy CS	\$97,227	\$127,611
			Pennsylvania Cyber School CS	\$597,405	\$784,094

Dedicated Charter School Funding – *continued*

Table 2: Potential Award to Pennsylvania Charter Schools - *continued*

Charter School	Low	High	Charter School	Low	High
People for People CS	\$154,522	\$202,810	The Environmental Charter School at Frick Park	\$41,617	\$54,622
Philadelphia Electrical & Tech CHS	\$183,170	\$240,410	The Laboratory Charter School	\$126,735	\$166,340
Philadelphia Harambee Inst CS	\$144,973	\$190,277	The Preparatory Charter School	\$172,752	\$226,737
Philadelphia Performing Arts CS	\$129,347	\$169,768	Tidioute Community CS	\$25,478	\$33,440
Planet Abacus CS	\$80,733	\$105,962	Truebright Science Academy CS	\$55,558	\$72,920
Pocono Mountain Charter School	\$27,101	\$35,570	Tuscarora Blended Learning CS	\$15,609	\$20,487
Propel CS-East	\$41,993	\$55,116	Universal Institute CS	\$175,356	\$230,155
Propel CS-Homestead	\$68,641	\$90,091	Urban League of Pittsburgh CS	\$38,574	\$50,628
Propel CS-McKeesport	\$57,601	\$75,601	Vitalistic Therapeutic CS	\$20,030	\$26,289
Propel CS-Montour	\$51,972	\$68,213	West Oak Lane CS	\$209,213	\$274,592
Renaissance Academy Edison CS	\$46,306	\$60,777	West Phila. Achievement CES	\$110,249	\$144,702
Renaissance Advantage CS	\$249,713	\$327,748	Widener Partnership CS	\$52,181	\$68,487
Renaissance CS	\$51,518	\$67,618	Wissahickon CS	\$116,325	\$152,676
Richard Allen Preparatory CS	\$117,194	\$153,817	World Communications CS	\$130,215	\$170,907
Robert Benjamin Wiley Community CS	\$71,737	\$94,155	Young Scholars CS	\$54,690	\$71,781
Robert Ketterer CS	\$7,842	\$10,293	Young Scholars of Central PA CS	\$4,650	\$6,104
Roberto Clemente CS	\$61,131	\$80,235	Young Scholars of Central PA CS	\$2,000	\$4,000
Russell Byers CS	\$118,062	\$154,956			
School Lane CS	\$70,178	\$92,108			
Southwest Leadership Academy CS	\$71,184	\$93,429			
Sugar Valley Rural CS	\$18,129	\$23,794			
Sylvan Heights Science CS	\$44,414	\$58,293			

-All charter schools not in Corrective Action are eligible for Race to the Top funding
 - Allocation is based on the proportion of Title I Part A funding the school receives
 - Charter schools that receive no Title I Part A funding or opened in 2009-10 school year but do not appear on this list are still eligible to receive some RTTT funds.

The list above does not include:

- 1) Charter schools that are ineligible for Race to the Top funding (charter schools in Corrective Action)
- 2) Charter schools that opened in 2009-10. (These schools are eligible for Race to the Top funding.)
- 3) Charter schools with < 2% census poor who were not on the state’s preliminary list for Title I Part A allocations. (These schools are eligible for Race to the Top funding.)

In addition to the funding received through Race to the Top, charter schools also will be expected to leverage other federal and state funding sources available for the same and/or complementary reform strategies targeted in the Race to the Top.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools

Objective 1: SAS and the Use of Data

Pennsylvania will further strengthen and expand the use and understanding of the standards-aligned system (SAS) and the data systems to support it. Such a system will enable district leaders, educators and classroom teachers to utilize and develop a coherent set of well aligned tools to directly target instruction to meet the academic and the social-emotional needs of individual students.

Effective use of SAS and a system of real time student level data promotes educational achievement because:

- ⊕ Students and their parents will have an accurate picture of students' academic and social-emotional strengths and weaknesses;
- ⊕ Teachers will know exactly where to target additional instructional and social-emotional support and have access to high-quality tools and resources;
- ⊕ Leaders will understand if there is a school-, district-, or postsecondary institution-wide issue that needs attention or promote an effective practice that could be spread more broadly;
- ⊕ PDE and IUs will be able to provide direct support and resources where they need to be deployed; and
- ⊕ Policymakers will clearly understand where spending is having the most impact.

The state will take appropriate action to align the model system of assessments to the final common core standards when adopted in Pennsylvania and will also develop and institute a system for appropriate assessment of all kindergarten children through the Pennsylvania Kindergarten Early Learning Network.

The following provides the specific required activities for participating districts to ensure that teachers and leaders are expanding the use of SAS and making the best use of an appropriate data system and the data available to them.

Required Activity 1: Implement a high quality curriculum that is aligned with standards, assessments, curriculum framework, instruction, materials and interventions.

Participating districts will be responsible for:

- ⊕ Crafting a strategic and coherent approach to these six elements of the standards aligned system that is consistent with the definitions and descriptions of these elements on the SAS portal at www.pdesas.org.
- ⊕ Aligning all district instructional materials and resources to the most granular level available (eligible content in the assessed content areas and standards-level in the non-assessment content areas).
- ⊕ Build time into the schedule for teachers to participate in collaborative learning such as peer-to-peer observations and teaming within and across grade levels that includes the use of SAS online tools; and
- ⊕ Provide additional supports to teachers in the use of SAS activities such as assigning mentors to staff needing additional assistance.

The Pennsylvania Department of Education will create voluntary training for district staff in curriculum mapping, delivery and evaluation of the alignment of all resources.

Required Activity 2: Implement a system of assessments with capacity to inform instruction on timely and regular basis.

Participating districts will utilize a coherent multi-level system of assessments that is fully aligned with standards and informs instruction on a regular basis. Levels of assessment must include summative assessment, including but not limited to the PSSA and Keystone Exams, when available, formative, benchmark and diagnostic assessments. Examples of benchmark assessments include 4Sight, Acuity, and Assess2Know. Examples of diagnostic assessments include DRAs, running records, GRADE and GMADE. Districts may

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 1: SAS and the Use of Data – *continued*

utilize the tools and resources as part of their system of assessments, which are available at PDE’s Standards Aligned System portal or develop their own system so long as it meets the same requirements.

Participating districts will be required to describe their system of assessments and how data from assessment will be collected, reviewed and used by teachers to inform and differentiate instruction and implement aligned interventions.

Required Activity 3: Implement a system to use real time student data to identify students at academic risk in grade 6 and above.

The state will develop a model Early Warning System that collects various elements of data which are predictive indicators of students who may be at risk for academic failure. Participating districts may adopt the state model or develop their own model which meets required standards. An early warning system must do the following:

- ⊕ Collect diagnostic, benchmark and summative assessment data as well as data on attendance, discipline, grades and credit accumulation;
- ⊕ Generate a “watch list” of students with at-risk indicators before school starts in September each year;
- ⊕ Update the “watch list” on a quarterly basis with progress of students on the list and addition of new students with at-risk indicators;
- ⊕ Identify and implement interventions for students on the “watch list” to address the problems identified by the at-risk indicators with particular emphasis on credit recovery interventions for high school students who fall behind in credit accumulation;
- ⊕ Monitor the performance of each school in the district at improving the performance of students identified with at-risk indicators and identify schools having success and schools that need additional help;

- ⊕ Generate automatic alerts e.g. e-mails, text messages or phone calls to parents, teachers and administrators when at risk indicators occur such as specified number of unexcused absences, string of poor test scores, second behavioral report, falling behind in credit accumulation;
- ⊕ Generate weekly reports for teachers and administrators of students showing early signs of risk of academic failure; and
- ⊕ Connect output from the early warning system to the state’s Response to Intervention (RTII) framework to assist teachers in identifying the most appropriate interventions based on the reported data

Required Activity 4: Implement a SIS that provides real time student data and can communicate with PIMS.

Pennsylvania will establish a **voluntary statewide, real-time model Student Information System (SIS)** which will enable efficient and effective communication with the Pennsylvania Information Management System (PIMS). PDE will convene a steering committee of PDE staff, identified state-wide organizations, and participating district representatives to identify system requirements, assist in drafting an RFP through which a vendor will be selected for system development as well as training of schools, districts and IUs on the use of the SIS. PDE will allocate Race to the Top state funds for the one-time design and purchasing costs of the voluntary SIS, school and district data cleaning and conversion, and school and district staff training. Schools and districts who choose to adopt the voluntary SIS will be responsible for the annual maintenance costs and service level agreements.

Required Activity 5: Provide collaborative time for teachers to review real time student data to drive instruction.

In addition to developing a model early warning system, the state will also develop a set of model routines and tools that facilitate review of data and data informed decision making at the classroom, school and district level and identification and implementation

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 1: SAS and the Use of Data – *continued*

of appropriate interventions. Data routines and tools are for the purpose of assisting teachers to differentiate instruction and help advanced students accelerate their learning and help struggling students catch up. Participating schools and districts must adopt these model data routines and tools or develop their own routines and tools that accomplish the same purpose of providing teachers and leaders with collaborative time to review student data and then to use that data to identify and implement appropriate, targeted interventions. These routines will include:

- ✦ **Conduct staff data review meeting one week before the new school year** facilitated by the leadership data team. During the meeting teachers will:
 - Review the prior-year’s summative assessment data for their incoming students, segment their students by performance and identify high-need students
 - Be trained on the use of the diagnostic reports on the SAS portal so that diagnostic assessments can be administered within the first week of school and be used to customize instruction for each student segment by integrating the appropriate instructional strategies, learning progressions, and academic interventions
 - Be trained in the appropriate instructional interventions to respond to specific deficiencies or needs identified by the data;
 - Collectively review school-level and grade-level data to identify issues and devise and implement action plans to address the issues.
- ✦ **Conduct staff data review** meetings with all staff at least quarterly during the school year led by the school’s leadership team. The meetings will be seminars organized each quarter (or after the release of interim assessment results) and time for these meetings will qualify as an ACT 80 activity. During the meetings staff will:
 - Discuss the previous quarter’s data and evaluate the outcomes of various action plans/ interventions;
 - Review the quarterly early warning system report to assess the effectiveness of interventions in helping at-risk students;
 - Devise new action plans for newly identified and previously identified at-risk students;
 - Review and discuss the school’s goals articulated in its school improvement plan, and use data to assess whether the school is on track to achieving the goals; and
 - Identify new targets and share strategies for the upcoming quarter
- ✦ **Conduct bi-weekly leadership data team** meetings where the school leadership team and instructional coaches will:
 - Use the early warning system data to identify at-risk students and devise strategies and interventions to respond to student specific needs;
 - Focus on school-wide issues identified during the quarterly reviews by using school-level data to track performance; and
 - Develop agendas and materials that will guide teacher collaborative planning time and make the time spent more effective
- ✦ **Provide for weekly teacher collaborative planning time** facilitated by instructional coaches or data facilitators where:
 - Grade-level teachers review at-risk students flagged by the early warning system, discuss the specific needs of such students and collaborate in the development of appropriate intervention strategies;
 - Subject matter teachers discuss common challenges they face with teaching specific portions of the curriculum;
 - Coaches help teachers with instructional strategies for specific objectives and share effective classroom practices that help improve outcomes

PDE will work with a vendor that specializes in developing tools for utilizing data in this manner. The vendor will be identified through an RFP process.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 2: Human Capital Pipeline

Pennsylvania’s strategy for ensuring the equitable distribution of effective teachers includes activities at both the state level and within participating districts and charter schools. At the state level, activities will be directed to increase the number of effective teachers, especially in subject matter shortage areas and in high need schools. Participating districts and charter schools will need to ensure they have human capital plans to attract and retain effective teachers and principals and to distribute them equitably across all schools and classrooms.

Required Activity 1: Develop a human capital plan to identify strategies based on district or school needs to attract and retain effective teachers, limit teacher vacancies, staff hard-to-staff subjects, and address the equitable distribution of highly effective teachers.

Participating districts and charter schools will be required to develop a human capital plan that identifies the district or charter school’s strategies for attracting and retaining effective teachers and leaders and to report the distribution of effective teachers across their schools and classrooms. In addition, schools and districts which are determined to lack equity in distribution of effective teachers among their lowest performing schools and schools that are high minority and high poverty will be required to develop Teacher Equity Plans as part of their RTTT Implementation Plan and also part of their Strategic Plan.

The human capital plan will be required to include specific elements described in guidance to be issued by the state, developed in collaboration with appropriate stakeholders including representatives of teachers unions, which elements may include:

- ✦ Identification of the specific skills and competencies incoming teachers should be able to demonstrate;
- ✦ Induction strategies for new teachers and for teachers new to the district;
- ✦ Plans to develop a career ladder and/or compensation incentives, if any;
- ✦ The hiring and placement of teams of teachers together in a cohort model;

- ✦ Assisting teachers in taking advantage of state-provided professional development opportunities in hard to staff and high rigor subjects;
- ✦ Incentives for teachers and leaders who pursue specific types of professional advancement linked to increased student achievement (e.g. National Board Certification, Advanced Placement certification, Reading Recovery teacher or teacher/leader certification)
- ✦ Partnerships with IHE teacher preparation programs for districts or schools to offer enhanced student teacher placements with highly effective supervising teachers; and
- ✦ Measurable outcomes of plan elements.

In addition, participating districts and schools will be required to adopt a common application for prospective teachers in order to facilitate the state wide online marketplace to be developed by the state. (See below under State level Activities).

Required Activity 2 (optional): Provide signing and retention bonuses for effective teachers and principals in hard to staff schools and subject areas.

Strategies available to districts to enhance equitable distribution of effective teachers include paying bonuses to teachers in hard-to-staff subjects and for moving to high need schools. Bonus payments can be back loaded to the end of four or five years to facilitate teacher retention.

Required Activity 3 (optional): Adopt a career ladder for promotion, compensation, and advancement of teachers based upon responsibility and other factors including student growth.

Development of a career ladders allows teachers to pursue a variety of positions throughout their careers – teacher, mentor and master teacher – depending upon their interests, abilities and accomplishments. As teachers move up the ranks, their qualifications, roles and responsibilities increase – and so does their

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 2: Human Capital Pipeline – *continued*

compensation. This allows good teachers to advance professionally without having to leave the classroom. It also creates expert teacher leaders within schools to provide support to other teachers.

Participating districts and charter schools, in collaboration with local unions as appropriate, may use teacher and principal evaluation results to develop individual goals and learning plans for all educators and link them to professional opportunities and additional compensation along a well-specified career ladder.

PDE will assist participating districts and charter schools by creating a model career ladder in collaboration with appropriate stakeholders that will include traditional rungs, such as advancement to team leaders, coaches, and district positions. The model will also include non-traditional rungs such as induction mentor, student teacher supervisor and master teacher.

State level activities:

A key strategy at the state level will be to develop statewide recruitment and alternative certification initiatives. The state will implement *Teach for PA*, a statewide centralized program to provide schools and districts with high-quality teachers for high-need subjects and schools through statewide marketing, a centralized application process, matching teachers with schools and districts, and facilitation of certification and program evaluation. *Teach for PA* will provide seed money to the following alternative certification programs:

- **Add-on certification:** For certified teachers needing additional certifications (e.g., English teacher moving to Special Education).
- **Residency certification:** For candidates with more than 5 years of work experience who meet content requirements (e.g., BA in Biology). Candidate completes 4 months of coursework and spends one year in residence with a highly effective teacher.
- **Internship Certification:** For candidates with less than 5 years of work experience or without content coursework. Candidates are in classroom full-time while earning their certification through one of 37 IHE programs around the state. Includes rural intern certification comprised of virtual coursework with on-site field component.
- **Turnaround Academies:** For certified and uncertified teachers wanting to teach in turnaround schools. Candidates are trained through a rigorous one-year residency program in a turnaround school.
- **Scholarship Program:** For high performing high school students from high-need schools who become certified to teach and agree to teach in high-need schools for 4 years in exchange for college tuition support.

Participating districts will have an opportunity to partner with the state to implement these activities in their district, including development of local turnaround academies.

In addition, the state will also streamline the certification process for out of state teachers by making requirements more relevant, using an interactive on-line program to guide teachers through requirements, and expediting the process for out-of-state teachers wanting to teach in high needs schools and subjects.

The state will also develop a state wide online marketplace where teaching applicants can fill out one standard application and easily apply for multiple positions. School and district staff will be able to view the statewide applicant pool and search by specific requirements as positions open. The state will also monitor the distribution of highly effective teachers and principals and deploy supports as appropriate.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 3: Multi-measure Evaluation

Addendum 1 to Secretary Zahorchak’s letter to superintendents on December 4, 2009 listed four specific “proposed activities” for participating districts relating to the primary objective of “multi-measure evaluation.” Set forth below is additional detail about each of these activities so participating districts and charter schools can understand exactly what is required by taking part in Pennsylvania’s Race to the Top application.

Multi-measure Teacher Evaluations

Required Activity 1. Develop and implement a multi-measure evaluation system for teachers that takes into account data on student growth as a significant factor and is designed and developed with teacher involvement.

Upon the awarding of a Race to the Top grant, the state will convene a steering committee to develop a model teacher evaluation system which is expected to be ready for a pilot by January 1, 2011. The steering committee will include representation of district leadership, Intermediate Units, teachers’ unions and other appropriate stakeholders.

Participating districts and charter schools may choose to adopt the state model, or adapt it with variations; participating districts and charter schools may also choose to develop their own evaluation system which must be approved by PDE. In the spring of the 2010-2011 school year, the state model evaluation system will be piloted in select districts. Professional development on the implementation of the new evaluation system will begin statewide for all participating districts and charter schools.

All participating districts and charter schools must begin implementation of a Race to the Top teacher evaluation system beginning in September 2011, using either the state model or a district developed model that has been approved by PDE.

Both the state model and district specific systems must meet the standards for teacher evaluation systems set forth in our Race to the Top application. For teachers, these standards include:

- ⊕ Utilizing multiple measures for evaluation that include at least the following;
 - Planning and Preparation (e.g., Setting instructional Outcomes, knowledge of resources and planning coherent instruction)
 - Classroom Environment (e.g., establishing a culture for learning, managing classroom procedures and managing student behavior)
 - Instruction (e.g., engaging students in learning, using assessments to inform instruction and demonstrating flexibility and responsiveness)
 - Professional Responsibilities (e.g., reflecting on teaching and student learning, keeping accurate records and appropriate communications with families)
 - Student Growth (student achievement gains through a range of assessments both quantitative and qualitative)
- ⊕ For each measure in the evaluation system, creating a transparent rubric by which teachers’ progress will be evaluated.
- ⊕ Providing for five levels of evaluation ratings. The ratings will be aligned with years of experience and expected performance as defined in the evaluation system. Educators will receive one of the following five ratings:
 - Entry
 - Emerging
 - Achieving
 - Highly Effective 1
 - Highly Effective 2

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Required Activity 2. Conduct annual evaluations of teachers that include timely and constructive feedback and provide data on student growth for students, classes and schools.

As part of the formal evaluation, teachers will be rated as described above, and placed in one of two tracks for the following review period: the growth track or the improvement track.

The purpose of the growth track is to collect information which will result in professional growth by allowing the teacher to progress toward mutually developed goals. For teachers in the growth track, principals or other trained evaluators will conduct at least two formal observations per year and complete an annual summative evaluation. The principal and the teacher will prepare and sign a development plan for the teacher. As part of creating and informing the development plan, principals will provide and discuss appropriate student growth data with teachers.

Teachers who have underperformed the effectiveness level expected based on their years of experience and qualifications are put into the *improvement track*. For teachers placed in the improvement track, the principal will design an improvement plan for the teacher with specific goals and benchmarks. For teachers in the improvement track, principals or other trained evaluators will conduct two formal evaluations per year. Each evaluation period will include two formal observations as well as informal observations as needed.

Teachers in the improvement track will earn ratings of “Satisfactory,” “Shows Improvement” or “Unsatisfactory” as required in the school code. A “Satisfactory” rating means the individual has attained the level expected in the growth track and satisfactorily completed their improvement plan and will return to the appropriate growth status. If the teacher receives two consecutive “Unsatisfactory” ratings after being placed in the improvement track, they may be dismissed according to State statute and collective bargaining contracts using fair and transparent procedures.

Required Activity 3. Provide training to all teachers on effective use of the evaluation system.

During the school year 2010-11, the state led evaluation steering committee will work with Intermediate Units to design and implement a statewide roll out of the model evaluation systems for teachers and principals including professional development at state expense for teachers, principals and superintendents in how best to implement and utilize the model system. Participating districts and charter schools that develop their own plan must also provide teachers and principals with professional development on how best to implement and use their evaluation system. The training plans will provide for ongoing coaching and development in addition to initial training.

Required Activity 4. Use evaluations to inform decisions regarding professional development, compensation, promotion and retention, tenure and removal of ineffective teachers after ample opportunity to improve.

Results of evaluations are to be used to inform the professional development of teachers both individually and in teams or groups. Evaluations will highlight *what* skills need improvement; targeted professional development can then focus on *how* to improve those specific skills.

As described above, principals will work with teachers in the growth track to create an annual development plan, and principals will work with teachers in the improvement track to develop an annual improvement plan.

Districts must develop a plan for how the teacher evaluation process will be used to identify highly effective teachers for additional responsibilities and/or additional compensation.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Specific opportunities and compensation levels for teachers designated highly effective must be collectively bargained at the local level but may include:

- Pay supplements or increases for highly effective I teachers and highly effective II teachers who choose to take on additional responsibilities, or highly effective teachers who work in high needs schools
- Group performance compensation (e.g., grade level, school)

Multi-measure Principal Evaluation

Required Activity 1. Develop and implement a multi-measure evaluation system for principals that takes into account data on student growth as a significant factor and is designed and developed with principal involvement.

Upon the awarding of a Race to the Top grant, the state will convene a steering committee that includes principals and teachers to develop a model principal evaluation system that is expected to be substantially completed by January 1, 2011. Participating districts may choose to adopt the state model, or adapt it with variations; participating districts may also choose to develop their own evaluation system which must be approved by PDE. School year 2010-11 will be a time for training and professional development on implementation of a principal evaluation system. All participating districts must begin implementation of a Race to the Top principal evaluation system beginning in September 2011, using either the state model or a district developed model that has been approved by PDE.

Both the state model and district specific Principal evaluation systems must meet include the following:

Core Standards:

- The leader has the knowledge and skills to think and plan strategically, creating an organizational vision around personalized student success.
- The leader has an understanding of standards-based systems theory and design and the ability to transfer that knowledge to the leader's job as the architect of standards-based reform in the school.

- The leader has the ability to access and use appropriate data to inform decision-making at all levels of the system.

Corollary Standards:

- The leader knows how to create a culture of teaching and learning with an emphasis on learning.
- The leader knows how to manage resources for effective results.
- The leader knows how to collaborate, communicate, engage and empower others inside and outside of the organization to pursue excellence in learning.
- The leader knows how to operate in a fair and equitable manner with personal and professional integrity.
- The leader knows how to advocate for children and public education in the larger political, social, economic, legal and cultural context.
- The leader knows how to support professional growth of self and others through practice and inquiry.

Required Activity 2. Conduct annual evaluations of principals that include timely and constructive feedback and provide data on student growth for students, classes and schools.

The model system and any district developed systems will provide for at least annual formal evaluations of principals. For principals working on an Administrative I certificate, evaluations shall be at least twice annually. Principal evaluations are to be conducted by their superintendent or direct supervisor, e.g. regional supervisor and will be based on competencies included in the Pennsylvania Inspired Leadership Program as well as student growth data. Evaluation input will include progress against an individual's annual performance plan and goals developed jointly between principal and superintendent, superintendent observations, student achievement, teacher surveys and self-assessment. Student Growth Data will include student achievement gains through a range of assessments both quantitative and qualitative for the principal's school.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 3: Multi-measure Evaluation – *continued*

Like the teacher evaluation system, the principal evaluation system will have multiple ratings that can be used to identify ineffective principals as well as highly effective principals for additional responsibilities, e.g. leading high needs school, acting as PIL facilitators, principal mentors and, potentially, earning higher compensation. Evaluation will result in identification of one of five levels of principal “effectiveness”:

- ⊕ Residency
- ⊕ Induction
- ⊕ Emerging
- ⊕ Achieving
- ⊕ Highly effective

Principals who have underperformed the effectiveness level expected of them are put into the *improvement track*. They will receive an improvement plan with specific goals and benchmarks. If the principal receives two unsatisfactory ratings, they may be dismissed according to State Statute using fair and transparent procedures.

Required Activity 3. Provide training to all principals on effective use of the evaluation system.

During the school year 2010-11, the state led evaluation steering committee will work with Intermediate Units to design and implement a statewide roll out of the model evaluation systems for teachers and principals including professional development for teachers, principals and superintendents in how best to implement and utilize the model system. The training plan will provide for ongoing coaching and development in addition to initial training.

Required Activity 4. Use evaluations to inform decisions regarding professional development, compensation, promotion and retention.

Principals will be evaluated each year by the superintendent, have post-evaluation conversations with their superintendent and be required to submit an individualized development plan. Effectiveness levels will be based on achievement of the performance plan,

which includes student growth objectives, and yearly goals. Principals identified as “ineffective” will have an improvement plan designed by their superintendent with semi-annual goals. Principals will have quarterly reviews and semi-annual evaluations. Principals identified as “unsatisfactory” for two consecutive evaluations can be dismissed. Principals working on an Administrative I certificate whose schools fail to show improved student growth for two consecutive years will not be recommended for an Administrative II certificate.

State Collection and Publication of Teacher Evaluation Data

Reporting requirements of the ARRA State Fiscal Stabilization Fund grant require the state to collect data on the evaluation systems **of all LEAs** and make the following information “publicly available”:

- ⊕ A description of the systems used to evaluate the performance of teachers and the use of results from those systems in decisions regarding teacher development, compensation, promotion, retention and removal (This will be summary data. No data that could identify any individual will be made publicly available.)
- ⊕ Whether the systems used to evaluate the performance of teachers include student achievement outcomes or student growth data as an evaluation criterion.
- ⊕ If the district’s teachers receive performance ratings or levels through an evaluation system, the number and percentage of teachers rated at each performance rating or level.
- ⊕ If the district’s teachers receive performance ratings or levels through an evaluation system, whether the number and percentage of teachers rated at each performance rating or level are publicly reported for each school in the LEA.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 4: Professional Development and Training

Pennsylvania has identified the knowledge and skills that successful teachers, principals and other school leaders need to improve student achievement, and the Department of Education has created a comprehensive system of preparation, induction, and continuing professional education to build those competencies. Building on the success of the Pennsylvania Inspired Leadership Program, the commonwealth will create a coherent approach to professional development for teachers as well as leaders. Recognizing that the best professional development is job-embedded and designed to change practice, Pennsylvania's system will ensure that all professional development activities for teachers are linked to classroom practice and the needs of teachers both individually and in groups as identified by the evaluation system. Likewise, professional development activities for principals will be linked to those needed leadership practices identified in the evaluations that will impact student achievement.

Required Activity 1: Provide professional development to teachers and principals based upon the needs evidenced by teacher and principal evaluation results

Through the multi-measure evaluation system described in Primary Objective 3, principals in participating district schools and charter schools will:

- In collaboration with teachers on the growth track, create an individual development plan for teachers on the growth track based on the results of the teacher's evaluation;
- Create an individual improvement plan for teachers on the improvement track based on the results of the teacher's evaluation;
- Establish school-wide professional development based upon the needs of the teachers as identified in the individual development/improvement plans;

- Create a system of supports that provides teachers with the opportunity to learn new skills and practice them in the classroom with guidance from the principal, mentors, master teachers or coaches;
- Ensure that the professional development and training opportunities detailed in the plans of individual teachers and the group plan directly meet the teachers' needs as described in evaluations;
- Be responsible for ensuring that the professional development plans of individual teachers and the group plan are fully implemented; and
- To the extent possible, identify effects on student achievement, engagement or other student related factors or particular professional development activities.

PDE will develop an online rubric to assist teachers and principals in matching professional development opportunities to specific individual needs and interests as identified in teacher professional development plans. For principals, Act 45 core and corollary standards are mapped to Pennsylvania Inspired Leadership (PIL) programs via an electronic rubric, so principals can clearly see what professional development is suited to specific needs identified through the evaluation process. Principals identified as "in need of improvement" will have an improvement plan designed by their superintendent with semi-annual goals and a professional development plan set forth. All professional development programs will include job-embedded activities that are designed to address the specific areas of improvement identified through the evaluation. Mentors may be assigned by the district to guide and support the principal in implementing identified improvements.

Addendum 1 – Pennsylvania Race to the Top Requirements for Charter Schools – *continued*

Objective 4: Professional Development and Training – *continued*

Required Activity 2: Provide professional development to all district instructional staff on effective instructional practices including: the use of data and systems of assessment to differentiate instruction; providing high rigor coursework; SAS tools and resources; Response to Instruction and Intervention; systems to identify students at risk; and development of Individual Learning Plans.

Participating districts and charter schools will:

- ⊕ Provide training to their instructional staff on their systems of assessment and their use in differentiating and customizing instruction based upon student needs and integrating the appropriate instructional strategies, learning progressions, and academic interventions;
- ⊕ Provide training to their instruction staff on the SAS (including the SAS portal) or on their own instructional improvement system;
- ⊕ Build time into the schedule for collaborative learning such as peer-to-peer observations and teaming within and across grade levels that includes the use of model SAS online tools or a similar instructional improvement system;
- ⊕ Provide supports such as assigning mentors to staff needing additional assistance in utilizing the instructional improvement system;
- ⊕ Implement systems to identify students at risk and align student needs with high quality intervention such as the Response to Instruction and Intervention (RTII) framework;
- ⊕ Provide professional development to high school teachers in providing high rigor coursework; and
- ⊕ Train on the development of Individual Learning Plans.

Required Activity 3: Ensure that district professional development plans and policies align with Race to the Top strategies and requirements.

- ⊕ Professional development expenditures of all participating districts will be aligned with the Race to the Top activities and the district professional development plan.
- ⊕ Review the district professional development plan and policies to ensure there are no barriers to teachers and principals participating in professional development that addresses needs identified in teacher and principal evaluations and individual development or improvement plans and revise as necessary;
- ⊕ District-sponsored professional development beginning in the 2010-2011 school year must focus on the implementation of Race to the Top activities including but not limited to the use and understanding of the standards-aligned system (SAS) to improve student achievement and the use of data to improve instruction based on student needs;
- ⊕ The plan must ensure that all Race to the Top professional development activities are included in district oversight of professional development activities; and
- ⊕ All school district leadership including school board members will receive training to assure that all district plans and policies align with Race to the Top strategies and requirements.

Addendum 2

Pennsylvania Race to the Top Memorandum of Understanding for Charter Schools

This Memorandum of Understanding (“MOU”) is entered into by and between the Commonwealth of Pennsylvania (“State”) and _____ (“RTTT Charter”). The purpose of this agreement is to establish a framework of collaboration, as well as articulate specific roles and responsibilities in support of the State in its implementation of an approved Race to the Top grant project.

I. SCOPE OF WORK

Exhibit I, the Preliminary Scope of Work, indicates the Required Activities consistent with the State’s proposed reform plans (“State Plan”) which the RTTT Charter is agreeing to implement

II. PROJECT ADMINISTRATION

A. RTTT CHARTER RESPONSIBILITIES

In assisting the State in implementing the tasks and activities described in the State’s Race to the Top application, the RTTT Charter subgrantee will:

- 1) Implement the RTTT Charter plan as identified in Exhibit I of this agreement;
- 2) Actively participate in all relevant convenings, communities of practice, or other practice-sharing events that are organized or sponsored by the State or by the U.S. Department of Education (“ED”);
- 3) Post to any website specified by the State or ED, in a timely manner, all non-proprietary products and lessons learned developed using funds associated with the Race to the Top grant;
- 4) Participate, as requested, in any evaluations of this grant conducted by the State or ED;
- 5) Be responsive to State or ED requests for information including on the status of the project, project implementation, outcomes, and any problems anticipated or encountered;
- 6) Participate in meetings and telephone conferences with the State to discuss (a) progress of the project, (b) potential dissemination of resulting non-proprietary products and lessons learned, (c) plans for subsequent years of the Race to the Top grant period, and (d) other matters related to the Race to the Top grant and associated plans.

B. STATE RESPONSIBILITIES

In assisting RTTT Charters in implementing their tasks and activities described in the State’s Race to the Top application, the State grantee will:

- 1) Work collaboratively with, and support the RTTT Charter in carrying out the Charter Plan as identified in Exhibit I of this agreement;
- 2) Timely distribute the RTTT Charter’s portion of Race to the Top grant funds during the course of the project period and in accordance with the Charter Plan identified in Exhibit I;
- 3) Provide feedback on the RTTT Charter’s status updates, annual reports, any interim reports, and project plans and products; and
- 4) Identify sources of technical assistance for the project:

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Charter Schools – *continued*

C. JOINT RESPONSIBILITIES

- 1) The State and the RTTT Charter will each appoint a key contact person for the Race to the Top grant.
- 2) These key contacts from the State and the RTTT Charter will maintain frequent communication to facilitate cooperation under this MOU.
- 3) State and RTTT Charter grant personnel will work together to determine appropriate timelines for project updates and status reports throughout the whole grant period.
- 4) State and RTTT Charter grant personnel will negotiate in good faith to continue to achieve the overall goals of the State's Race to the Top grant, even when the State Plan requires modifications that affect the RTTT Charter, or when the Charter Plan requires modifications.
- 5) Nothing in this MOU shall be construed to alter or otherwise affect the rights, remedies, and procedures afforded under federal, state, or local laws (including applicable regulations or court orders) or under the terms of any applicable collective bargaining agreements. By way of the signatures below, the RTTT Charter and any local teachers' union agree that if the State's application is funded they will bargain in good faith regarding those elements of the RTTT Charter's plan in Exhibit I that are mandatory subjects of collective bargaining or are contrary to any provision of the collective bargaining agreement between the RTTT Charter and the union; and further agree that those portions of Exhibit I that are mandatory subjects of bargaining, as provided by the Public Employee Relations Act and decisions of the PA Labor Relations Board or courts, or are contrary to any provision of the collective bargaining agreement shall be implemented only upon agreement of the RTTT Charter and the union.

D. STATE RECOURSE FOR CHARTER NON-PERFORMANCE

The State intends to conduct reviews of RTTT Charter progress in plan implementation three times per year. If the State determines that the Charter is not meeting its goals, timelines, budget, or annual targets or is not fulfilling other applicable requirements, the State grantee will take appropriate enforcement action, which could include a collaborative process between the State and the RTTT Charter, or any of the enforcement measures that are detailed in 34 CFR section 80.43 including putting the RTTT Charter on reimbursement payment status, temporarily withholding funds, disallowing costs or terminating this MOU for non compliance.

III. ASSURANCES

The RTTT Charter hereby certifies and represents that it:

- 1) Has all requisite power and authority to execute this MOU;
- 2) Is familiar with the State's Race to the Top grant application and is supportive of and committed to working on all or significant portions of the State Plan;
- 3) Is a bricks-and mortar charter school chartered by a school district in Pennsylvania that has met AYP in the most recent year or has the ability to meet AYP by being in Warning, School Improvement 1 or School Improvement 2, and is therefore eligible to take advantage of the dedicated charter school funding described in the State Plan;
- 4) Agrees to be a RTTT Charter and will implement those portions of the State Plan indicated in Exhibit I, if the State application is funded,

Addendum 2 – continued

Pennsylvania Race to the Top Memorandum of Understanding for Charter Schools – continued

- 5) Will provide a Final Scope of Work in a form to be prescribed by the State only if the State’s application is funded; will do so in a timely fashion but no later than 90 days after a grant is awarded; and will describe in the Final Scope of Work the Charter’s specific goals, activities, timelines, budgets including budget detail by line item, key personnel, and annual targets for key performance measures attached as an Addendum to that certain letter from Pennsylvania Secretary of Education Gerald Zahorchak to RTTT Charter dated January 5, 2010 which is incorporated herein by reference (“Charter Plan”) in a manner that is consistent with (i) the Preliminary Scope of Work (Exhibit I) and (ii) the State Plan; and which Final Scope of Work will be subject to State approval and will be incorporated by reference into this MOU; and
- 6) Will comply with all of the terms of the Grant, the State’s subgrant, and all applicable Federal and State laws and regulations, including laws and regulations applicable to Race to the Top, and the applicable provisions of EDGAR (34 CFR Parts 75, 77, 79, 80, 82, 84, 85, 86, 97, 98 and 99).

IV. MODIFICATIONS

This Memorandum of Understanding may be amended only by written agreement signed by each of the parties involved, and in consultation with ED. In particular, the approval of State shall be required for changes in any budget line items once a Final Scope of Work has been approved including shifting of costs between or among line items.

V. DURATION/TERMINATION

This Memorandum of Understanding shall be effective, beginning with the date of the last signature hereon and, if a grant is received, ending upon the expiration of the grant project period, or upon mutual agreement of the parties, whichever occurs first.

VI. SIGNATURES

Charter Administrator:

Signature/Date

Print Name/Title

President of Charter Board of Directors:

Signature/Date

Print Name/Title

Teachers’ Union Leader (if applicable):

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the Charter as a RTTT Charter.

Signature/Date

Print Name/Title

Addendum 2 – continued

Pennsylvania Race to the Top Memorandum of Understanding for Charter Schools – continued

EXHIBIT I – PRELIMINARY SCOPE OF WORK for RTTT Charters

RTTT Charter hereby agrees to participate in implementing the State Plan in each of the areas identified below.

Primary Objective	Required Activity
Strengthen and expand the standards-aligned system (SAS) and develop data systems capable of supporting reform.	<p>Implement a high quality curriculum that is aligned with standards, assessments, curriculum framework, instruction, materials and interventions (B)(3)</p> <p>Implement a system of assessments with capacity to inform instruction on timely and regular basis (B)(3)</p> <p>Implement a system to use real-time student data to identify students at academic risk in grade 6 and above. (C)(3)</p> <p>Implement a SIS that provides real-time student data and can communicate with PIMS ((C)(3)(i)</p> <p>Provide collaborative time for teachers to review real-time student data to drive instruction</p>
Develop a world-class human capital pipeline for teachers and leaders	<p>Develop a human capital plan to identify strategies based on charter school needs to attract and retain effective teachers, limit teacher vacancies, staff hard to-staff subjects, and address the equitable distribution of highly effective teachers (D)(3)(i) and (ii)</p> <p>Adopt the state-developed standard application for prospective teachers.</p> <p>Provide signing and retention bonuses for effective teachers and principals in hard-to-staff schools and subject areas (optional activity)</p>
Develop a robust multi-measure evaluation system	<p>Implement a multi-measure evaluation system for teachers and principals that takes into account data on student growth as a significant factor and is designed and developed with teacher and principal involvement (D)(2)(i), (ii)</p> <p>Conduct annual evaluations of teachers and principals that include timely and constructive feedback and provide data on student growth for students, classes and schools (D)(2)(iii)</p> <p>Provide training to all principals and teachers on effective use of the evaluation system</p> <p>Use evaluations to inform decisions regarding professional development, compensation, promotion and retention, tenure and removal of ineffective teachers after ample opportunity to improve (D)(2)(iv)(a – d)</p>
Create a coherent approach to professional development	<p>Adopt a career ladder for promotion, compensation and advancement of teachers based on responsibility and other factors including student growth (optional activity)</p> <p>Provide professional development to teachers based on the needs evidenced by teacher evaluation results (D)(5)(i)</p> <p>Provide PD to all instructional staff on effective instructional practices including:</p> <ul style="list-style-type: none"> – The use of data including diagnostic and formative assessment tools to differentiate classroom instruction (C)(3)(ii) – SAS tools and resources – Response to Instruction and Intervention (RTII) – Systems to identify students at risk – Development of Individual Learning Plans (D)(5)(i) <p>Provide professional development to high school teachers in providing high-rigor coursework (e.g., AP, IB or Dual Enrollment).</p>
<p>Initials: Charter Administrator _____ Board President _____ Union President _____ State Official _____</p>	

Addendum 2 – *continued*

Pennsylvania Race to the Top Memorandum of Understanding for Charter Schools – *continued*

EXHIBIT I – PRELIMINARY SCOPE OF WORK for RTTT Charters

RTTT Charter hereby agrees to participate in implementing the State Plan in each of the areas identified below.

Primary Objective	Required Activity
Turn around the lowest performing schools	N/A
Evaluate programs and identify and spread best practices	Provide data and access to PDE to evaluate and study RTTT strategies and activities (C)(3)(iii); (D)(5)(ii) Review available research and evaluations when developing school reform plans and work with PDE and the State's technical assistance network to implement best-practices

Initials: Charter Administrator _____ Board President _____ Union President _____ State Official _____

VII. SIGNATURES:

Charter School Administrator:

Signature/Date

Print Name/Title

President of Board of Directors:

Signature/Date

Print Name/Title

Local Teachers' Union Leader (if applicable):

Signature/Date

Print Name/Title

Authorized State Official:

By its signature below, the State hereby accepts the Charter as a RTTT Charter.

Signature/Date

Print Name/Title

Addendum 3

Pennsylvania Race to the Top Expected Impact and Charter School Performance Targets

Charter School	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
Academy CS	14%	48%	31%	23%	49%	38%
Ad Prima CS	90%	100%	0%	62%	99%	2%
Alliance for Progress CS	53%	85%	2%	28%	72%	10%
Antonia Pantoja Community CS	50%	77%	9%	36%	71%	12%
Avon Grove CS	65%	88%	2%	56%	89%	4%
Bear Creek Community CS	71%	93%	2%	60%	92%	3%
Belmont Charter School	56%	82%	4%	34%	72%	11%
Boys Latin of Philadelphia CS	51%	80%	6%	34%	72%	11%
Career Connections CHS	20%	61%	18%	28%	61%	24%
Center for Student Learning CS at Pennsbury	29%	52%	28%	40%	65%	19%
Charter High School for Architecture and Design	23%	69%	8%	32%	71%	8%
Chester Community CS	57%	86%	5%	39%	81%	6%
Christopher Columbus CS	60%	88%	3%	54%	90%	3%
City CHS	25%	75%	9%	42%	82%	9%
Collegium CS	58%	87%	4%	49%	87%	5%
Delaware Valley CHS	17%	56%	16%	34%	68%	15%
Discovery Charter School	57%	87%	4%	41%	82%	6%
Environmental Charter School at Frick Park	67%	91%	1%	55%	93%	4%
Eugenio Maria De Hostos CS	57%	87%	3%	31%	79%	7%
Fell CS	54%	80%	6%	44%	79%	9%
First Phila CS For Literacy	60%	86%	4%	49%	86%	4%
Folk Arts-Cultural Treasures CS	66%	91%	2%	46%	83%	5%
Franklin Towne CHS	28%	74%	8%	40%	76%	8%
Freire CS	28%	74%	9%	36%	77%	10%
Global Leadership Academy CS	55%	82%	7%	39%	78%	8%
Graystone Academy CS	55%	80%	7%	38%	76%	9%
Green Woods CS	68%	93%	1%	62%	92%	2%
Imani Education Circle CS	51%	81%	7%	41%	81%	7%
Independence CS	68%	91%	1%	56%	87%	3%
Khepera CS	60%	87%	2%	45%	83%	6%
KIPP Academy Charter School	65%	89%	2%	48%	78%	5%
Laboratory CS	86%	100%	0%	65%	100%	0%
Lehigh Valley Academy Regional CS	65%	93%	2%	59%	92%	2%
Lehigh Valley CHS for Performing Arts	25%	74%	9%	63%	87%	0%

Addendum 3 – continued

Pennsylvania Race to the Top Expected Impact and Charter School Performance Targets – continued

Charter School	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
Lincoln CS	59%	87%	4%	34%	78%	6%
Lincoln Park Performing Arts CS	41%	76%	6%	65%	90%	2%
Manchester Academic CS	66%	91%	2%	52%	85%	5%
Maritime Academy Charter School	61%	84%	4%	53%	85%	5%
MAST Community Charter School	75%	95%	1%	65%	94%	2%
Mastery Charter High School	48%	84%	4%	48%	77%	5%
Mastery CS-Pickett Campus	66%	88%	4%	57%	85%	6%
Mastery CS-Shoemaker Campus	79%	96%	0%	68%	90%	3%
Mastery CS-Thomas Campus	53%	84%	4%	49%	81%	6%
Math Civics and Sciences CS	50%	79%	7%	38%	76%	8%
Montessori Regional CS	58%	86%	3%	47%	92%	2%
Multi-Cultural Academy CS	18%	70%	12%	31%	70%	6%
New Foundations CS	67%	96%	0%	52%	92%	0%
New Hope Academy CS	48%	69%	15%	41%	67%	11%
New Media Technology CS	47%	77%	8%	47%	78%	6%
Northside Urban Pathways CS	46%	78%	6%	49%	84%	6%
Northwood Academy CS	62%	87%	4%	51%	87%	6%
Nueva Esperanza Academy CS	16%	42%	33%	25%	44%	30%
Pan American Academy CS	50%	82%	6%	34%	84%	9%
People for People CS	54%	83%	6%	40%	75%	11%
Philadelphia Electrical & Tech CHS	25%	70%	10%	42%	68%	13%
Philadelphia Harambee Inst CS	59%	87%	4%	48%	86%	5%
Philadelphia Performing Arts CS	68%	92%	1%	58%	91%	2%
Planet Abacus CS	91%	100%	0%	60%	100%	0%
Pocono Mountain Charter School	52%	80%	7%	40%	77%	9%
Preparatory CS	33%	79%	4%	55%	86%	4%
Propel CS-East	71%	92%	3%	55%	89%	4%
Propel CS-Homestead	63%	90%	2%	43%	81%	6%
Propel CS-McKeesport	89%	99%	0%	58%	91%	3%
Propel CS-Montour	61%	88%	4%	48%	82%	6%
Renaissance Academy CS	67%	90%	1%	61%	91%	2%
Richard Allen Preparatory CS	50%	74%	9%	40%	73%	9%
Robert Benjamin Wiley Community CS	54%	86%	7%	33%	74%	13%
Roberto Clemente CS	46%	70%	11%	41%	73%	11%
Russell Byers CS	54%	86%	4%	37%	80%	7%

Addendum 3 – continued

Pennsylvania Race to the Top Expected Impact and Charter School Performance Targets – continued

Charter School	Math			Reading		
	Expected advanced math (2014)	Expected above proficient math (2014)	Expected below basic math (2014)	Expected advanced reading (2014)	Expected above proficient reading (2014)	Expected below basic reading (2014)
School Lane CS	64%	90%	2%	53%	89%	3%
Southwest Leadership Academy CS	50%	81%	9%	33%	79%	10%
Sugar Valley Rural CS	47%	73%	16%	32%	73%	13%
Sylvan Heights Science CS	49%	86%	2%	31%	84%	4%
Tidioute Community CS	61%	82%	5%	46%	82%	6%
Truebright Science Academy CS	54%	76%	9%	41%	70%	9%
Tuscarora Blended Learning CS	24%	39%	45%	27%	44%	37%
Universal Institute CS	62%	89%	3%	46%	84%	4%
Urban League of Pittsburgh CS	59%	90%	0%	32%	88%	3%
West Oak Lane CS	60%	91%	1%	39%	80%	7%
West Phila. Achievement CES	50%	80%	5%	27%	71%	10%
Widener Partnership CS	55%	91%	0%	39%	91%	6%
Wissahickon CS	60%	85%	5%	47%	84%	5%
World Communications CS	47%	83%	4%	41%	79%	4%
Young Scholars CS	66%	88%	6%	54%	81%	8%
Young Scholars of Central PA CS	71%	94%	0%	64%	95%	3%

*Only eligible charters that (A) receive Title 1 Part A funding and (B) have students who took the 2009 PSSA appear on this list. Eligible charters who do not appear on this list and do not have students who take the PSSA will be required to meet an alternative set of targets.

Appendix A-6

RTTT Impact Projections

I. Improved Student Achievement with RTTT

PSSA

Table 1 PSSA Projections by Grade for Mathematics¹

Grade	Advanced				At or Above Proficient				Below Basic			
	2006	2009	2014	2014 with RTTT	2006	2009	2014	2014 with RTTT	2006	2009	2014	2014 with RTTT
3	55.0	43.6	45.7	55.1	83.0	81.7	83.2	89.4	7.0	5.2	4.1	1.7
4	43.5	51.2	51.2	59.1	77.2	81.8	83.3	89.5	12.6	9.4	6.7	3.5
5	38.9	44.3	46.0	55.6	66.9	73.5	78.7	85.3	13.4	9.6	6.9	3.7
6	37.8	49.5	58.2	66.9	68.0	75.7	81.4	87.2	15.8	11.1	7.8	4.6
7	37.2	47.5	56.9	65.4	66.5	75.3	81.2	86.9	17.3	11.6	8.0	4.8
8	36.1	44.7	55.1	63.6	62.2	71.3	79.3	85.2	18.9	12.8	8.5	5.2
11	28.1	25.7	25.7	27.8	52.0	55.6	60.5	67.4	30.4	24.9	18.9	14.1
All	39.3	43.7	47.7	56.1	67.7	73.4	78.4	84.3	16.6	12.2	9.0	5.4

Source: Pennsylvania Department of Education

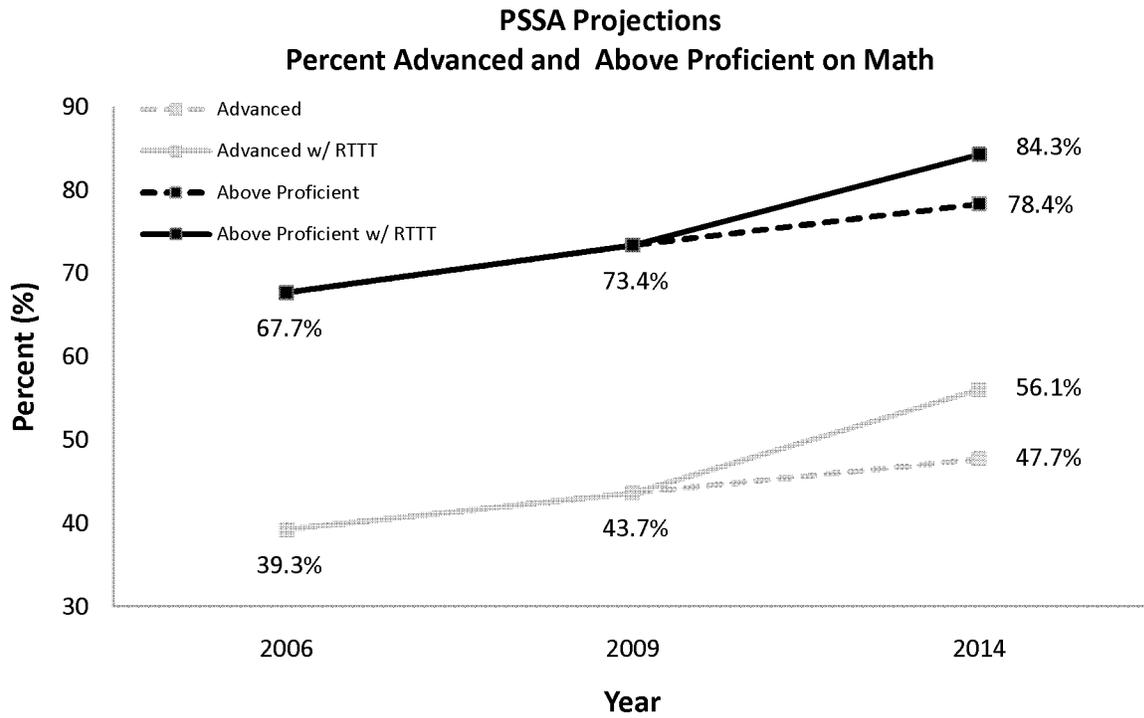
Table 2 PSSA Projections by Grade for Reading

Grade	Advanced				At or Above Proficient				Below Basic			
	2006	2009	2014	2014 with RTTT	2006	2009	2014	2014 with RTTT	2006	2009	2014	2014 with RTTT
3	31.0	26.2	27.1	35.4	69.0	77.0	80.5	87.4	16.0	13.5	11.4	6.9
4	31.0	36.4	36.4	43.3	68.1	72.6	78.0	85.1	15.3	12.8	11.0	6.6
5	20.8	22.7	24.9	32.8	60.6	64.5	73.1	80.7	21.1	17.9	13.8	8.9
6	32.4	37.1	48.3	55.9	65.9	67.6	74.1	80.9	15.6	14.0	10.5	6.8
7	34.9	41.4	52.2	59.6	68.1	71.4	77.0	83.2	14.6	11.2	9.0	5.6
8	43.5	55.3	64.6	71.9	70.6	80.5	83.7	89.2	16.2	10.6	8.5	5.1
11	31.2	33.1	35.4	41.7	65.1	65.2	65.6	71.3	18.5	18.8	18.7	14.2
All	32.3	36.2	41.5	48.9	66.8	71.3	76.2	82.5	16.7	14.1	12.1	7.7

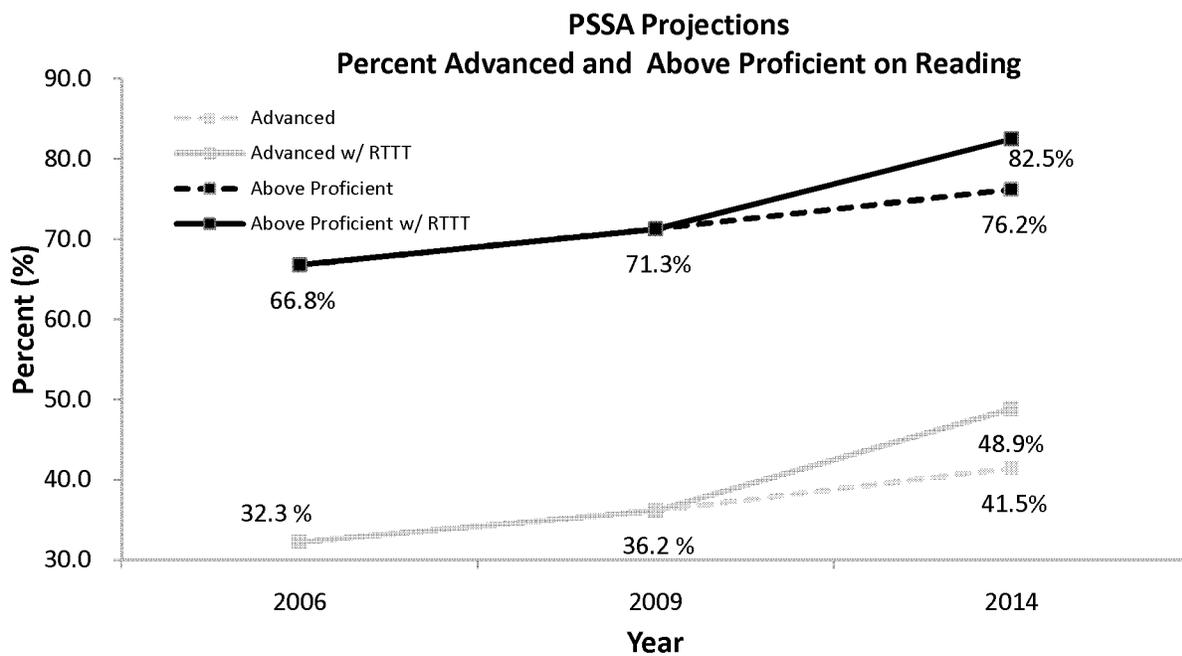
Source: Pennsylvania Department of Education

¹ Projection calculated as follows: (1) For SY2009-2010 schools were projected to improve at the historical mean of annual improvement for similar schools and grade levels between 2006 and 2009. Beginning in SY2010-2011, schools were projected to improve at the 90th percentile of annual improvement for similar schools (2009 performance at the top, middle, or bottom of the distribution) and grade levels (high school or elementary/middle) between 2006 and 2009.

Exhibit 1. Projected PSSA in Math and Reading by Grade, with and without Race to the Top Funding



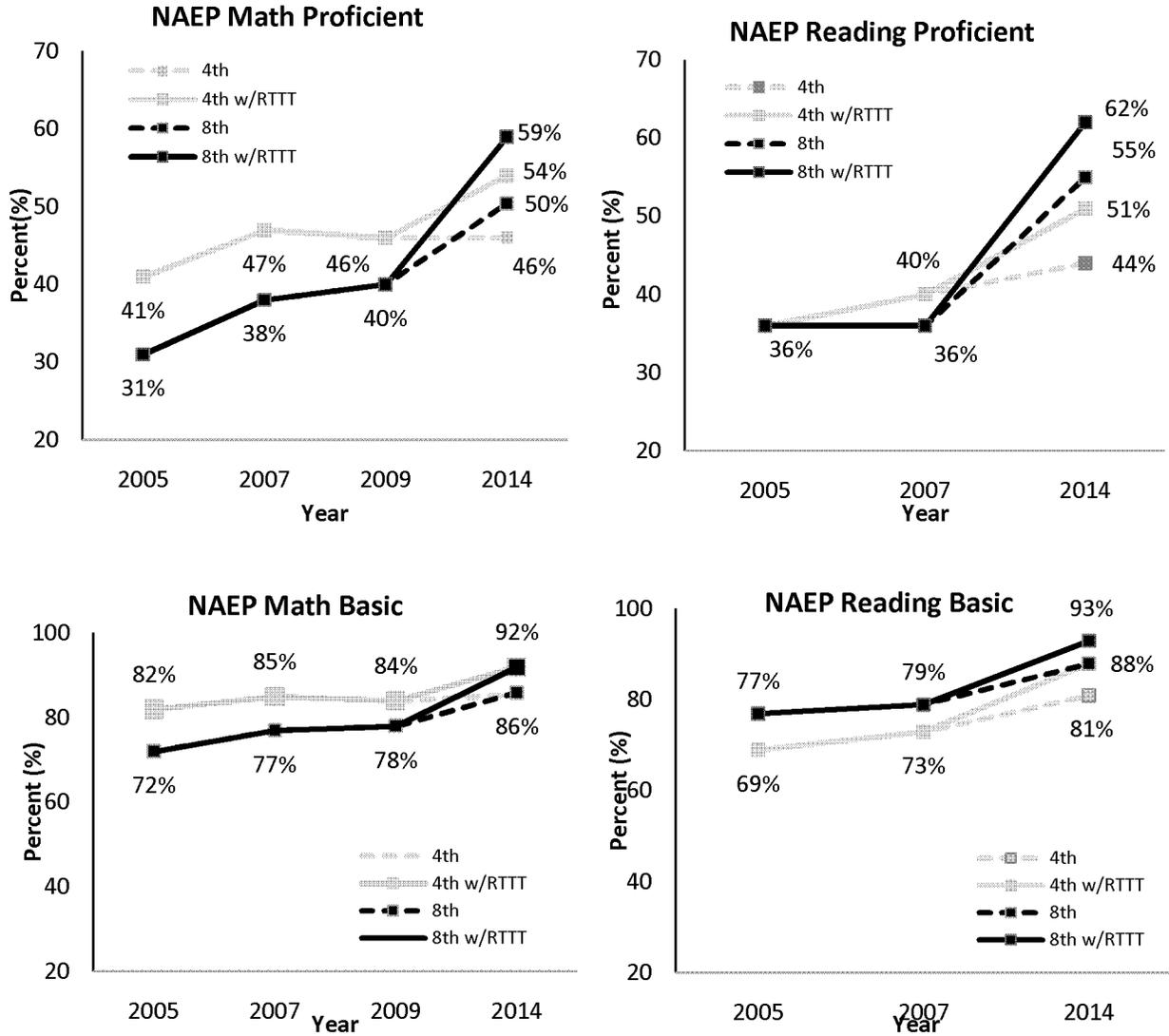
Source: Pennsylvania Department of Education



Source: Pennsylvania Department of Education

NAEP

Exhibit 2. Projected NAEP achievement in Math and Reading by Grade, with and without Race to the Top Funding²

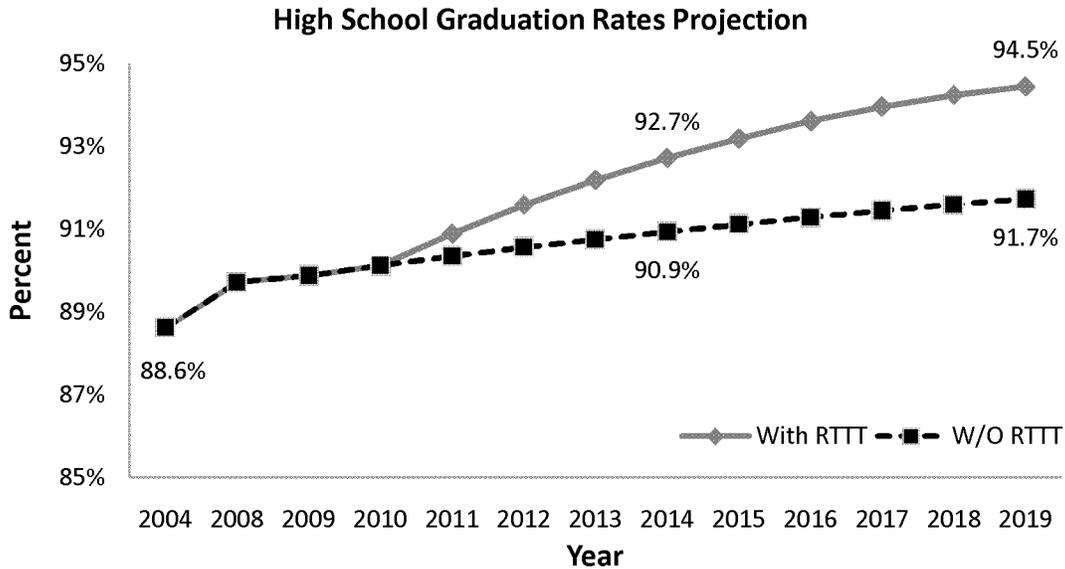


Source: PDE Analysis of the NAEP Data from the U.S. Department of Education

² NAEP and PSSA achievement levels were compared at each grade level for the years 2005, 2007 and 2009 to identify approximate percentile equivalencies. As reported previously, PSSA proficient corresponds closely to NAEP basic across reading and math at grades 4 and 8. PDE analysis indicates that PSSA advanced corresponds closely to NAEP proficiency. NAEP scores were projected at each grade level and subject by using the corresponding PSSA projections with PSSA advanced achievement levels used to project NAEP proficient achievement levels and PSSA proficient achievement levels used to project NAEP basic achievement levels. Projections were adjusted based on the difference between PSSA and NAEP achievement equivalencies in the year for which the most recent data is available (2009 for math; 2007 for reading)

High School Graduation and Early College Success

Exhibit 3. Projected increases in high school graduation rates³, with and without Race to the Top Funding



Source: Pennsylvania Department of Education

Table 3. Graduation Rates Projection for Sub-group

Subgroup	2004	2008	2014 baseline	2014 w/ RTTT
White	N/A	94%	94%	95%
Black	N/A	86%	89%	93%
Hispanic	N/A	68%	71%	75%
Students with IEP	N/A	84%	85%	87%
Students w/o IEP	N/A	92%	92%	94%
Economically disadvantaged	N/A	78%	80%	83%
Non-Economically disadvantaged	N/A	96%	97%	98%
TOTAL	89%	90%	91%	93%

Note: Subgroup graduation rates estimated assuming the same school-level graduation rate across all student groups within the school

Early College Success: College Enrollment and College Retention

College enrollment: Estimation of the percentage of students who graduate from high school in PA and attend a postsecondary institution anywhere in the U.S.

- Methodology:** College enrollment rates by group were calculated by adjusting overall PA college enrollment rates (available through National Center for Higher Education Management Services) according to relative subgroup college enrollment rates of recent HS graduates nationwide as reported by BLS with the average rate for Black and Hispanic subgroups used to approximate the enrollment rate for economically disadvantaged students. **Targets:** The overall target for college enrollment was set as the 90th percentile for US States as reported by NCHEMS. A 20% increase was projected for minority and economically disadvantaged students based upon the experience of College Summit in increasing college enrollment for these groups. Targets and baselines will be revised based upon data from the updated PA SLDS system

Table 4. Estimated College Enrollment Rate, 2006-2014

	2006 est.	2014 without RTTT	2014 w/ RTTT
<i>Total Enrolled in College</i>	<i>62.1</i>	<i>62.1</i>	<i>71.0</i>
White	64.1	64.1	73.3
Black	49.7	49.7	59.7
Asian	79.2	79.2	
Hispanic	57.7	57.7	69.3
Economically disadvantaged (~27% of HS graduates)	53.7	53.7	64.5
Non-economically disadvantaged (~73% of HS graduates)	65.2	65.2	73.5

Source: Pennsylvania Department of Education

College Retention Rate: Retention rate refers to the percentage of first-year students who persist from the fall of their first year to the fall of their second year

- Methodology:** College retention rates were used as a proxy for college proficiency rates. College retention rates by group were calculated by adjusting overall retention rates by relative subgroup college graduation rates with the average rate for Black and Hispanic subgroups used to approximate the retention rate for economically disadvantaged students. 2014 targets with Race to the Top were set based on the experience of College Summit in improving college proficiency rates for minority and low-income students (65% proficiency rate target). Targets and baselines will be revised based upon data from the updated PA SLDS system

Table 5. Projection of College Proficiency Rate

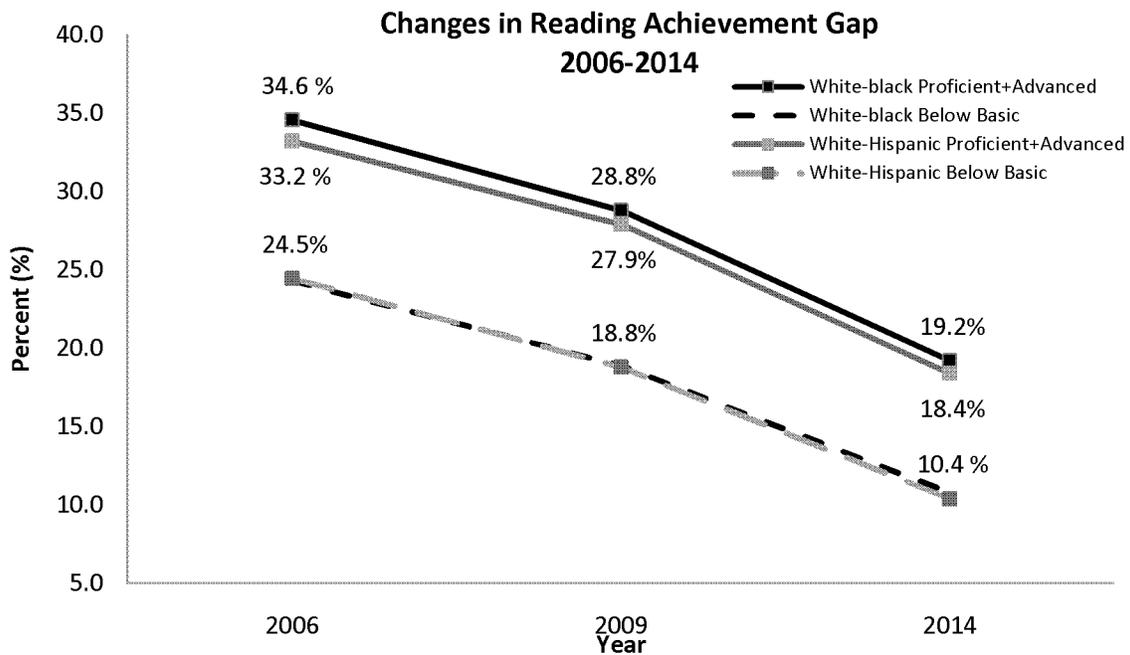
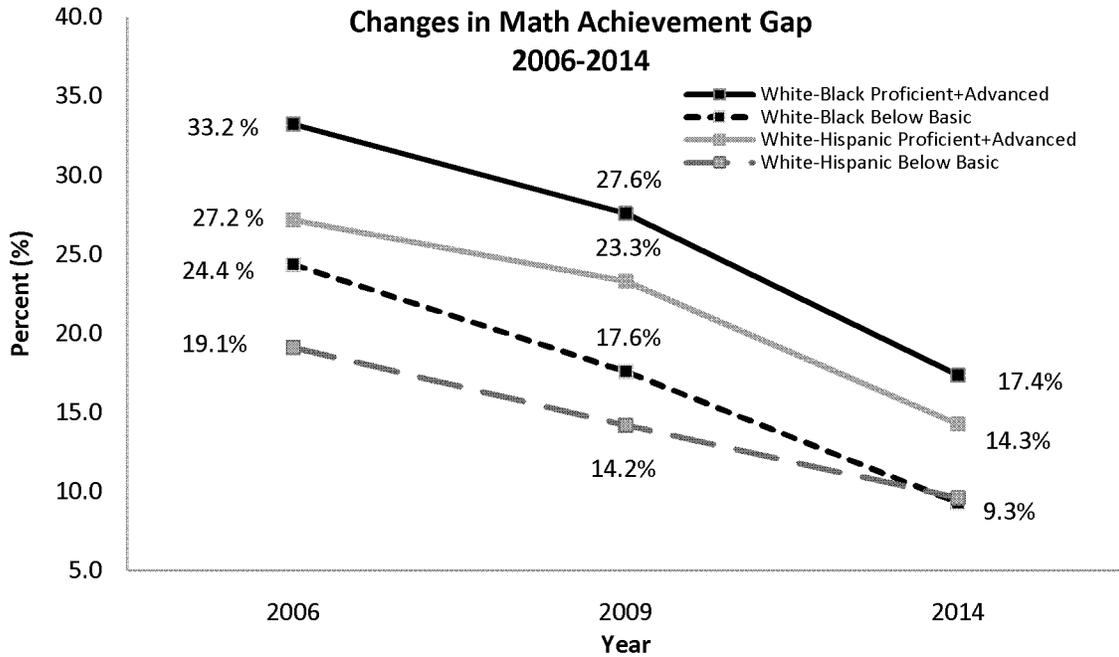
	Current Weighted Average	2014 without RTTT	2014 w/ RTTT
White	68.1	68.1	71.1
Black	46.1	46.1	65.0
Hispanic	55.8	55.8	65.0
Other	62.4	62.4	N/A
Economically disadvantaged	50.9	50.9	65.0
Non-economically disadvantaged	70.3	70.3	75.5
<i>Overall</i>	<i>65.1</i>	<i>65.1</i>	<i>70.0</i>

Source: Pennsylvania Department of Education

II. Closing Achievement Gaps

PSSA

Exhibit 4. Projected Change in Achievement Gaps by Racial/Ethnic Group for PSSA Math and Reading, 2014



Source: Pennsylvania Department of Education

Table 6. Historical and Projected Performance by Sub-group (%) in Math

	Advanced				Proficient and Advanced				Below Basic			
	2006	2009	2014	Expected change (2009 to 2014)	2006	2009	2014	Expected change (2009 to 2014)	2006	2009	2014	Expected change (2009 to 2014)
White	45.0	49.2	58.5	9.3	74.3	79.1	86.7	7.6	11.8	8.5	4.1	-4.4
Black	15.6	21.3	49.4	28.1	41.1	51.5	77.4	25.9	36.1	26.1	9.1	-17.0
Hispanic	19.7	25.2	51.1	25.9	47.1	55.8	79.2	23.4	30.9	22.7	7.9	-14.8
Asian	60.8	68	80.5	12.5	83.8	89.2	98.8	9.6	7.1	4.3	0.0	-4.3
Native American	36.2	34.1	*		56.2	65.6	*		20.0	15.2	*	
Multiethnic	28.8	35.5	52.5	17.0	58.6	67.3	81.5	14.2	23.0	15.4	6.7	-8.7
Economically disadvantaged	22.1	27.4	47.3	19.9	50.5	59.4	77.0	17.6	28.4	20.3	9.2	-11.1
ELL	16.6	14.3	43.3	29.0	40.4	41.2	68.3	27.1	35.2	33.6	15.8	-17.8
IEP	12.8	15.8	28.8	13.0	32.3	39.1	50.6	11.5	48.1	38.7	31.4	-7.3
Non-IEP	43.9	48.8	61.2	12.4	73.9	79.7	90.6	10.8	11.2	7.3	0.6	-6.7
Non-ELL	39.8	44.3	56.6	12.2	68.3	74.1	84.8	10.7	16.2	11.7	5.1	-6.6
Non-Economically disadvantaged	48.0	53.2	61.6	8.4	76.5	81.5	88.8	7.3	10.6	7.5	3.1	-4.4
TOTAL	39.3	43.7	56.1	12.4	67.7	73.4	84.3	10.9	16.6	12.2	5.4	-6.8
Gap analysis	2006	2009	2014	Total decrease in the gap (2006-2009)	2006	2009	2014	Total decrease in the gap (2006-2009)	2006	2009	2014	Total decrease in the gap (2006-2009)
White-Black	29.4	27.9	9.2	5%	33.2	27.6	9.3	17%	24.4	17.6	5.0	28%
White-Hispanic	25.3	24.0	7.4	5%	27.2	23.3	7.6	14%	19.1	14.2	3.8	26%
NonED-ED*	25.9	25.8	14.3	1%	26.0	22.1	11.9	15%	17.7	12.8	6.2	28%
NonIEP-IEP	31.1	33.0	32.4	-6%	41.6	40.6	40.0	2%	37.0	31.4	30.8	15%
NonELL-ELL	23.2	30.0	13.2	-30%	27.9	32.9	16.5	-18%	19.0	21.9	10.7	-15%

*ED: Economically Disadvantaged

Table 7. Historical and Projected Performance by Sub-group (%) in Reading

	Advanced				Proficient and Advanced				Below Basic			
	2006	2009	2014	Expected change (2009 to 2014)	2006	2009	2014	Expected change (2009 to 2014)	2006	2009	2014	Expected change (2009 to 2014)
White	37.9	41.7	52.4	10.7	74.1	77.7	85.9	8.2	11.5	9.9	6.1	-3.8
Black	11.4	16.4	39.0	22.6	39.6	48.9	74.1	25.2	35.8	28.8	11.3	-17.5
Hispanic	12.4	17.1	38.3	21.2	40.9	49.8	73.9	24.1	35.9	28.7	11.6	-17.1
Asian	43.1	50.8	64.3	13.5	75.6	82.5	93.2	10.7	11.0	7.5	1.8	-5.7
Native American	27.2	29.6	*		60.5	65.5	*		20.5	17.1	*	
Multiethnic	21.7	27.3	42.6	15.3	56.0	64.1	77.1	13.0	24.3	18.1	10.6	-7.5
Economically disadvantaged	15.1	19.6	36.8	17.2	46.4	54.7	72.7	18.0	30.7	24.6	12.9	-11.7
ELL	5.0	4	27.4	23.4	23.8	25.1	53.4	28.3	52.8	50.4	29.4	-21.0
IEP	7.9	10.1	23.1	13.0	27.4	32.7	44.4	11.7	51.7	46	39.1	-6.9
Non-IEP	36.5	41.0	53.6	12.6	73.6	78.4	89.6	11.2	10.7	8.2	1.9	-6.3
Non-ELL	32.8	36.9	49.4	12.6	67.7	72.3	83.3	11.0	16.0	13.3	7.1	-6.2
Non-Economically disadvantaged	41.0	45.8	56.1	10.2	77.2	80.9	88.5	7.6	9.6	8.0	4.6	-3.5
TOTAL	32.3	36.2	48.9	12.7	67.6	71.3	82.5	11.2	16.7	14.1	7.7	-6.4
Gap analysis	2006	2009	2014	Total decrease in the gap (2006-2009)	2006	2009	2014	Total decrease in the gap (2006-2009)	2006	2009	2014	Total decrease in the gap (2006-2009)
White-Black	26.5	25.3	13.3	5%	34.6	28.8	11.7	17%	24.3	18.9	5.2	22%
White-Hispanic	25.5	24.6	14.1	3%	33.2	27.9	12.0	16%	24.5	18.8	5.4	23%
NonED-ED*	25.9	26.2	19.3	-1%	30.8	26.2	15.8	15%	21.1	16.6	8.3	21%
NonIEP-IEP	28.7	30.9	30.5	-8%	41.6	40.6	40.0	2%	41.1	37.8	37.2	8%
NonELL-ELL	27.8	32.9	22.1	-18%	27.9	32.9	16.5	-18%	36.8	37.1	22.3	-1%

NAEP**Table 8. Projected Change in Achievement Gaps by Racial/Ethnic Group for NAEP 4th Grade Math**

	4 th Grade Math Basic			4 th Grade Math Proficient		
	2009	2014	2014 w/ RTTT	2009	2014	2014 w/ RTTT
White	91	91	94	53	53	55
Black	64	73	85	17	24	42
Hispanic	68	75	85	23	29	44
Asian	91	91	98	62	62	67
Economically disadvantaged	71	75	83	23	25	38
Not economically disadvantaged	93	93	96	60	60	62
<i>White-Black</i>	27	18	9	36	29	13
<i>White-Hispanic</i>	23	16	9	30	24	11
<i>Non-econ vs. Econ</i>	22	18	13	37	35	24

Source: PDE Analysis of U.S. Department of Education Data

Table 9. Projected Change in Achievement Gaps by Racial/Ethnic Group for NAEP 8th Grade Math

	8 th Grade Math Basic			8 th Grade Math Proficient		
	2009	2014	2014 w/ RTTT	2009	2014	2014 w/ RTTT
White	84	89	93	45	53	60
Black	49	64	74	13	28	42
Hispanic	55	69	79	18	33	45
Asian	87	91	97	60	67	76
Economically disadvantaged	60	71	79	18	31	41
Not economically disadvantaged	87	91	96	50	58	64
<i>White-Black</i>	35	25	19	32	25	18
<i>White-Hispanic</i>	29	20	15	27	20	15
<i>Non-econ vs. Econ</i>	27	20	17	32	27	23

Source: PDE Analysis of U.S. Department of Education Data

Table 10. Projected Change in Achievement Gaps by Racial/Ethnic Group for NAEP 4th Grade Reading

	4 th Grade Reading Basic			4 th Grade Reading Proficient		
	2007	2014	2014 w/ RTTT	2007	2014	2014 w/ RTTT
White	81	84	89	47	47	50
Black	44	57	70	13	17	31
Hispanic	43	55	67	15	18	31
Asian	72	75	83	41	41	45
Economically disadvantaged	53	62	71	19	20	30
Not economically disadvantaged	83	85	90	52	52	55
<i>White-Black</i>	<i>37</i>	<i>27</i>	<i>18</i>	<i>34</i>	<i>30</i>	<i>19</i>
<i>White-Hispanic</i>	<i>38</i>	<i>28</i>	<i>22</i>	<i>32</i>	<i>29</i>	<i>19</i>
<i>Non-econ vs. Econ</i>	<i>30</i>	<i>23</i>	<i>19</i>	<i>33</i>	<i>32</i>	<i>24</i>

Source: PDE Analysis of U.S. Department of Education Data

Table 11. Projected Change in Achievement Gaps by Racial/Ethnic Group for NAEP 8th Grade Reading

	8 th Grade Reading Basic			8 th Grade Reading Proficient		
	2007	2014	2014 w/ RTTT	2007	2014	2014 w/ RTTT
White	84	89	93	41	57	63
Black	49	64	74	14	37	49
Hispanic	55	69	79	14	34	45
Asian	87	91	97	58	78	85
Economically disadvantaged	60	71	79	20	40	49
Not economically disadvantaged	87	91	96	44	62	68
<i>White-Black</i>	<i>35</i>	<i>25</i>	<i>19</i>	<i>27</i>	<i>21</i>	<i>15</i>
<i>White-Hispanic</i>	<i>29</i>	<i>20</i>	<i>15</i>	<i>27</i>	<i>23</i>	<i>18</i>
<i>Non-econ vs. Econ</i>	<i>27</i>	<i>20</i>	<i>17</i>	<i>24</i>	<i>22</i>	<i>19</i>

Source: PDE Analysis of U.S. Department of Education Data

High School Graduation, College Attendance, and College Attainment

Table 12. Projections of Graduation Rate Gaps by Sub-group with and without RTTT

	2008	2014
White-Black Baseline	8%	5%
<i>White-Black RTTT</i>	18%	2%
White-Hispanic Baseline	26%	23%
<i>White-Hispanic RTTT</i>	26%	22%
Non IEP-IEP Baseline	7%	7%
<i>Non IEP-IEP RTTT</i>	7%	7%
Non Economically Disadvantaged-ED Baseline	18%	17%
<i>Non Economically Disadvantaged -ED RTTT</i>	18%	15%

Note: Subgroup graduation rates estimated assuming the same school-level graduation rate across all student groups within the school

Appendix A-7

COMPLETE COLLEGE AMERICA

**WORKING WITH STATES TO ACHIEVE MORE
COLLEGE DEGREES AND CREDENTIALS**

1250 H Street NW, Suite 700
Washington, DC 20005
(V) 202-349-4148 / (F) 202-293-2605

**COMPLETE
COLLEGE
AMERICA**
www.completeclege.org

TODAY'S HIGHER EDUCATION

- For the first time in our nation's history, the current generation of college-age Americans will be less educated than their parents' generation – unless things change quickly

(National Center for Higher Education Management Systems, 2008)

- Once first in the world, America now ranks 10th in the percentage of young adults with a college degree

(Organisation for Economic Cooperation and Development, 2009)

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ECONOMIC IMPACT ON STATES AND OUR NATION

- Increases in the proportion of a region's population with a bachelor's degree result in wage increases for *all* workers in the region, regardless of education level

(College Board, 2007)

- Nationwide, unemployment rates are twice as high for those with just a high school diploma (9.1%) than for those with a college degree (4.5%)

(Bureau of Labor Statistics, 2009)

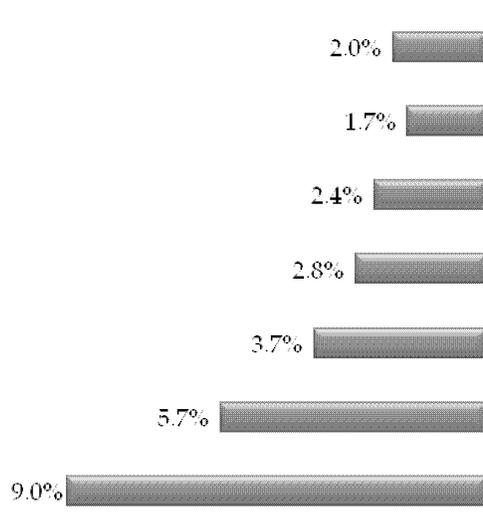
- By the end of this decade, more than 60% of jobs will require college education.

(Georgetown University Center on Education and the Workforce, 2009)

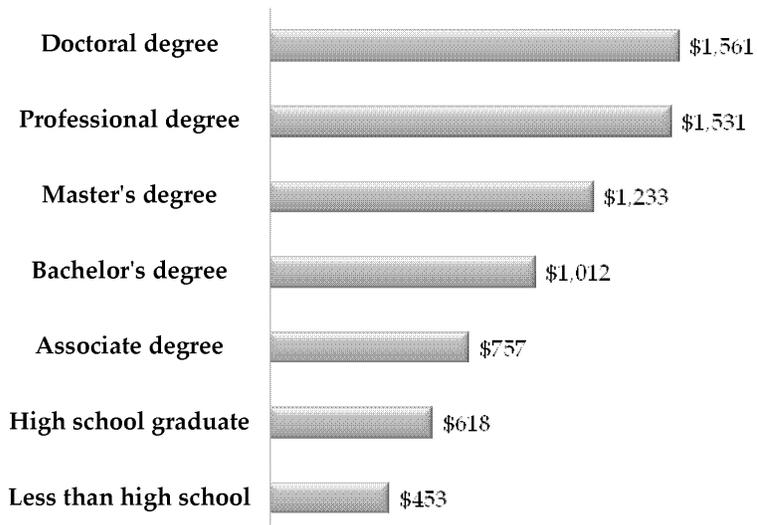
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AMERICA**
www.completercollege.org

EDUCATION PAYS

Unemployment rate in 2008



Median weekly earnings in 2008



(Bureau of Labor Statistics, 2008)

THE COMPLETE COLLEGE SHORTFALL

**College access without success is an empty
promise...and a missed opportunity with
economic consequences**

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AMERICA**
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ABOUT COMPLETE COLLEGE AMERICA

Complete College America is a national nonprofit working to significantly increase the number of Americans with a college degree or credential of value and to close attainment gaps for traditionally underrepresented populations.

The organization was founded in 2009 to focus *solely* on dramatically increasing the nation's college completion rate through state policy change, and to build consensus for change among state leaders, higher education, and the national education policy community.

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AMERICA**
www.completeccollege.org

ABOUT COMPLETE COLLEGE AMERICA

GOALS

- 6 out of 10 of the nation's young adults ages 25-34 having a college degree by 2020
- Significantly increase the number of Americans with a college degree or credential of value
- Close attainment gaps for traditionally underrepresented populations

ALLIANCE OF STATES

21 states are making higher education a top priority by:

Setting completion goals: Establish annual state and campus-specific degree and credential completion goals through 2020.

Developing action plans and move key policy levers, including strategies to:

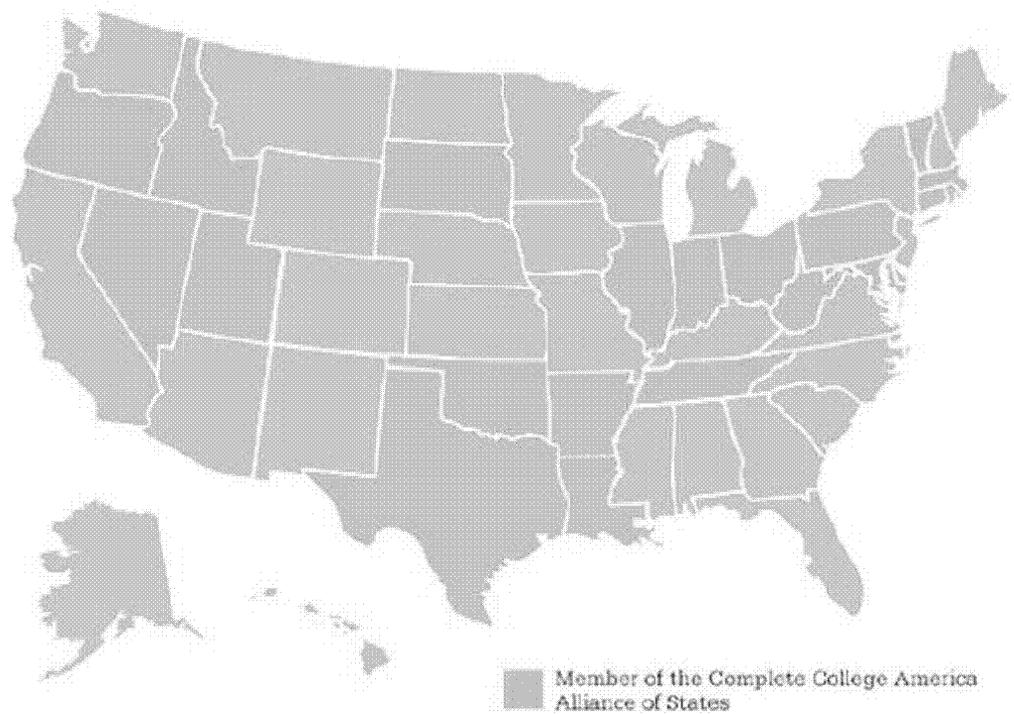
- Ensure all students are ready to start and succeed in freshman credit courses.
- Redesign remediation efforts to substantially improve success.
- Increase the number of students completing on-time.
- Develop new, shorter and faster pathways to degrees and credentials of value.
- Use available financial resources to provide incentives to students and colleges for progress and completion.

Collecting and reporting common measures of progress to create a culture that values completion.



- ARKANSAS
- CONNECTICUT
- HAWAII
- IDAHO
- ILLINOIS
- INDIANA
- LOUISIANA
- MARYLAND
- MASSACHUSETTS
- NEVADA
- OHIO
- OKLAHOMA
- OREGON
- PENNSYLVANIA
- RHODE ISLAND
- SOUTH DAKOTA
- TENNESSEE
- TEXAS
- UTAH
- VERMONT
- WEST VIRGINIA

21 states in the *Alliance of States*:



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POLICY AND RESEARCH PARTNERS

Complete College America works closely with several national organizations to ensure collaboration among state initiatives:

- Achieve, Inc.
- Achieving the Dream:
Community Colleges Count
- The National Association of
System Heads (NASH) –
Access to Success
- National Center for Higher
Education Management
Systems (NCHEMS)
- Southern Regional Education
Board (SREB)
- State Higher Education
Executive Officers (SHEEO)
- Western Interstate
Commission for Higher
Education (WICHE)

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AMERICA**
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STATES MUST LEAD ON COLLEGE COMPLETION

- **State Authority:** While state-appointed or elected citizen boards directly govern public institutions, ultimately states are responsible for public colleges and universities.
- **Majority Investor:** By a wide measure, state taxpayers provide the greatest funding for institutions, especially community colleges and open access four-year institutions.
- **Systemic, Scalable Change:** States are the best positioned to ensure reform across systems and campuses by setting goals, establishing uniform measures, and monitoring progress.
- **Accountability:** States have leverage over both governance and the funding mechanisms needed to achieve higher levels of completion.
- **Transparency:** States are more likely than individual institutions to share and publish data to drive reform.
- **Economic Development:** State leadership will ensure stronger linkages between each state's economic needs and higher education delivery.
- **Mobility of Students:** Coherent state policy and integrated state strategies are essential for assuring ease of transfer and efficient completion of academic programs.

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STATES LEADING THE WAY

Governor and Higher Education Leadership:

- Committed state to the Complete College Agenda
- Determined the State Liaison (point of contact) and State Team members, to usher the state's Complete College America work

Key Complete College America Dates:

- March 2010 – National Launch
- Spring 2010 – Commitment Letters
- June 2010 – Alliance of States Kick-Off Meeting (convening of state teams to share policy frameworks, build action plans)
- Fall 2010 – Completion Academy

OUR PARTNERS

- Achieve, Inc.
- Achieving the Dream: Community Colleges Count Center on Education and the Workforce, Georgetown University
- Community College Research Center (CCRC) at Teachers College, Columbia University
- The Delta Project on Postsecondary Education Costs, Productivity, and Accountability
- The Education Trust
- FutureWorks
- Jobs for the Future (JFF)
- Midwestern Higher Education Compact (MHEC)
- The National Association of System Heads (NASH)
- National Center for Higher Education Management Systems (NCHEMS) Higher Ed Info
The National Center for Public Policy and Higher Education
- Southern Regional Education Board (SREB)
- State Higher Education Executive Officers (SHEEO)
- Western Interstate Commission for Higher Education (WICHE)

Complete College America is grateful for the support and guidance provided by our funders.

- Bill & Melinda Gates Foundation
- Carnegie Corporation of New York
- Ford Foundation
- Lumina Foundation for Education
- W.K. Kellogg Foundation

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Appendix A-8

Management Tasks

Management Tasks	Key Strategies
<i>Communication and coordination with IUs and LEAs</i>	<ul style="list-style-type: none"> • The RTTT Project Director coordinates communication with IUs, to minimize duplication multiple touchpoints • Monthly teleconference and frequent face-to-face meetings involving the PDE’s directors, PDE’s project manager, and IUs, and Participating LEAs as appropriate • Frequent telephone and electronic mail conversations between the PDE, IUs, and Participating LEAs • Biweekly conversations among all project team members • Monthly progress reports that address recent developments task by task and any issues requiring attention from partners. The monthly reports will also highlight any deviations from the proposed project schedule and provide suggestions for overcoming obstacles. Performance measures and progress toward benchmarks will be included in the report and funding will be contingent upon adequate progress.
<i>Communication and Coordination with the US Department of Education (USDE)</i>	<ul style="list-style-type: none"> • Monthly teleconference and frequent face-to-face meetings involving the Contracting Officers Representative (COR), other USDE staff, PDE’s project manager, and PDE’s task leaders as appropriate • Frequent telephone and electronic mail conversations between the COR and the Project Manager • Quarterly progress reports that address recent developments task by task and any issues requiring attention from partners. The monthly reports will also highlight any deviations from the proposed project schedule and provide suggestions for overcoming obstacles • Attend all required meetings in Washington, DC and elsewhere
<i>Management of subcontractors and consultants</i>	<ul style="list-style-type: none"> • Define clear and specific roles and responsibilities: Teaming agreements or consultant agreements will specify expected roles and responsibilities of each subcontractor. The team includes PDE, subcontractors and consultants, Advisory Committee members and our Work Group members. • As a standard practice, PDE ensures that all appropriate controls and legal remedies have been incorporated into its subcontracts. The subcontracts will specify mutually agreed-upon tasks to be performed, deliverable schedules, staffing, and subcontractor budgets. PDE also has well-established procedures for obtaining consultants who will assist the team. There are standard consulting agreement formats that incorporate clear specification of tasks and of fees to be paid.

Management Tasks	Key Strategies
<i>Fiscal controls</i>	<ul style="list-style-type: none"> • RTTT Project Director will conduct monthly internal review of work progress and budget status: The key to effective control of a project’s expenditures are detailed work plans and a project budget, coupled with systematic reviews of actual performance against those plans and the ability to make adjustments to the plan and budget as required. Accomplishments will be compared to the planned workflows and budgets for the month. Any variances will be noted and solutions will be proposed and implemented.
<i>Quality control</i>	<ul style="list-style-type: none"> • Shared responsibility: While the Secretary is ultimately accountable for quality control for all aspects of the initiative, we instill a shared responsibility for quality within all of our teams. As noted above, our internal structure includes PDE Cabinet and expert advisors, who will provide independent oversight of all tasks and facilitate collaboration among key stakeholders.
<i>Tracking Progress and Fund Disbursement: Participating Districts</i>	<ul style="list-style-type: none"> • Activities, accomplishments, and financials will be carefully tracked for this initiative. We recognize that the Recovery Act requires accountability and transparency in the use of the funds we are seeking. • Within 90 days of award, participating districts will submit to PDE final scopes of work (SOWs) containing detailed work plans which are consistent with their preliminary scopes of work and Pennsylvania’s application. SOWs will include specific goals, activities, timelines, budgets, key personnel, and annual targets for key performance measures. Performance measures will include implementation progress, as well as student achievement and attainment targets set by PDE. • Upon PDE approval of the SOWs, participating districts will receive the first annual allocation of funds, per their approved budgets. • Participating districts will report and PDE will review performance measures three times a year. After each review, PDE will assess each participating district as “behind,” “meeting,” or “exceeding” expectations. • PDE reserves the right to withhold future payments from participating districts assessed as “behind” two reviews in a row. • PDE will reserve a pool of Race to the Top funds to reward, on a one-time basis, participating districts that exceed expectations on student achievement by 10 percent at the end of years 1, 2, or 3.

Appendix A-9

District-by-District Performance Targets by 2014

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
1. ABINGTON HEIGHTS SD	75%	95%	1%	73%	95%	1%
2. ABINGTON SD	77%	95%	1%	68%	94%	1%
3. ALBERT GALLATIN AREA SD	59%	87%	4%	50%	84%	7%
4. ALIQUIPPA SD	53%	79%	8%	37%	74%	9%
5. ALLEGHENY VALLEY SD	59%	88%	3%	58%	88%	6%
6. ALLEGHENY-CLARION VALLEY SD	57%	85%	4%	48%	83%	6%
7. ALLENTOWN CITY SD	56%	83%	5%	42%	78%	9%
8. ALTOONA AREA SD	64%	90%	3%	55%	87%	5%
9. AMBRIDGE AREA SD	66%	90%	2%	57%	90%	4%
10. ANNVILLE-CLEONA SD	68%	94%	1%	60%	91%	2%
11. ANTIETAM SD	56%	86%	4%	44%	82%	6%
12. APOLLO-RIDGE SD	56%	87%	4%	50%	85%	6%
13. ARMSTRONG SD	66%	91%	2%	58%	89%	4%
14. ATHENS AREA SD	62%	89%	3%	51%	85%	6%
15. AUSTIN AREA SD	63%	89%	4%	58%	83%	9%
16. AVELLA AREA SD	59%	86%	4%	58%	89%	5%
17. AVON GROVE SD	80%	96%	1%	70%	93%	3%
18. AVONWORTH SD	73%	95%	1%	72%	95%	1%
19. BALD EAGLE AREA SD	62%	89%	3%	55%	88%	4%
20. BALDWIN-WHITEHALL SD	66%	91%	3%	56%	87%	5%
21. BANGOR AREA SD	60%	86%	4%	55%	87%	5%
22. BEAVER AREA SD	76%	96%	0%	67%	95%	1%
23. BEDFORD AREA SD	63%	89%	3%	55%	87%	5%
24. BELLE VERNON AREA SD	63%	90%	3%	57%	88%	4%
25. BELLEFONTE AREA SD	63%	90%	3%	59%	89%	4%
26. BELLWOOD-ANTIS SD	71%	92%	2%	63%	91%	3%
27. BENSLEM TOWNSHIP SD	61%	88%	3%	52%	86%	5%
28. BENTON AREA SD	66%	91%	2%	55%	89%	3%
29. BENTWORTH SD	61%	88%	3%	53%	85%	6%
30. BERLIN BROTHERSVALLEY SD	72%	94%	1%	59%	89%	5%
31. BERMUDIAN SPRINGS SD	64%	88%	3%	54%	86%	5%
32. BERWICK AREA SD	63%	89%	3%	54%	86%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
33. BETHEL PARK SD	72%	96%	1%	68%	95%	1%
34. BETHLEHEM AREA SD	63%	88%	4%	55%	86%	5%
35. BETHLEHEM-CENTER SD	59%	87%	3%	54%	87%	5%
36. BIG BEAVER FALLS AREA SD	68%	91%	3%	55%	87%	5%
37. BIG SPRING SD	62%	90%	3%	53%	86%	6%
38. BLACKHAWK SD	73%	95%	1%	64%	93%	2%
39. BLACKLICK VALLEY SD	60%	86%	4%	49%	83%	7%
40. BLAIRSVILLE-SALTSBURG SD	68%	91%	2%	58%	88%	5%
41. BLOOMSBURG AREA SD	72%	93%	2%	62%	91%	3%
42. BLUE MOUNTAIN SD	65%	90%	2%	62%	92%	2%
43. BLUE RIDGE SD	59%	87%	3%	54%	86%	5%
44. BOYERTOWN AREA SD	73%	95%	1%	63%	92%	2%
45. BRADFORD AREA SD	63%	87%	3%	56%	86%	6%
46. BRANDYWINE HEIGHTS AREA SD	64%	90%	2%	59%	89%	4%
47. BRENTWOOD BOROUGH SD	63%	90%	3%	59%	90%	3%
48. BRISTOL BOROUGH SD	62%	89%	3%	49%	84%	7%
49. BRISTOL TOWNSHIP SD	61%	89%	3%	50%	84%	6%
50. BROCKWAY AREA SD	61%	89%	3%	52%	85%	5%
51. BROOKVILLE AREA SD	57%	87%	3%	55%	87%	6%
52. BROWNSVILLE AREA SD	54%	84%	4%	46%	81%	8%
53. BURGETTSTOWN AREA SD	62%	91%	2%	52%	87%	5%
54. BURRELL SD	63%	91%	1%	61%	92%	3%
55. BUTLER AREA SD	65%	91%	2%	56%	90%	4%
56. CALIFORNIA AREA SD	62%	91%	2%	57%	87%	4%
57. CAMBRIA HEIGHTS SD	64%	90%	2%	61%	91%	3%
58. CAMERON COUNTY SD	57%	88%	4%	52%	88%	5%
59. CAMP HILL SD	70%	93%	0%	67%	94%	1%
60. CANON-MCMILLAN SD	69%	93%	2%	66%	93%	2%
61. CANTON AREA SD	58%	84%	4%	50%	84%	6%
62. CARBONDALE AREA SD	69%	92%	2%	62%	90%	3%
63. CARLISLE AREA SD	67%	91%	3%	62%	90%	4%
64. CARLYNTON SD	63%	89%	4%	54%	87%	5%
65. CARMICHAELS AREA SD	62%	88%	4%	50%	86%	6%
66. CATASAUQUA AREA	61%	87%	3%	51%	85%	6%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
SD						
67. CENTENNIAL SD	66%	92%	1%	61%	91%	3%
68. CENTER AREA SD	69%	93%	1%	65%	94%	2%
69. CENTRAL BUCKS SD	84%	98%	0%	75%	97%	1%
70. CENTRAL CAMBRIA SD	63%	91%	3%	60%	90%	4%
71. CENTRAL COLUMBIA SD	69%	93%	2%	62%	89%	4%
72. CENTRAL DAUPHIN SD	67%	90%	3%	56%	87%	5%
73. CENTRAL FULTON SD	67%	92%	2%	54%	85%	6%
74. CENTRAL GREENE SD	62%	88%	5%	52%	84%	6%
75. CENTRAL YORK SD	70%	94%	1%	67%	94%	2%
76. CHAMBERSBURG AREA SD	60%	87%	4%	53%	86%	6%
77. CHARLEROI SD	59%	87%	4%	51%	85%	6%
78. CHARTIERS VALLEY SD	65%	90%	3%	61%	89%	4%
79. CHARTIERS-HOUSTON SD	63%	89%	3%	59%	88%	4%
80. CHELTENHAM TOWNSHIP SD	72%	92%	1%	68%	92%	2%
81. CHESTER-UPLAND SD	46%	71%	15%	34%	68%	17%
82. CHESTNUT RIDGE SD	64%	90%	3%	55%	88%	5%
83. CHICHESTER SD	58%	84%	5%	50%	84%	6%
84. CLAIRTON CITY SD	50%	79%	7%	39%	73%	11%
85. CLARION AREA SD	67%	92%	1%	60%	92%	2%
86. CLARION-LIMESTONE AREA SD	65%	91%	2%	59%	90%	4%
87. CLAYSBURG-KIMMEL SD	61%	89%	3%	53%	87%	5%
88. CLEARFIELD AREA SD	61%	88%	4%	53%	85%	6%
89. COATESVILLE AREA SD	60%	87%	3%	54%	85%	6%
90. COCALICO SD	67%	92%	1%	63%	91%	3%
91. COLONIAL SD	80%	97%	1%	74%	96%	1%
92. COLUMBIA BOROUGH SD	58%	86%	4%	49%	82%	7%
93. COMMODORE PERRY SD	60%	90%	2%	61%	91%	3%
94. CONEMAUGH TOWNSHIP AREA SD	75%	95%	1%	64%	91%	3%
95. CONEMAUGH VALLEY SD	67%	91%	2%	57%	87%	4%
96. CONESTOGA VALLEY SD	65%	91%	2%	60%	90%	3%
97. CONEWAGO VALLEY SD	65%	90%	2%	54%	85%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
98. CONNEAUT SD	61%	88%	4%	54%	85%	5%
99. CONNELLSVILLE AREA SD	58%	86%	4%	50%	83%	7%
100. CONRAD WEISER AREA SD	65%	89%	3%	54%	87%	5%
101. CORNELL SD	64%	90%	4%	49%	86%	5%
102. CORNWALL-LEBANON SD	68%	94%	1%	63%	92%	2%
103. CORRY AREA SD	57%	86%	5%	48%	83%	7%
104. COUDERSPORT AREA SD	62%	89%	2%	58%	89%	4%
105. COUNCIL ROCK SD	73%	95%	1%	69%	95%	2%
106. CRANBERRY AREA SD	65%	91%	2%	58%	88%	5%
107. CRAWFORD CENTRAL SD	57%	84%	4%	53%	85%	6%
108. CRESTWOOD SD	67%	91%	2%	62%	93%	2%
109. CUMBERLAND VALLEY SD	78%	96%	1%	71%	94%	2%
110. CURWENSVILLE AREA SD	68%	92%	2%	60%	90%	4%
111. DALLAS SD	75%	96%	1%	67%	95%	1%
112. DALLASTOWN AREA SD	68%	93%	1%	67%	93%	2%
113. DANIEL BOONE AREA SD	62%	90%	2%	54%	89%	4%
114. DANVILLE AREA SD	69%	92%	2%	63%	92%	3%
115. DEER LAKES SD	63%	90%	2%	63%	91%	4%
116. DELAWARE VALLEY SD	74%	96%	1%	70%	95%	1%
117. DERRY AREA SD	68%	92%	2%	62%	91%	3%
118. DERRY TOWNSHIP SD	78%	96%	1%	68%	93%	2%
119. DONEGAL SD	63%	89%	2%	53%	87%	5%
120. DOVER AREA SD	59%	89%	2%	56%	88%	4%
121. DOWNINGTOWN AREA SD	74%	94%	1%	71%	95%	1%
122. DUBOIS AREA SD	66%	90%	2%	57%	88%	5%
123. DUNMORE SD	65%	92%	1%	60%	93%	2%
124. DUQUESNE CITY SD	51%	76%	12%	34%	66%	21%
125. EAST ALLEGHENY SD	58%	86%	3%	50%	85%	5%
126. EAST LYCOMING SD	77%	95%	1%	65%	91%	3%
127. EAST PENN SD	70%	94%	1%	65%	93%	2%
128. EAST PENNSBORO AREA SD	67%	92%	2%	58%	90%	3%
129. EAST STROUDSBURG AREA SD	60%	87%	3%	55%	87%	4%
130. EASTERN LANCASTER CO SD	68%	92%	2%	60%	90%	3%
131. EASTERN LEBANON	61%	87%	3%	54%	86%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
CO SD						
132. EASTERN YORK SD	64%	90%	3%	53%	88%	5%
133. EASTON AREA SD	64%	90%	3%	54%	85%	6%
134. ELIZABETH FORWARD SD	66%	92%	2%	57%	89%	4%
135. ELIZABETHTOWN AREA SD	66%	92%	2%	59%	90%	4%
136. ELK LAKE SD	65%	90%	2%	57%	89%	4%
137. ELLWOOD CITY AREA SD	64%	90%	3%	56%	89%	4%
138. EPHRATA AREA SD	67%	90%	2%	58%	88%	5%
139. ERIE CITY SD	66%	92%	2%	54%	89%	3%
140. EVERETT AREA SD	62%	89%	2%	52%	87%	5%
141. EXETER TOWNSHIP SD	65%	91%	2%	61%	92%	3%
142. FAIRFIELD AREA SD	63%	88%	3%	55%	87%	5%
143. FAIRVIEW SD	66%	92%	2%	73%	95%	2%
144. FANNETT-METAL SD	58%	88%	3%	44%	82%	7%
145. FARRELL AREA SD	50%	80%	8%	40%	75%	10%
146. FERNDALE AREA SD	64%	92%	2%	51%	88%	5%
147. FLEETWOOD AREA SD	63%	91%	2%	57%	90%	3%
148. FORBES ROAD SD	62%	87%	4%	54%	83%	8%
149. FOREST AREA SD	57%	86%	5%	52%	87%	6%
150. FOREST CITY REGIONAL SD	57%	85%	4%	58%	89%	4%
151. FOREST HILLS SD	66%	91%	2%	56%	88%	5%
152. FORT CHERRY SD	60%	90%	3%	58%	91%	4%
153. FORT LEOEUF SD	67%	92%	1%	63%	92%	3%
154. FOX CHAPEL AREA SD	80%	96%	0%	75%	96%	1%
155. FRANKLIN AREA SD	62%	88%	3%	52%	85%	6%
156. FRANKLIN REGIONAL SD	73%	97%	1%	75%	97%	2%
157. FRAZIER SD	71%	93%	2%	58%	91%	4%
158. FREEDOM AREA SD	73%	95%	0%	60%	92%	3%
159. FREEPORT AREA SD	68%	92%	1%	62%	94%	2%
160. GALETON AREA SD	66%	92%	2%	50%	87%	3%
161. GARNET VALLEY SD	77%	95%	1%	74%	97%	0%
162. GATEWAY SD	67%	91%	3%	62%	90%	4%
163. GENERAL MCLANE SD	65%	91%	1%	59%	90%	4%
164. GETTYSBURG AREA SD	66%	92%	2%	60%	88%	4%
165. GIRARD SD	75%	95%	1%	57%	90%	3%
166. GLENDALE SD	57%	87%	4%	48%	83%	5%
167. GOVERNOR MIFFLIN SD	62%	89%	2%	60%	92%	3%
168. GREAT VALLEY SD	79%	96%	1%	77%	97%	1%
169. GREATER JOHNSTOWN SD	56%	85%	4%	44%	81%	7%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
170. GREATER LATROBE SD	76%	96%	1%	66%	93%	2%
171. GREATER NANTICOKE AREA SD	61%	87%	4%	52%	84%	7%
172. GREENCASTLE-ANTRIM SD	64%	89%	3%	59%	89%	4%
173. GREENSBURG SALEM SD	78%	96%	1%	64%	93%	2%
174. GREENVILLE AREA SD	61%	89%	3%	55%	87%	5%
175. GREENWOOD SD	59%	89%	3%	53%	88%	4%
176. GROVE CITY AREA SD	71%	92%	1%	64%	92%	3%
177. HALIFAX AREA SD	59%	88%	2%	59%	89%	4%
178. HAMBURG AREA SD	64%	90%	2%	53%	87%	5%
179. HAMPTON TOWNSHIP SD	81%	96%	0%	78%	98%	1%
180. HANOVER AREA SD	58%	86%	3%	53%	84%	5%
181. HANOVER PUBLIC SD	60%	87%	4%	52%	86%	5%
182. HARBOR CREEK SD	67%	95%	1%	62%	93%	3%
183. HARMONY AREA SD	58%	86%	4%	50%	82%	8%
184. HARRISBURG CITY SD	45%	70%	15%	35%	66%	19%
185. HATBORO-HORSHAM SD	80%	97%	1%	69%	95%	1%
186. HAVERFORD TOWNSHIP SD	73%	94%	2%	65%	93%	2%
187. HAZLETON AREA SD	62%	88%	3%	56%	86%	6%
188. HEMPFIELD SD	71%	93%	1%	65%	93%	3%
189. HEMPFIELD AREA SD	66%	92%	2%	63%	93%	3%
190. HERMITAGE SD	70%	93%	1%	64%	91%	3%
191. HIGHLANDS SD	64%	90%	3%	52%	87%	5%
192. HOLLIDAYSBURG AREA SD	69%	93%	2%	64%	92%	4%
193. HOMER-CENTER SD	64%	91%	2%	55%	88%	5%
194. HOPEWELL AREA SD	69%	94%	1%	60%	91%	3%
195. HUNTINGDON AREA SD	65%	90%	3%	56%	87%	5%
196. INDIANA AREA SD	64%	89%	3%	63%	90%	4%
197. INTERBORO SD	61%	90%	3%	55%	87%	4%
198. IROQUOIS SD	60%	89%	3%	50%	83%	6%
199. JAMESTOWN AREA SD	71%	93%	1%	63%	94%	2%
200. JEANNETTE CITY SD	58%	88%	3%	54%	87%	5%
201. JEFFERSON-MORGAN SD	56%	86%	5%	47%	84%	6%
202. JENKINTOWN SD	77%	95%	1%	75%	96%	1%
203. JERSEY SHORE AREA SD	67%	92%	2%	55%	88%	5%
204. JIM THORPE AREA SD	59%	89%	3%	53%	87%	5%
205. JOHNSONBURG AREA SD	64%	89%	3%	55%	87%	4%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
206. JUNIATA COUNTY SD	61%	89%	3%	53%	86%	6%
207. JUNIATA VALLEY SD	62%	90%	1%	55%	86%	5%
208. KANE AREA SD	60%	88%	2%	55%	87%	5%
209. KARNIS CITY AREA SD	63%	90%	2%	57%	91%	3%
210. KENNETT CONSOLIDATED SD	67%	90%	3%	62%	89%	5%
211. KEYSTONE CENTRAL SD	61%	88%	3%	51%	85%	6%
212. KEYSTONE OAKS SD	66%	92%	3%	58%	89%	4%
213. KEYSTONE SD	62%	92%	2%	59%	91%	4%
214. KISKI AREA SD	67%	92%	2%	64%	93%	3%
215. KUTZTOWN AREA SD	66%	90%	2%	60%	90%	4%
216. LACKAWANNA TRAIL SD	64%	90%	3%	58%	88%	4%
217. LAKELAND SD	61%	90%	2%	58%	89%	3%
218. LAKE-LEHMAN SD	65%	90%	3%	63%	91%	3%
219. LAKEVIEW SD	63%	91%	2%	54%	89%	4%
220. LAMPETER-STRASBURG SD	73%	95%	1%	69%	95%	2%
221. LANCASTER SD	55%	82%	6%	42%	77%	10%
222. LAUREL SD	61%	88%	3%	54%	87%	4%
223. LAUREL HIGHLANDS SD	60%	86%	4%	54%	85%	7%
224. LEBANON SD	55%	84%	6%	42%	78%	9%
225. LEECHBURG AREA SD	60%	88%	3%	51%	86%	5%
226. LEHIGHTON AREA SD	64%	89%	2%	56%	89%	4%
227. LEWISBURG AREA SD	75%	96%	1%	73%	93%	3%
228. LIGONIER VALLEY SD	72%	94%	1%	63%	91%	2%
229. LINE MOUNTAIN SD	66%	91%	3%	58%	87%	5%
230. LITTLESTOWN AREA SD	60%	88%	3%	52%	86%	5%
231. LOWER DAUPHIN SD	72%	94%	1%	64%	92%	3%
232. LOWER MERION SD	83%	97%	1%	79%	98%	1%
233. LOWER MORELAND TOWNSHIP SD	81%	98%	0%	74%	97%	1%
234. LOYALSOCK TOWNSHIP SD	73%	95%	1%	62%	89%	5%
235. MAHANoy AREA SD	65%	90%	3%	56%	86%	5%
236. MANHEIM CENTRAL SD	67%	91%	2%	58%	90%	4%
237. MANHEIM TOWNSHIP SD	73%	94%	1%	68%	93%	3%
238. MARION CENTER AREA SD	65%	93%	2%	58%	89%	5%
239. MARPLE NEWTOWN SD	70%	94%	1%	66%	94%	1%
240. MARS AREA SD	70%	95%	1%	66%	95%	1%
241. MCGUFFEY SD	61%	89%	3%	57%	88%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
242. MCKEESPORT AREA SD	56%	83%	6%	46%	80%	8%
243. MECHANICSBURG AREA SD	71%	95%	1%	63%	92%	3%
244. MERCER AREA SD	67%	92%	1%	64%	92%	4%
245. METHACTON SD	78%	95%	1%	72%	96%	1%
246. MEYERSDALE AREA SD	60%	87%	3%	54%	87%	5%
247. MID VALLEY SD	62%	89%	3%	49%	85%	6%
248. MIDDLETOWN AREA SD	63%	90%	2%	51%	87%	5%
249. MIDD-WEST SD	62%	90%	2%	54%	87%	4%
250. MIDLAND BOROUGH SD	73%	93%	1%	57%	91%	4%
251. MIFFLIN COUNTY SD	62%	89%	2%	51%	85%	5%
252. MIFFLINBURG AREA SD	71%	92%	2%	62%	90%	4%
253. MILLCREEK TOWNSHIP SD	65%	91%	2%	61%	90%	4%
254. MILLERSBURG AREA SD	60%	90%	3%	57%	88%	5%
255. MILLVILLE AREA SD	63%	89%	3%	62%	89%	4%
256. MILTON AREA SD	61%	87%	4%	51%	85%	6%
257. MINERSVILLE AREA SD	63%	88%	4%	57%	88%	4%
258. MOHAWK AREA SD	62%	88%	2%	51%	85%	6%
259. MONACA SD	58%	90%	3%	49%	86%	5%
260. MONESSEN CITY SD	64%	89%	3%	47%	83%	6%
261. MONITEAU SD	63%	90%	2%	55%	88%	4%
262. MONTGOMERY AREA SD	77%	95%	1%	61%	93%	2%
263. MONTOUR SD	68%	92%	2%	64%	92%	3%
264. MONTOURSVILLE AREA SD	74%	94%	1%	64%	93%	2%
265. MONTROSE AREA SD	62%	89%	3%	58%	88%	4%
266. MOON AREA SD	73%	94%	1%	65%	95%	2%
267. MORRISVILLE BOROUGH SD	60%	87%	3%	52%	86%	6%
268. MOSHANNON VALLEY SD	58%	88%	3%	52%	87%	5%
269. MOUNT CARMEL AREA SD	61%	88%	3%	53%	86%	6%
270. MOUNT PLEASANT AREA SD	61%	88%	3%	59%	89%	5%
271. MOUNT UNION AREA SD	62%	88%	3%	48%	83%	7%
272. MOUNTAIN VIEW SD	56%	85%	3%	53%	86%	5%
273. MT LEBANON SD	76%	96%	0%	78%	98%	1%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
274. MUHLENBERG SD	62%	89%	3%	54%	85%	5%
275. MUNCY SD	64%	89%	2%	57%	88%	4%
276. NAZARETH AREA SD	67%	92%	2%	61%	91%	3%
277. NESHAMINY SD	69%	93%	1%	62%	92%	2%
278. NESHANNOCK TOWNSHIP SD	70%	94%	1%	60%	93%	3%
279. NEW BRIGHTON AREA SD	57%	86%	4%	52%	85%	5%
280. NEW CASTLE AREA SD	62%	88%	3%	51%	85%	6%
281. NEW HOPE-SOLEBURY SD	76%	96%	1%	72%	95%	2%
282. NEW KENSINGTON-ARNOLD SD	61%	87%	3%	52%	84%	7%
283. NEWPORT SD	59%	85%	4%	50%	85%	6%
284. NORRISTOWN SD	62%	87%	4%	48%	83%	8%
285. NORTH ALLEGHENY SD	83%	98%	0%	77%	98%	1%
286. NORTH CLARION COUNTY SD	63%	92%	2%	58%	90%	4%
287. NORTH EAST SD	66%	90%	2%	60%	90%	5%
288. NORTH HILLS SD	70%	94%	2%	65%	93%	2%
289. NORTH PENN SD	76%	96%	1%	67%	94%	2%
290. NORTH POCONO SD	61%	90%	2%	59%	89%	4%
291. NORTH SCHUYLKILL SD	61%	89%	2%	50%	85%	5%
292. NORTH STAR SD	64%	91%	3%	57%	87%	5%
293. NORTHAMPTON AREA SD	63%	90%	2%	56%	90%	4%
294. NORTHEAST BRADFORD SD	60%	87%	4%	48%	83%	7%
295. NORTHEASTERN YORK SD	65%	91%	2%	53%	88%	4%
296. NORTHERN BEDFORD COUNTY SD	61%	89%	2%	55%	85%	5%
297. NORTHERN CAMBRIA SD	66%	90%	2%	55%	87%	4%
298. NORTHERN LEBANON SD	54%	84%	5%	50%	85%	6%
299. NORTHERN LEHIGH SD	60%	87%	3%	53%	85%	5%
300. NORTHERN POTTER SD	63%	88%	4%	48%	83%	6%
301. NORTHERN TIOGA SD	61%	90%	3%	53%	85%	5%
302. NORTHERN YORK CO SD	67%	91%	2%	59%	91%	3%
303. NORTHGATE SD	65%	91%	2%	57%	90%	5%
304. NORTHWEST AREA SD	57%	84%	5%	54%	85%	6%
305. NORTHWESTERN	66%	91%	1%	64%	91%	3%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
LEHIGH SD						
306. NORTHWESTERN SD	61%	88%	4%	54%	85%	6%
307. NORWIN SD	77%	97%	1%	69%	93%	2%
308. OCTORARA AREA SD	65%	91%	2%	57%	88%	4%
309. OIL CITY AREA SD	58%	87%	4%	47%	83%	7%
310. OLD FORGE SD	64%	90%	2%	56%	88%	5%
311. OLEY VALLEY SD	63%	91%	2%	63%	92%	3%
312. OSWAYO VALLEY SD	63%	88%	4%	53%	86%	7%
313. OTTO-ELDRED SD	65%	90%	2%	58%	90%	4%
314. OWEN J ROBERTS SD	74%	94%	1%	68%	95%	1%
315. OXFORD AREA SD	65%	89%	2%	60%	89%	5%
316. PALISADES SD	68%	93%	2%	64%	92%	3%
317. PALMERTON AREA SD	66%	90%	3%	58%	90%	3%
318. PALMYRA AREA SD	65%	91%	2%	60%	91%	3%
319. PANTHER VALLEY SD	53%	81%	7%	43%	79%	8%
320. PARKLAND SD	77%	96%	1%	68%	94%	2%
321. PEN ARGYL AREA SD	65%	92%	1%	59%	89%	4%
322. PENN CAMBRIA SD	64%	89%	3%	56%	88%	5%
323. PENN HILLS SD	54%	84%	5%	48%	82%	7%
324. PENN MANOR SD	63%	90%	3%	56%	88%	4%
325. PENNCREST SD	63%	88%	3%	56%	87%	6%
326. PENN-DELCO SD	70%	94%	1%	64%	93%	2%
327. PENNRIDGE SD	66%	93%	1%	63%	93%	2%
328. PENNS MANOR AREA SD	56%	85%	4%	50%	86%	5%
329. PENNS VALLEY AREA SD	69%	93%	1%	62%	91%	3%
330. PENNSBURY SD	69%	92%	2%	66%	93%	2%
331. PENN-TRAFFORD SD	78%	97%	1%	70%	96%	1%
332. PEQUEA VALLEY SD	63%	89%	3%	56%	87%	5%
333. PERKIOMEN VALLEY SD	76%	96%	1%	69%	96%	1%
334. PETERS TOWNSHIP SD	79%	97%	0%	73%	97%	1%
335. PHILADELPHIA CITY SD	55%	81%	8%	43%	76%	11%
336. PHILIPSBURG-OSCEOLA AREA SD	57%	86%	4%	52%	85%	6%
337. PHOENIXVILLE AREA SD	75%	95%	1%	67%	94%	2%
338. PINE GROVE AREA SD	65%	91%	2%	53%	87%	4%
339. PINE-RICHLAND SD	72%	94%	1%	67%	94%	2%
340. PITTSBURGH SD	57%	84%	5%	47%	80%	8%
341. PITTSTON AREA SD	65%	90%	2%	58%	88%	5%
342. PLEASANT VALLEY SD	59%	88%	3%	55%	88%	4%
343. PLUM BOROUGH SD	64%	91%	1%	64%	93%	2%
344. POCONO MOUNTAIN SD	62%	89%	3%	52%	86%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
345. PORT ALLEGANY SD	60%	87%	4%	52%	84%	7%
346. PORTAGE AREA SD	61%	89%	3%	55%	86%	6%
347. POTTSBURY SD	64%	90%	3%	54%	88%	5%
348. POTTSBURY SD	60%	87%	3%	47%	85%	6%
349. POTTSVILLE AREA SD	59%	89%	3%	55%	87%	5%
350. PUNXSUTAWNEY AREA SD	62%	89%	3%	56%	87%	5%
351. PURCHASE LINE SD	63%	87%	5%	52%	86%	6%
352. QUAKER VALLEY SD	76%	95%	0%	75%	95%	2%
353. QUAKERTOWN COMMUNITY SD	78%	95%	1%	66%	93%	2%
354. RADNOR TOWNSHIP SD	84%	98%	0%	80%	98%	1%
355. READING SD	56%	84%	5%	41%	77%	9%
356. RED LION AREA SD	67%	91%	2%	55%	88%	5%
357. REDBANK VALLEY SD	64%	90%	3%	54%	88%	4%
358. REYNOLDS SD	62%	91%	3%	59%	87%	4%
359. RICHLAND SD	69%	94%	1%	67%	94%	2%
360. RIDGWAY AREA SD	62%	89%	2%	54%	86%	6%
361. RIDLEY SD	63%	89%	3%	54%	87%	5%
362. RINGGOLD SD	59%	87%	4%	53%	86%	6%
363. RIVERSIDE SD	61%	88%	4%	53%	86%	6%
364. RIVERSIDE BEAVER COUNTY SD	66%	91%	2%	58%	89%	3%
365. RIVERVIEW SD	71%	91%	3%	64%	91%	3%
366. ROCHESTER AREA SD	60%	88%	3%	50%	85%	4%
367. ROCKWOOD AREA SD	65%	92%	3%	56%	90%	4%
368. ROSE TREE MEDIA SD	77%	95%	1%	73%	95%	1%
369. SAINT CLAIR AREA SD	60%	87%	3%	52%	87%	4%
370. SAINT MARYS AREA SD	70%	96%	1%	58%	90%	3%
371. SALISBURY TOWNSHIP SD	66%	92%	2%	66%	93%	2%
372. SALISBURY-ELK LICK SD	65%	90%	3%	50%	88%	5%
373. SAUCON VALLEY SD	74%	96%	1%	63%	94%	2%
374. SAYRE AREA SD	69%	93%	1%	59%	91%	2%
375. SCHUYLKILL HAVEN AREA SD	63%	91%	2%	54%	88%	5%
376. SCHUYLKILL VALLEY SD	66%	91%	1%	63%	91%	2%
377. SCRANTON SD	64%	90%	3%	56%	87%	5%
378. SELINSBURY AREA SD	71%	94%	1%	65%	91%	3%
379. SENECA VALLEY SD	72%	95%	1%	66%	93%	2%
380. SHADE-CENTRAL CITY SD	61%	88%	3%	52%	86%	6%
381. SHALER AREA SD	63%	88%	3%	56%	88%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
382. SHAMOKIN AREA SD	59%	89%	3%	52%	86%	6%
383. SHANKSVILLE-STONYCREEK SD	64%	92%	1%	56%	88%	4%
384. SHARON CITY SD	62%	88%	3%	51%	84%	6%
385. SHARPSVILLE AREA SD	57%	87%	4%	55%	87%	5%
386. SHENANDOAH VALLEY SD	59%	87%	4%	50%	85%	6%
387. SHENANGO AREA SD	68%	94%	2%	60%	91%	3%
388. SHIKELLAMY SD	59%	86%	3%	52%	85%	6%
389. SHIPPENSBURG AREA SD	63%	88%	3%	54%	85%	6%
390. SLIPPERY ROCK AREA SD	64%	90%	3%	57%	88%	5%
391. SMETHPORT AREA SD	65%	91%	2%	52%	84%	7%
392. SOLANCO SD	67%	91%	2%	60%	90%	3%
393. SOMERSET AREA SD	60%	87%	4%	51%	84%	6%
394. SOUDERTON AREA SD	76%	95%	1%	68%	94%	2%
395. SOUTH ALLEGHENY SD	61%	87%	4%	52%	85%	6%
396. SOUTH BUTLER COUNTY SD	66%	92%	1%	61%	91%	4%
397. SOUTH EASTERN SD	64%	90%	2%	58%	89%	4%
398. SOUTH FAYETTE TOWNSHIP SD	90%	98%	0%	77%	97%	1%
399. SOUTH MIDDLETON SD	64%	91%	2%	61%	91%	4%
400. SOUTH PARK SD	67%	91%	2%	63%	91%	4%
401. SOUTH SIDE AREA SD	62%	90%	3%	57%	90%	3%
402. SOUTH WESTERN SD	68%	92%	2%	57%	89%	5%
403. SOUTH WILLIAMSPORT AREA SD	69%	94%	1%	61%	92%	2%
404. SOUTHEAST DELCO SD	54%	83%	5%	43%	79%	8%
405. SOUTHEASTERN GREENE SD	58%	88%	4%	49%	83%	7%
406. SOUTHERN COLUMBIA AREA SD	67%	92%	2%	59%	90%	4%
407. SOUTHERN FULTON SD	78%	96%	1%	68%	92%	2%
408. SOUTHERN HUNTINGDON COUNTY SD	59%	87%	4%	48%	83%	7%
409. SOUTHERN LEHIGH SD	72%	94%	1%	65%	95%	2%
410. SOUTHERN TIOGA SD	60%	89%	3%	53%	87%	5%
411. SOUTHERN YORK CO SD	69%	94%	1%	65%	93%	2%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
412. SOUTHMORELAND SD	68%	93%	2%	58%	89%	5%
413. SPRING COVE SD	62%	88%	3%	57%	88%	5%
414. SPRING GROVE AREA SD	65%	91%	2%	56%	88%	4%
415. SPRINGFIELD SD	76%	95%	1%	67%	94%	2%
416. SPRINGFIELD TOWNSHIP SD	70%	92%	2%	65%	92%	3%
417. SPRING-FORD AREA SD	80%	97%	1%	67%	94%	2%
418. STATE COLLEGE AREA SD	73%	92%	2%	72%	94%	2%
419. STEEL VALLEY SD	63%	89%	3%	52%	84%	6%
420. STEELTON-HIGHSPIRE SD	53%	80%	7%	39%	75%	10%
421. STO-ROX SD	55%	84%	6%	42%	76%	9%
422. STROUDSBURG AREA SD	63%	88%	3%	58%	88%	5%
423. SULLIVAN COUNTY SD	65%	89%	2%	59%	92%	3%
424. SUSQUEHANNA COMM SD	69%	92%	3%	59%	88%	4%
425. SUSQUEHANNA TOWNSHIP SD	65%	89%	3%	55%	86%	5%
426. SUSQUENITA SD	62%	89%	3%	54%	85%	5%
427. TAMAQUA AREA SD	61%	90%	2%	55%	89%	4%
428. TITUSVILLE AREA SD	64%	90%	2%	54%	88%	3%
429. TOWANDA AREA SD	61%	88%	3%	50%	86%	6%
430. TREDYFFRIN-EASTTOWN SD	80%	97%	0%	80%	98%	0%
431. TRINITY AREA SD	65%	90%	2%	62%	90%	4%
432. TRI-VALLEY SD	66%	92%	2%	57%	89%	4%
433. TROY AREA SD	69%	92%	2%	57%	88%	4%
434. TULPEHOCKEN AREA SD	70%	93%	3%	57%	88%	5%
435. TUNKHANNOCK AREA SD	64%	90%	3%	59%	88%	4%
436. TURKEYFOOT VALLEY AREA SD	54%	82%	7%	41%	77%	9%
437. TUSCARORA SD	58%	86%	4%	51%	84%	6%
438. TUSSEY MOUNTAIN SD	57%	88%	3%	48%	82%	6%
439. TWIN VALLEY SD	72%	94%	0%	62%	91%	3%
440. TYRONE AREA SD	61%	88%	3%	61%	89%	5%
441. UNION SD	62%	88%	3%	53%	85%	5%
442. UNION AREA SD	63%	89%	3%	58%	88%	3%
443. UNION CITY AREA SD	61%	87%	4%	49%	83%	7%
444. UNIONTOWN AREA SD	61%	88%	4%	55%	85%	6%
445. UNION VILLE-CHADDS	87%	99%	0%	79%	99%	0%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
FORD SD						
446. UNITED SD	65%	90%	3%	57%	88%	5%
447. UPPER ADAMS SD	65%	89%	3%	57%	87%	5%
448. UPPER DARBY SD	62%	88%	4%	50%	84%	6%
449. UPPER DAUPHIN AREA SD	64%	90%	2%	53%	88%	5%
450. UPPER DUBLIN SD	82%	97%	1%	75%	95%	1%
451. UPPER MERION AREA SD	73%	95%	1%	65%	93%	2%
452. UPPER MORELAND TOWNSHIP SD	69%	95%	1%	64%	93%	2%
453. UPPER PERKIOMEN SD	64%	92%	2%	59%	90%	3%
454. UPPER SAINT CLAIR SD	86%	99%	0%	80%	99%	0%
455. VALLEY GROVE SD	55%	86%	4%	44%	84%	5%
456. VALLEY VIEW SD	65%	91%	1%	58%	91%	3%
457. WALLENPAUPACK AREA SD	65%	91%	2%	63%	91%	2%
458. WALLINGFORD-SWARTHMORE SD	81%	96%	1%	78%	97%	1%
459. WARREN COUNTY SD	61%	88%	3%	53%	87%	5%
460. WARRIOR RUN SD	66%	91%	2%	54%	89%	4%
461. WARWICK SD	66%	92%	2%	62%	91%	3%
462. WASHINGTON SD	60%	86%	5%	47%	83%	7%
463. WATTSBURG AREA SD	60%	88%	1%	58%	89%	4%
464. WAYNE HIGHLANDS SD	69%	92%	1%	60%	90%	4%
465. WAYNESBORO AREA SD	65%	90%	2%	55%	87%	5%
466. WEATHERLY AREA SD	72%	93%	2%	63%	90%	3%
467. WELLSBORO AREA SD	62%	89%	2%	55%	87%	4%
468. WEST ALLEGHENY SD	67%	92%	1%	62%	93%	2%
469. WEST BRANCH AREA SD	56%	84%	5%	48%	83%	7%
470. WEST CHESTER AREA SD	74%	95%	1%	72%	96%	2%
471. WEST GREENE SD	56%	85%	6%	48%	81%	8%
472. WEST JEFFERSON HILLS SD	67%	93%	1%	69%	95%	1%
473. WEST MIDDLESEX AREA SD	62%	89%	1%	55%	86%	5%
474. WEST MIFFLIN AREA SD	63%	89%	3%	54%	86%	5%
475. WEST PERRY SD	55%	85%	4%	52%	84%	6%
476. WEST SHORE SD	61%	88%	3%	58%	88%	5%
477. WEST YORK AREA SD	69%	92%	1%	60%	89%	4%
478. WESTERN BEAVER COUNTY SD	66%	92%	2%	58%	88%	5%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
479. WESTERN WAYNE SD	65%	89%	2%	59%	89%	4%
480. WESTMONT HILLTOP SD	71%	96%	0%	67%	94%	1%
481. WHITEHALL-COPLAY SD	64%	91%	2%	57%	89%	4%
482. WILKES-BARRE AREA SD	59%	87%	3%	51%	85%	6%
483. WILKINSBURG BOROUGH SD	50%	77%	8%	35%	72%	11%
484. WILLIAM PENN SD	51%	80%	7%	40%	75%	11%
485. WILLIAMS VALLEY SD	54%	86%	5%	49%	83%	6%
486. WILLIAMSBURG COMMUNITY SD	56%	87%	4%	49%	84%	7%
487. WILLIAMSPORT AREA SD	66%	90%	3%	52%	86%	5%
488. WILMINGTON AREA SD	66%	91%	2%	61%	91%	4%
489. WILSON AREA SD	69%	93%	1%	61%	90%	4%
490. WILSON SD	75%	95%	1%	67%	94%	1%
491. WINDBER AREA SD	68%	89%	3%	66%	92%	4%
492. WISSAHICKON SD	77%	95%	1%	72%	94%	2%
493. WOODLAND HILLS SD	54%	83%	6%	45%	80%	8%
494. WYALUSING AREA SD	60%	88%	4%	54%	86%	5%
495. WYOMING AREA SD	72%	94%	1%	62%	92%	2%
496. WYOMING VALLEY WEST SD	59%	87%	3%	53%	86%	5%
497. WYOMISSING AREA SD	73%	92%	2%	66%	91%	4%
498. YORK CITY SD	54%	81%	7%	38%	74%	11%
499. YORK SUBURBAN SD	75%	95%	1%	69%	93%	2%
500. YOUGH SD	58%	87%	4%	54%	88%	5%

Appendix A-10

Charter School Performance Targets by 2014

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
1. Academy CS	14%	48%	31%	23%	49%	38%
2. Ad Prima CS	90%	100%	0%	62%	99%	2%
3. Alliance for Progress CS	53%	85%	2%	28%	72%	10%
4. Antonia Pantoja Community CS	50%	77%	9%	36%	71%	12%
5. Avon Grove CS	65%	88%	2%	56%	89%	4%
6. Bear Creek Community CS	71%	93%	2%	60%	92%	3%
7. Belmont Charter School	56%	82%	4%	34%	72%	11%
8. Boys Latin of Philadelphia CS	51%	80%	6%	34%	72%	11%
9. Career Connections CHS	20%	61%	18%	28%	61%	24%
10. Center for Student Learning CS at Pennsbury	29%	52%	28%	40%	65%	19%
11. Charter High School for Architecture and Design	23%	69%	8%	32%	71%	8%
12. Chester Community CS	57%	86%	5%	39%	81%	6%
13. Christopher Columbus CS	60%	88%	3%	54%	90%	3%
14. City CHS	25%	75%	9%	42%	82%	9%
15. Collegium CS	58%	87%	4%	49%	87%	5%
16. Delaware Valley CHS	17%	56%	16%	34%	68%	15%
17. Discovery Charter School	57%	87%	4%	41%	82%	6%
18. Environmental Charter School at Frick Park	67%	91%	1%	55%	93%	4%
19. Eugenio Maria De Hostos CS	57%	87%	3%	31%	79%	7%
20. Fell CS	54%	80%	6%	44%	79%	9%
21. First Phila CS For Literacy	60%	86%	4%	49%	86%	4%
22. Folk Arts-Cultural Treasures CS	66%	91%	2%	46%	83%	5%
23. Franklin Towne CHS	28%	74%	8%	40%	76%	8%
24. Freire CS	28%	74%	9%	36%	77%	10%
25. Global Leadership	55%	82%	7%	39%	78%	8%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
Academy CS						
26. Graystone Academy CS	55%	80%	7%	38%	76%	9%
27. Green Woods CS	68%	93%	1%	62%	92%	2%
28. Imani Education Circle CS	51%	81%	7%	41%	81%	7%
29. Independence CS	68%	91%	1%	56%	87%	3%
30. Khepera CS	60%	87%	2%	45%	83%	6%
31. KIPP Academy Charter School	65%	89%	2%	48%	78%	5%
32. Laboratory CS	86%	100%	0%	65%	100%	0%
33. Lehigh Valley Academy Regional CS	65%	93%	2%	59%	92%	2%
34. Lehigh Valley CHS for Performing Arts	25%	74%	9%	63%	87%	0%
35. Lincoln CS	59%	87%	4%	34%	78%	6%
36. Lincoln Park Performing Arts CS	41%	76%	6%	65%	90%	2%
37. Manchester Academic CS	66%	91%	2%	52%	85%	5%
38. Maritime Academy Charter School	61%	84%	4%	53%	85%	5%
39. MAST Community Charter School	75%	95%	1%	65%	94%	2%
40. Mastery Charter High School	48%	84%	4%	48%	77%	5%
41. Mastery CS-Pickett Campus	66%	88%	4%	57%	85%	6%
42. Mastery CS-Shoemaker Campus	79%	96%	0%	68%	90%	3%
43. Mastery CS-Thomas Campus	53%	84%	4%	49%	81%	6%
44. Math Civics and Sciences CS	50%	79%	7%	38%	76%	8%
45. Montessori Regional CS	58%	86%	3%	47%	92%	2%
46. Multi-Cultural Academy CS	18%	70%	12%	31%	70%	6%
47. New Foundations CS	67%	96%	0%	52%	92%	0%
48. New Hope Academy CS	48%	69%	15%	41%	67%	11%
49. New Media Technology CS	47%	77%	8%	47%	78%	6%
50. Northside Urban Pathways CS	46%	78%	6%	49%	84%	6%
51. Northwood Academy CS	62%	87%	4%	51%	87%	6%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
52. Nueva Esperanza Academy CS	16%	42%	33%	25%	44%	30%
53. Pan American Academy CS	50%	82%	6%	34%	84%	9%
54. People for People CS	54%	83%	6%	40%	75%	11%
55. Philadelphia Electrical & Tech CHS	25%	70%	10%	42%	68%	13%
56. Philadelphia Harambee Inst CS	59%	87%	4%	48%	86%	5%
57. Philadelphia Performing Arts CS	68%	92%	1%	58%	91%	2%
58. Planet Abacus CS	91%	100%	0%	60%	100%	0%
59. Pocono Mountain Charter School	52%	80%	7%	40%	77%	9%
60. Preparatory CS	33%	79%	4%	55%	86%	4%
61. Propel CS-East	71%	92%	3%	55%	89%	4%
62. Propel CS-Homestead	63%	90%	2%	43%	81%	6%
63. Propel CS-McKeesport	89%	99%	0%	58%	91%	3%
64. Propel CS-Montour	61%	88%	4%	48%	82%	6%
65. Renaissance Academy CS	67%	90%	1%	61%	91%	2%
66. Richard Allen Preparatory CS	50%	74%	9%	40%	73%	9%
67. Robert Benjamin Wiley Community CS	54%	86%	7%	33%	74%	13%
68. Roberto Clemente CS	46%	70%	11%	41%	73%	11%
69. Russell Byers CS	54%	86%	4%	37%	80%	7%
70. Southwest Leadership Academy CS	50%	81%	9%	33%	79%	10%
71. Sugar Valley Rural CS	47%	73%	16%	32%	73%	13%
72. Sylvan Heights Science CS	49%	86%	2%	31%	84%	4%
73. Tidioute Community CS	61%	82%	5%	46%	82%	6%
74. Truebright Science Academy CS	54%	76%	9%	41%	70%	9%
75. Tuscarora Blended Learning CS	24%	39%	45%	27%	44%	37%
76. Universal Institute CS	62%	89%	3%	46%	84%	4%
77. Urban League of Pittsburgh CS	59%	90%	0%	32%	88%	3%
78. West Oak Lane CS	60%	91%	1%	39%	80%	7%
79. West Phila. Achievement CES	50%	80%	5%	27%	71%	10%
80. Widener Partnership	55%	91%	0%	39%	91%	6%

District	Math			Reading		
	Advanced	Above proficient	Below basic	Advanced	Above proficient	Below basic
CS						
81. Wissahickon CS	60%	85%	5%	47%	84%	5%
82. World Communications CS	47%	83%	4%	41%	79%	4%
83. Young Scholars CS	66%	88%	6%	54%	81%	8%
84. Young Scholars of Central PA CS	71%	94%	0%	64%	95%	3%

Appendix A-11

List of Lowest Performing Schools Participating in RTTT Turnaround Initiative

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
1. Academy CS	Making Progress	9 - 12	City	151	83%	61%	22%
2. Academy Park High School	Corrective Action 2 (third year)	9 - 12	Suburb	1,305	47%	38%	37%
3. Achievement House CS	School Improvement 2	9 - 12	Suburb	267	39%	48%	34%
4. Aldan Basics School	Warning	K5F - 6	Suburb	340	64%	30%	49%
5. Aliquippa SHS	Corrective Action 2 (second year)	9 - 12	Suburb	334	81%	51%	27%
6. ALLEN ETHEL DR.	Corrective Action 2 (first year)	PKF - 6	Philadelphia	325	96%	49%	23%
7. Anderson ADD B School	Making Progress	PKF - 7	Philadelphia	413	97%	33%	42%
8. Antonia Pantoja Community Charter School	Warning	K5F - 8	City	726	91%	38%	35%
9. Arsenal Elementary School	School Improvement 2	PKF - 5	City	249	92%	40%	35%
10. Benjamin Franklin School	School Improvement 2	K5F - 8	City	636	82%	33%	43%
11. Bethune Mary McLeod	Corrective Action 2 (sixth year)	PKF - 8	Philadelphia	621	100%	35%	39%
12. James G Blaine Schools	Corrective Action 2 (third year)	PKF - 8	Philadelphia	312	100%	40%	36%
13. Bluford Buion Elementary School	Corrective Action 2 (sixth year)	K5F - 6	Philadelphia	558	100%	48%	23%
14. Brashear High School	Corrective Action 1	9 - 12	City	1,155	59%	33%	48%
15. Brownsville Area High School	Corrective Action 2 (first year)	9 - 12	Town	572	58%	30%	49%
16. William C Bryant School	Making Progress	PKF - 8	Philadelphia	503	88%	38%	39%
17. Camp Curtin School	Corrective Action 2 (fifth year)	PKF - 8	City	661	89%	52%	22%
18. Career Connections CHS	School Improvement 2	9 - 12	City	248	73%	48%	34%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
19. Career Technology Academy	School Improvement 2	8 - 12	City	337	85%	73%	10%
20. Carnell Laura High School	Corrective Action 2 (second year)	K5F - 8	Philadelphia	1,400	40%	34%	44%
21. Carroll Charles School	Corrective Action 2 (fifth year)	PKF - 12	Philadelphia	400	95%	62%	15%
22. Central Dauphin East SHS	Corrective Action 2 (third year)	9 - 12	Suburb	1,610	40%	34%	45%
23. Charles Kelly Elementary School	School Improvement 1	1 - 5	Suburb	310	42%	29%	46%
24. CHESTER A ARTHUR	Making Progress	K5F - 8	Philadelphia	213	100%	26%	49%
25. Chester High School	Corrective Action 2 (third year)	4 - 12	City	1,717	71%	71%	12%
26. Clairton Elementary School	Warning	K5F - 5	Suburb	348	86%	30%	45%
27. Clairton High School	Making Progress	9 - 12	Suburb	250	76%	43%	35%
28. Clemente Rorberto Middle School	Corrective Action 2 (seventh year)	5 - 8	Philadelphia	674	100%	45%	30%
29. Clymer George School	Corrective Action 2 (seventh year)	PKF - 8	Philadelphia	440	100%	43%	28%
30. Columbus Elementary School	Corrective Action 2 (third year)	PKF - 7	City	675	93%	52%	24%
31. Cooke Jay Middle School	Corrective Action 2 (seventh year)	K5F - 8	Philadelphia	464	100%	32%	41%
32. Cornell SHS	Warning	9 - 12	Suburb	243	50%	39%	49%
33. Corry Area High School	School Improvement 1	9 - 12	Town	855	46%	35%	39%
34. Daroff Samuel School	Corrective Action 2 (first year)	K5F - 8	Philadelphia	638	100%	53%	22%
35. Deburgos Bilingual	Corrective Action 2 (sixth year)	PKF - 8	Philadelphia	641	100%	36%	37%
36. Dick William School	Corrective Action 2 (first year)	PKF - 8	Philadelphia	258	100%	35%	42%
37. Dobbins Murrell AVT High School	Corrective Action 2 (fifth year)	9 - 12	Philadelphia	836	100%	44%	24%
38. Douglass Frederick	Corrective Action 2	PKF - 8	Philadelphia	437	91%	47%	27%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
School	(fifth year)						
39. Drew Charles R School	Corrective Action 2 (fourth year)	PKF - 8	Philadelphia	236	77%	38%	38%
40. Dunbar Paul L School	Corrective Action 2 (seventh year)	PKF - 8	Philadelphia	203	84%	61%	17%
41. Duquesne Consolidated School	School Improvement 1	K5F - 8	Suburb	500	91%	48%	32%
42. East Allegheny High School	School Improvement 1	9 - 12	Suburb	690	47%	27%	49%
43. Edison High School – Fareira Skills	Corrective Action 2 (seventh year)	PKF - 12	Philadelphia	2,073	99%	66%	16%
44. Edmunds Henry R School	Corrective Action 2 (third year)	K5F - 8	Philadelphia	946	40%	41%	31%
45. Everett Area High School	Warning	9 - 12	Rural	507	43%	30%	53%
46. Faison Helen S Arts Academy	School Improvement 2	PKF - 8	City	745	93%	37%	36%
47. Farrell Area High School/UMS	Making Progress	7 - 12	Suburb	387	85%	31%	45%
48. Fels Samuel High School	Corrective Action 2 (fourth year)	9 - 12	Philadelphia	1,459	40%	72%	11%
49. Feltonville Intermediate School	Corrective Action 2 (first year)	3 - 5	Philadelphia	714	100%	42%	34%
50. Ferguson Joseph C School	Making Progress	PKF - 8	Philadelphia	389	92%	26%	52%
51. Fitzsimons Thomas Academy	Corrective Action 2 (sixth year)	7 - 12	Philadelphia	382	100%	61%	17%
52. Francis D Raub Middle School	Corrective Action 2 (third year)	6 - 8	City	979	83%	34%	41%
53. Frankford High School	Corrective Action 2 (fourth year)	9 - 12	Philadelphia	1,880	100%	68%	11%
54. Franklin Benjamin High School	Corrective Action 2 (fifth year)	PKF - 12	Philadelphia	615	98%	56%	20%
55. Fulton Elementary School	Made AYP	K4F - 5	City	444	92%	29%	49%
56. Furness Horace High	Corrective Action 2	9 - 12	Philadelphia	724	100%	55%	22%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
School	(fifth year)						
57. George Washington Elementary School	Corrective Action 2 (second year)	K4F - 5	City	598	97%	31%	48%
58. George Washington High school	Corrective Action 2 (fourth year)	9 - 12	Philadelphia	2,065	37%	37%	40%
59. Germantown High School	Corrective Action 2 (fourth year)	PKF - 12	Philadelphia	1,151	97%	73%	11%
60. Germantown Settlement CS	Corrective Action 2 (third year)	5 - 8	City	361	100%	50%	22%
61. Gillespie Eliz D Middle School	Corrective Action 2 (seventh year)	7 - 8	Philadelphia	160	100%	46%	30%
62. Gratz Simon High School	Corrective Action 2 (fourth year)	9 - 12	Philadelphia	1,319	100%	71%	13%
63. Graystone Academy CS	Made AYP	K5F - 8	Suburb	409	74%	30%	47%
64. Hamilton School	School Improvement 2	K5F - 6	City	316	94%	65%	15%
65. Harding Warren G Middle School	Corrective Action 2 (seventh year)	5 - 8	Philadelphia	843	100%	42%	31%
66. Harmony Area High School	Warning	10 - 12	Rural	96	51%	30%	40%
67. Harrisburg High School	Corrective Action 2 (sixth year)	9 - 12	City	1,603	80%	67%	16%
68. Harrit William F School	Corrective Action 2 (sixth year)	PKF - 7	Philadelphia	549	92%	48%	25%
69. Hazleton Area High School	Corrective Action 2 (third year)	9 - 12	Suburb	3,411	45%	29%	49%
70. Hope CS	Corrective Action 2 (third year)	9 - 12	City	355	70%	89%	3%
71. Hopkinson Francis School	Corrective Action 2 (sixth year)	K5F - 8	Philadelphia	912	100%	31%	43%
72. Hunter William EL	Corrective Action 2 (fourth year)	PKF - 8	Philadelphia	499	100%	30%	48%
73. John Bartram High School	Corrective Action 2 (sixth year)	9 - 12	Philadelphia	1,321	100%	73%	11%
74. Jones John Paul Middle School	Corrective Action 2 (seventh year)	5 - 8	Philadelphia	773	100%	44%	31%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
75. Kenderton School	Corrective Action 2 (sixth year)	K5F - 8	Philadelphia	370	100%	45%	29%
76. Kensington International Business Finance	School Improvement 1	9 - 12	Philadelphia	491	100%	78%	9%
77. Keystone Education Center CS	Corrective Action 2 (second year)	3 - 12	Town	282	83%	57%	16%
78. King Martin Luther High School	Corrective Action 2 (fourth year)	9 - 12	Philadelphia	1,190	100%	72%	11%
79. La Academia CS	Corrective Action 2 (second year)	6 - 12	City	111	98%	52%	11%
80. Lafayette Middle School	School Improvement 1	6 - 8	Suburb	178	77%	33%	41%
81. Lambertson Robert E School	Corrective Action 2 (second year)	K5F - 8	Philadelphia	614	47%	27%	52%
82. Langley High School	Corrective Action 1	9 - 12	City	510	79%	36%	45%
83. Lea Henry C School	Corrective Action 2 (fourth year)	PKF - 8	Philadelphia	421	100%	38%	39%
84. Lebanon SHS	Corrective Action 2 (second year)	9 - 12	City	1,101	60%	29%	44%
85. Lincoln Abraham High School	Corrective Action 2 (fourth year)	PKF - 12	Philadelphia	1,730	44%	62%	19%
86. Locke Alain School	Corrective Action 2 (fourth year)	K5F - 8	Philadelphia	406	100%	42%	32%
87. Lowell James R School	Corrective Action 2 (first year)	PKF - 4	Philadelphia	977	98%	26%	52%
88. Ludlow James R School	Corrective Action 2 (fourth year)	PKF - 8	Philadelphia	270	100%	28%	54%
89. Main Street School	Corrective Action 2 (third year)	PKF - 8	City	308	92%	29%	48%
90. Mann William B School	Corrective Action 2 (fifth year)	PKF - 5	Philadelphia	359	100%	33%	40%
91. Marshall School	Making Progress	PKF - 8	City	417	79%	39%	35%
92. Mastbaum Jules E AVTS	Making Progress	9 - 12	Philadelphia	1,063	100%	36%	30%
93. McCaskey Campus	Corrective Action 2 (third year)	9 - 12	City	2,806	71%	45%	31%
94. McKeesport Area SHS	Corrective Action 2	9 - 12	Suburb	1,383	53%	37%	36%

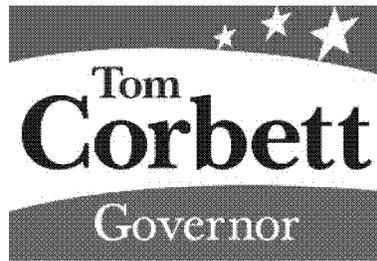
Schools	AYP Overall Proceeding Level (third year)	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
95. McKinley Elementary School	Made AYP	1 - 5	City	233	92%	31%	51%
96. McKinley School	Corrective Action 2 (third year)	K5F - 5	City	459	93%	32%	41%
97. Melrose School	Corrective Action 1	PKF - 9	City	315	88%	53%	23%
98. Morrison Andrew J School	Corrective Action 2 (sixth year)	K5F - 8	Philadelphia	753	100%	30%	45%
99. Mount Union Area SHS	#N/A	9 - 12	Town	456	48%	30%	47%
100. New Hope Academy CS	School Improvement 1	7 - 10	City	316	79%	46%	27%
101. Norristown Area High School	Corrective Action 2 (third year)	9 - 12	Suburb	1,926	52%	39%	40%
102. Northwest Elementary School	Corrective Action 2 (first year)	K4F - 5	City	650	89%	36%	42%
103. Nueva Esperanza Academy CS	School Improvement 1	9 - 12	City	705	100%	58%	17%
104. Oliver High School	Corrective Action 2 (third year)	9 - 12	City	625	78%	54%	25%
105. Olney High School West-704	School Improvement 1	9 - 12	Philadelphia	937	100%	75%	9%
106. Overbrook High School	Corrective Action 2 (third year)	PKF - 12	Philadelphia	1,609	98%	68%	14%
107. Pa Distance Learning CS	Corrective Action 1	K5F - 12	n/a	432	19%	36%	41%
108. Pan American Academy CS	Made AYP	K5F - 4	City	306	100%	31%	51%
109. Panther Valley SHS	Corrective Action 1	9 - 12	Town	555	56%	29%	42%
110. Park Lane El School	School Improvement 2	K5F - 6	Suburb	373	83%	36%	37%
111. Pastourius Francis P	Corrective Action 2 (sixth year)	K5F - 8	Philadelphia	657	100%	45%	32%
112. Peabody High School	Corrective Action 2 (second year)	9 - 12	City	503	78%	53%	23%
113. Penn Hills SHS	#N/A	10 - 12	Suburb	1,277	35%	29%	49%
114. Penn Treaty Middle School	Corrective Action 2 (seventh year)	5 - 8	Philadelphia	682	100%	36%	42%
115. Penn William High	Corrective Action 2	9 - 12	Philadelphia	604	100%	69%	11%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
School	(seventh year)						
116. Penn Wood High School - Green Ave Campus	Corrective Action 2 (third year)	9 - 12	Suburb	1,052	62%	47%	30%
117. Pennell Joseph School	Making Progress	PKF - 6	Philadelphia	409	100%	32%	38%
118. Pepper George Middle School	Corrective Action 2 (fifth year)	5 - 8	Philadelphia	678	100%	42%	30%
119. Perry Traditional Academy	Corrective Action 2 (second year)	9 - 12	City	755	66%	39%	37%
120. Perseus House CS of Excellence	Corrective Action 1	7 - 12	City	375	73%	50%	22%
121. Phila Community Academy CS	Corrective Action 2 (third year)	K5F - 12	City	1,251	74%	49%	27%
122. Philadelphia Montessori CS	Corrective Action 1	K5F - 6	City	162	81%	51%	24%
123. Potter-Thomas School	Corrective Action 2 (seventh year)	PKF - 8	Philadelphia	460	100%	48%	28%
124. Price Elementary School	Corrective Action 1	PKF - 6	City	419	88%	38%	44%
125. Reading SHS	Corrective Action 2 (third year)	9 - 12	City	4,825	82%	43%	33%
126. Rhodes E W Academy	Making Progress	7 - 12	Philadelphia	416	100%	33%	40%
127. Rowland School	Corrective Action 1	4 - 8	City	636	91%	55%	21%
128. Roxborough High School	Corrective Action 2 (third year)	9 - 12	Philadelphia	896	100%	67%	10%
129. Sayre William L Middle School	Corrective Action 2 (fifth year)	9 - 12	Philadelphia	610	100%	77%	8%
130. Schenley High School	Corrective Action 1	9 - 12	City	710	56%	31%	52%
131. Second District EI School	Made AYP	K5F - 6	Town	260	88%	32%	41%
132. Shaw Anna H Middle School	Corrective Action 2 (fourth year)	7 - 8	Philadelphia	280	100%	37%	40%
133. Smedley Franklin School	Corrective Action 2 (fifth year)	K5F - 5	Philadelphia	568	100%	55%	23%
134. Smedley Middle School	Warning	8 - 8	City	209	84%	43%	36%
135. South Philadelphia High School	Corrective Action 2 (seventh year)	PKF - 12	Philadelphia	1,163	99%	68%	12%
136. Southwest Leadership	Made AYP	K5F - 4	City	244	75%	34%	47%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
Academy CS							
137. Springfield El School	School Improvement 1	K5F - 6	Suburb	334	69%	31%	49%
138. Spruance Gilbert School	Corrective Action 2 (first year)	PKF - 8	Philadelphia	1,284	83%	26%	53%
139. Sterne Allen M School	Corrective Action 2 (fourth year)	PKF - 6	Philadelphia	397	100%	28%	51%
140. Steele School	School Improvement 1	PKF - 5	City	251	93%	48%	27%
141. John B Stetson Middle School	Corrective Action 2 (seventh year)	5 - 8	Philadelphia	567	100%	56%	18%
142. Stevens El School	Made AYP	K5F - 5	Town	261	89%	30%	42%
143. Strong Vincent High School	Warning	9 - 12	City	1,037	66%	24%	45%
144. Sugar Valley Rural CS	Warning	K5F - 12	Rural	204	53%	38%	43%
145. James J Sullivan School	Corrective Action 2 (fifth year)	K5F - 5	Philadelphia	681	100%	26%	58%
146. Swenson Arts & Technology High School	Corrective Action 2 (second year)	9 - 12	Philadelphia	743	41%	49%	24%
147. Taylor Bayard School	Corrective Action 2 (first year)	K5F - 5	Philadelphia	582	100%	36%	40%
148. Theodore Roosevelt Middle School	Making Progress	PKF - 8	Philadelphia	371	99%	31%	50%
149. Transition School	Corrective Action 1	7 - 12	City	284	64%	42%	28%
150. Truebright Science Academy CS	Made AYP	7 - 10	City	218	68%	37%	35%
151. Turkeyfoot Valley Area JSHS	Made AYP	7 - 12	Rural	161	46%	30%	49%
152. Tuscarora Blended Learning CS	School Improvement 1	K5F - 12	Rural	220	68%	59%	19%
153. University City High School	Corrective Action 2 (seventh year)	9 - 12	Philadelphia	1,085	100%	73%	10%
154. Edwin H Vare Middle School	Corrective Action 2 (seventh year)	PKF - 8	Philadelphia	364	100%	41%	34%
155. Vaux Roberts High School	Corrective Action 2 (seventh year)	9 - 12	Philadelphia	430	100%	81%	5%
156. Walnut Street El School	Warning	K5F - 6	Suburb	473	89%	30%	43%

Schools	AYP Overall Proceeding Level	Grade Span	Locale	Number of Students	% Low Income	% Below Basic	% Proficient or Above
157. West Greene High School	Warning	9 - 12	Rural	262	40%	34%	50%
158. West Philadelphia High School	Corrective Action 2 (sixth year)	9 - 12	Philadelphia	891	100%	74%	10%
159. Westinghouse High School	Corrective Action 2 (first year)	9 - 12	City	352	89%	52%	19%
160. William Penn SHS	Corrective Action 2 (fourth year)	9 - 12	City	1,414	87%	52%	30%
161. Wister John School	Making Progress	PKF - 6	Philadelphia	405	95%	37%	40%
162. Woolslair Elementary School	Made AYP	K5F - 5	City	207	88%	29%	55%

Appendix A-12



May 28, 2010

The Honorable Arne Duncan
Secretary
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202

Dear Secretary Duncan:

I write today to confirm that if I am elected by the citizens of the Commonwealth of Pennsylvania to serve as their Governor, I will work to ensure that Pennsylvania implements the activities as described in its Phase 2 Race to the Top grant application. Meaningful educational reform is critically important to the future of our children and our economic viability. I am encouraged by the application's new accountability measures for school districts and the linkage of resources to demonstrated improvement in student performance over the three year grant period.

As a candidate for Governor, I have laid out a comprehensive education reform agenda that would work to further enhance the scope and reach of the Race to the Top funding. I believe that we must strengthen teacher evaluations and professional development opportunities, enhance educational choices through strong standards for charter schools and link student achievement data to outcomes for teachers and administrators. It is time to make Pennsylvania's educational system child centric and focused.

I recognize that for school districts to meet the ambitious targets for student performance outlined in the proposal that the Pennsylvania Department of Education and the Pennsylvania State Board of Education will need to partner with local districts and exercise important oversight and leadership. I will support their efforts to ensure that Pennsylvania is effectively implementing the strategies outlined in the Commonwealth's application.

Sincerely,

A handwritten signature in black ink that reads "Tom Corbett". The signature is fluid and cursive, with a long horizontal stroke at the end.

Tom Corbett
Pennsylvania Attorney General



Friends of Dan Onorato
PO Box 23205 | Pittsburgh, PA 15222
P: 412-281-5678 F: 412-281-0909
www.voteonorato.com

PAID FOR BY FRIENDS OF DAN ONORATO


May 27, 2010

The Honorable Arne Duncan
Secretary of Education
U.S. Department of Education
400 Maryland Avenue, SW
Washington, D.C. 20202

Dear Secretary Duncan:

I am writing to support Pennsylvania's Race to the Top application and to share my commitment to implement it if I am elected Governor in November.

The Race to the Top initiative will improve accountability, turn around failing schools and expand the use of charter schools and other reforms. Pennsylvania's application has broad bipartisan support and has been endorsed by over 170 school districts and charter schools.

Increasing student achievement is essential to growing our economy, and the Race to the Top is a wise investment of federal stimulus funds. As Governor, I would ensure that these resources achieve the intended goal of preparing Pennsylvania's students for success in college and the workforce.

Sincerely,

(b)(6)

Dan Onorato

Appendix A-13

List of Letters of Support/Commitment from Stakeholders and Selected Letters

Organization Type.....	Number of Letters
Legislative/Government.....	16
Teachers' Unions.....	4
Higher Education Institutions.....	23
Early Education Organizations.....	8
Education Organizations.....	19
Intermediate Units.....	23
Non-Participating School District Superintendents.....	152
Business Community.....	10
Community Organizations/Advocacy Groups.....	18
Total.....	273

Legislative/Government

- Republican Candidate for Pennsylvania Governor, Tom Corbett
- Democratic Candidate for Pennsylvania Governor, Dan Onorato
- City of Lancaster, J. Richard Gray, Mayor
- City of Philadelphia, Mayor Nutter, Mayor
- Senate Education Committee, Andrew E. Dinniman, Minority Chair
- House Education Committee, James R. Roebuck, Majority Chair
- House Education Committee, John T. Yudichak, Committee Member
- House Education Committee, Barbara McIlvaine Smith, Committee Member
- House Education Committee, Ken Smith, Committee Member
- House Education Committee, Mike Carroll, Committee Member
- House Education Committee, H. Scott Conklin, Committee Member
- House Education Committee, Lawrence Curry, Committee Member
- House Education Committee, Patrick Harkins, Committee Member
- House Education Committee, Mark Longiotti, Committee Member
- House Education Committee, Mike O'Brien, Committee Member
- House Education Committee, Chelsa Wagner, Committee Member

Teachers' Unions

- American Federation of Teachers Pennsylvania, Ted Kirsch, President
- Pennsylvania State Education Association, James P. Testerman, President
- Philadelphia Federation of Teachers, Jerry T. Jordan, President
- Pittsburgh Federation of Teachers, John Tarka, President

Higher Education Institutions

- Arcadia University, Mark P. Curchack, Associate Vice President for Planning and Assessment
- Bloomsburg University of Pennsylvania, Dr. David L. Soltz, President
- Butler County Community College, Nicholas Neupauer, President
- California University of Pennsylvania, Dr. Angelo Armenti, Jr., President
- Cheyney University of Pennsylvania, Dr. Michelle Howard-Vital, President

- Clarion University of Pennsylvania, Dr. Joseph P. Gruenenwald , President
- Community College of Allegheny County, Alex Johnson , President
- Community College of Philadelphia, Stephen M. Curtis, President
- East Stroudsburg University of Pennsylvania, Dr. Robert J. Dillman, President
- Edinboro University of Pennsylvania, Dr. Jeremy Brown, President
- Indiana University of Pennsylvania, Dr. Tony Atwater , President
- Kutztown University of Pennsylvania, Dr. F. Javier Cevallos, President
- Mansfield University of Pennsylvania, Dr. Maravene S. Loeschke, President
- Millersville University of Pennsylvania, Dr. Francine G. McNairy, President
- Northeastern Pennsylvania Technology Institute, Christopher J. Haran, President & CEO
- Pennsylvania Commission for Community Colleges, Diane C. Bosak, Executive Director
- Pennsylvania State System of Higher Education, John C. Cavanaugh, Ph.D., Chancellor
- PSU Prevention Research Center, Mark T. Greenburg, Ph.D., Director
- Shippensburg University of Pennsylvania, Dr. William N. Rudd, President
- Slippery Rock University of Pennsylvania, Dr. Robert M. Smith, President
- Temple University, Jamie M. Bracey, The Intergenerational Center Assistant Director
- University of Pennsylvania, Joseph Bordogna, Alfred Filter Moore Professor of Engineering
- West Chester University of Pennsylvania, Dr. Greg R. Weisenstein, President

Early Education Organizations

- Cen-Clear Child Services, Inc., Eugene M. Kephart, D.Ed., Executive Director
- Delaware Valley AEYC, Sharon Easterling, Executive Director
- Early Connections, Nancy Anne Kalista, Executive Director
- Northeastern Child Care Services, Judith Graziano, President
- Pennsylvania Community Providers Association, George J. Kimes, Executive Director
- Sunshine and Rainbows- Daycare and Preschools, Jocelyn Kreig, Director
- The Cuddle Zone Learning Center, Michele A. Mcellroy, Owner/Director
- YMCA of Greater Erie, Child Care Services, Tina M. Carter, Vice President

Education Organizations

- Homeless Children's Education Fund, Joseph Lagana, Founder
- National Board for Teaching Standards, Joseph A. Aguerrebere, Ed.D., President/ CEO
- PA Association of Intermediate Units (PAIU), James Shields, Ed.D, Executive Director
- Pennsylvania Association for School Administrators, Dr. Fred Johnson, President
- Pennsylvania Association For Supervision And Curriculum Development, Winston E. Cleland, Policy Specialist
- Pennsylvania Association of Career and Technical Administrators, Jacqueline L. Cullen, Executive Director
- Pennsylvania Association of Intermediate Units, Robert Coad, President
- Pennsylvania Association of School Business Officials, Jay Himes, Executive Director
- Pennsylvania Association of School Business Officials, Laura E. Cowburn, President
- Pennsylvania Coalition of Charter Schools, Guy Ciarrocchi, Executive Director
- Pennsylvania Library Association, Margie Stern, President

- Pennsylvania Partnership for Children, Joan Benso, Executive Director
- Pennsylvania School Boards Association, Thomas Gentzle, Director
- Pennsylvania Training and Technical Assistance Network, Angela Kirby-Wehr, Director
- Philadelphia Education Fund, Carol S. Fixman, Executive Director
- Philadelphia Education Fund, Don F. McKinney, Consultant
- The Pittsburgh Promise, Saleem Ghubril, Executive Director
- Pennsylvania Association of Elementary and Secondary School Principals, Dr. William R. Hartman Jr., Executive Director
- Public Citizens for Children and Youth, Shelly Yanoff, Executive Director

Intermediate Units

- Allegheny Intermediate Unit, Linda B. Hippert, Ed. D., Executive Director
- ARIN Intermediate Unit, Robert Coad, Executive Director
- Beaver Valley Intermediate Unit, Thomas Zelesnik, Executive Director
- Berks County Intermediate Unit, John J. George, Ed. D., Executive Director
- Blast Intermediate Unit, William Martens, Executive Director
- Bucks County Intermediate Unit, Barry Glasso, Ed. D., Executive Director
- Capital Area Intermediate Unit, Amy Morton, Executive Director
- Carbon Lehigh Intermediate Unit, Elaine Eib, Executive Director
- Central Intermediate Unit, J. Hugh Dwyer, Ed.D., Executive Director
- Central Susquehanna Intermediate Unit, Robert Witten, Executive Director
- Chester County Intermediate Unit, Joseph J. O'Brien, Executive Director
- Colonial Intermediate Unit, Charlene M. Brenna, Ed. D., Executive Director
- Delaware County Intermediate Unit, Lawrence J. O'Shea, Executive Director
- Intermediate Unit 1, Charles Mahoney, Executive Director
- Lancaster-Lebanon IU, Cynthia Burkhart, Executive Director
- Lincoln Intermediate Unit, Michael Thew, Ed. D., Executive Director
- Luzerne Intermediate Unit, Hal Blass, Executive Director
- Midwestern Intermediate Unit, Cecelia Yauger, Executive Director
- Northwest Tri-County Intermediate Unit, Marjorie Wallace, Executive Director
- Pittsburgh-Mount Oliver Intermediate Unit, Linda Baehr, Executive Director
- Riverview Intermediate Unit, John Cornish, Executive Director
- Seneca Highlands Intermediate Unit, Mary Colf, Executive Director
- Tuscarora Intermediate Unit, Richard Daubert, Executive Director

Non-Participating School District Superintendents

- Unionville-Chadds Ford SD, Dr. Sharon Parker
- Mid Valley SD, Randy Parry
- Burgettstown Area SD, Deborah Jackson
- Conemaugh Township Area SD, Dr Joseph DiBartola
- Smethport Area SD, Mr George J Romanowski
- Northwestern SD, Partrick Kelley
- Lakeland SD, Dr. Margaret Billings-Jones
- Council Rock SD, Mr Mark J Klein

- North Penn SD, Curtis Dietrich
- Easton Area SD, Susan McGinley
- Altoona Area SD, Dennis Murray
- Northampton Area SD, Joseph Kovalchik
- Avon Grove SD, Dr Augustus Massaro
- Wyoming Valley West SD, Charles Suppon
- Carlisle Area SD, Mary Kay Durham
- Cheltenham Township SD, Dr. William Kiefer
- Baldwin-Whitehall SD, Lawrence Korchnak, PhD
- Kennett Consolidated SD, Barry Tomasetti, Ed.D.
- Albert Gallatin Area SD, Carl Bezjak
- Mechanicsburg Area SD, Joseph L. Hood
- Pennsbury SD, Dr Paul B Long
- Dover Area SD, Robert Kranz
- Abington Heights SD, Michael Mahon
- Springfield SD, Dr. James P. Capolupo
- Central Dauphin SD, Dr Luis B Gonzalez
- Seneca Valley SD, Dr. Donald J. Tylinski
- Tuscarora SD, Rebecca Erb, EdD
- Hamburg Area SD, Steven Keifer
- Saint Marys Area SD, Mrs. Anna Kearney
- Boyertown Area SD, Dr Dion E Betts
- Wilkes-Barre Area SD, Dr Jeffrey T Namey
- Ligonier Valley SD, Dr. Christine Oldham
- Dunmore SD, Richard McDonald
- Washington SD, Dr. Roberta LiLorenzo
- Sto-Rox SD, Fran Serenka EdD
- Northwest Area SD, Nncy Tkatch
- Steelton-Highspire SD, Deborah Wortham, EdD
- Bentworth SD, Charles F. Baker
- Mountain View SD, Andrew Chichura, D.Ed
- Fort Cherry SD, Robert Dinnen
- Camp Hill SD, Connie Kindler
- Williams Valley SD, Olga Ehrhart
- Central Fulton SD, Julia Cigola, PhD
- Ridley SD, Ms Lee Ann Wentzel
- Otto-Eldred SD, Michele Angevine Zapel
- Forbes Road SD, Fred Foster
- Pocono Mountain SD, Dwight Pfennig, EdD
- Parkland SD, Dr. Louise Donohue
- Chambersburg Area SD, Dr. Joseph Padasak
- West Shore SD, Jemry Small
- Cumberland Valley SD, William Harner, PhD
- North Hills SD, Dr Joseph Goodnack

- Woodland Hills SD, Mr. Wallace
- Upper Dublin SD, Dr Michael J Pladus
- Plum Borough SD, Dr Lillian Naccarati
- Dubois Area SD, Tim Deluccia
- Dallastown Area SD, Stewart Weinberg, PhD
- Methacton SD, Timothy J. Quinn
- Moon Area SD, Dr. Donna K. Milanovich
- Nazareth Area SD, Victor Lesky, Ed D
- Derry Township SD, Dr. Linda Brewer
- Penn-Trafford SD, Debbie Kolonay
- Governor Mifflin SD, Mary t. Weiss, Ed. D.
- Whitehall-Coplay SD, John W. Corby
- Ringgold SD, Gary Hamilton
- West Mifflin Area SD, Dr. Janet Sardon
- Gettysburg Area SD, Dr. William Hall
- Berwick Area SD, Mr. Wayne Brookhart
- Susquehanna Township SD, Dr Susan M Kegerise
- Wallenpaupack Area SD, Michael Silsby
- Lower Dauphin SD, Dr. Sherri Smith
- South Eastern SD, Dr Tracy S Shank
- Wayne Highlands SD, Mr. Thomas A Jenkins
- Southern Lehigh SD, Mr. Joseph P Liberati
- Uniontown Area SD, Dr Charles D Machesky
- Shikellamy SD, Dr. James Hartman
- Conrad Weiser Area SD, Dennis Roule
- Bellefonte Area SD, Dr James T Masullo Jr
- Manheim Central SD, William Clark
- South Butler County SD, Dr Frank C Prazenica Jr.
- Laurel Highlands SD, Dr. Brain
- East Pennsboro Area SD, Mr Bruce M Deveney
- Phoenixville Area SD, Dr. Barbara Burke-Stevenson
- Grove City Area SD, Dr Robert M Post
- Greater Johnstown SD, Barbara parkins, EdD
- Upper Perkiomen SD, Timothy Kirby, Ed.D
- Juniata County SD, Dr. Kenneth Albaugh
- Valley View SD, Joseph Dalley
- Eastern Lebanon County SD, Dr. Richard Nilsen
- Punxsutawney Area SD, Dr. Thomas Frantz
- Saucon Valley SD, Dr. Sandra Fellin
- Yough SD, Dr. Denise Shipe
- Middletown Area SD, Dr. Richard Weinstein
- Danville Area SD, Dr. Susan Bickford
- Fleetwood Area SD, Paul Eaken, EdD
- Oil City Area SD, Dr. Joseph Carrico

- Mifflinburg Area SD, Mr. Dan Lichtel
- Littlestown Area SD, Dr. Donald Wills
- South Middleton SD, Dr Patricia Sanker
- Franklin Area SD, Mr. Ron Paranick
- Western Wayne SD, Andrew Falonk
- Bedford Area SD, Glenn Thompson, PhD
- Hanover Area SD, Mr. Anthony Podczasy
- South Fayette Township SD, Dr. Bille Rondinelli
- Palisades SD, Dr Francis Barnes
- Beaver Area SD, Dr John C Hansen
- Palmerton Area SD, Ms Carol S Boyce
- Huntingdon Area SD, Jill Adams
- General McLane SD, Alan Karns
- Oley Valley SD, Dr Jeffrey F Zackon
- Southmoreland SD, John Halfhill
- Brownsville Area SD, Dr Philip J Savini Jr
- Forest Hills SD, Donald Bailey
- North Schuylkill SD, Andrew D. Smarkanic
- Springfield Township SD, Wendy Royer
- Deer Lakes SD, Dean Casello, EdD
- Freedom Area SD, Dr Ronald R Sofo
- Fairview SD, Erik Kincade
- Troy Area SD, Mr. W. Charles Young
- Cambria Heights SD, Michael Strasser
- Wellsboro Area SD, Phil Waber
- Mercer Area SD, Dr William D Gathers
- Wyalusing Area SD, Ray Fleming
- Sharpsville Area SD, Mr Mark Ferrara
- Lakeview SD, Mr. Frank M. McClard
- United SD, Dr. David G Blozowich
- Northgate SD, Reggie Bonfield, EdD
- Halifax Area SD, Mr Robert E Hassinger
- Clarion-Limestone Area, John David Johnson
- California Area SD, Linda Mancini
- Moshannon Valley SD, Cheryl Pataky
- Coudersport Area SD, Mrs. Alanna Huck
- Homer-Center SD, Vincent Delconte
- Southern Fulton SD, Ralph Scott
- Berlin Brothers Valley SD, Margie Zorn
- Forest City Regional SD, Dr. Robert Vadella
- Clarion Area SD, Dr George E White
- Millersburg Area SD, Sheree-Lee Knorr
- Ferndale Area SD, Carole M. Kakabar
- Sullivan County SD, Mr. Steven M. Gobble

- Rockwood Area SD, Mark Bower
- West Greene SD, Thema J. Szarell
- Millville Area SD, Kathleen Stark Edd
- Jamestown Area SD, Mr. Shane S. Murry
- Southeastern Greene SD, Michael Caruso
- Forest Area SD, Mr. William Nichols
- Williamsburg Community SD, Ms. Linda Smith
- Saint Clair Area SD, Mrs. Kendy K. Hinkel
- Galetton Area SD, Mr. David W. Wishard
- Oswayo Valley SD, Charles Wicker

Business Community

- Berks Business Education Coalition, Robert A. Runkle. Ed. E., Executive Director
- Center for eBusiness and Advanced IT, Ronald G. May, Executive Director
- DVIRC, Tony Girifalco, Executive Director
- Greater Hazleton Chamber of Commerce, Donna Palermo, Chairman of the Board
- Pennsylvania Workforce Investment Board, Robert Garraty, Ph.D., Executive Director
- Regional Center for Workforce Excellence, Michele Zieziula, CEO
- Southwest Corner WIB, Linda L. Bell, Director
- Team Pennsylvania Foundation, Rich Hudic, CEO/ President
- Tri-County WIB, Fred Fornataro, Executive Director
- Warren County Chamber of Business and Industry, James Decker, President/ CEO

Community Organizations/Advocacy Groups

- 21st Century Partnership for STEM Education, Gary Cooper, Director of Professional Services
- 21st Century Partnership for STEM Education, F. Joseph Merlino, President/ CEO
- ASSET Inc., Dr. Helen Sobehart, Incoming Executive Director
- Economic Growth Connection, John A. Skiavo, President/ CEO
- Governor's Commission for Children and Family, Ellen DiDomenico, Executive Director
- Junior Achievement of Greater Reading and Lehigh Valley, Robin Costenbader-Jacobson, President/ CEO
- Learning Point Associates, Gina Burkhardt, CEO
- Luzerne County-Offices of Human Services, Joesph DeVizia, Executive Director
- Pennoni Associates Inc., Eric L. Flicker, PE, CFO/ Treasurer
- Philadelphia Biotechnology and Life Sciences Institute, Chad Womack, President/ Executive Director
- Real World Design Challenge, Ralph K. Coppola, Ed.D, Director
- Saint Francis University Science Outreach Center and the Central Pennsylvania STEM Initiative Region, Allison Felix, Director
- Select Greater Philadelphia, Claire Marrazzo Greenwood, Director of Policy Development
- Southwest Pennsylvania STEM Network, Elizabeth A. Nilsen
- The Challenge Program, Barbara Grandinetti, Executive Director

- The Franklin Institute, Frederic Bertley, Vice President
- The Grable Foundation, Gregg S. Behr, Executive Director
- United Way of Lackawanna and Wayne Counties, Gary Drapek, President



Friends of Dan Onorato
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PAID FOR BY FRIENDS OF DAN ONORATO


May 27, 2010

The Honorable Arne Duncan
Secretary of Education
U.S. Department of Education
400 Maryland Avenue, SW
Washington, D.C. 20202

Dear Secretary Duncan:

I am writing to support Pennsylvania's Race to the Top application and to share my commitment to implement it if I am elected Governor in November.

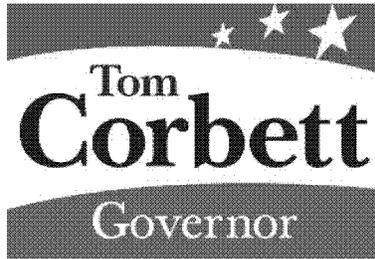
The Race to the Top initiative will improve accountability, turn around failing schools and expand the use of charter schools and other reforms. Pennsylvania's application has broad bipartisan support and has been endorsed by over 170 school districts and charter schools.

Increasing student achievement is essential to growing our economy, and the Race to the Top is a wise investment of federal stimulus funds. As Governor, I would ensure that these resources achieve the intended goal of preparing Pennsylvania's students for success in college and the workforce.

Sincerely,

(b)(6)


Dan Onorato



May 28, 2010

The Honorable Arne Duncan
Secretary
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202

Dear Secretary Duncan:

I write today to confirm that if I am elected by the citizens of the Commonwealth of Pennsylvania to serve as their Governor, I will work to ensure that Pennsylvania implements the activities as described in its Phase 2 Race to the Top grant application. Meaningful educational reform is critically important to the future of our children and our economic viability. I am encouraged by the application's new accountability measures for school districts and the linkage of resources to demonstrated improvement in student performance over the three year grant period.

As a candidate for Governor, I have laid out a comprehensive education reform agenda that would work to further enhance the scope and reach of the Race to the Top funding. I believe that we must strengthen teacher evaluations and professional development opportunities, enhance educational choices through strong standards for charter schools and link student achievement data to outcomes for teachers and administrators. It is time to make Pennsylvania's educational system child centric and focused.

I recognize that for school districts to meet the ambitious targets for student performance outlined in the proposal that the Pennsylvania Department of Education and the Pennsylvania State Board of Education will need to partner with local districts and exercise important oversight and leadership. I will support their efforts to ensure that Pennsylvania is effectively implementing the strategies outlined in the Commonwealth's application.

Sincerely,

A handwritten signature in black ink that reads "Tom Corbett". The signature is fluid and cursive, with a long horizontal stroke at the end.

Tom Corbett
Pennsylvania Attorney General



AFT Pennsylvania

A Union of Professionals

An affiliate of the
American Federation
of Teachers, AFL-CIO

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Ted Kirsch
PRESIDENT

John Tarku
EXECUTIVE VICE PRESIDENT

May 26, 2010

The Honorable Thomas Gluck
Acting Secretary of Education
333 Market Street., 10th Floor
Harrisburg, PA 17126

Dear Secretary Gluck:

AFT Pennsylvania fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of AFT Pennsylvania and similar organizations make Pennsylvania uniquely equipped for this grant opportunity.

Several of AFT Pennsylvania locals, including three of the largest school districts in the state of Pennsylvania (Philadelphia, Pittsburgh and Scranton), are participating in Pennsylvania's application. We support their efforts to make RTTT opportunities available to the students, schools and communities that could benefit from the RTTT grants.

AFT nationally and AFT Pennsylvania worked very hard to fashion an application process for RTTT that understood, acknowledged and respected collective bargaining. The Memorandum of Understanding that major stakeholders (superintendent, teacher union president and school board) signed signaled their understanding that meaningful educational improvement must be a joint effort. As AFT's president, Randi Weingarten says, education reform must be done with teachers not to teachers.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,

Ted Kirsch, President
AFT Pennsylvania

TK/hmg.usw10-286,afl-cio



June 1, 2010

The Honorable Tom Gluck
Acting Secretary
Department of Education
Tenth Floor, 333 Market Street
Harrisburg, PA

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www.psea.org
James P. Testerman, *President*
Michael J. Crossey, *Vice President*
W. Gerard Oleksiak, *Treasurer*
John F. Springer, *Executive Director*

Dear Secretary Gluck:

Please accept this letter as an addendum to Pennsylvania's application for federal funding through the U.S. Department of Education's Race to the Top (RTTT) program. This letter reflects the position of the Pennsylvania State Education Association (PSEA).

As you know, PSEA's 191,000 members are committed to providing the very best education to the Commonwealth's students. This is a goal we strive to achieve each day in our classrooms and it is an objective that reflects our members' view that their work as educators is not just a career, but a vocation that contributes to the creation of successful students, strong schools and vibrant communities.

In an effort to make RTTT opportunities available to the students, schools and communities that could benefit from them, PSEA has worked with you and your staff in the best spirit of cooperation. We commend your staff for their willingness to listen to our concerns and suggestions and for fashioning reasonable solutions to the issues we have brought to your attention. Should Pennsylvania's application for RTTT funding be approved, successful implementation of the program will hinge upon the continued understanding that key stakeholders must be fully engaged in the conversation and program design.

A good example of an innovation that must be implemented collaboratively is the alternative compensation career ladder plan that is new to this application and which PSEA sees as a positive addition. After completing a two-year project reviewing the research on alternative compensation systems, PSEA developed this innovative alternative compensation and career ladder framework that incorporates research on effective practices and knowledge of what works, as well as requirements of RTTT. It preserves the current single salary schedule, but creates two additional salary levels to be funded with alternative revenue sources. Based on our research, we believe that this framework avoids the pitfalls that caused the failure of many alternative compensation plans that have been tried in the past. As we noted in our formal comments on the RTTT draft regulations, however, teacher acceptance of compensation structure changes is necessary for such changes to be successful. That is why PSEA has committed to finalize a state-level career ladder framework that will provide guidance for school districts and local associations to reach agreement. In addition, PSEA will provide support to local associations in developing and implementing the career ladder compensation plan.

The RTTT program and Pennsylvania's application involve many other laudable ideas that can, in certain schools and communities, make important contributions to the goals that PSEA members have long held. In addition, we believe that the ideas espoused in RTTT must be combined with ideas that

The PSEA Mission

To advocate for quality public education and our members through collective action.



research has consistently proven to increase student achievement. PSEA's 20/20 Vision for the Future of Public Education will be an excellent resource for PDE, districts, and local associations to reference as they develop local implementation plans.

I must make clear PSEA's expectations that, should PDE's application be approved, the dollars school districts receive for RTTT programs be used appropriately. The education funding increases witnessed in Pennsylvania during the last eight years, and the last two in particular, have demonstrated that more adequate resources, directed toward proven programs, can positively affect student achievement levels. Therefore, it is imperative that RTTT funds not be used by school districts to supplant funding or otherwise fill budget gaps. To permit this would guarantee failure of the program. In addition, success of the program hinges on the state maintaining its multi-year commitment to closing adequacy funding gaps as set forth in the basic education funding formula.

PSEA has been pleased to cooperate with PDE to craft language in the RTTT memorandum of understanding (MOU) that protects our members' collective bargaining and contractual rights. As you know, the conditions under which PSEA members work also are the conditions under which children learn. It is imperative that we use this opportunity to ensure that optimal conditions for teaching and learning are present in each classroom and school setting.

While PSEA is satisfied that the language in the RTTT MOU provides satisfactory protection of our members' legal rights, PSEA's position on the merits of the program itself is based on the needs of each of its local associations. The determinations of each local association on this important question were based on its members' analysis of the impact RTTT could have on the students they serve.

PSEA has been very clear on this question. There were situations where it made sense to sign on and other situations where the circumstances were very different and choosing not to participate was an equally sound decision. We remain committed in our support of each local's decision and will provide them with our best advice and counsel as we move forward with the implementation of the program.

As an organization that includes local associations in 490 Pennsylvania school districts, we know well that the educational needs of our Commonwealth's students and communities are varied. In some school districts, RTTT resources and supports could make a difference in delivering the power of a great education to students. In others, RTTT could become a needless distraction from current programs that already are serving children well.

PSEA supports the professional judgments of its members and defers to their unique analysis of the needs of their students, schools and communities. For local associations that have determined RTTT could make a positive difference in their schools, PSEA will partner with them to ensure that the RTTT grant program is developed and implemented in accordance with existing federal, state, and local laws (including applicable regulations or court orders) and under the terms of collective bargaining agreements.

Again, cooperation among stakeholders will be fundamental to the success of this initiative, because many of the important programmatic details have yet to be decided or even discussed at length. Fundamental questions remain that, if Pennsylvania's application is successful, will need to be answered with clarity, with balanced, well-rounded analysis and with a clear eye toward what will work in our schools.

The speed at which this initiative has moved has not allowed sufficient time to resolve many of these issues. So, we have agreed, again in the spirit of cooperation, to defer those conversations.

The membership of PSEA remains committed to delivering the power of a great education to each of our students. However, if the need for collaboration has not been made sufficiently clear to date, I will make it so now. No education initiative of the breadth and scope of RTTT will succeed without a strong partnership between educators, administrators, community leaders and state policy makers. PSEA stands ready to partner with all of these stakeholders. Without this kind of cooperation, the RTTT initiative likely will fall short of its intended outcomes. Yet, by working together in a deliberative, respectful and reasoned manner, we have an opportunity to further the success of the students we serve.

Sincerely,

A handwritten signature in cursive script that reads "James P. Testerman". The signature is written in dark ink and includes a long horizontal flourish extending to the right.

James P. Testerman
President



May 28, 2010

The Honorable Thomas Gluck
Acting Secretary of Education
Commonwealth of Pennsylvania
Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

I write this letter in support of Pennsylvania's application for the U.S. Department of Education's Race to the Top (RTTT) grant competition.

The School District of Philadelphia and the Philadelphia Federation of Teachers reached an historic contract agreement in January that aligns with RTTT. The agreement includes the following programs for teachers: a rigorous evaluation, a peer assistance and review program and the transformation model to turn around low performing schools. Also, a value added program that measures student growth and encourages school staff to work harmoniously to improve student achievement, are only a few examples.

RTTT represent a unique opportunity for advancement in student learning and achievement as long as a strong partnership among superintendents, union presidents, and local school boards flourish. Such a partnership for our children is essential. The members of the Philadelphia Federation of Teachers intend to work hard to improve the life chances of our students.

Sincerely,

JERRY T. JORDAN
President

JTJ*jdf
usw 10-286
afl-cio



Pittsburgh Federation of Teachers

AFT Pennsylvania • American Federation of Teachers • AFL-CIO
10 South Nineteenth Street at the River • Pittsburgh, Pennsylvania 15203-1842
Phone: (412) 431-5900; (412) 431-4755 • Fax: (412) 431-6882 • Website: www.pft400.org

Thursday, May 27, 2010

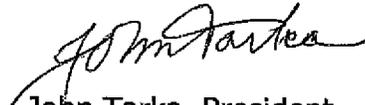
Mr. Tom Gluck
Acting PA Secretary of Education
Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Mr. Gluck,

I write today to confirm my support for Pennsylvania's application to the US Department of Education for access to Race to the Top federal grant funds. Without question, such funding, if attained, will provide vital support to us as we continue in our determination to improve dramatically the achievement of students in Pittsburgh and across the Commonwealth.

While I may not agree with some provisions contained in the application, I fully support the large goals of the application, and I look forward to continued work with the Pittsburgh Public Schools and the Commonwealth to accomplish these goals in a manner that will benefit our students and be fair to teachers.

Sincerely,



John Tarka, President
Pittsburgh Federation of Teachers

JT:pjtopeiu457aff-cio

cc: PFT Executive Board members

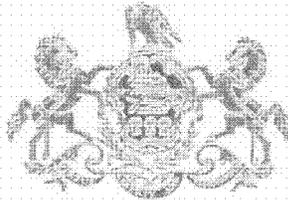
ANDREW E. DINNIMAN

State Senator
19TH District

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Senate of Pennsylvania

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Education Commission of the States
Joint Legislative Conservation Committee
Life Sciences and Biotechnology Caucus, Co-Chair
Pennsylvania Charitable Nonprofit Caucus, Co-Chair
Pennsylvania Emergency Management Council
State Board of Education

May 26, 2010

Thomas E. Gluck, Acting Secretary
Pennsylvania Department of Education
10th Floor, Harrisburg
333 Market Street
Harrisburg, PA 17126-0333

Dear Acting Secretary Gluck:

As Minority Chairman of the Senate Education Committee, I am writing to express my support for the Commonwealth's application for the second round of Race to the Top (RTTT) funds. I believe Pennsylvania has demonstrated its commitment to being a leader in education reform for the past 8 years under the leadership and guidance of Governor Edward G. Rendell, and the efforts of you and your predecessors at the Pennsylvania Department of Education. While other states have proposed decreasing funding for education, the Commonwealth has remained steadfast in continuing its investments and was one of only a few states to increase funding for public education during the past fiscal year.

Pennsylvania continues to dedicate itself to providing each student a quality education and believes that every student can be taught to the top of the curriculum. The strategies and goals put forth in the Commonwealth's second round RTTT application build on the successes of the past decade. The state's investment has led to increased investments to provide the need resources for our struggling school districts to implement programs that provide a first class education for all of our students.

As was noted in the previous letter of support for the first round of RTTT funding, our state's leadership in education reform resulted from a willingness to work in the spirit of collaboration, oftentimes in a bi-partisan manner. Democrats and Republicans, urban, suburban and rural leaders, and many other officials and diverse stakeholder groups worked together on initiatives that align with the current goals of RTTT. The United States Department of Education can be assured of these continued efforts even after the election of a new governor in November.

Thomas E. Gluck, Acting Secretary
Page 2
May 26, 2010

The initiatives and accomplishments of the past decade and the plans, strategies and goals outlined in the round 2 RTTT application show why the Commonwealth is well situated and qualified to receive funding during the second round of RTTT. Many of the reforms undertaken by the State and even those under consideration for implementation in the coming year compliment and align with the goals of RTTT.

Pennsylvania's investments in education, as well as the Commonwealth's commitment to quality education and accountability make the State uniquely qualified for funding under the second round of RTTT funding. We will continue to build upon the strong foundation of education reform and will rise to the challenge of bold and innovative reform. Thank you for your efforts.

Sincerely,



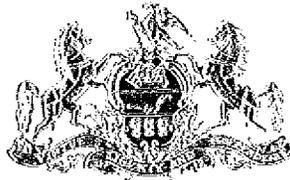
Senator Andrew E. Dinniman
State Senator – 19th District

AED/ekf

Cc: Senator Jeffrey Piccola
Majority Chair, Senate Education Committee
Representative James Roebuck, Jr.
Majority Chair, House Education Committee
Representative Paul Clymer, Minority Chair, House Education Committee
Teresa Colarusso, Pennsylvania Department of Education

JAMES R. ROEBUCK, MEMBER
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HOUSE OF REPRESENTATIVES
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

COMMITTEES
CHAIRMAN
EDUCATION COMMITTEE

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May 26, 2010

Thomas E. Gluck, Acting Secretary
Pennsylvania Department of Education
Tenth Floor, Harrisstown 2
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

As members of the Democratic Pennsylvania House Education Committee, we fully support the Pennsylvania Department of Education's application for Race to the Top funding and Pennsylvania's plans described therein to accelerate student achievement for all of Pennsylvania's children. Pennsylvania's historic investments in education, our dedication to quality education and our commitment to accountability make our commonwealth uniquely qualified for this unprecedented opportunity. In this time of great financial distress, our state is one of only a few states that have continued to increase funding for public education.

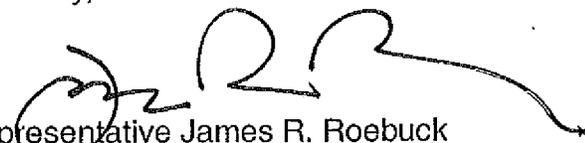
Pennsylvania has transformed its education landscape in recent years, moving us closer to our goal of a first-class education for every student in every school district. Our efforts have focused on increasing the resources for basic education and driving those resources to strategies that work, including early childhood education, highly qualified teachers, clear standards and strong supports. As members of the state legislature, we will continue our commitment to ensure adequate, equitable funding to all school districts. This commitment also demonstrates our state's continuing efforts to address the problems and needs of our academically and financially challenged schools.

A further sign of our state's commitment to a quality education for all our students is legislation enacted since the first round of Race to the Top funding that provides for greater alternative pathways for teacher certification and recruitment that will increase the number of highly qualified teachers in academic shortage areas and in academically distressed schools.

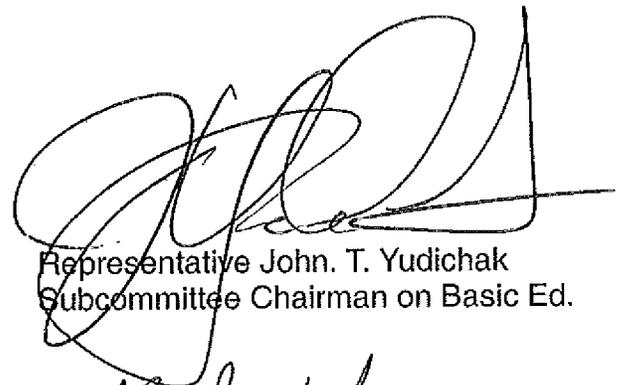
The Race to the Top grant will accelerate strategies currently in place and provide additional resources for further innovation while ensuring every school district uses its funding wisely. We strongly support the state's approach of tying expenditures to performance, and, through the revision of our state Empowerment Act, we will continue to hold schools accountable.

The Democratic members of the House Education Committee are committed to supporting the implementation of Pennsylvania's strategies as described in this application. We believe the Commonwealth of Pennsylvania is prepared for the challenge of bold and innovative reform, and the students of Pennsylvania will be well served by your investment in their future.

Sincerely,



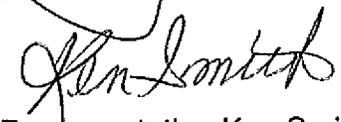
Representative James R. Roebuck
Majority Chairman; House Education Committee



Representative John T. Yudichak
Subcommittee Chairman on Basic Ed.



Representative Barbara McIlvaine Smith
Subcommittee Chairman on Special Ed.



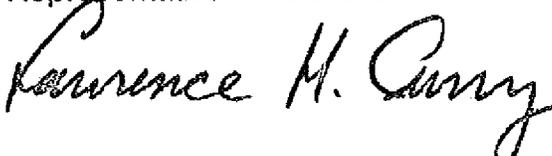
Representative Ken Smith
Secretary; House Education Committee



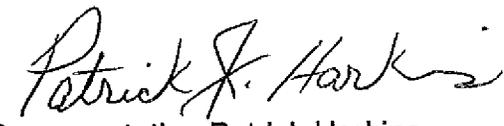
Representative Mike Carroll



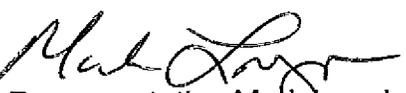
Representative H. Scott Conklin



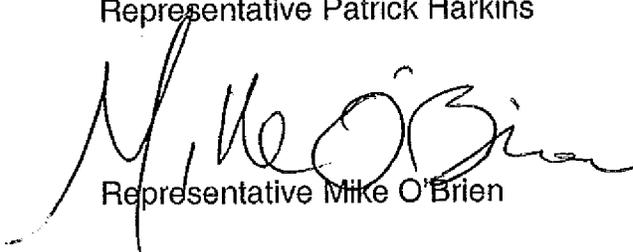
Representative Lawrence Curry



Representative Patrick Harkins



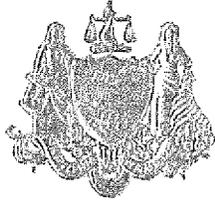
Representative Mark Longiotti



Representative Mike O'Brien



Representative Chelsa Wagner



CITY OF PHILADELPHIA

Office of the Mayor
215 City Hall
Philadelphia, PA 19107
(215) 686-2181
FAX (215) 686-2180

MICHAEL A. NUTTER
Mayor

May 26, 2010

Thomas E. Gluck
Acting Secretary of Education
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The City of Philadelphia fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of Philadelphia and cities around the commonwealth make Pennsylvania uniquely equipped for this grant opportunity.

When I first took office in 2008, I pledged to cut Philadelphia's dropout rate of 45% in half in 5 – 10 years and double our city's baccalaureate attainment rate in 7 – 10 years—from 18% to 36%. While these goals are ambitious, they are critical to making Philadelphia a safe, economically vibrant city.

Philadelphia is fortunate to have the leadership of Superintendent Arlene Ackerman, a nationally recognized instructional leader for our city's schools. During her tenure, academic achievement across all grades has continued to increase and high school graduation rates have continued to climb. Moving forward, the School District's *Imagine 2014* strategic plan lays out a framework for improving teacher effectiveness, turning around low performing schools, and creating early warning systems to identify students on the path to dropping out. This work is critical to the achievement of my goals and to the future prosperity of our city.

I am happy to hear that the School District of Philadelphia was a key partner in the creation of the Race to the Top application. As the largest municipality in the commonwealth, which educates one out of every ten Pennsylvania students, there is no doubt that our city's educational gains will help move the entire commonwealth in the right direction. The strategies outlined in the Pennsylvania Department of Education's application will accelerate the city and state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in our global economy.

Thomas E. Gluck
May 26, 2010
Page Two

I am committed to supporting the state's efforts to secure Race to the Top funding. I believe that this ground-breaking opportunity will better equip Philadelphia—and the entire commonwealth—to dramatically improve our schools for all of our students.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Nutter", with a long horizontal line extending to the right.

Michael A. Nutter
Mayor

City of
Lancaster
OFFICE OF MAYOR, J. RICHARD GRAY

May 24, 2010

Acting Secretary of Education Thomas E. Gluck
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The City of Lancaster fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of the City of Lancaster and other cities make Pennsylvania uniquely equipped for this grant opportunity.

The City of Lancaster recognizes that it will only flourish when our City's schools flourish. In recognition of this the Lancaster Superintendent of Schools and I meet on a regular basis to discuss common problems and solutions.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,



J. Richard Gray

JRG/blb

June 1, 2010

The Honorable Arne Duncan
Secretary of Education
U.S. Department of Education
400 Maryland Avenue, S.W.
Washington, DC 20202

Dear Secretary Duncan:

The undersigned superintendents of school districts in Pennsylvania are writing to express our strong support for the goals and strategies set forth in Pennsylvania's Race to the Top application. In each of our districts, we have participated in numerous and substantive conversations with our school board members, educators, local union leadership and key groups within our communities.

Pennsylvania's application builds upon the strong progress in academic achievement we have made over the last several years due in part to the strong financial and programmatic support we have received from the state as well as to the hard and smart work of our local school boards, educators, students and parents. Working together, Pennsylvania was the only state to show academic improvement in all grade levels in an independent report issued last summer by the Center for Education Policy. All of us are proud of that achievement and we believe Pennsylvania's strategies for Race to the Top will help us continue down that bright path of achievement for all of Pennsylvania's children.

While our districts were not able to join as a participating district in Pennsylvania's application, we look forward to taking advantage of the tools, resources, training and supports that Pennsylvania will make available to all districts with Race to the Top funding. We believe that the plan outlined in Pennsylvania's application provides a road map for school districts to follow to significantly improve the quality of education of every child in the Commonwealth and are confident that as Pennsylvania implements its Race to the Top agenda, there will be lessons learned from which we can all benefit.

It is with great enthusiasm that we express our support for Pennsylvania's application for Race to the Top and our continued commitment to work together to prepare every student in the commonwealth for success.

Sincerely,

Pennsylvania School District Superintendents
(152 Non-Participating Superintendents, see List of Letters of Support)

**The Greater Philadelphia Regional Compact for STEM Education Steering Group
&
Southeastern Pennsylvania STEM Network**

May18, 2010

Thomas E. Gluck
Acting Secretary
Pennsylvania Department of Education
Commonwealth of Pennsylvania
333 Market Street
Harrisburg, PA 17126-0333

Dear Acting Secretary Gluck,

The Greater Philadelphia Regional Compact for STEM (Science, Technology, Engineering, Math) Education Steering Group and the Southeastern Pennsylvania STEM Network are pleased to offer this letter of support for the Pennsylvania Department of Education's application for *Race to the Top* funding.

We are pleased that the Department has included STEM as part of its *Race to the Top* strategy. The department's work on STEM education over the past 2 ½ years in partnership with the National Governors Association (NGA) and the Team Pennsylvania Foundation has positioned Pennsylvania to make meaningful progress in its efforts to improve student achievement, particularly in STEM disciplines. When combined with the energy and activity going on in regions throughout the commonwealth around education, Pennsylvania is uniquely equipped for this grant opportunity.

Our *Regional Compact for STEM Education* (now with over 100 signatories) led directly to the commonwealth's award for a planning grant from the NGA, and set the stage for the development of the state's five STEM regions, which are now experiencing a new level of collaboration around educational reform.

We strongly support and commit to Pennsylvania's Race to the Top application to the U.S. Department of Education and are hopeful that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills, globally-competitive, knowledge-based economy. We are pleased to offer our support and look forward to working with the department on its STEM components.

Sincerely,

The Greater Philadelphia Regional Compact for STEM Education Steering Group

The Greater Philadelphia Regional Compact for STEM Education Steering Group
&
Southeastern Pennsylvania STEM Network



Frederic Bertley
Vice President
The Franklin Institute



Joseph Bordogna
Alfred Fitler Moore Professor of Engineering
University of Pennsylvania



Jamie M. Bracey
Assistant Director Training
The Intergenerational Center
Temple University



Gary Cooper
Director of Professional Services
21st Century Partnership for STEM Education



Mark P. Curchack
Associate Vice President for Planning and
Assessment
Arcadia University



Carol S. Fixman
Executive Director
Philadelphia Education Fund

The Greater Philadelphia Regional Compact for STEM Education Steering Group
&
Southeastern Pennsylvania STEM Network



Tony Girifalco
Executive Vice President
DVIRC

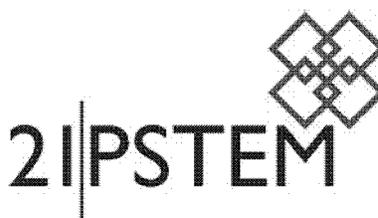


A CEO Council For Growth Initiative

Claire Marrazzo Greenwood
Director of Policy Development
Select Greater Philadelphia



Don F. McKinney
Consultant
Philadelphia Education Fund



F. Joseph Merlino
President and CEO
21st Century Partnership for STEM Education



Chad Womack
President and Executive Director
Philadelphia Biotechnology and Life Sciences Institute

Pennsylvania Association For Supervision And Curriculum Development

Mr. Thomas E. Gluck
Acting Secretary of Education
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

May 18, 2010

Dear Mr. Gluck,

The Pennsylvania Association for Supervision and Curriculum Development (PASCD) strongly supports the revised Race to the Top Application being submitted by the Pennsylvania Department of Education (PDE). This application is comprehensive and the goals and activities will improve learning for students throughout the Commonwealth.

The requirement that the school board president, the superintendent and the union president all sign the memorandum of agreement will maximize the possibility for the collaboration necessary to complete activities such as creating a robust multi-measure staff evaluation system, developing a coherent approach to professional development and implementing “best practices”.

PASCD strongly supports the goal of creating a coherent approach to professional development. Our members stand ready to help school districts in this effort.

PASCD members believe that there should be a multi-measure evaluation for staff and students. We also believe that programs should be evaluated and those that help turn around schools should be identified and shared with all schools. All students should have access to “best practice” programs.

PASCD supports this application and hopes that the U.S. Department funds this proposal. Pennsylvania’s children will reap the rewards of a successful application.

Sincerely,

Winston E. Cleland
PASCD Policy Specialist

May 24, 2010

The Honorable Thomas E. Gluck
PA Secretary of Education
333 Market Street
Harristown 2
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania School Boards Association would like to express its support of Pennsylvania's application for the federal Race to the Top funds. The plan provides the tools and resources that Pennsylvania's school districts need to provide the kinds of reform that will improve the lives of the children they serve. Additionally, the plan recognizes the important role that school boards play in implementing those reforms.

By initiating practices that will help ensure the continued availability of highly qualified individuals to teach and lead our schools and turning around those school buildings that need the most assistance, Pennsylvania's plan will serve students well for generations to come.

We thank you and all of those at the Pennsylvania Department of Education who worked so diligently on the commonwealth's Race to the Top application for their strong leadership on this issue.

Sincerely,



Thomas J. Gentzel
Executive Director



PENNSYLVANIA
Association of Career & Technical
Administrators

www.pacareertech.org

May 25, 2010

Mr. Thomas Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania Association of Career and Technical Administrators (PACTA) fully supports the Pennsylvania Department of Education's second round application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of PACTA and similar organizations make Pennsylvania uniquely equipped for this grant opportunity.

PACTA has partnered with the Pennsylvania Department of Education for the last two years on a Technical Assistance Program, the purpose of which is to increase the academic achievement levels of students in career and technical education centers. Through that program we have provided on-site technical assistance, professional development and resources to the teachers and administrators of the career and technical education centers. Other partners in this effort are the Southern Regional Education Board and the Education Trust. The program is reforming career and technical education and the way it educates students to increase the emphasis on academic achievement.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this groundbreaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,

A handwritten signature in cursive script that reads 'Jacqueline L. Cullen'. The signature is written in black ink and is positioned above the printed name and title.

Jacqueline L. Cullen
Executive Director



Pennsylvania Association of School Business Officials

Mailing Address:
P.O. Box 6993
Harrisburg, PA 17112-0993

Office Location:
2579 Interstate Drive
Harrisburg, PA 17110

Telephone 717-540-9551

www.pasbo.org

FAX 717-540-1796

May 24, 2010

Mr. Thomas Gluck
Acting Secretary
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

Subject: Race to the Top Application

The Pennsylvania Association of School Business Officials commends you and your staff for the significant effort in developing the Race to the Top Application. These potential federal funds will provide additional resources to enhance Pennsylvania's proven commitment to increasing student achievement.

The outreach by the department's staff in developing the application is greatly appreciated. We urge the department to continue its dialogue with stakeholders during the implementation stage. As you know, we want to work closely with PDE staff on the significant initiative of developing a statewide student information system and on financial reporting requirements.

We support investments in the education of all students across the Commonwealth. We believe that this ground-breaking opportunity will help sustain Pennsylvania's position as a national leader in education and prepare every commonwealth student for success.

Thank you for your leadership in pursuing this opportunity.

Sincerely,

Laura E. Cowburn
Laura E. Cowburn, PRSBA
President

Jay Hines
Jay Hines, CAE
Executive Director



**Pennsylvania
Partnerships for Children**

Joan L. Benso, *President and CEO*

David S. Feinberg, *Chair of the Board*

116 Pine Street, Suite 430, Harrisburg, PA 17101-1244

May 20, 2010

Mr. Thomas E. Gluck, Acting Secretary of Education
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

Pennsylvania Partnerships for Children (PPC) fully supports the Pennsylvania Department of Education's application for Race to the Top (RTTT) funding. In recent years, Pennsylvania's keen focus on student achievement strategies and commitment to targeted investments to foster our children's academic success has resulted in unprecedented gains. We feel that Pennsylvania is well prepared for the challenge afforded us in RTTT and this grant opportunity will allow us to continue to build on our state's education reform that is focused on improving student achievement.

PPC has helped lead strategic education reform efforts in Pennsylvania as part of sustained-multi year efforts to focus state policy and investments on preparing children and youth for the rigors of the 21st century global economy. The scope of PPC's work in education extends from pre-kindergarten through post-secondary access. As a result, PPC has been a leader and partner in securing: high standards and dedicated state funding for the Commonwealth's nationally recognized Pre-K Counts program; a basic education school funding formula built on the principles of adequacy, equity and accountability; a consistent assessment system for all Pennsylvania students; and academic supports to help teachers and students, including end-of-course assessments, diagnostics to identify struggling students, and requirement for supplemental instruction for those students not meeting academic standards, dropout prevention efforts and more.

PPC – uniquely positioned as the state's leading child advocacy organization – is fully committed to supporting the Commonwealth in this effort. We look forward to working together to assure that every Pennsylvania child is prepared for the rigors of the 21st century and leaves our preK-12 system prepared for post-secondary education, work and life.

Sincerely,

Joan L. Benso
President & CEO



May 21, 2010

Mr. Thomas Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

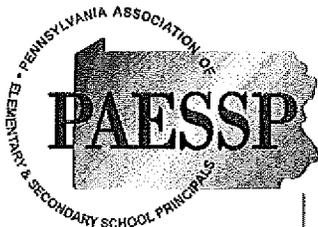
The Southwest Pennsylvania STEM Network fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education and its proven dedication to quality education make Pennsylvania uniquely equipped for this grant opportunity.

The Southwest Pennsylvania STEM Network is focused on expanding opportunities for the region's young people and incumbent workers to be fully qualified for emerging careers in science, technology, engineering, and mathematics. Key to our efforts are several areas addressed by the state's Race to the Top application: ensuring that student learn fundamental skills in science and mathematics, improving teacher quality, and providing opportunities for advanced learning through such programs as Advanced Placement. We are particularly pleased that the Pennsylvania application will build on our work by partnering with the statewide Pennsylvania STEM Initiative and look forward to working with the Department to that end.

We are committed to supporting the state's efforts in strengthening educational opportunities for all students. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,

Elizabeth A. Nilsen
Coordinator, Southwest Pennsylvania STEM Network



May 25, 2010

**Pennsylvania
Association of
Elementary
and Secondary
School Principals**

President

REBECCA L. STANFIELD
Troy Area S.D.

President-Elect

MARGARET S. FOSTER
Bear Creek Comm. Charter Sch.

Past President

DAVID G. BIERI
Scranton S.D.

Treasurer

MICHAEL E. ALLISON
Hopewell Area S.D.

Secretary

DR. LINDA W. MARCINCIN
Northern Lehigh S.D.

NASSP Coordinator

BRIAN L. CASHMAN, SR.
Southern York Co. S.D.
MARK A. KORCINSKY
Seneca Valley S.D.

NAESP Representative

THOMAS W. SIGAFOOS, JR.
Upper Dublin S.D.

Alternative Funding

FRANK P. GALICKI
Dallas S.D.
RICHARD P. HOUSEKNECHT
Pennsbury S.D.

Executive Director

DR. WILLIAM R. HARTMAN, JR.

Asst. Executive Director

JOSEPH P. ACRI
122 Valley Rd., P.O. Box 39
Summerdale, PA 17093

Manager, Western Region Office

JOSEPH J. FORISKA
1028 Fox Terrier Drive
Bethel Park, PA 15102

WEST REGION

Defia Zahniser, *Crawford Central S.D.*
Joseph Neuch, *Union Area S.D.*
Joyce Depenhart, *Central Valley S.D.*
Leonard Rich, *Sharon City S.D.*
Janet O'Rourke, *Bethel Park S.D.*
Dr. Zeb Jansanto, *Bethel Park S.D.*
Elaine Wallace, *Pittsburgh S.D.*
Dr. Jeffrey Spadafora, *Pittsburgh S.D.*

CENTRAL REGION

Dr. Kimberly Hamilton, *Muncy S.D.*
Curtis Johnson, *State College Area S.D.*
Dr. Joshua Doll, *Dallastown Area S.D.*
Dr. Barry Purvis, *Chambersburg Area S.D.*
Robert Gildea, *Hollidaysburg Area S.D.*
Dr. David Cummie, *Spring Cove S.D.*

EAST REGION

Paul Stefan, *Scranton S.D.*
Vito Quaglia, *Wyoming Area S.D.*
Jeffrey Wallers, *Stroudsburg Area S.D.*
Dennis Nemes, *Northwestern Lehigh S.D.*
Dr. Melissa Patschke, *Spring-Ford Area S.D.*
Dr. William Ziegler, *Pottsgrove S.D.*

Mr. Thomas E. Gluck
Acting Secretary
Department of Education
Commonwealth of Pennsylvania
333 Market Street, 10th Floor
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania Association of Elementary and Secondary School Principals (PAESSP) recognize the effort of the Pennsylvania Department of Education in securing additional federal funding for Pennsylvania schools through the Race to the Top program. While we are supportive of efforts to create a state-of-the-art standards aligned system (SAS), we have real concerns about how realistic the time commitments required of principals are, given the myriad duties each principal faces daily. We also oppose the rigid requirement of removing the principal in various turnaround models and believe it may violate the employment rights of our members, based largely upon unfounded assumptions about the principal.

We are committed to working with the Department and school districts to make improvements in our system and we strongly support PDE efforts to increase funding for Pennsylvania schools. Again, thank you for providing us with the opportunity to share information on this endeavor.

Sincerely,

William R. Hartman Jr.

Dr. William R. Hartman, Jr.
Executive Director PAESSP

122 Valley Road • P.O. Box 39 • Summerdale, PA 17093

phone: (717) 732-4999 • fax: (717) 732-4890 • e-mail: paessp@paessp.org • web site: www.paessp.org

Affiliate of the National Association of Elementary School Principals and the National Association of Secondary School Principals

Serving *21st* Cent. Schools, Assistant Principals and Other Educational Leaders



James F. Shields, ED.D., *Executive Director*

Thomas E. Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

May 24, 2010

Dear Secretary Gluck,

The Pennsylvania Association of Intermediate Units (PAIU) fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of PAIU and other education organizations make Pennsylvania uniquely equipped for this grant opportunity.

The 29 intermediate units (IUs) in Pennsylvania have been active partners supporting PDE and our 500 school districts in implementing many of the reform initiatives that have resulted in improved student achievement in the state. IUs have played an integral role in helping develop statewide academic standards, in improving student data collection and interpretation and in providing effective professional development activities for teachers and administrators. Many IUs have worked closely with the staffs of struggling schools, utilizing tools like "Getting Results", in efforts to turn around student performance.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in important and significant gains in student achievement in recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children have access to an education that prepares them to be productive citizens and to succeed in a high-skills, globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,

Dr. Robert H. Coad, Jr

Robert H. Coad, Jr.

President, Pa Association of Intermediate Units



Pennsylvania Association of School Administrators
2608 Market Place - Harrisburg, PA 17109-9358
(717) 540-4448 (717) 540-4405 fax www.pasa-net.org

May 18, 2010

Mr. Thomas Gluck
Acting Secretary of Education
PA Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Acting Secretary Gluck:

The Pennsylvania Association of School Administrators (PASA) supports the Pennsylvania Department of Education's application for "Race to the Top" funding.

We believe that this application will assist Pennsylvania and local school districts as they continue their efforts to raise student achievement. The application builds on Pennsylvania's many initiatives in recent years, including a focus on high-quality academic standards and assessment and professional development for administrators that emphasizes leadership in both school management and instruction. In addition, the state's recent revisions to certification requirements for professional educators, ongoing commitment to appropriate instruction for all students in an inclusive classroom, and professional development focused on instructional excellence evidence Pennsylvania's commitment to raising student achievement. Race to the Top will allow the state and participating local school districts to continue that effort.

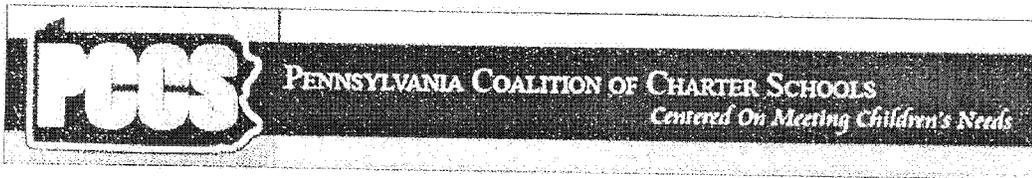
The Center on Educational Policy in Washington DC has recognized the Commonwealth as the only state in the nation to show gains on both the National Assessment of Education Progress (NAEP) and Pennsylvania's System of School Assessment (PSSA) tests at every grade level. The Race to the Top grant from the U.S. Department of Education would allow the state to build upon the policy goals and practices already in place that have resulted in these important and significant gains in student achievement. The strategies outlined in the Race to the Top initiative will assist Pennsylvania's education leaders and professional educators to continue a commitment to providing all children in the Commonwealth access to an education that prepares them to be productive citizens and to succeed in a high-skills, globally-competitive, and knowledge-based economy.

For these reasons, we believe that the opportunities provided in this Race to the Top application will help to position Pennsylvania to continue as a leader in education and to prepare every commonwealth student for success.

Sincerely,

A handwritten signature in cursive script that reads "Fred Johnson". The ink is dark and the signature is written in a fluid, connected style.

Dr. Fred Johnson, 2009-10 ASA President
Superintendent — Selinsgrove Area SD



May 25, 2010

Thomas E. Gluck, Secretary of Education
 333 Market Street
 Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania Coalition of Public Charter Schools fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of Pennsylvania Coalition of Public Charter Schools and similar organizations make Pennsylvania uniquely equipped for this grant opportunity. PCPCS particularly recognizes and appreciates the support provided by the Pennsylvania Department of Education in this application.

Charter Schools and PCPCS: the Pennsylvania Context

Charter school growth in Pennsylvania, as in other parts of the country, has been fueled by parents and communities that are frustrated with underperforming, inflexible or unsafe traditional public schools. They are looking for innovative educational choices and alternatives, especially within urban communities. In many areas, growth has been accompanied by strong results achieved by charters. For example, in Philadelphia, 73% of charter schools made Adequate Yearly Progress (AYP) goals during the 2008 to 2009 academic year compared to just 41% of traditional public schools. That said, overall demand in the state is much greater than supply, leaving charter schools with long waiting lists each year, and making schools with strong reputations exceedingly difficult to get into. There is good reason to expect that the demand for high-quality educational settings will continue to increase. Given the continued demand, Pennsylvania's charter movement has grown significantly since the adoption of charter school legislation in 1997. During the 2008 to 2009 school year, 129 charter schools were operating, representing 4.1% of all public schools in the Commonwealth. Nearly half the charter schools are in the City of Philadelphia, where charters serve 15% of the student population. Nearly two-thirds of all charter schools are in urban areas, with many serving student populations largely from economically disadvantaged backgrounds.

The mission of the Pennsylvania Coalition of Public Charter Schools is to provide information and guidance to persons wishing to start a charter public school; to act in an advisory capacity to the Pennsylvania State Department of Education in matters concerning charter public schools; to act as a monitor to charter public school legislation; and, to focus and promote efforts to strengthen charter public school legislation.

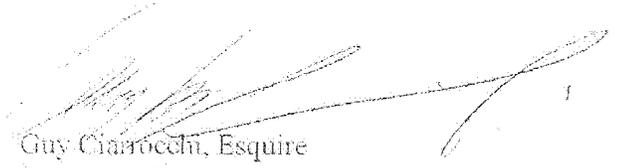
PCPCS Support for PDE Race to Top Recommendation

Within this Pennsylvania charter school context, we understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the

Commonwealth has access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,



Guy Chiarocci, Esquire
Executive Director
Pennsylvania Coalition of Public Charter Schools

PCPA



Pennsylvania
Community
Providers
Association

Building 3, Suite 200 ▶ 2101 North Front Street ▶ Harrisburg, PA 17110-1063
Tel: 717-364-3280 ▶ Fax: 717-364-3287 ▶ mail@paproviders.org ▶ www.paproviders.org

May 25, 2010

Thomas E. Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania Community Providers Association (PCPA) fully supports the Pennsylvania Department of Education's application for Race to the Top grant application. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of partnerships between schools and community services for students with behavioral, developmental and social challenges make Pennsylvania uniquely equipped for this grant opportunity.

The Pennsylvania Community Providers Association is a state association representing over 200 community-based agencies that provide mental health, intellectual disability, substance abuse, and other human services. Our association and its members are increasingly working in partnership with the Pennsylvania Department of Education and schools in our communities. Our members have participated in the implementation of a range of innovative school based services that enable students age 3 through transition with challenging behaviors and developmental challenges to successfully engage in the life and opportunities of their local schools. Most recently PCPA has worked with the department to promote resiliency by expanding the use of the evidence based Positive Behavior Intervention and Support model to meet the social and emotional needs of all students and to enhance their academic and social success.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices such as those noted here that the state has been using in our schools which have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,

George J. Kimes
Executive Director

PCPA promotes a community-based, responsive and viable system of agencies providing quality services for individuals receiving mental health, mental retardation, addictive disease and other related human services.

Pennsylvania Training and Technical Assistance Network

Pennsylvania Department of Education

May 18, 2010

Thomas E. Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

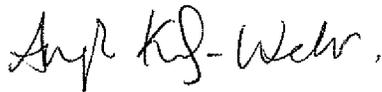
Dear Secretary Gluck:

The Pennsylvania Training and Technical Network (PaTTAN) fully supports the Pennsylvania Department of Education's application for Race to the Top funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the broad-based support of PaTTAN and similar organizations make Pennsylvania uniquely equipped for this grant opportunity.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every commonwealth student for success.

Sincerely,



Angela Kirby-Wehr
Director of PaTTAN Harrisburg

6340 Flank Drive, Suite 600, Harrisburg, PA 17112-2764

717-541-4960 • Toll Free 800-360-7282 • Fax 717-541-4968 • TTY 800-654-5984 • www.pattan.net

3190 William Pitt Way • Pittsburgh, PA 15238-1360
412-826-2336 • Toll Free 800-446-5607
Fax 412-826-1964 • TTY 412-826-2338

200 Anderson Road • King of Prussia, PA 19406-1904
610-265-7321 • Toll Free 800-441-3215
Fax 610-265-5737 • TTY 610-768-9723



Office of the Chancellor | Dixon University Center | 2985 North Second Street | Harrisburg, PA 17110-1201
717 720-4000 | www.psu.edu

May 19, 2010

Thomas E. Gluck
Acting Secretary of Education
Commonwealth of Pennsylvania
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck:

The Pennsylvania State System of Higher Education fully supports the Pennsylvania Department of Education's application for Race to the Top funding. Pennsylvania has made an unprecedented commitment to preK-12 education over the past five years. The 14 universities that comprise the State System, with a long history in teacher education, are supportive of partnering with school districts and the Department of Education to ensure this commitment is realized in the opportunities for and achievements of students. Specific initiatives in which we currently are engaged, and will continue, include:

- Building a State Data Systems Network to incorporate ongoing and emerging opportunities for states upgrading their higher education and P-16 data capabilities;
- Developing alternate teacher certification programs in high need areas such as science, math and special education;
- Increasing the number and quality of teachers in high need and low performing school districts;
- Providing linkages between the higher education community and school districts to clarify expectations for the transition from high school to college, including the adoption of a rigorous curriculum aligned to the Pennsylvania standards to promote student success;
- Increasing degree completion of economically disadvantaged and minority students including continued and expanded dual enrollment and early college high school programs; and
- Increasing the quality and the diversity of the teacher workforce.

Pennsylvania's Race to the Top grant application to the U.S. Department of Education builds upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We believe that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the Commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

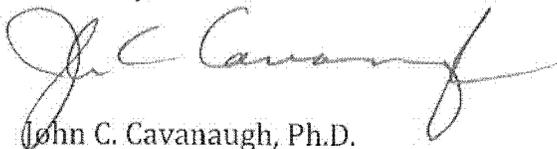
Acting Secretary Thomas E. Gluck

May 19, 2010

Page 2

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every Commonwealth student for success.

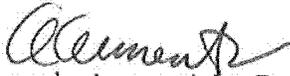
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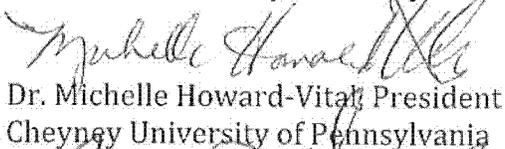
John C. Cavanaugh, Ph.D.
Chancellor



Dr. David L. Soltz, President
Bloomsburg University of Pennsylvania



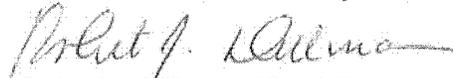
Dr. Angelo Armenti, Jr., President
California University of Pennsylvania



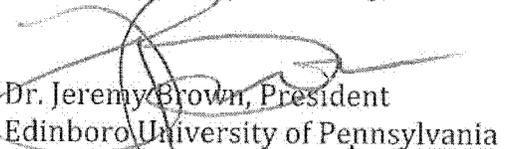
Dr. Michelle Howard-Vital, President
Cheyney University of Pennsylvania



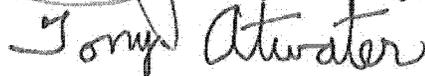
Dr. Joseph P. Grunenwald, President
Clarion University of Pennsylvania



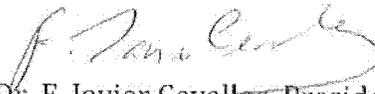
Dr. Robert J. Dillman, President
East Stroudsburg University of Pennsylvania



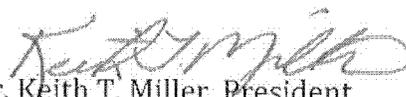
Dr. Jeremy Brown, President
Edinboro University of Pennsylvania



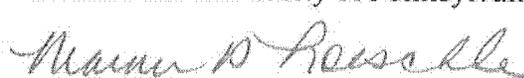
Dr. Tony Atwater, President
Indiana University of Pennsylvania



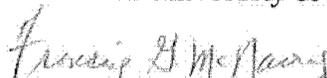
Dr. F. Javier Cevallos, President
Kutztown University of Pennsylvania



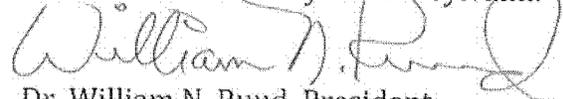
Dr. Keith T. Miller, President
Lock Haven University of Pennsylvania



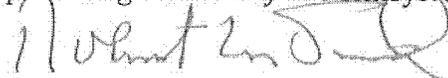
Dr. Maravene S. Loeschke, President
Mansfield University of Pennsylvania



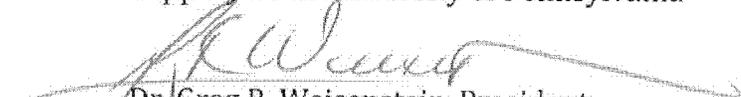
Dr. Francine G. McNairy, President
Millersville University of Pennsylvania



Dr. William N. Ruud, President
Shippensburg University of Pennsylvania



Dr. Robert M. Smith, President
Slippery Rock University of Pennsylvania



Dr. Greg R. Weisenstein, President
West Chester University of Pennsylvania



PENNSYLVANIA COMMISSION FOR COMMUNITY COLLEGES

Community College of
Allegheny County
www.ccac.edu

Community College of
Beaver County
www.cbcc.edu

Bucks County
Community College
www.bucks.edu

Butler County
Community College
www.bc3.edu

Delaware County
Community College
www.dccc.edu

Harrisburg Area
Community College
www.hacc.edu

Lehigh Carbon
Community College
www.lccc.edu

Luzerne County
Community College
www.luzerne.edu

Montgomery County
Community College
www.mc3.edu

Northampton
Community College
www.northampton.edu

Pennsylvania Highlands
Community College
www.pennhighlands.edu

Community College of
Philadelphia
www.ccp.edu

Reading Area
Community College
www.racc.edu

Westmoreland County
Community College
www.wccc.edu

May 18, 2010

The Honorable Thomas E. Gluck
Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Acting Secretary Gluck:

The Pennsylvania Commission for Community Colleges fully supports the Pennsylvania Department of Education's application for **Race to the Top** funding. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education, and the broad-based support of the Commonwealth's 14 community colleges and many other educational institutions, make Pennsylvania uniquely equipped for this grant opportunity.

Pennsylvania's community colleges have continued to support and align with the recommendations of the *Governor's Commission on College and Career Success* as well as other reform efforts initiated by the state Department of Education. Several specific recommendations to note include:

- Standards Aligned System for English, math, science and social studies, and work with high schools to help define course relevancy.
- P-16 Longitudinal Data System and continue to participate in the development and implementation of the system.
- Increase the college going and completion of economically disadvantaged and minority students through continued and expanded dual enrollment and early college high school programs.
- Drop-out recovery by working with high schools and the Departments of Welfare and Unemployment to reengage the students in education. Work with PA Partnerships for Children who have developed an advocacy strategy around dropout re-engagement.

We understand that Pennsylvania seeks a grant from the U.S. Department of Education to build upon strategies and practices the state has been using in our schools that have resulted in the important and significant gains in student achievement of recent years. We agree that these strategies will accelerate the state's academic gains and deliver on the commitment that all children in the Commonwealth have access to an education that prepares them to be productive citizens and to succeed in a high-skills globally-competitive, knowledge-based economy.

We are committed to supporting the state's efforts in this area. We believe that this ground-breaking opportunity will help position Pennsylvania to be a leader in education and prepare every Commonwealth student for success.

Sincerely,



Diane C. Bosak
Executive Director

TEAM Pennsylvania

F O U N D A T I O N

Co-Chair
Edward G. Rendell
Governor
Commonwealth of Pennsylvania

Co-Chair
Karen Winner
Chief Executive Officer
Winner International

5/24/2010

Thomas E. Gluck, Acting Secretary of Education
333 Market Street
Harrisburg, PA 17126-0333

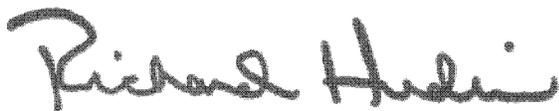
Dear Secretary Gluck:

Team Pennsylvania Foundation believes strongly that a highly educated and skilled workforce is key to a growing and thriving economy in Pennsylvania, and that a successful application for Race to the Top funding is key to accomplishing that goal. We believe that Pennsylvania's historic investments in education, its proven dedication to quality education and the unique engagement and support of the business community through entities like Team PA Foundation make Pennsylvania distinctively equipped for this grant opportunity.

Over the last few years, our Foundation has strategically increased our work and investment in education policy reform because of our deep ties to the business community and keen awareness of the relationship between quality schools, a strong workforce, and an attractive business environment. We thank you for your partnership in both our successful work to link K-12 reform with economic development via both our STEM education reform work, and the For the Future initiative, successfully passing a contentious but comprehensive reform of high school graduation requirements.

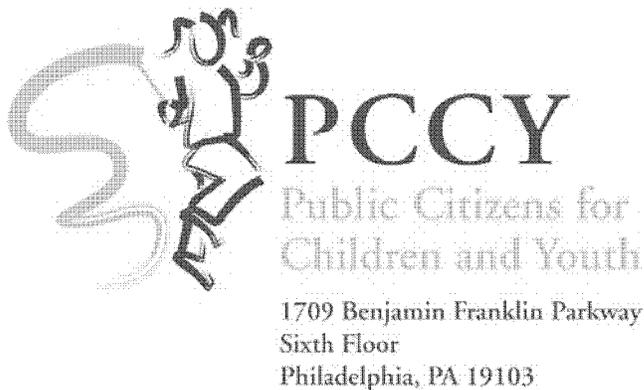
We are committed to improving the education opportunities for all Pennsylvanian's through our partnership with the commonwealth and we look forward to continuing and enhancing this partnership over the coming years, as we assist in implementing the important work delineated in this Race to the Top application.

Sincerely,



Richard Hudic
President & CEO

innovate | invest | impact



May 25, 2010

Thomas E Gluck, Acting Secretary of Education
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126-0333

Dear Secretary Gluck,

It is with great hope that Public Citizens for Children and Youth (PCCY) writes to endorse Pennsylvania's application for Race to the Top funding.

We believe that Pennsylvania's performance in education in the last decade, marked by accountability and results have positioned the Commonwealth to take giant steps in improving the educational opportunity for the children and youth of the Commonwealth.

PCCY has been advocating in support of educational reform for twenty years, for fair and equitable funding, quality teaching and learning environments, small class size, early intervention, and challenging and engaging school experiences for all students.

We understand that Pennsylvania seeks a grant from the U. S. Department of Education to build upon strategies and practices that the state has been using in our schools that have resulted in significant gains in student achievement in recent years. We believe these strategies will advance the state's academic gains and allow all children in the Commonwealth to become the productive citizens they must be to succeed in a knowledge based economy.

We are committed to supporting the state's efforts and believe this opportunity will help make Pennsylvania's children become the citizens we want and need for the future.

Sincerely yours,

Shelly Yanoff
Executive Director

Appendix A-14
Distinguished Educators (DEs) Results

**Growth Results for Districts with Distinguished Educators (DEs): Cumulative Gain Index*
(Grades 4-8) for 2006-07 and 2007-08**

-  Cumulative gains are equal to or greater than 2 Standard Errors.
-  Cumulative gains are between -2 and less than 2 standard errors.
-  Cumulative gains are below the growth standard by more than 2 Standard Errors.

District Name	Cum_Index _Math SY 06-07	Cum_Index _Read SY 06-07	Cum_Index _Math SY 07-08	Cum_Index _Read SY 07-08
Aliquippa School District	-5.5	-1.6	-4.0	-0.1
Allentown City School District	4.6	9.6	10.2	8.7
Bangor Area School District	3.8	5.1	8.3	2.1
Bethlehem Area School District	26.1	9.8	22.9	17.3
Bristol Township School District	18.6	9.0	11.8	7.1
Chester-Upland School District	-9.6	2.1	6.0	-0.7
Clairton City School District	1.7	5.4	9.3	4.0
Duquesne City School District	-5.5	-3.1	-1.0	-0.5
East Stroudsburg Area School District	11.9	5.9	9.1	7.2
Easton Area School District	7.4	-0.4	12.1	12.8
Farrell Area School District	-2.7	-1.5	4.1	3.4
Harrisburg City School District	-1.2	5.6	15.5	10.2
Lancaster School District	4.4	3.7	16.8	10.4
Lebanon School District	2.9	1.1	11.9	5.4
McKeesport Area School District	1.7	-0.4	12.0	9.2
Norristown Area School District	10.3	4.3	19.4	9.5
Penn Hills School District	1.7	-2.5	9.4	12.2
Pocono Mountain School District	6.3	2.5	21.4	13.5
Reading School District	13.4	9.5	20.0	15.8
Southeast Delco School District	-2.2	-2.4	15.8	6.0

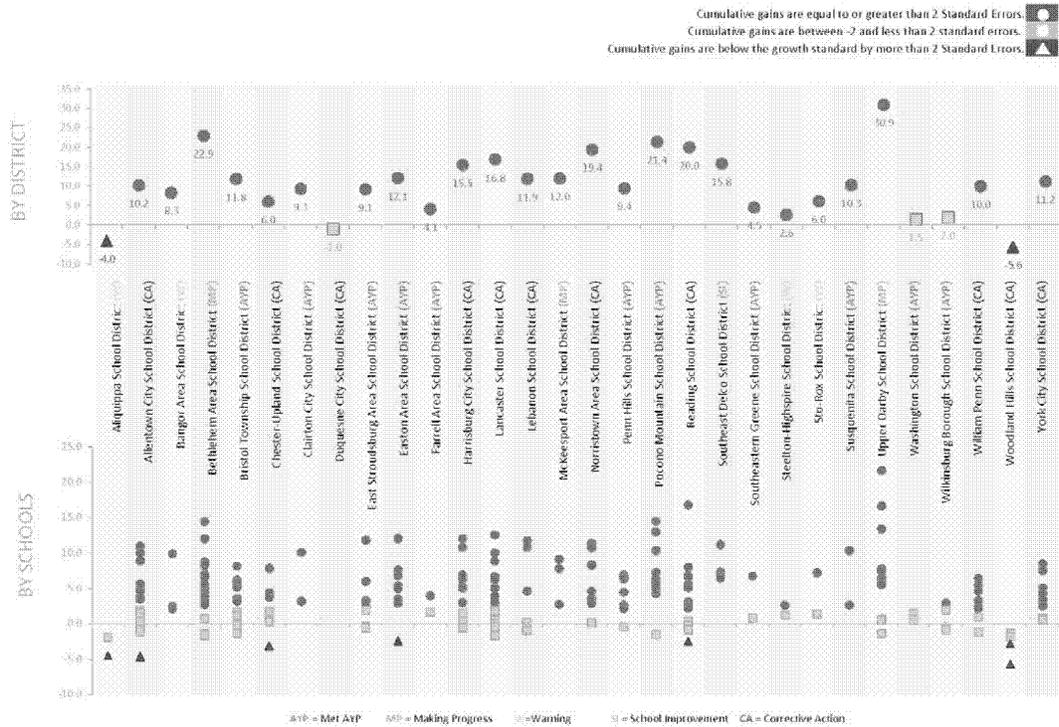
Appendix A-14
Distinguished Educators (DEs) Results

Southeastern Greene School District	0.0	-2.7	4.5	6.3
Steelton-Highspire School District	-1.8	-0.7	2.6	0.5
Sto-Rox School District	3.5	2.3	6.0	-0.1
Susquenita School District	7.7	2.3	10.3	1.4
Upper Darby School District	23.2	10.3	30.9	14.2
Washington School District	6.3	0.1	1.5	-0.9
Wilkinsburg Borough School District	2.5	3.1	2.0	0.4
William Penn School District	3.9	2.0	10.0	5.8
Woodland Hills School District	-7.1	-2.3	-5.6	-4.0
York City School District	0.8	-0.8	11.2	6.3

*Cumulative Gain Index: The Cumulative Gain index is a measure of student progress for the selected test and subject. For PSSA Reading/Math 4th-8th grade tests, it is calculated by dividing the most recent year's Mean NCE Gain Over Grades Relative to the Growth Standard (0.0) by the corresponding standard error. For PSSA Reading/Math 11th grade, the School Effect for the most recent testing year is divided by its standard error to calculate the Cumulative Gain Index.

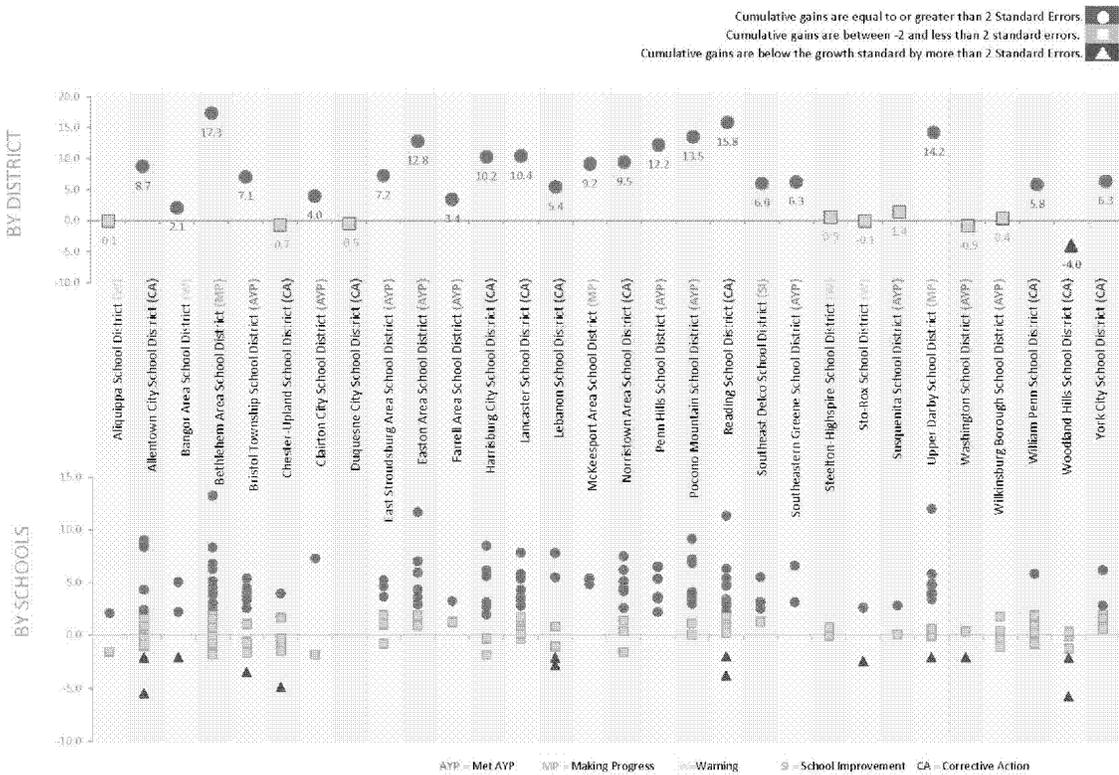
Appendix A-14 Distinguished Educators (DEs) Results

PVAAS Results for Pennsylvania's "DE" Districts / 2007-2008 Math Results for Grade 4-8



Appendix A-14 Distinguished Educators (DEs) Results

PVAAS Results for Pennsylvania's "DE" Districts / 2007-2008 Reading Results for Grade 4-8



**Appendix A-15
NAEP and PSSA Results**

1. NAEP: 4th grade reading by gender, disability, and ELL status

		1992 ¹	1994 ¹	1998 ¹	2000 ¹	2002	2003	2005	2007 ^{a/}	2009	
All	Below basic	32	39	—	—	34	35	31	27	30	
	At or above basic	68	61	—	—	66	65	69	73	70	
	At or above proficient	32	30	—	—	34	33	36	40	37	
	At advanced	6	7	—	—	9	7	9	11	10	
Disability status	SWD	Below basic	‡	‡	—	—	65	76	65	64	62
		At or above basic	‡	‡	—	—	35	24	35	36	38
		At or above proficient	‡	‡	—	—	11	7	13	15	14
		At advanced	‡	‡	—	—	2	1	2	4	3
	Without disabilities	Below basic	‡	‡	—	—	30	30	27	22	26
		At or above basic	‡	‡	—	—	70	70	73	78	74
		At or above proficient	‡	‡	—	—	37	36	39	44	40
		At advanced	‡	‡	—	—	9	8	10	13	10
Gender	Male	Below basic	36	43	—	—	36	38	35	31	33
		At or above basic	64	57	—	—	64	62	65	69	67
		At or above proficient	29	25	—	—	32	30	32	37	35
		At advanced	5	5	—	—	7	6	7	11	9
	Female	Below basic	29	35	—	—	31	32	28	24	28
		At or above basic	71	65	—	—	69	68	72	76	72
		At or above proficient	34	35	—	—	37	36	40	44	38
		At advanced	7	9	—	—	10	8	11	12	11
ELL status	ELL	Below basic	‡	‡	—	—	‡	‡	58	69	76
		At or above basic	‡	‡	—	—	‡	‡	42	31	24
		At or above proficient	‡	‡	—	—	‡	‡	16	10	4
		At advanced	‡	‡	—	—	‡	‡	1	3	#
	Non-ELL	Below basic	‡	‡	—	—	33	35	31	27	29
		At or above basic	‡	‡	—	—	67	65	69	73	71
		At or above proficient	‡	‡	—	—	35	33	36	41	37
		At advanced	‡	‡	—	—	9	7	9	12	10

¹ Accommodations were not permitted for this assessment.

^{a/} Exclusion rate for SWD and ELL were 4.9 and 0.3, respectively.

Note: Detail may not sum to totals because of rounding. Some apparent differences between estimates may not be statistically significant.

Source: U.S. Department of Education, Institute of Education Sciences

2. NAEP: 4th grade mathematics by gender, disability, and ELL status

		1990 ¹	1992 ¹	1996 ¹	2000 ¹	2003	2005	2007 ²	2009	
All students	Below basic	—	35	32	—	22	18	15	16	
	At or above basic	—	65	68	—	78	82	85	84	
	At or above proficient	—	22	20	—	36	41	47	46	
	At advanced	—	2	1	—	4	6	7	8	
Disability status	SWD	Below basic	—	‡	‡	—	58	48	38	40
		At or above basic	—	‡	‡	—	42	52	62	60
		At or above proficient	—	‡	‡	—	12	16	26	19
		At advanced	—	‡	‡	—	1	2	3	3
	Without disabilities	Below basic	—	‡	‡	—	18	13	11	12
		At or above basic	—	‡	‡	—	82	87	89	88
		At or above proficient	—	‡	‡	—	39	45	51	50
		At advanced	—	‡	‡	—	5	7	8	8
Gender	Male	Below basic	—	34	31	—	21	18	15	15
		At or above basic	—	66	69	—	79	82	85	85
		At or above proficient	—	23	21	—	39	44	50	48
		At advanced	—	2	2	—	6	7	9	9
	Female	Below basic	—	36	32	—	23	18	15	16
		At or above basic	—	64	68	—	77	82	85	84
		At or above proficient	—	21	20	—	32	39	44	43
		At advanced	—	2	1	—	3	5	5	6
ELL status	ELL	Below basic	—	‡	‡	—	‡	46	53	53
		At or above basic	—	‡	‡	—	‡	54	47	47
		At or above proficient	—	‡	‡	—	‡	17	8	12
		At advanced	—	‡	‡	—	‡	4	2	0
	Not ELL	Below basic	—	‡	‡	—	22	17	14	14
		At or above basic	—	‡	‡	—	78	83	86	86
		At or above proficient	—	‡	‡	—	36	42	48	46
		At advanced	—	‡	‡	—	4	6	7	8

¹ Accommodations were not permitted for this assessment.

² Exclusion rate for SWD and ELL were 2.5 and 0.2, respectively.

Note: Detail may not sum to totals because of rounding. Some apparent differences between estimates may not be statistically significant.

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP).

3. NAEP Scaled Score. 1992-2009

Subject	Grade	Year	Pennsylvania Average	National Average	
Mathematics (scale: 0-500)	4 th grade	1992 ⁿ	224	[219]	
		1996 ⁿ	226	[222]	
		2003	236	[234]	
		2005	241	[237]	
		2007	244	[239]	
		2009	244	[239]	
	8 th grade	1990 ⁿ	266	[262]	
		1992 ⁿ	271	[267]	
		2003	279	[276]	
		2005	281	[278]	
		2007	286	[280]	
		2009	288	[282]	
	Reading (scale: 0-500)	4 th grade	1992 ⁿ	221	[215]
			1994 ⁿ	215	[212]
2002			221	[217]	
2003			219	[216]	
2005			223	[217]	
2007			226	[220]	
2009			224	[220]	
8 th grade		2002	265	[263]	
		2003	264	[261]	
		2005	267	[260]	
		2007	268	[261]	
		2009	271	[262]	

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

4. Exclusion rates for students with disabilities and ELLs in 2007 NAEP Was NOT updated for 2009 – still good

	Grade 4		Grade 8	
	Reading	Mathematics	Reading	Mathematics
Students with Disabilities	4.9	2.5	5.2	3.7
ELLs	0.8	0.2	1.0	0.5

5. NAEP: 8th grade reading by gender, disability, and ELL status

		1992 ¹	1994 ¹	1998 ¹	2002	2003	2005	2007 ^{a/}	2009	
All Students		Below basic	—	—	—	23	24	23	21	19
		At or above basic	—	—	—	77	76	77	79	81
		At or above proficient	—	—	—	35	32	36	36	40
		At advanced	—	—	—	2	2	3	3	3
Disability Status	SWD	Below basic	—	—	—	70	69	65	60	54
		At or above basic	—	—	—	30	31	35	40	46
		At or above proficient	—	—	—	5	4	6	10	10
		At advanced	—	—	—	0	0	0	1	1
	Without disabilities	Below basic	—	—	—	17	17	17	16	12
		At or above basic	—	—	—	83	83	83	84	88
		At or above proficient	—	—	—	39	36	40	40	45
		At advanced	—	—	—	3	2	4	4	4
Gender	Male	Below basic	—	—	—	25	30	27	23	22
		At or above basic	—	—	—	75	70	73	77	78
		At or above proficient	—	—	—	32	26	31	33	35
		At advanced	—	—	—	2	1	2	3	3
	Female	Below basic	—	—	—	21	18	19	20	15
		At or above basic	—	—	—	79	82	81	80	85
		At or above proficient	—	—	—	38	38	41	40	45
		At advanced	—	—	—	3	3	4	4	4
ELL Status	ELL	Below basic	—	—	—	‡	‡	‡	‡	54
		At or above basic	—	—	—	‡	‡	‡	‡	45
		At or above proficient	—	—	—	‡	‡	‡	‡	5
		At advanced	—	—	—	‡	‡	‡	‡	#
	Not ELL	Below basic	—	—	—	23	23	22	21	18
		At or above basic	—	—	—	77	77	78	79	82
		At or above proficient	—	—	—	35	32	36	37	41
		At advanced	—	—	—	2	2	3	3	4

¹ Accommodations were not permitted for this assessment.

^{a/} Exclusion rate for SWD and ELL were 5.2 and 1.0, respectively.

Note: Detail may not sum to totals because of rounding. Some apparent differences between estimates may not be statistically significant.

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

6. NAEP: 8th grade mathematics by gender, disability, and ELL status

		1990 ¹	1992 ¹	1996 ¹	2000 ¹	2003	2005	2007 ^{a/}	2009	
All students		Below basic	44	38	—	—	31	28	23	22
		At or above basic	56	62	—	—	69	72	77	78
		At or above proficient	17	21	—	—	30	31	38	40
		At advanced	2	3	—	—	5	6	8	10
Disability Status	SWD	Below basic	‡	‡	—	—	73	68	56	58
		At or above basic	‡	‡	—	—	27	32	44	42
		At or above proficient	‡	‡	—	—	6	6	14	10
		At advanced	‡	‡	—	—	0	0	2	1
	Without disabilities	Below basic	‡	‡	—	—	25	22	19	16
		At or above basic	‡	‡	—	—	75	78	81	84
		At or above proficient	‡	‡	—	—	33	35	42	45
		At advanced	‡	‡	—	—	6	6	9	11
Gender	Male	Below basic	41	35	—	—	30	26	21	22
		At or above basic	59	65	—	—	70	74	79	78
		At or above proficient	20	24	—	—	33	33	42	42
		At advanced	3	3	—	—	6	7	10	12
	Female	Below basic	47	41	—	—	32	30	25	22
		At or above basic	53	59	—	—	68	70	75	78
		At or above proficient	14	19	—	—	27	29	35	37
		At advanced	1	2	—	—	4	5	6	8
ELL Status	ELL	Below basic	‡	‡	—	—	‡	‡	‡	63
		At or above basic	‡	‡	—	—	‡	‡	‡	37
		At or above proficient	‡	‡	—	—	‡	‡	‡	11
		At advanced	‡	‡	—	—	‡	‡	‡	1
	Not ELL	Below basic	‡	‡	—	—	31	27	22	21
		At or above basic	‡	‡	—	—	69	73	78	79
		At or above proficient	‡	‡	—	—	30	31	39	40
		At advanced	‡	‡	—	—	5	6	8	10

¹ Accommodations were not permitted for this assessment.

^{a/} Exclusion rate for SWD and ELL were 3.7 and 0.5, respectively.

Note: Detail may not sum to totals because of rounding. Some apparent differences between estimates may not be statistically significant.

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

7. PSSA Scaled Scores - Mathematics by Subgroup, 2003-2009

Grade	Year	All Students	Race			Free or Reduced Price Meals		Disability		ELL	
			White	Black	Hispanic	Not Eligible	Eligible	SWD	Non-SWD	ELL	Non-ELL
4	2006	1,400	1,440	1,260	1,280	1,460	1,300	1,250	1,430	1,240	1,410
	2007	1,420	1,460	1,280	1,300	1,470	1,320	1,260	1,450	1,240	1,420
	2008	1,440	1,490	1,290	1,330	1,510	1,340	1,280	1,480	1,260	1,450
	2009	1,460	1,490	1,320	1,350	1,520	1,360	1,300	1,490	1,270	1,460
5	2003	1,340	1,380	1,190	1,220	1,400	1,240	1,160	1,370	1,200	1,340
	2004	1,380	1,430	1,210	1,250	1,450	1,270	1,160	1,420	1,230	1,390
	2005	1,420	1,460	1,280	1,310	1,480	1,320	1,230	1,450	1,260	1,420
	2006	1,420	1,460	1,280	1,310	1,480	1,320	1,240	1,460	1,260	1,430
	2007	1,430	1,470	1,280	1,310	1,480	1,330	1,250	1,460	1,240	1,430
	2008	1,450	1,490	1,320	1,340	1,510	1,350	1,270	1,490	1,250	1,460
	2009	1,450	1,490	1,320	1,350	1,510	1,360	1,280	1,490	1,260	1,460
8	2003	1,320	1,350	1,170	1,180	1,370	1,200	1,110	1,350	1,180	1,320
	2004	1,350	1,390	1,210	1,230	1,410	1,250	1,150	1,390	1,210	1,360
	2005	1,370	1,400	1,220	1,260	1,420	1,260	1,160	1,410	1,210	1,370
	2006	1,370	1,400	1,220	1,250	1,420	1,260	1,160	1,410	1,210	1,370
	2007	1,390	1,430	1,250	1,280	1,450	1,290	1,180	1,430	1,210	1,400
	2008	1,410	1,440	1,270	1,300	1,460	1,310	1,190	1,450	1,220	1,410
	2009	1,420	1,450	1,300	1,310	1,470	1,330	1,220	1,460	1,230	1,420
11	2003	1,320	1,340	1,150	1,160	1,350	1,180	1,100	1,340	1,190	1,320
	2004	1,320	1,350	1,150	1,160	1,360	1,180	1,080	1,350	1,200	1,320
	2005	1,340	1,370	1,130	1,160	1,390	1,180	1,050	1,380	1,200	1,340
	2006	1,340	1,380	1,130	1,160	1,390	1,190	1,040	1,390	1,170	1,340
	2007	1,330	1,370	1,160	1,180	1,370	1,210	1,070	1,370	1,160	1,340
	2008	1,340	1,380	1,160	1,190	1,390	1,210	1,070	1,390	1,140	1,350
	2009	1,350	1,380	1,180	1,200	1,390	1,220	1,090	1,390	1,150	1,350

Source: Pennsylvania Department of Education

8. PSSA Scaled Scores - Reading by Subgroup, 2003-2009

Grade	Year	All Students	Race			Free or Reduced Price Meals		Disability		ELL	
			White	Black	Hispanic	Not Eligible	Eligible	SWD	Non-SWD	ELL	Non-ELL
4	2006	1,340	1,380	1,200	1,200	1,400	1,230	1,160	1,370	1,140	1,340
	2007	1,350	1,390	1,220	1,220	1,410	1,250	1,160	1,380	1,140	1,360
	2008	1,370	1,410	1,230	1,250	1,430	1,260	1,180	1,400	1,150	1,370
	2009	1,380	1,410	1,250	1,260	1,440	1,280	1,200	1,410	1,150	1,380
5	2003	1,330	1,370	1,180	1,180	1,400	1,220	1,110	1,370	1,110	1,340
	2004	1,370	1,410	1,220	1,210	1,440	1,250	1,140	1,410	1,150	1,380
	2005	1,340	1,380	1,180	1,190	1,400	1,220	1,120	1,380	1,120	1,340
	2006	1,310	1,350	1,170	1,180	1,380	1,200	1,100	1,350	1,090	1,320
	2007	1,320	1,360	1,180	1,190	1,380	1,210	1,120	1,360	1,090	1,320
	2008	1,330	1,370	1,200	1,200	1,390	1,230	1,120	1,370	1,090	1,340
	2009	1,330	1,370	1,210	1,220	1,390	1,240	1,130	1,370	1,080	1,340
8	2003	1,340	1,380	1,180	1,170	1,390	1,200	1,080	1,380	1,080	1,340
	2004	1,370	1,410	1,210	1,200	1,430	1,240	1,100	1,410	1,090	1,370
	2005	1,360	1,400	1,190	1,200	1,430	1,220	1,060	1,410	1,070	1,360
	2006	1,420	1,470	1,240	1,240	1,500	1,280	1,140	1,480	1,110	1,430
	2007	1,440	1,490	1,290	1,290	1,500	1,320	1,190	1,490	1,130	1,450
	2008	1,480	1,530	1,310	1,320	1,550	1,340	1,200	1,530	1,170	1,490
	2009	1,500	1,540	1,360	1,350	1,570	1,380	1,230	1,550	1,180	1,510
11	2003	1,320	1,350	1,150	1,140	1,350	1,170	1,040	1,350	1,080	1,320
	2004	1,340	1,380	1,140	1,140	1,390	1,170	1,030	1,380	1,030	1,350
	2005	1,360	1,410	1,120	1,160	1,420	1,170	1,020	1,410	1,020	1,370
	2006	1,370	1,410	1,170	1,180	1,410	1,210	1,060	1,410	1,060	1,370
	2007	1,350	1,390	1,160	1,170	1,390	1,200	1,050	1,390	1,030	1,350
	2008	1,360	1,400	1,180	1,190	1,410	1,220	1,060	1,410	1,020	1,370
	2009	1,370	1,410	1,190	1,210	1,420	1,230	1,080	1,410	1,060	1,370

Source: Pennsylvania Department of Education

9. PSSA General Performance Level Descriptors

Performance Level	Descriptions
Advanced	The Advanced Level reflects superior academic performance. Advanced work indicates an in-depth understanding and exemplary display of the skills included in the PA Academic Content Standards
Proficient	The Proficient Level reflects satisfactory academic performance. Proficient work indicates a solid understanding and adequate display of the skills included in the PA Academic Content Standards. Students must perform at this level or above to be considered as having reached the Commonwealth's performance expectations
Basic	The Basic Level reflects marginal academic performance. Basic work indicates a partial understanding and limited display of the skills included in the PA Academic Content Standards. This work is approaching satisfactory performance, but has not been reached. There is a need for additional instructional opportunities and/or increased student academic commitment to achieve the proficient level
Below Basic	The Below Basic Level reflects inadequate academic performance. Below Basic work indicates little understanding and minimal display of the skills included in the PA Academic Content Standards. There is a more need for additional instructional opportunities and/or increased student academic commitment to achieve the Proficient Level

PSSA Performance Level Cut Scores¹ - Mathematics

MATH	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 11	
	low	high	low	high										
<i>Advanced</i>	1370	and up	1445	and up	1483	and up	1476	and up	1472	and up	1446	and up	1509	and up
<i>Proficient</i>	1180	1369	1246	1444	1312	1482	1298	1475	1298	1471	1284	1445	1304	1508
<i>Basic</i>	1044	1179	1156	1245	1158	1311	1174	1297	1183	1297	1171	1283	1167	1303
High Basic	1112	1179	1201	1245	1235	1311	1236	1297	1240	1297	1227	1283	1235	1303
Low Basic	1044	1111	1156	1200	1158	1234	1174	1235	1183	1239	1171	1226	1167	1234
<i>Below Basic</i>	750	1043	700	1155	700	1157	700	1173	700	1182	700	1170	700	1166
High Below Basic	897	1043	928	1155	929	1157	937	1173	941	1182	935	1170	933	1166
Low Below Basic	750	896	700	927	700	928	700	936	700	940	700	934	700	932

¹ For additional details, see http://www.portal.state.pa.us/portal/server.pt/community/cut_scores/7441

PSSA Performance Level Cut Scores² - Reading

READING	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 11	
	low	high	low	high										
<i>Advanced</i>	1442	and up	1469	and up	1497	and up	1456	and up	1470	and up	1473	and up	1492	and up
<i>Proficient</i>	1235	1441	1255	1468	1275	1496	1278	1455	1279	1469	1280	1472	1257	1491
<i>Basic</i>	1168	1234	1112	1254	1137	1274	1121	1277	1131	1278	1146	1279	1112	1256
High Basic	1201	1234	1183	1254	1206	1274	1199	1277	1205	1278	1213	1279	1184	1256
Low Basic	1168	1200	1112	1182	1137	1205	1121	1198	1131	1204	1146	1212	1112	1183
<i>Below Basic</i>	1000	1167	700	1111	700	1136	700	1120	700	1130	700	1145	700	1111
High Below Basic	1084	1167	906	1111	918	1136	910	1120	915	1130	923	1145	906	1111
Low Below Basic	1000	1083	700	905	700	917	700	909	700	914	700	922	700	905

² For additional details, see http://www.portal.state.pa.us/portal/server.pt/community/cut_scores/7441

10. PSSA Below Basic Level, 5th, 8th, and 11th Grade (2002-2009)

Grade	Group	2002	2003	2004	2005	2006	2007	2008	2009	
5th Grade	Math	All students	25.2	22.4	20.1	11.9	13.4	12.1	10.4	9.6
		EP	64.7	57.2	52.6	38.6	40.1	37.8	34.9	32.2
		ELL	61.0	49.9	45.8	32.3	35.9	38.9	35.2	32.9
		Economically Disadvantaged	46.0	39.5	35.7	22.0	24.1	22.1	18.9	16.9
		White	17.6	15.1	13.2	7.4	8.8	7.4	6.6	6.2
		Black	58.2	49.5	46.4	28.5	30.7	29.3	23.8	22.1
		Hispanic	46.9	43.4	39.5	23.6	26.6	26.4	21.8	18.6
		Asian	15.3	13.0	9.8	4.8	5.5	5.0	4.1	3.5
		Native American	42.1	31.5	23.4	11.0	16.0	12.6	8.2	11.9
	Multi-ethnic	30.4		23.5	17.7	19.3	16.2	17.2	12.8	
	Reading	All students	20.3	21.5	18.3	19.1	21.1	20.4	18.9	17.9
		EP	62.9	61.0	54.8	53.8	57.6	55.7	54.9	52.7
		ELL	66.8	60.9	52.5	53.7	58.0	62.1	60.9	62.5
		Economically Disadvantaged	39.6	39.2	33.4	34.5	36.7	35.8	32.9	30.5
		White	13.3	14.5	12.2	12.6	15.1	14.2	13.2	12.6
		Black	48.9	45.4	39.6	41.5	42.3	42.1	37.5	35.9
		Hispanic	43.4	46.7	40.3	39.7	41.1	41.9	37.9	34.5
		Asian	16.9	18.7	12.7	11.8	12.3	11.1	11.8	9.1
		Native American	37.2	32.5	19.4	21.3	29.8	24.7	21.5	22.9
Multi-ethnic		24.4		18.4	22.4	28.3	24.7	25.3	22.0	
8th Grade	Math	All students	27.0	26.4	21.7	19.3	18.9	16.9	16.0	12.8
		EP	74.1	72.0	65.1	59.2	58.8	54.2	53.3	44.9
		ELL	60.4	57.1	51.2	47.5	49.0	48.5	45.6	38.8
		Economically Disadvantaged	52.1	48.6	39.4	34.9	33.9	30.3	28.1	22.4
		White	19.5	19.4	15.7	13.4	13.2	11.6	11.3	8.9
		Black	62.3	57.0	48.0	43.7	41.7	37.4	33.9	27.3
		Hispanic	53.3	53.4	43.3	36.0	35.8	31.4	29.3	24.0
		Asian	15.2	14.3	9.9	8.2	6.8	5.3	4.7	4.0
		Native American	52.2	29.7	25.3	26.7	25.4	14.5	20.0	18.4
	Multi-ethnic	34.3		29.0	32.8	30.3	27.3	30.5	21.2	
	Reading	All students	20.5	17.6	15.9	19.7	16.2	12.3	12.1	10.6
		EP	67.6	60.3	56.2	63.0	53.9	43.7	44.6	40.7
		ELL	69.9	62.0	59.6	63.4	57.2	55.4	50.0	47.1

Grade	Group	2002	2003	2004	2005	2006	2007	2008	2009	
1 th Grade	Economically Disadvantaged	42.4	35.7	30.7	35.6	30.4	23.7	22.7	19.2	
	White	14.3	12.1	11.0	14.2	11.1	7.8	8.0	7.3	
	Black	47.8	39.4	34.7	40.2	34.5	27.5	26.0	21.4	
	Hispanic	44.2	42.9	38.4	40.1	35.0	28.2	26.7	22.9	
	Asian	16.5	16.2	12.5	13.8	9.9	7.1	5.9	5.1	
	Native American	45.0	21.1	17.0	27.3	23.0	10.4	13.0	13.8	
	Multi-ethnic	22.4		17.7	32.8	25.0	20.2	21.5	16.3	
	Math	All students	29.0	30.0	31.0	30.5	30.4	26.6	26.6	24.9
		EP	78.2	77.2	78.6	77.2	77.6	72.9	72.6	69.5
		ELL	57.5	56.0	57.5	53.6	59.8	57.6	61.6	58.9
		Economically Disadvantaged	56.5	55.8	56.3	54.1	52.9	46.0	45.2	42.1
		White	24.1	24.6	25.1	24.7	24.5	21.1	21.0	19.3
		Black	62.0	63.9	64.1	62.0	61.6	53.8	53.9	50.2
		Hispanic	58.0	61.0	62.0	56.5	57.5	51.2	49.0	45.7
Asian		17.3	18.4	16.2	14.9	14.8	11.4	11.9	9.5	
Native American		46.9	44.3	36.9	33.1	39.8	30.3	33.6	30.7	
Multi-ethnic		36.0		43.9	49.1	45.1	40.7	49.5	39.7	
Reading		All students	19.7	22.0	21.8	22.0	18.5	19.3	19.0	18.8
		EP	68.7	70.7	69.3	67.6	62.1	64.0	62.2	61.5
		ELL	76.3	65.6	71.6	68.6	66.0	69.0	70.7	66.9
		Economically Disadvantaged	44.2	44.8	45.0	44.2	36.9	37.0	35.6	34.3
	White	15.3	17.3	16.3	16.2	13.6	14.2	14.1	13.9	
	Black	46.6	48.2	49.6	51.6	42.5	42.7	41.5	39.6	
	Hispanic	45.1	50.5	51.6	46.7	42.1	43.3	40.5	37.6	
	Asian	19.5	21.6	21.2	22.6	15.6	14.6	14.2	12.6	
	Native American	38.1	30.5	28.6	24.7	25.9	21.4	27.0	27.4	
	Multi-ethnic	23.5		32.1	37.3	31.3	27.8	35.6	28.9	

Source: Pennsylvania Department of Education

11. PSSA Proficient by Subgroup, 2002-2009

Grade		Subgroups	2002	2003	2004	2005	2006	2007	2008	2009
5 th Grade	Math	White	38.6	35.5	30.0	24.0	26.2	22.0	20.4	20.5
		Black	81.8	74.9	69.7	57.0	59.6	55.2	50.2	49.4
		Hispanic	71.2	68.0	61.8	50.7	53.5	50.3	46.0	43.3
		Asian	32.4	29.4	21.6	16.9	16.7	14.3	12.5	11.4
		Native American	67.3	53.3	45.9	34.8	42.6	36.4	29.8	28.7
		Multi-Ethnic	56.1		43.2	38.0	44.1	37.3	36.3	33.1
		EP	83.1	78.5	72.9	66.0	66.7	62.6	61.3	59.3
		ELL	81.3	72.3	65.6	61.0	62.5	65.4	63.8	63.9
		Economically Disadvantaged	70.7	64.8	58.4	48.6	50.8	46.3	43.1	41.3
	Reading	White	34.3	33.5	29.5	27.6	32.0	32.6	31.2	28.4
		Black	78.0	71.7	65.4	48.4	66.0	66.8	63.6	59.5
		Hispanic	71.2	70.2	64.7	61.4	63.9	64.7	62.3	57.6
		Asian	40.0	36.2	28.0	25.9	27.7	26.9	25.8	22.2
		Native American	65.6	50.3	43.6	40.6	49.7	44.6	38.4	37.2
		Multi-Ethnic	51.2		40.4	40.6	51.6	48.6	47.4	42.2
		EP	84.6	81.4	77.0	73.7	76.1	76.7	75.6	72.6
		ELL	87.2	80.9	75.2	75.1	78.5	83.1	84.2	84.5
		Economically Disadvantaged	68.0	64.5	57.9	56.6	60.0	60.4	58.2	53.0
		8 th Grade	Math	White	40.4	41.3	34.8	29.9	30.4	24.9
Black	84.5			81.3	73.9	67.2	67.5	60.2	54.1	51.1
Hispanic	76.3			77.9	68.8	58.8	61.1	52.3	49.1	47.9
Asian	31.0			32.2	22.7	19.2	18.1	12.5	11.9	10.9
Native American	73.7			55.8	50.0	45.4	44.7	36.2	37.8	41.5
Multi-Ethnic	59.2				52.5	51.8	53.1	48.2	46.1	42.6
EP	89.6			89.0	84.1	79.4	79.7	74.1	72.5	70.0
ELL	77.0			77.2	72.3	70.2	71.2	69.1	67.7	66.7
Economically Disadvantaged	75.4			73.8	64.9	57.8	58.5	51.1	47.1	45.2
Reading	White		33.3	29.0	24.2	29.0	22.2	18.1	15.6	14.4
	Black		76.0	67.5	58.6	52.4	56.1	49.3	43.3	36.7
	Hispanic		70.0	67.9	60.3	61.4	55.1	48.6	42.5	38.3
	Asian		36.9	33.2	26.0	27.0	19.5	16.6	12.0	10.2

Grade	Subgroups	2002	2003	2004	2005	2006	2007	2008	2009		
	Native American	67.1	43.9	41.8	47.1	37.0	25.8	27.8	29.5		
	Multi-Ethnic	47.3		34.1	50.3	42.2	37.0	34.1	30.1		
	EP	86.8	82.6	77.4	81.5	72.6	66.6	63.8	60.1		
	ELL	89.7	82.6	79.7	81.6	76.2	76.6	70.7	70.6		
	Economically Disadvantaged	68.8	61.5	52.6	57.3	49.8	43.6	38.2	33.6		
	1 th Grade	Math	White	45.9	45.7	45.4	43.6	42.5	40.7	38.4	38.4
			Black	82.7	84.1	82.5	80.6	78.3	75.4	72.8	71.7
			Hispanic	78.7	80.5	81.1	76.6	75.4	72.3	69.2	69.2
			Asian	33.4	33.4	30.0	27.8	26.6	22.9	22.0	20.3
			Native American	64.8	65.8	55.0	50.0	58.2	52.6	55.1	53.8
Multi-Ethnic			59.7		64.8	64.7	62.8	59.3	67.2	61.0	
EP			90.1	90.4	91.0	89.8	89.3	88.2	86.2	85.1	
ELL			76.6	73.5	71.6	70.8	73.6	73.8	76.9	76.0	
Economically Disadvantaged			78.1	76.9	76.2	73.8	70.9	68.3	65.2	64.7	
Reading		White	35.9	35.4	32.9	28.4	28.7	28.3	28.9	28.4	
		Black	74.1	71.8	72.1	60.6	65.2	64.4	64.2	61.5	
		Hispanic	71.3	72.5	70.6	64.2	64.7	63.8	62.6	60.3	
		Asian	38.8	37.1	36.5	33.7	29.9	27.9	28.4	25.1	
		Native American	58.1	47.9	44.7	40.9	49.2	43.9	45.6	43.4	
		Multi-Ethnic	47.2		53.0	50.7	51.3	46.0	53.6	48.9	
		EP	86.4	86.2	85.2	81.6	81.2	81.3	81.2	79.5	
		ELL	94.3	81.9	85.7	80.7	84.4	85.8	89.4	86.3	
		Economically Disadvantaged	70.6	67.4	66.2	60.6	58.6	57.6	57.5	55.6	

Source: Pennsylvania Department of Education

12. PSSA Proficient for all students, 2002-2009

Year	5 th Grade		8 th Grade		11 th Grade	
	Math	Reading	Math	Reading	Math	Reading
2002	46.9	43.0	48.3	41.2	50.4	41.0
2003	43.7	42.0	48.7	36.6	50.9	40.8
2004	38.2	37.3	42.1	31.1	50.9	39.2
2005	31.0	35.8	37.1	35.9	49.1	35.0
2006	33.1	39.4	37.8	29.4	48.0	34.9

Year	5 th Grade		8 th Grade		11 th Grade	
	Math	Reading	Math	Reading	Math	Reading
2007	29.0	40.0	32.1	25.0	46.3	34.6
2008	26.8	38.4	29.7	21.7	44.1	35.3
2009	26.5	35.5	28.7	19.5	44.4	34.8

13. Graduation Rates by Sub-group Membership, 2003-2008

Year	All Student	Black	Hispanic	White	Economically Disadvantaged	ELL	Students with IEPs
2002	86.4	68.9	63.0	90.1	74.9	75.7	81.8
2003	86.7	70.5	64.6	90.5	75.8	65.9	81.5
2004	87.7	73.5	67.7	91.1	78.1	68.2	82.2
2005	87.6	74.2	68.2	91.2	79.0	72.0	81.3
2006	88.3	75.7	69.9	91.8	79.9	70.5	81.1
2007	89.8	80.0	73.2	92.6	81.5	72.2	83.2
2008	89.3	77.0	71.7	92.7	78.5	73.0	82.5

Source: Pennsylvania Department of Education

14. PSSA Math Achievement Projections by Grade Level

Grade	Advanced Math				Proficient + Advanced Math				Below Basic Math			
	2006	2009	2014 Baseline	2014 RTTT	2006	2009	2014 Baseline	2014 RTTT	2006	2009	2014 Baseline	2014 RTTT
3	55.0	43.6	45.7	57.6	83.0	81.7	83.2	90.7	7.0	5.2	4.1	1.6
4	43.5	51.2	49.2	61.9	77.2	81.8	83.3	90.8	12.6	9.4	6.7	3.0
5	38.9	44.3	46.0	58.1	66.9	73.5	78.7	86.8	13.4	9.6	6.9	3.1
6	37.8	49.5	58.2	69.3	68.0	75.7	81.4	88.4	15.8	11.1	7.8	3.9
7	37.2	47.5	56.9	67.8	66.5	75.3	81.2	88.2	17.3	11.6	8.0	4.1
8	36.1	44.7	55.1	66.0	62.2	71.3	79.3	86.4	18.9	12.8	8.5	4.5
11	28.1	25.7	23.3	29.4	52.0	55.6	60.5	69.5	30.4	24.9	18.9	12.8
All	39.3	43.7	47.7	58.5	67.7	73.4	78.4	86.0	16.6	12.2	9.0	5.0

15. PSSA Reading Achievement Projections by Grade Level

Grade	Advanced				Proficient + Advanced				Below Basic			
	2006	2009	2014 Baseline	2014 RTTT	2006	2009	2014 Baseline	2014 RTTT	2006	2009	2014 Baseline	2014 RTTT
<i>3</i>	31.0	26.2	27.1	38.1	69.0	77.0	80.5	88.6	16.0	13.5	11.4	6.1
<i>4</i>	31.0	36.4	34.7	45.9	68.1	72.6	78.0	86.3	15.3	12.8	11.0	5.8
<i>5</i>	20.8	22.7	24.9	35.6	60.6	64.5	73.1	82.0	21.1	17.9	13.8	8.0
<i>6</i>	32.4	37.1	48.3	57.9	65.9	67.6	74.1	82.2	15.6	14.0	10.5	6.1
<i>7</i>	34.9	41.4	52.2	61.6	68.1	71.4	77.0	84.5	14.6	11.2	9.0	5.0
<i>8</i>	43.5	55.3	64.6	73.9	70.6	80.5	83.7	90.2	16.2	10.6	8.5	4.5
<i>11</i>	31.2	33.1	35.4	43.6	65.1	65.2	65.6	72.8	18.5	18.8	18.7	13.1
<i>All</i>	<i>32.3</i>	<i>36.2</i>	<i>41.5</i>	<i>51.4</i>	<i>66.8</i>	<i>71.3</i>	<i>76.2</i>	<i>84.0</i>	<i>16.7</i>	<i>14.1</i>	<i>12.1</i>	<i>7.2</i>

Appendix A-16

NAEP Achievement Gaps Comparison

NAEP data reveals Pennsylvania has exciting news to share regarding achievement gaps. A first look reveals that Pennsylvania had achievement gap gains or was neutral relative the National Public in seven of 12 areas. That is good news indeed. However, that does not tell the great news that even where Pennsylvania achievement gaps widened the scores for all students AND the disadvantaged group increased MORE than the national average.

Achievement Gaps 2003-2009, NAEP Scores PA versus National Avg.(NA)		GAP Improved versus NA	PA Students Improved	PA Students Improved More Than NA	Disadvantaged Improved More Than NA
Gender Gap	Math Grade 4	Yes	Yes	Yes	Yes
	Math Grade 8	Yes	Yes	Yes	Yes
	Reading Grade 4	No	Yes	Yes	Yes
	Reading Grade 8	No	Yes	Yes	Yes
Poverty Gap	Math Grade 4	Yes	Yes	Yes	Yes
	Math Grade 8	No	Yes	Yes	Yes
	Reading Grade 4	Yes	Yes	Yes	Yes
	Reading Grade 8	No	Yes	Yes	Yes
White- Black Gap	Math Grade 4	Yes	Yes	Yes	Yes
	Math Grade 8	Yes	Yes	Yes	Yes
	Reading Grade 4	Yes	Yes	Yes	Yes
	Reading Grade 8	No	Yes	Yes	Yes

Achievement Gap Appendix:

Achievement Gaps 2003-2009, NAEP Scores PA versus National Avg.(NA)		GAP Change PA	GAP Change NA	GAP Change Difference	ALL Students PA	ALL Students NA	ALL Students Difference	Disadvantaged Improved PA	Disadvantaged Improved NA	Disadvantaged Improved Difference
Gender Gap	Math Grade 4	(1.5)	(0.9)	(0.6)	7.6	5.1	2.5	8.4	5.6	2.8
	Math Grade 8	(0.3)	0.4	(0.7)	9.8	5.6	4.2	9.9	5.4	4.5
	Reading Grade 4	1.9	0.5	1.4	5.0	3.1	1.8	4.0	2.9	1.1
	Reading Grade 8	4.0	1.2	2.9	6.4	1.0	5.5	4.4	0.4	4.0
Poverty Gap	Math Grade 4	(0.6)	(0.3)	(0.3)	7.6	5.1	2.5	8.2	6.0	2.2
	Math Grade 8	(1.3)	(1.5)	0.1	9.8	5.6	4.2	11.8	7.9	3.9
	Reading Grade 4	(4.8)	(1.8)	(3.0)	5.0	3.1	1.8	8.0	4.9	3.1
	Reading Grade 8	2.4	(0.8)	3.3	6.4	1.0	5.5	5.8	2.7	3.1
White- Black Gap	Math Grade 4	(4.6)	(1.0)	(3.6)	7.6	5.1	2.5	10.9	6.2	4.7
	Math Grade 8	(4.0)	(3.0)	(0.9)	9.8	5.6	4.2	13.1	8.5	4.6
	Reading Grade 4	(6.1)	(4.6)	(1.5)	5.0	3.1	1.8	9.3	6.7	2.6
	Reading Grade 8	1.0	(0.9)	1.9	6.4	1.0	5.5	6.2	1.9	4.4

How to read this table:

First Line: For the period of 2003-2009, NAEP scores in Math Grade 4, Pennsylvania (PA) narrowed its Gender Gap by 1.5 points, while the National Average (NA) only narrowed by 0.9 points, with PA closing the achievement gap by 0.6 point more than NA. PA scores for All students increased by 7.6 points, while the NA only increased by 5.1, PA outpacing NA by 2.5 points. Disadvantaged students in particular improved by 8.4 points in Pennsylvania, while the NA only improved about 5.6 points, or PA again outpacing the NA by about 2.8 points. Numbers are rounded.

Third Line:

Even where the achievement gap widened in PA by 1.4 versus the NA, All students in PA improved more than the NA by 1.8 points, as did Disadvantaged students, by 1.1 points. While PA's achievement widened more than the NA, it is because both groups performed worse at the NA relative to PA, particularly the non-disadvantaged students. **Simply put, Disadvantaged students were better off in PA than the NA.**

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Mathematics scale score sorted by gender, grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			Male			Female			Male - Female difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
	N/A National Public	233.9528024	239.0933145	5.140512129	235.291531	239.9739911	4.682460093	232.5561941	238.1749342	5.618740091	2.735336921	1.799056923	-0.936279997
	N/A Pennsylvania	235.9470171	243.5878732	7.640856028	237.8997123	244.738227	6.838514639	233.9956912	242.3648247	8.369133507	3.904021142	2.373402274	-1.530618868

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Mathematics scale score sorted by gender, grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			Male			Female			Male - Female difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
	N/A National Public	276.1152756	281.6747811	5.559505483	277.0107081	282.771746	5.761037988	275.2023906	280.5554383	5.353047674	1.806317436	2.216307748	0.407990312
	N/A Pennsylvania	278.5377581	288.3041689	9.766410799	280.3231454	289.9309894	9.607843932	276.759765	286.6622481	9.902483017	3.563380374	3.268741288	-0.294639085

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Reading scale score sorted by gender, grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			Male			Female			Male - Female difference		
		2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score
	N/A National Public	216.4559993	219.5990303	3.143031029	212.7420156	216.1726632	3.430647547	220.2487365	223.1357061	2.8869696	-7.506720852	-6.963042905	0.542677948
	N/A Pennsylvania	218.6984275	223.6794399	4.981012349	215.4405984	221.3485904	5.907991992	222.1421287	226.1305387	3.98840998	-6.701530305	-4.781948293	1.919582012

— Not available.

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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Average Reading scale score sorted by gender, grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			Male			Female			Male - Female difference		
		2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score
	N/A National Public	261.3326151	262.2936177	0.961002671	256.0706771	257.6377699	1.567092868	266.6280676	267.019506	0.391438354	-10.55739056	-9.381736042	1.175654514
	N/A Pennsylvania	264.2673651	270.7005367	6.433171608	258.5513479	266.9784763	8.42712835	270.0922035	274.4878157	4.395612183	-11.5408556	-7.509339428	4.031518167

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Mathematics scale score sorted by natl school lunch prog eligibility (3 categories), grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			Eligible			Not eligible			Eligible - Not eligible difference		
		2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score
	N/A National Public	233.9528024	239.0933145	5.140512129	221.5321062	227.5201692	5.988063013	244.3410009	250.0084829	5.66748208	-22.80889463	-22.4883137	0.320580933
	N/A Pennsylvania	235.9470171	243.5878732	7.640856028	220.2152064	228.3961858	8.180979378	245.6510365	253.2053182	7.554281668	-25.43583008	-24.80913237	0.626697709

† Reporting standards not met.

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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National Assessment of Educational Progress (NAEP)

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Average Mathematics scale score sorted by natl school lunch prog eligibility (3 categories), grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			Eligible			Not eligible			Eligible - Not eligible difference		
		2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score	2003 Scale Score	2009 Scale Score	Change Scale Score
	N/A National Public	276.1152756	281.6747811	5.559505483	258.4115942	266.3615206	7.949926415	286.8026371	293.2995573	6.496920223	-28.39104287	-26.93803667	1.453005192
	N/A Pennsylvania	278.5377581	288.3041689	9.766410799	256.602017	268.410272	11.80825499	287.5637098	298.0639297	10.50021991	-30.96169284	-29.65365776	1.30803509

† Reporting standards not met.

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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Average Reading scale score sorted by natl school lunch prog eligibility (3 categories), grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			Eligible			Not eligible			Eligible - Not eligible difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
	N/A National Public	216.4559993	219.5990303	3.143031029	201.080515	206.0045561	4.924041105	228.9946965	232.1069426	3.112246106	-27.91418147	-26.10238647	1.811794999
	N/A Pennsylvania	218.6984275	223.6794399	4.981012349	198.235469	206.2395949	8.004125863	231.3300872	234.50956	3.179472787	-33.09461818	-28.2699651	4.824653076

— Not available.

‡ Reporting standards not met.

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

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This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Reading scale score sorted by natl school lunch prog eligibility (3 categories), grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			Eligible			Not eligible			Eligible - Not eligible difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
	N/A National Public	261.3326151	262.2936177	0.961002671	245.8686331	248.6173226	2.748689466	270.7485135	272.6589561	1.91044256	-24.87988039	-24.04163349	0.838246905
	N/A Pennsylvania	264.2673651	270.7005367	6.433171608	247.2963924	253.1022684	5.805875987	271.2009709	279.4198341	8.21886324	-23.9045785	-26.31756575	2.412987253

‡ Reporting standards not met.

NOTE: National Public is included for reference only and is not included in sorting the jurisdictions. Score differences are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Mathematics scale score sorted by race/ethnicity (from school records), grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			White			Black			White - Black difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
N/A	National Public	233.9528024	239.0933145	5.140512129	242.73082	247.8458004	5.114980393	215.8339315	221.984481	6.150549537	26.89688852	25.86131938	-1.035569144
N/A	Pennsylvania	235.9470171	243.5878732	7.640856028	243.0891161	249.3497068	6.260590738	211.9908292	222.8635157	10.87268648	31.09828665	26.4861911	-4.612095745

† Reporting standards not met.

are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Mathematics scale score sorted by race/ethnicity (from school records), grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			White			Black			White - Black difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
N/A	National Public	276.1152756	281.6747811	5.559505483	286.5387135	292.0237168	5.485003277	251.7476805	260.2795532	8.531872738	34.791033	31.74416354	-3.046869461
N/A	Pennsylvania	278.5377581	288.3041689	9.766410799	284.9451086	294.1214353	9.176326777	247.146027	260.2758193	13.1297923	37.79908152	33.845616	-3.953466522

† Reporting standards not met.

are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Reading scale score sorted by race/ethnicity (from school records), grade 4 public schools: By jurisdiction

Order	Jurisdiction	All students			White			Black			White - Black difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
N/A	National Public	216.4559993	219.5990303	3.143031029	227.0952123	229.2075082	2.112295891	197.2500192	203.9568673	6.706848141	29.8451931	25.25064085	-4.59455225
N/A	Pennsylvania	218.6984275	223.6794399	4.981012349	227.1260277	230.2944307	3.168402935	191.3396404	200.6363786	9.296738233	35.78638734	29.65805204	-6.128335298

— Not available.

† Reporting standards not met.

are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP State Comparisons Tool <http://nces.ed.gov/nationsreportcard/statecomparisons/>

Average Reading scale score sorted by race/ethnicity (from school records), grade 8 public schools: By jurisdiction

Order	Jurisdiction	All students			White			Black			White - Black difference		
		2003	2009	Change	2003	2009	Change	2003	2009	Change	2003	2009	Change
		Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score	Scale Score
N/A	National Public	261.3326151	262.2936177	0.961002671	270.4359352	271.3609387	0.925003442	243.6018578	245.4586392	1.85678136	26.83407742	25.9022995	-0.931777935
N/A	Pennsylvania	264.2673651	270.7005367	6.433171608	268.4189208	275.6531421	7.234221288	243.2507583	249.4914914	6.240733151	25.16816247	26.16165061	0.993488137

† Reporting standards not met.

are calculated based on differences between unrounded average scale scores.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP)

Appendix B-1

Copy of the Memorandum of Agreement with a Standards Consortium

**The Council of Chief State School Officers and
The National Governors Association Center for Best Practices**

Common Core Standards Memorandum of Agreement

Purpose. This document commits states to a state-led process that will draw on evidence and lead to development and adoption of a common core of state standards (common core) in English language arts and mathematics for grades K-12. These standards will be aligned with college and work expectations, include rigorous content and skills, and be internationally benchmarked. The intent is that these standards will be aligned to state assessment and classroom practice. The second phase of this initiative will be the development of common assessments aligned to the core standards developed through this process.

Background. Our state education leaders are committed to ensuring all students graduate from high school ready for college, work, and success in the global economy and society. State standards provide a key foundation to drive this reform. Today, however, state standards differ significantly in terms of the incremental content and skills expected of students.

Over the last several years, many individual states have made great strides in developing high-quality standards and assessments. These efforts provide a strong foundation for further action. For example, a majority of states (35) have joined the American Diploma Project (ADP) and have worked individually to align their state standards with college and work expectations. Of the 15 states that have completed this work, studies show significant similarities in core standards across the states. States also have made progress through initiatives to upgrade standards and assessments, for example, the New England Common Assessment Program.

Benefits to States. The time is right for a state-led, nation-wide effort to establish a common core of standards that raises the bar for all students. This initiative presents a significant opportunity to accelerate and drive education reform toward the goal of ensuring that all children graduate from high school ready for college, work, and competing in the global economy and society. With the adoption of this common core, participating states will be able to:

- Articulate to parents, teachers, and the general public expectations for students;
- Align textbooks, digital media, and curricula to the internationally benchmarked standards;
- Ensure professional development to educators is based on identified need and best practices;
- Develop and implement an assessment system to measure student performance against the common core; and
- Evaluate policy changes needed to help students and educators meet the common core standards and "end-of-high-school" expectations.

An important tenet of this work will be to increase the rigor and relevance of state standards across all participating states; therefore, no state will see a decrease in the level of student expectations that exist in their current state standards.

Process and Structure

- **Common Core State-Based Leadership.** The Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center) shall assume responsibility for coordinating the process that will lead to state adoption of a common core set of standards. These organizations represent governors and state commissioners of education who are charged with defining K-12 expectations at the state level. As such, these organizations will

facilitate a state-led process to develop a set of common core standards in English language arts and math that are:

- Fewer, clearer, and higher, to best drive effective policy and practice;
 - Aligned with college and work expectations, so that all students are prepared for success upon graduating from high school;
 - Inclusive of rigorous content and application of knowledge through high-order skills, so that all students are prepared for the 21st century;
 - Internationally benchmarked, so that all students are prepared for succeeding in our global economy and society; and
 - Research and evidence-based.
- **National Validation Committee.** CCSSO and the NGA Center will create an expert validation group that will serve a several purposes, including validating end-of-course expectations, providing leadership for the development of K-12 standards, and certifying state adoption of the common core. The group will be comprised of national and international experts on standards. Participating states will have the opportunity to nominate individuals to the group. The national validation committee shall provide an independent review of the common core. The national validation committee will review the common core as it is developed and offer comments, suggestions, and validation of the process and products developed by the standards development group. The group will use evidence as the driving factor in validating the common core.
- **Develop End-of-High-School Expectations.** CCSSO and the NGA Center will convene Achieve, ACT and the College Board in an open, inclusive, and efficient process to develop a set of end-of-high-school expectations in English language arts and mathematics based on evidence. We will ask all participating states to review and provide input on these expectations. This work will be completed by July 2009.
- **Develop K-12 Standards in English Language Arts and Math.** CCSSO and the NGA Center will convene Achieve, ACT, and the College Board in an open, inclusive, and efficient process to develop K-12 standards that are grounded in empirical research and draw on best practices in standards development. We will ask participating states to provide input into the drafting of the common core and work as partners in the common core standards development process. This work will be completed by December 2009.
- **Adoption.** The goal of this effort is to develop a true common core of state standards that are internationally benchmarked. Each state adopting the common core either directly or by fully aligning its state standards may do so in accordance with current state timelines for standards adoption not to exceed three (3) years.

This effort is voluntary for states, and it is fully intended that states adopting the common core may choose to include additional state standards beyond the common core. States that choose to align their standards to the common core standards agree to ensure that the common core represents at least 85 percent of the state's standards in English language arts and mathematics.

Further, the goal is to establish an ongoing development process that can support continuous improvement of this first version of the common core based on research and evidence-based learning and can support the development of assessments that are aligned to the common core across the states, for accountability and other appropriate purposes.

- **National Policy Forum.** CCSSO and the NGA Center will convene a National Policy Forum (Forum) comprised of signatory national organizations (e.g., the Alliance for Excellent Education, Business Roundtable, National School Boards Association, Council of Great City Schools, Hunt Institute, National Association of State Boards of Education, National Education Association, and others) to share ideas, gather input, and inform the common core initiative. The forum is intended as a place for refining our shared understanding of the scope and elements of a common core; sharing and coordinating the various forms of implementation of a common core; providing a means to develop common messaging between and among participating organizations; and building public will and support.

- **Federal Role.** The parties support a state-led effort and not a federal effort to develop a common core of state standards; there is, however, an appropriate federal role in supporting this state-led effort. In particular, the federal government can provide key financial support for this effort in developing a common core of state standards and in moving toward common assessments, such as through the Race to the Top Fund authorized in the American Recovery and Reinvestment Act of 2009. Further, the federal government can incentivize this effort through a range of tiered incentives, such as providing states with greater flexibility in the use of existing federal funds, supporting a revised state accountability structure, and offering financial support for states to effectively implement the standards. Additionally, the federal government can provide additional long-term financial support for the development of common assessments, teacher and principal professional development, other related common core standards supports, and a research agenda that can help continually improve the common core over time. Finally, the federal government can revise and align existing federal education laws with the lessons learned from states' international benchmarking efforts and from federal research.

Agreement. The undersigned state leaders agree to the process and structure as described above and attest accordingly by our signature(s) below.

Signatures	
Governor:	
Chief State School Officer:	

Appendix B-2
Number and List of States Participating in the Standards Consortium

Pennsylvania is part of the Common Core State Standards Initiative (see Appendix 4.1 for the MOU), comprised of 48 States, 2 territories, and the District of Columbia.

- | | |
|-------------------------|--------------------------------|
| 1. Alabama | 28. NevadaNew Hampshire |
| 2. Arizona | 29. New Jersey |
| 3. Arkansas | 30. New Mexico |
| 4. California | 31. New York |
| 5. Colorado | 32. North Carolina |
| 6. Connecticut | 33. North Dakota |
| 7. Delaware | 34. Ohio |
| 8. District of Columbia | 35. Oklahoma |
| 9. Florida | 36. Oregon |
| 10. Georgia | 37. <u>Pennsylvania</u> |
| 11. Hawaii | 38. Rhode Island |
| 12. Idaho | 39. South Carolina |
| 13. Illinois | 40. South Dakota |
| 14. Indiana | 41. Tennessee |
| 15. Iowa | 42. Utah |
| 16. Kansas | 43. Vermont |
| 17. Kentucky | 44. Virginia |
| 18. Louisiana | 45. Washington |
| 19. Maine | 46. West Virginia |
| 20. Maryland | 47. Wisconsin |
| 21. Massachusetts | 48. Wyoming |
| 22. Michigan | 49. Puerto Rico |
| 23. Minnesota | 50. Virgin Islands |
| 24. Mississippi | |
| 25. Missouri | |
| 26. Montana | |
| 27. Nebraska | |

Appendix B-3

Dear State Partners:

Thank you so much for taking a look at this *unproofed, unformatted* final version of the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects.

This final version is built on your excellent and thorough feedback. We want to begin by thanking you again for your work and that of your teams and the educators in your state. As you may know, we were also in receipt of ten thousand comments from the public Web site, so this draft reflects those comments as well. Finally, of course, several teacher organizations and other leading educational organizations and experts have continued to give us detailed feedback, so our work reflects this as well.

So thank you, thank you, thank you for your constructive feedback, conversation, and joint problem solving throughout the process. We never would have gotten to this final version without so much help and input from you. We hope you can now consider it your own work as well as ours.

In this note, we wanted to outline briefly themes from the feedback, how we incorporated the feedback, and what will be in the appendices and glossary that are not being sent now but will be in the published version.

Themes from the feedback and how we revised the Standards:

1. *Attending more fully to technical reading and writing:* Several states felt we had not adequately addressed technical reading and writing, and the Standards are substantially enhanced in this regard. You will notice the change in the title to make technical texts explicit. Also, we have threaded the demands of technical reading and writing throughout the grade-specific standards. Additional samples of technical reading will be added to Appendix B, and samples of student technical writing will be included in Appendix C.
2. *Ensuring text complexity is treated as a goal that does not overly constrain student reading throughout the year:* States were concerned that the way we had framed the text complexity requirements of the Standards seemed to limit attention to individual student needs during the year. We have substantially revised standard 10 on reading complex texts to ensure it is clear that it is an end-of-year expectation.
3. *Clarifying the grade-by-grade progressions, rendering them smoother and clearer to support high-quality instruction and assessment.* All of the progressions have been reviewed repeatedly and with care; we think you will find them far clearer as grade-specific standards year to year.
4. *Making sure the K–2 material is developmentally appropriate:* We have revised the K–2 standards to ensure that they are developmentally appropriate and that key skills such as fluency are extended to grade 5. In a similar vein, we have made standards pertaining to such areas as media and research applicable at the earliest grades in response to overwhelming feedback to do so.

5. *Expanding the richness of multimedia literacy and global diversity:* We have enhanced the Standards to address a fuller range of media and electronic text. We have also added clearer language on the need to study world literature and works from diverse cultures.

There are many other changes, based, as always, on our understanding of the feedback as well as the evidence for college and career readiness. We have made several clarifications that have been requested. We consider all of the changes we have made refinements, not radical revisions.

The appendices and glossary that will be published with the final Standards:

As requested, we will be adding a glossary of key terms. We are also refining Appendices A, B, and C in accord with your feedback.

Now that this is the final version, we are asking whether there are inadvertent errors that remain. Please let us know of any such errors by May 18th. We will not have the capacity to add significant new material or to make significant changes. However, we ask that states keep in mind their flexibility to add 15 percent to the Standards if they believe there is essential material that needs greater attention.

We have made every effort to listen closely and act with care and judgment. Thanks again for all your help and collaboration.

Best regards,

The ELA/Literacy Writing Team (Sue, David, and Jim)

COMMON CORE
STATE STANDARDS FOR

English Language Arts
&
Literacy in History/Social Studies,
Science, and Technical Subjects

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Introduction

The Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects (“the Standards”) are the culmination of an extended, broad-based effort to fulfill the charge issued by the states to create the next generation of K–12 standards in order to help ensure that all students are college and career ready in literacy no later than the end of high school.

The present work, led by the Council of Chief State School Officers (CCSSO) and the National Governors Association (NGA), builds on the foundation laid by states in their decades-long work on crafting high-quality education standards. The Standards also draw on the most important international models as well as research and input from numerous sources, including state departments of education, scholars, assessment developers, professional organizations, educators from kindergarten through college, and parents, students, and other members of the public. In their design and content, refined through successive drafts and numerous rounds of feedback, the Standards represent a synthesis of the best elements of standards-related work to date and an important advance over that previous work.

As specified by CCSSO and NGA, the Standards are (1) research and evidence based, (2) aligned with college and work expectations, (3) rigorous, and (4) internationally benchmarked. A particular standard was included in the document only when the best available evidence indicated that its mastery was essential for college and career readiness in a twenty-first-century, globally competitive society. The Standards are intended to be a living work: as new and better evidence emerges, the Standards will be revised accordingly.

The Standards are an extension of a prior initiative led by CCSSO and NGA to develop College and Career Readiness (CCR) standards in reading, writing, speaking, listening, and language as well as in mathematics. The CCR Reading, Writing, and Speaking and Listening Standards, released in draft form in September 2009, serve, in revised form, as the backbone for the present document. Grade-specific K–12 standards in reading, writing, speaking, listening, and language translate the broad (and, for the earliest grades, seemingly distant) aims of the CCR standards into age- and attainment-appropriate terms.

The Standards set requirements for English language arts (ELA) but also for literacy in history/social studies, science, and technical subjects. Just as students must learn to read, write, speak, listen, and use language effectively in a variety of content areas, so too must the Standards specify the literacy skills and understandings required for college and career readiness in multiple disciplines. Literacy standards for grade 6 and above are predicated on teachers of ELA, history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6–12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them. States may incorporate the standards into their standards for these subjects or adopt them as content area literacy standards.

As a natural outgrowth of meeting the charge to define college and career readiness, the Standards also lay out a vision of what it means to be a literate person in the twenty-first century. Indeed, the skills and understandings students are expected to demonstrate have wide applicability outside the classroom or workplace. Students who meet the Standards readily undertake the close, attentive reading that is at the heart of understanding and enjoying complex works of literature. They habitually perform the critical reading necessary to pick carefully through the staggering amount of information available today in print and digitally. They actively seek the wide, deep, and thoughtful engagement with high-quality literary and informational texts that builds knowledge, enlarges experience, and broadens worldviews. They reflexively demonstrate the cogent reasoning and use of evidence that is essential to both private deliberation and responsible citizenship in a democratic republic. In short, students who meet the Standards develop the skills in reading, writing, speaking, and listening that are the foundation for any creative and purposeful expression in language.

May 2010

Key Design Considerations

CCR and grade-specific standards

The CCR standards anchor the document and define general, cross-disciplinary literacy expectations that must be met for students to be prepared to enter college and workforce training programs ready to succeed. The K–12 grade-specific standards define end-of-year expectations and a cumulative progression designed to enable students to meet college- and career-readiness expectations no later than the end of high school. The CCR and high school grade-specific standards work in tandem to define the college- and career-readiness line—the former providing broad standards, the latter providing additional specificity. Hence, both should be considered when developing college- and career-readiness assessments.

Students advancing through the grades are expected to meet each year's grade-specific standards, retain or further develop skills and understandings mastered in preceding grades, and work steadily toward meeting the more general expectations described by the CCR standards.

Grade levels for K–8; grade bands for 9–10 and 11–12

The Standards use individual grade levels in kindergarten through grade 8 to provide useful specificity; the Standards use two-year bands in grades 9–12 to allow schools, districts, and states flexibility in high school course design.

A focus on results rather than means

By emphasizing required achievements, the Standards leave room for teachers, curriculum developers, and states to determine how those goals should be reached and what additional topics should be addressed. Thus, the Standards do not mandate such things as a particular writing process or the full range of metacognitive strategies that students may need to monitor and direct their thinking and learning. Teachers are thus free to provide students with whatever tools and knowledge their professional judgment and experience identify as most helpful for meeting the goals set out in the Standards.

An integrated model of literacy

Although the Standards are divided into Reading, Writing, Speaking and Listening, and Language strands for conceptual clarity, the processes of communication are closely connected, as reflected throughout this document. For example, Writing standard 9 requires that students be able to

write about what they read. Likewise, Speaking and Listening standard 4 sets the expectation that students will share findings from their research.

Research and media skills blended into the Standards as a whole

To be ready for college, workforce training, and life in a technological society, students need the ability to gather, comprehend, evaluate, synthesize, and report on information and ideas, to conduct original research in order to answer questions or solve problems, and to analyze and create a high volume and extensive range of print and nonprint texts in media forms old and new. The need to conduct research and to produce and consume media is embedded into every aspect of today's curriculum. In like fashion, research and media skills and understandings are embedded throughout the Standards rather than treated in a separate section.

Shared responsibility for students' literacy development

The Standards insist that instruction in reading, writing, speaking, listening, and language be a shared responsibility within the school. The K–5 standards include expectations for reading, writing, speaking, listening, and language applicable to a range of subjects, including but not limited to ELA. The grades 6–12 standards are divided into two sections, one for ELA and the other for history/social studies, science, and technical subjects. This division reflects the unique, time-honored place of ELA teachers in developing students' literacy skills while at the same time recognizing that teachers in other areas must have a role in this development as well.

Part of the motivation behind the interdisciplinary approach to literacy promulgated by the Standards is extensive research establishing the need for college- and career-ready students to be proficient in reading complex informational text independently in a variety of content areas. Most of the required reading in college and workforce training programs is informational in structure and challenging in content; postsecondary education programs typically provide students with both a higher volume of such reading than is generally required in K–12 schools and comparatively little scaffolding.

The Standards are not alone in calling for a special emphasis on informational text. The 2009 reading framework of the National Assessment of Educational Progress (NAEP) requires a high and increasing proportion of informational text on its assessment as students advance through the grades.

Distribution of Literary and Informational Passages by Grade in the 2009 NAEP Reading Framework

Grade	Literary	Informational
4	50%	50%
8	45%	55%
12	30%	70%

The Standards aim to align instruction with this framework so that many more students than at present can meet the requirements of college and career readiness. In K–5, the Standards follow NAEP’s lead in balancing the reading of literature with the reading of informational texts, including texts in history/social studies, science, and technical subjects. In accord with NAEP’s growing emphasis on informational texts in the higher grades, the Standards demand that a significant amount of reading of informational texts take place in and outside of the ELA classroom. Fulfilling the standards for 6–12 ELA requires much greater attention to a specific category of informational text—literary nonfiction—than has been traditional. Because the ELA classroom must focus on literature (stories, drama, and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes if the NAEP assessment framework is to be matched instructionally.¹ To measure students’ growth toward college and career readiness, assessments aligned with the Standards should adhere to the distribution of texts across grades cited in the NAEP framework.

NAEP likewise outlines a distribution across the grades of the core purposes and types of student writing. Similar to the Standards, the 2011 NAEP framework cultivates the development of three mutually reinforcing writing capacities: writing to persuade, to explain, and to convey real or imagined experience. Evidence concerning the demands of college and career readiness gathered during development of the Standards concurs with NAEP’s shifting emphases: standards for grades 9–12 describe writing in all three forms, but, consistent with NAEP, the overwhelming focus of writing

¹ The percentages on the table reflect the sum of student reading, not just reading in ELA settings. Teachers of senior English classes, for example, are not required to devote 70 percent of reading to informational texts. Rather, 70 percent of student reading across the grade should be informational.

throughout high school should be on writing to argue and to inform or explain.²

Distribution of Communicative Purposes by Grade in the 2011 NAEP Writing Framework

Grade	To Persuade	To Explain	To Convey Experience
4	30%	35%	35%
8	35%	35%	30%
12	40%	40%	20%

It follows that writing assessments aligned with the Standards should adhere to the distribution of writing purposes across grades outlined by NAEP.

What is not covered by the Standards

The Standards should be recognized for what they are *not* as well as what they are. The most important intentional design limitations are as follows:

- 1) The Standards define what all students are expected to know and be able to do, not how teachers should teach. The Standards must be complemented by a well-developed, content-rich curriculum consistent with the expectations laid out in this document.
- 2) While the Standards do attempt to focus on what is most essential, they do not describe all that can or should be taught. A great deal is left to the discretion of teachers and curriculum developers. The aim of the Standards is to articulate the fundamentals, not to set out an exhaustive list nor a set of restrictions that limits what can be taught beyond what is specified herein.
- 3) The Standards do not define the nature of advanced work for students who meet the Standards prior to the end of high school. For those students, advanced work in such areas as literature, composition, language, and journalism should be available. This

² As with reading, the percentages in the table reflect the sum of student writing, not just writing in ELA settings.

work should provide the next logical step up from the college and career readiness baseline established here.

- 4) The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. For example, for students with disabilities *reading* should allow for use of Braille, screen reader technology, or other assistive devices, while *writing* should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and *listening* should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.
- 5) While the ELA and content area literacy components described herein are critical to college and career readiness, they do not define the whole of such readiness. Students require a wide-ranging, rigorous academic preparation and, particularly in the early grades, attention to such matters as social, emotional, and physical development and approaches to learning. Similarly, the Standards define literacy expectations in history/social studies, science, and technical subjects, but literacy standards in other areas, such as mathematics and health education, modeled on those herein are strongly encouraged to allow for a comprehensive, schoolwide literacy program.

The Student Who is College and Career Ready in Reading, Writing, Speaking, Listening, and Language

The descriptions that follow are not standards themselves but instead offer a portrait of students who meet the standards set out in this document. As students advance through the grades and master the standards in reading, writing, speaking, listening, and language, they are able to exhibit with increasing fullness and regularity these capacities of the literate individual.

- **They demonstrate independence.**

Students can, without significant scaffolding or support, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and clearly convey intricate or multifaceted information. Likewise, students are independently able to discern a speaker's key points and request clarification if something is not understood. They ask relevant questions, build on others' ideas, articulate their own ideas, and ask for confirmation that they have been understood. Without prompting, they observe language conventions, determine word meanings, attend to the connotations of words, and acquire new vocabulary.

- **They build strong content knowledge.**

Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.

- **They respond to the varying demands of audience, task, purpose, and discipline.**

Students consider their communication in relation to audience, task, purpose, and discipline. They appreciate nuances, such as how the composition of an audience should affect tone when speaking and how the connotations of words affect meaning. They also know that different disciplines call for different types of evidence (e.g., documentary evidence in history, experimental evidence in the sciences).

- **They comprehend as well as critique.**

Students are engaged and open-minded—but discerning—readers and listeners. They work diligently to understand precisely what an author or speaker is saying, but they also question an author's or speaker's assumptions and assess the veracity of claims.

- **They value evidence.**

Students cite specific evidence when offering an oral or written interpretation of a text. They use relevant evidence when supporting their own points in writing and speaking, making their reasoning clear to the reader or listener, and they constructively evaluate others' use of evidence.

- **They use technology and digital media strategically and capably.**

Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.

- **They come to understand other perspectives and cultures.**

Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.

How to Read This Document

Overall Document Organization and Main Features

The Standards comprise three main sections: a comprehensive K–5 section and two content area–specific sections for grades 6–12, one for ELA and one for history/social studies, science, and technical subjects. Three appendices (lettered A, B, and C) accompany the main document.

Each section is divided into *strands*. K–5 and 6–12 ELA have Reading, Writing, Speaking and Listening, and Language strands; the 6–12 history/social studies, science, and technical subjects section focuses on Reading and Writing. Each strand is headed by a strand-specific set of *College and Career Readiness Anchor Standards* that is identical across all grades and content areas.

Standards for each grade within K–8 and for grades 9–10 and 11–12 follow the CCR standards in each strand. Each *grade-specific standard* (as these standards are collectively referred to) corresponds to the same-numbered CCR standard. Put another way, each CCR standard has an accompanying grade-specific standard translating the broader CCR statement into grade-appropriate end-of-year expectations.

Individual CCR standards can be identified by their strand, CCR status, and number (R.CCR.6, for example). Individual grade-specific standards can be identified by their strand, grade, and number or number and letter so that RI.4.3, for example, stands for Reading, Informational Text, grade 4, standard 3. Likewise, W.5.1a stands for Writing, grade 5, standard 1a. Strand designations can be found in brackets alongside the full strand title.

Who is responsible for which portion of the Standards

A single K–5 section lists CCR and grade-specific standards for reading, writing, speaking, listening, and language across the curriculum, reflecting the fact that most or all of the instruction students in these grades receive comes from one teacher. Grades 6–12 are covered in two content area–specific sections, the first for the English language arts teacher and the second for teachers of history/social studies, science, and technical subjects. Each section uses the same CCR standards but also includes grade-specific standards tuned to the literacy requirements of the particular discipline(s).

Key Features of the Standards

Reading: Text complexity and the growth of comprehension

The Reading standards place equal emphasis on the sophistication of what students read and the skill with which they read. Standard 10 defines a grade-by-grade “staircase” of increasing text complexity that rises from beginning reading to the college- and career-readiness level. Whatever they are reading, students must also show a steadily growing ability to discern more from and make fuller use of text, including making an increasing number of connections among ideas and between texts, considering a wider range of textual evidence, and becoming more sensitive to inconsistencies, ambiguities, and poor reasoning in texts.

Writing: Text types, responding to reading, and research

The Standards acknowledge the fact that whereas some writing skills, such as the ability to plan, revise, edit, and publish, are applicable to many types of writing, other skills are more properly defined in terms of specific writing types: arguments, informative/explanatory texts, and narratives. Standard 9 stresses the importance of the writing-reading connection by requiring students to draw and write about evidence from literary and informational texts. Because of the centrality of writing to most forms of inquiry, research standards are prominently included in this strand, though skills important to research are infused throughout the document.

Speaking and Listening:

Flexible communication and collaboration

Including but not limited to skills necessary for formal presentations, the Speaking and Listening standards require students to develop a range of broadly useful oral communication and interpersonal skills. Students must learn to work together, express and listen to ideas, integrate information from oral, visual, and multimodal sources, evaluate what they hear, use digital media and visual displays strategically to help achieve communicative purposes, and adapt speech to context and task.

Language: Conventions and vocabulary

The standards on conventions and effective language use include the essential “rules” of formal written and spoken English, but they also approach language as a matter of craft and informed choice among alternatives. The vocabulary standards focus on understanding words, their relationships, and

their nuances and on acquiring new words and phrases, particularly general academic and domain-specific vocabulary.

Appendices A, B, and C

Appendix A contains supplementary material on reading, writing, speaking and listening, and language as well as a glossary of key terms. Appendix B consists of text exemplars illustrating the complexity, quality, and range of reading appropriate for various grade levels. Appendix C includes annotated samples demonstrating at least adequate performance in student writing at various grade levels.

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**Standards for English Language Arts
&
Literacy in History/Social Studies,
Science, and Technical Subjects**

K-5

College and Career Readiness Anchor Standards for Reading

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and explain how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented graphically, visually, orally, and multimodally as well as in words within and across print and digital sources.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see “Research to Build and Present Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Note on range and content of student reading

To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.

Reading Standards for Literature K–5

[RL]

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Kindergartners:	Grade 1 students:	Grade 2 students:
Key Ideas and Details		
1. With prompting and support, ask and answer questions about key details in a text.	1. Ask and answer questions about key details in a text.	1. Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.
2. With prompting and support, retell familiar stories, including key details.	2. Retell stories, including key details, and demonstrate understanding of their central message or lesson.	2. Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.
3. With prompting and support, identify characters, settings, and major events in a story.	3. Describe characters, settings, and major events in a story, using key details.	3. Describe how characters in a story respond to major events and challenges.
Craft and Structure		
4. Ask and answer questions about unknown words in a text.	4. Identify words and phrases in stories or poems that suggest feelings or appeal to the senses.	4. Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song.
5. Recognize common types of texts (e.g., storybooks, poems).	5. Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.	5. Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action.
6. With prompting and support, name the author and illustrator of a story and define the role of each in telling the story.	6. Identify who is telling the story at various points in a text.	6. Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud.
Integration of Knowledge and Ideas		
7. With prompting and support, describe the connection between pictures or other illustrations and the overall story in which they appear.	7. Refer to pictures, illustrations, and details in a story to describe characters, setting, or events.	7. Use information from illustrations, other visual elements (e.g., maps), and the words in a print or digital text to demonstrate understanding of the characters, setting, or plot.
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)
9. With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories.	9. Compare and contrast the adventures and experiences of characters in stories.	9. Compare and contrast two or more versions of the same story (e.g., Cinderella stories) by different authors or from different cultures.
Range of Reading and Level of Text Complexity		
10. Actively engage in group reading activities with purpose and understanding.	10. With prompting and support, read appropriately complex prose and poetry for grade 1.	10. By the end of the year, read literature, including stories, poetry, and drama, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Grade 3 students:	Grade 4 students:	Grade 5 students:
Key Ideas and Details		
<p>1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</p> <p>2. Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.</p> <p>3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.</p>	<p>1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.</p> <p>3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character’s thoughts, words, or actions).</p>	<p>1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>2. Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.</p> <p>3. Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).</p>
Craft and Structure		
<p>4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.</p> <p>5. Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as <i>chapter</i>, <i>scene</i>, and <i>stanza</i>; describe how each successive part builds on earlier sections.</p> <p>6. Distinguish their own point of view from that of the narrator or those of the characters.</p>	<p>4. Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., <i>Herculean</i>), drawing on a wide reading of classic myths from a variety of cultures and periods.</p> <p>5. Explain major differences between poems, drama, and prose and refer to the core structural elements of poems (e.g., stanza, verse, rhythm, meter) and drama (e.g., casts of characters, setting descriptions, dialogue, acts, scenes, stage directions) when writing or speaking about a text.</p> <p>6. Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.</p>	<p>4. Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.</p> <p>5. Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem.</p> <p>6. Describe how a narrator’s or speaker’s point of view influences how events are described.</p>
Integration of Knowledge and Ideas		
<p>7. Explain how specific images and illustrations contribute to or clarify a story (e.g., create mood, emphasize particular aspects of characters or settings).</p> <p>8. (Not applicable to literature)</p> <p>9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series).</p>	<p>7. Integrate information gained from illustrations and other visual elements in a text with the words to demonstrate understanding of how the characters, setting, and plot interact and develop.</p> <p>8. (Not applicable to literature)</p> <p>9. Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.</p>	<p>7. Analyze how visual and multimedia elements in conjunction with words contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction).</p> <p>8. (Not applicable to literature)</p> <p>9. Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.</p>

Grade 3 students:	Grade 4 students:	Grade 5 students:
<i>Range of Reading and Level of Text Complexity</i>		
10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 2–3 text complexity band independently and proficiently.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4–5 text complexity band independently and proficiently.

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Reading Standards for Informational Text K–5

[RI]

Kindergartners:	Grade 1 students:	Grade 2 students:
Key Ideas and Details		
1. With prompting and support, ask and answer questions about key details in a text.	1. Ask and answer questions about key details in a text.	1. Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.
2. With prompting and support, identify the main topic and retell key details of a text.	2. Identify the main topic and retell key details of a text.	2. Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.	3. Describe the connection between two individuals, events, ideas, or pieces of information in a text.	3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
Craft and Structure		
4. With prompting and support, ask and answer questions about unknown words in a text.	4. Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.	4. Determine the meaning of words and phrases in a text relevant to a <i>grade 2 topic or subject area</i> .
5. Identify the front cover, back cover, and title page of a book.	5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.	5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text quickly and efficiently.
6. Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.	6. Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.	6. Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
Integration of Knowledge and Ideas		
7. With prompting and support, describe the connection between pictures or other illustrations and the overall text in which they appear.	7. Use pictures, illustrations, and details in a text to describe its key ideas.	7. Explain how specific images and other illustrations contribute to and clarify a text (e.g., show how something works).
8. With prompting and support, identify the reasons an author gives to support points in a text.	8. Identify the reasons an author gives to support points in a text.	8. Describe how reasons support specific points the author makes in a text.
9. With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	9. Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	9. Compare and contrast the most important points presented by two texts on the same topic.
Range of Reading and Level of Text Complexity		
10. Actively engage in group reading activities with purpose and understanding.	10. With prompting and support, read appropriately complex informational texts for grade 1.	10. By the end of year, read and comprehend informational texts, including historical, scientific and technical texts, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range

Grade 3 students:	Grade 4 students:	Grade 5 students:
Key Ideas and Details		
<p>1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</p> <p>2. Determine the main idea of a text; recount the key details and explain how they support the main idea.</p> <p>3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.</p>	<p>1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.</p> <p>3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.</p>	<p>1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.</p> <p>2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.</p> <p>3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.</p>
Craft and Structure		
<p>4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a <i>grade 3 topic or subject area</i>.</p> <p>5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic quickly and efficiently.</p> <p>6. Distinguish their own point of view from that of the author of a text.</p>	<p>4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a <i>grade 4 topic or subject area</i>.</p> <p>5. Describe the overall structure of events, ideas, concepts, or information (e.g., chronology, comparison, cause/effect) in a text or part of a text.</p> <p>6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.</p>	<p>4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a <i>grade 5 topic or subject area</i>.</p> <p>6. Compare and contrast the organizational structure of events, ideas, concepts, or information (e.g., chronology, comparison, cause/effect, problem/solution) in two or more texts.</p> <p>7. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.</p>
Integration of Knowledge and Ideas		
<p>7. Use information gained from illustrations, other visual elements (e.g., maps, photographs), and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).</p> <p>8. Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).</p> <p>9. Compare and contrast the most important points and key details presented in two texts on the same topic.</p>	<p>7. Interpret factual information presented graphically or visually (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to understanding the text in which they appear.</p> <p>8. Explain how an author uses reasons and evidence to support particular points in a text.</p> <p>9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.</p>	<p>7. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.</p> <p>8. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence supports which point(s).</p> <p>9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.</p>

Grade 3 students:	Grade 4 students:	Grade 5 students:
<i>Range of Reading and Level of Text Complexity</i>		
<p>10. By the end of the year, read and comprehend informational texts, including historical, scientific, and technical texts, in the grades 2–3 text complexity band independently and proficiently.</p>	<p>10. By the end of year, read and comprehend informational texts, including historical, scientific, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as necessary at the high end of the range.</p>	<p>10. By the end of the year, read and comprehend informational text, including historical, scientific, and technical texts, in the grades 4–5 text complexity band level independently and proficiently.</p>

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Reading Standards: Foundational Skills (K–5)

[RF]

These standards are directed toward fostering students' understanding and working knowledge of concepts of print, the alphabetic principle, and other basic conventions of the English writing system. These Foundational Skills are not an end in and of themselves; rather, they are necessary and important components of an effective, comprehensive reading program designed to develop proficient readers with the capacity to comprehend texts across a range of types and disciplines. Instruction should be differentiated: Good readers will need much less practice with these concepts than struggling readers. The point is to teach students what they need to learn and not what they already know—to discern when particular children or activities warrant more or less attention.

** In Kindergarten children are expected to demonstrate increasing awareness and competence in the areas that follow.*

Kindergartners:	Grade 1 students:
<p>Print Concepts</p> <ol style="list-style-type: none">1. Demonstrate understanding of the organization and basic features of print.<ol style="list-style-type: none">a. Follow words from left to right, top to bottom, and page-by-page.b. Recognize that spoken words are represented in written language by specific sequences of letters.c. Understand that words are separated by spaces in print.d. Recognize and name all upper- and lowercase letters of the alphabet.	<ol style="list-style-type: none">1. Demonstrate understanding of the organization and basic features of print.<ol style="list-style-type: none">a. Recognize the distinguishing features of a sentence (e.g., first word, capitalization, ending punctuation).
<p>Phonological Awareness</p> <ol style="list-style-type: none">2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).<ol style="list-style-type: none">a. Recognize and produce rhyming words.b. Count, pronounce, blend, and segment syllables in spoken words.c. Blend and segment onsets and rimes of single-syllable spoken words.d. Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (CVC) words.¹ (This does not include CVCs ending with /l/, /r/, or /x/.)e. Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.	<ol style="list-style-type: none">2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).<ol style="list-style-type: none">a. Distinguish long from short vowel sounds in spoken single-syllable words.b. Orally produce single-syllable words by blending sounds (phonemes), including consonant blends.c. Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words.d. Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes).

¹Words, syllables, or phonemes written in /slashes/ refer to their pronunciation or phonology. Thus, /CVC/ is a word with three phonemes regardless of the number of letters in the spelling of the word.

Reading Standards: Foundational Skills (K–5)

[RF]

* In Kindergarten children are expected to demonstrate increasing awareness and competence in the areas that follow.

Kindergartners:*	Grade 1 students:	Grade 2 students:
<i>Phonics and Word Recognition</i>		
<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Demonstrate basic knowledge of letter-sound correspondences by producing the primary or most frequent sound for each consonant. b. Associate the long and short sounds with the common spellings (graphemes) for the five major vowels. c. Read common high-frequency words by sight. (e.g., <i>the, of, to, you, she, my, is, are, do, does</i>). d. Distinguish between similarly spelled words by identifying the sounds of the letters that differ. 	<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Know the spelling-sound correspondences for common consonant digraphs. (two letters that represent one sound). b. Decode regularly spelled one-syllable words. c. Know final <i>-e</i> and common vowel team conventions for representing long vowel sounds. d. Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word. e. Decode two-syllable words following basic patterns by breaking the words into syllables. f. Read words with inflectional endings. g. Recognize and read grade-appropriate irregularly spelled words. 	<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Distinguish long and short vowels when reading regularly spelled one-syllable words. b. Know spelling-sound correspondences for additional common vowel teams. c. Decode regularly spelled two-syllable words with long vowels. d. Decode words with common prefixes and suffixes. e. Identify words with inconsistent but common spelling-sound correspondences. f. Recognize and read grade-appropriate irregularly spelled words.
<p>4. Read emergent-reader texts with purpose and understanding.</p>	<p>4. Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> a. Read on-level text with purpose and understanding. b. Read on-level text orally with accuracy, appropriate rate, and expression. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. 	<p>4. Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> a. Read on-level text with purpose and understanding. b. Read on-level text orally with accuracy, appropriate rate, and expression. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

Grade 3 students:	Grade 4 students:	Grade 5 students:
<i>Phonics and Word Recognition</i>		
<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Identify and know the meaning of the most common prefixes and derivational suffixes. b. Decode words with common Latin suffixes. c. Decode multisyllable words. d. Read grade-appropriate irregularly spelled words. 	<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multi-syllabic words in context and out of context. 	<p>3. Know and apply grade-level phonics and word analysis skills in decoding words.</p> <ul style="list-style-type: none"> a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multi-syllabic words in context and out of context.
<i>Fluency</i>		
<p>4. Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. 	<p>4. Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. 	<p>4. Read with sufficient accuracy and fluency to support comprehension.</p> <ul style="list-style-type: none"> a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

College and Career Readiness Anchor Standards for Writing

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Text Types and Purposes¹

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.²
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

¹These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

²See standards 1–3 in Language, pages 26–31, for specific editing expectations.

Note on range and content of student writing

To build a foundation for college and career readiness, students need to learn to use writing as a way of offering and supporting opinions, demonstrating understanding of the subjects they are studying, and conveying real and imagined experiences and events. They learn to appreciate that a key purpose of writing is to communicate clearly to an external, sometimes unfamiliar audience, and they begin to adapt the form and content of their writing to accomplish a particular task and purpose. They develop the capacity to build knowledge on a subject through research projects and to respond analytically to literary and informational sources. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and extended time frames throughout the year.

Writing Standards K–5

[W]

The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades. The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

Kindergartners:	Grade 1 students:	Grade 2 students:
Text Types and Purposes		
1. Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., <i>My favorite book is . . .</i>).	1. Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.	1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., <i>because</i> , <i>and</i> , <i>also</i>) to connect opinion and reasons, and provide a concluding statement or section.
2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	2. Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.	2. Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.
3. Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.	3. Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.	3. Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
Production and Distribution of Writing		
4. (Begins in grade 3)	4. (Begins in grade 3)	4. (Begins in grade 3)
5. With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.	5. With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed.	5. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.
6. With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.	6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.	6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
Research to Build and Present Knowledge		
7. Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	7. Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).	7. Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	8. Recall information from experiences or gather information from provided sources to answer a question.
9. (Begins in grade 4)	9. (Begins in grade 4)	9. (Begins in grade 4)
Range of Writing		
10. (Begins in grade 3)	10. (Begins in grade 3)	10. (Begins in grade 3)

Grade 3 students:	Grade 4 students:	Grade 5 students:
Text Types and Purposes		
<p>1. Write opinion pieces on familiar topics or texts, supporting a point of view with reasons.</p> <ul style="list-style-type: none"> a. Introduce the topic or book they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., <i>because, therefore, since, for example</i>) to connect opinion and reasons. d. Provide a concluding statement or section. 	<p>1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p> <ul style="list-style-type: none"> a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer’s purpose. b. Provide reasons that are supported by facts and details. c. Link opinion and reasons using words and phrases (e.g., <i>for instance, in order to, in addition</i>). d. Provide a concluding statement or section related to the opinion presented. 	<p>1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.</p> <ul style="list-style-type: none"> a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer’s purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words, phrases, and clauses (e.g., <i>consequently, specifically</i>). d. Provide a concluding statement or section related to the opinion presented.
<p>2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., <i>also, another, and, more, but</i>) to connect ideas within categories of information. d. Provide a concluding statement or section. 	<p>2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within categories of information using words and phrases (e.g., <i>another, for example, also, because</i>). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented. 	<p>2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., <i>in contrast, especially</i>). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented.
<p>3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.</p> <ul style="list-style-type: none"> a. Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations. c. Use temporal words and phrases to signal event order. d. Provide a sense of closure. 	<p>3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.</p> <ul style="list-style-type: none"> a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and description to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words and phrases to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events. 	<p>3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.</p> <ul style="list-style-type: none"> a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events.

Grade 3 students:	Grade 4 students:	Grade 5 students:
<i>Production and Distribution of Writing</i>		
<p>4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> <p>5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.</p> <p>6. With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.</p>	<p>4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> <p>5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.</p> <p>6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing (using the keyboard) as well as to interact and collaborate with others.</p>	<p>4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> <p>5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.</p> <p>6. With some guidance and support from adults, use technology, including the Internet, to produce and publish a minimum of two pages of writing (using the keyboard) as well as to interact and collaborate with others.</p>
<i>Research to Build Knowledge</i>		
<p>7. Conduct short research projects that build knowledge about a topic.</p> <p>8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.</p> <p>9. (Begins in grade 4)</p>	<p>7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.</p> <p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research. <ul style="list-style-type: none"> a. Apply <i>grade 4 Reading standards</i> to literature (e.g., “Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text”). b. Apply <i>grade 4 Reading standards</i> to informational texts (e.g., “Explain how an author uses reasons and evidence to support particular points in a text”). </p>	<p>7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.</p> <p>8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.</p> <p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research. <ul style="list-style-type: none"> a. Apply <i>grade 5 Reading standards</i> to literature (e.g., “Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text”). b. Apply <i>grade 5 Reading standards</i> to informational texts (e.g., “Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence supports which point[s]”). </p>
<i>Range of Writing</i>		
<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

College and Career Readiness Anchor Standards for Speaking and Listening

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Comprehension and Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate content from multiple graphical, visual, oral, or multimodal sources.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Note on range and content of student speaking and listening

To build a foundation for college and career readiness, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner. Being productive members of these conversations requires that students contribute accurate, relevant information; respond to and develop what others have said; make comparisons and contrasts; and analyze and synthesize a multitude of ideas in various domains.

New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio.

Speaking and Listening Standards K–5

[SL]

The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Kindergartners:	Grade 1 students:	Grade 2 students:
Comprehension and Collaboration		
<ol style="list-style-type: none"> Participate in collaborative conversations about <i>kindergarten topics and texts</i> with peers and adults in small and larger groups. <ol style="list-style-type: none"> Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion). Continue a conversation through multiple exchanges. Confirm understanding of written texts read aloud or information presented orally or through media by asking and answering questions about key details. Ask and answer questions in order to seek help, get information, or clarify something that is not understood. 	<ol style="list-style-type: none"> Participate in collaborative conversations about <i>grade 1 topics and texts</i> with peers and adults in small and larger groups. <ol style="list-style-type: none"> Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). Build on others’ talk in conversations by responding to the comments of others through multiple exchanges. Ask questions to clear up any confusion about the topics and texts under discussion. Demonstrate understanding of written texts read aloud or information presented orally or through media by asking and answering questions about key details and restating key elements. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood. 	<ol style="list-style-type: none"> Participate in collaborative conversations about <i>grade 2 topics and texts</i> with peers and adults in small and larger groups. <ol style="list-style-type: none"> Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). Build on others’ talk in conversations by linking their comments to the remarks of others. Ask for clarification and further explanation as needed about the topics and texts under discussion. Recount or describe key ideas or details from written texts read aloud or information presented orally or through media. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
Presentation of Knowledge and Ideas		
<ol style="list-style-type: none"> Describe familiar people, places, things, and events and, with prompting and support, provide additional detail. Add drawings or other visual displays to descriptions as desired to provide additional detail. Speak audibly and express thoughts, feelings, and ideas clearly. 	<ol style="list-style-type: none"> Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. Produce complete sentences when appropriate to task and situation. (See standards 1–3 in Language, pages 26–31, for specific expectations.) 	<ol style="list-style-type: none"> Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See standards 1–3 in Language, pages 26–31, for specific expectations.)

Grade 3 students:	Grade 4 students:	Grade 5 students:
Comprehension and Collaboration		
<p>1. Engage effectively in a range of collaborative discussions (one-on-one and in groups) on <i>grade 3 topics and texts</i>, building on others' ideas and expressing their own clearly.</p> <p>a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).</p> <p>b. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.</p> <p>c. Explain their own ideas and understanding in light of the discussion.</p>	<p>1. Engage effectively in range of collaborative discussions (one-on-one and in groups) on <i>grade 4 topics and texts</i>, building on others' ideas and expressing their own clearly.</p> <p>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussions.</p> <p>b. Follow agreed-upon rules for discussions and carry out assigned roles.</p> <p>c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</p> <p>d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</p>	<p>1. Engage effectively in a range of collaborative discussions (one-on-one and in groups) on <i>grade 5 topics and texts</i>, building on others' ideas and expressing their own clearly.</p> <p>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.</p> <p>b. Follow agreed-upon rules for discussions and carry out assigned roles.</p> <p>c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.</p> <p>d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.</p>
<p>2. Identify the main ideas and supporting details of written texts read aloud or information presented graphically, orally, visually, or multimodally.</p>	<p>2. Paraphrase portions of written texts read aloud or information presented graphically, orally, visually, or multimodally.</p>	<p>2. Summarize written texts read aloud or information presented graphically, orally, visually, or multimodally.</p>
<p>3. Ask and answer questions about information from a speaker's, offering appropriate elaboration and detail.</p>	<p>3. Identify the reasons and evidence a speaker provides to support particular points.</p>	<p>3. Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.</p>
Presentation of Knowledge and Ideas		
<p>4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.</p>	<p>4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.</p>	<p>4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.</p>
<p>5. Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.</p>	<p>5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.</p>	<p>5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.</p>
<p>6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See standards 1–3 in Language, pages 26–31, for specific expectations.)</p>	<p>6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See standards 1–3 in Language, pages 26–31, for specific expectations.)</p>	<p>6. Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See standards 1–3 in Language, pages 26–31, for specific expectations.)</p>

College and Career Readiness Anchor Standards for Language

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Conventions

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of capitalization, punctuation, and spelling when writing.

Effective Language Use

3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.

Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of word relationships and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific vocabulary sufficient for reading, writing, speaking, and listening at the college and career readiness level.

Note on range and content of student language use

To build a foundation for college and career readiness in language, students must gain control over many conventions of grammar, usage, and mechanics as well as learn ways to use language to enhance meaning. They must also be able to determine or clarify the meaning of grade-appropriate words encountered through listening, reading, and media use, come to appreciate that words have nonliteral meanings, shadings of meaning, and relationships to other words, and expand their vocabulary in the course of studying content. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.

Language Standards K–5

[L]

The following standards for grades K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades. Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 31 for a complete list and Appendix A for an example of how these skills develop in sophistication.

Kindergartners:	Grade 1 students:	Grade 2 students:
Conventions		
<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Print many upper- and lowercase letters. b. Use frequently occurring nouns and verbs. c. Form regular plural nouns orally by adding /s/ or /es/ (e.g., <i>dog, dogs; wish, wishes</i>). d. Understand and use question words (interrogatives) (e.g., <i>who, what, where, when, why, how</i>). e. Use the most frequently occurring prepositions (e.g., <i>to, from, in, out, on, off, for, of, by, with</i>). f. Produce and expand complete sentences in shared language activities. 	<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Print all upper- and lowercase letters. b. Use common, proper, and possessive nouns. c. Use singular and plural nouns with matching verbs in basic sentences (e.g., <i>He hops; We hop</i>). d. Use personal, possessive, and indefinite pronouns (e.g., <i>I, me, my; they, them, their, anyone, everything</i>). e. Use verbs to convey a sense of past, present, and future (e.g., <i>Yesterday I walked home; Today I walk home; Tomorrow I will walk home</i>). f. Use frequently occurring adjectives. g. Use frequently occurring conjunctions (e.g., <i>and, but, or, so, because</i>). g. Use determiners (e.g., articles, demonstratives). h. Use frequently occurring prepositions (e.g., <i>during, beyond, toward</i>). i. Produce and expand complete simple and compound declarative, interrogative, imperative, and exclamatory sentences in response to questions and prompts. 	<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Use collective nouns (e.g., <i>group</i>). b. Form and use frequently occurring irregular plural nouns (e.g., <i>feet, children, teeth, mice, fish</i>). c. Use reflexive pronouns (e.g., <i>myself, ourselves</i>). d. Form and use the past tense of frequently occurring irregular verbs (e.g., <i>sat, hid, told</i>). e. Use adjectives and adverbs, and choose between them depending on what is to be modified. f. Produce, expand, and rearrange complete simple and compound sentences (e.g., <i>The boy watched the movie; The little boy watched the movie; The action movie was watched by the little boy</i>).
<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Capitalize the first word in a sentence and the pronoun <i>I</i>. b. Recognize and name end punctuation. c. Write a letter or letters for most consonant and short-vowel sounds (phonemes). d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships. 	<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Capitalize dates and names of people. b. Use end punctuation for sentences. c. Use commas in dates and to separate single words in a series. d. Use conventional spelling for words with common spelling patterns and for frequently occurring irregular words. e. Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions. 	<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Capitalize holidays, product names, and geographic names. b. Use commas in greetings and closings of letters. c. Use an apostrophe to form contractions and frequently occurring possessives. d. Generalize learned spelling patterns when writing words (e.g., <i>cage → badge; boy → boil</i>). e. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings.
Effective Language Use		
<p>3. (Begins in grade 3)</p>	<p>3. (Begins in grade 3)</p>	<p>3. (Begins in grade 3)</p>

Kindergartners:	Grade 1 students:	Grade 2 students:
Vocabulary Acquisition and Use		
<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>kindergarten reading and content</i>.</p> <ul style="list-style-type: none"> a. Identify new meanings for familiar words and apply them accurately (e.g., knowing <i>duck</i> as a bird and learning the verb <i>to duck</i>). b. Use the most frequently occurring inflections and affixes (e.g., <i>-ed</i>, <i>-s</i>, <i>re-</i>, <i>un-</i>, <i>pre-</i>, <i>-ful</i>, <i>-less</i>) as a clue to the meaning of an unknown word. 	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 1 reading and content</i>, choosing flexibly from an array of strategies.</p> <ul style="list-style-type: none"> a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Use frequently occurring affixes as a clue to the meaning of a word. c. Identify frequently occurring root words (e.g., <i>look</i>) and their inflectional forms (e.g., <i>looks</i>, <i>looked</i>, <i>looking</i>). 	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 2 reading and content</i>, choosing flexibly from an array of strategies.</p> <ul style="list-style-type: none"> a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., <i>happy/unhappy</i>, <i>tell/retell</i>). c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., <i>addition</i>, <i>additional</i>). d. Use knowledge of the meaning of individual words to predict the meaning of compound words (e.g., <i>birdhouse</i>, <i>lighthouse</i>, <i>housefly</i>; <i>bookshelf</i>, <i>notebook</i>, <i>bookmark</i>). e. Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases.
<p>5. With guidance and support from adults, explore word relationships and nuances in word meanings.</p> <ul style="list-style-type: none"> a. Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent. b. Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms). c. Identify real-life connections between words and their use (e.g., note places at school that are <i>colorful</i>). d. Distinguish shades of meaning among verbs describing the same general action (e.g., <i>walk</i>, <i>march</i>, <i>strut</i>, <i>prance</i>) by acting out the meanings. 	<p>5. With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings.</p> <ul style="list-style-type: none"> a. Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent. b. Define words by category and by one or more key attributes (e.g., a <i>duck</i> is a bird that swims; a <i>tiger</i> is a large cat with stripes). c. Identify real-life connections between words and their use (e.g., note places at home that are <i>cozy</i>). d. Distinguish shades of meaning among verbs differing in manner (e.g., <i>look</i>, <i>peek</i>, <i>glance</i>, <i>stare</i>, <i>glare</i>, <i>scowl</i>) and adjectives differing in intensity (e.g., <i>large</i>, <i>gigantic</i>) by defining or choosing them or by acting out the meanings. 	<p>5. Demonstrate understanding of word relationships and nuances in word meanings.</p> <ul style="list-style-type: none"> a. Identify real-life connections between words and their use (e.g., describe foods that are <i>spicy</i> or <i>juicy</i>). b. Distinguish shades of meaning among closely related verbs (e.g., <i>toss</i>, <i>throw</i>, <i>hurl</i>) and closely related adjectives (e.g., <i>thin</i>, <i>slender</i>, <i>skinny</i>, <i>scrawny</i>).
<p>6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.</p>	<p>6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., <i>I named my hamster Nibblet because she nibbles too much because she likes that</i>).</p>	<p>6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., <i>When other kids are happy that makes me happy</i>).</p>

Grade 3 students:

Grade 4 students:

Grade 5 students:

Conventions

- | | | |
|---|---|--|
| <p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ol style="list-style-type: none"> a. Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences. b. Form and use regular and irregular plural nouns. c. Use abstract nouns (e.g., <i>childhood</i>). d. Form and use regular and irregular verbs. e. Form and use the simple (e.g., <i>I walked; I walk; I will walk</i>) verb tenses. f. Ensure subject-verb and pronoun-antecedent agreement.* g. Form and use comparative and superlative adjectives and adverbs, and choose between them depending on what is to be modified. h. Use coordinating and subordinating conjunctions. i. Produce simple, compound, and complex sentences. | <p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ol style="list-style-type: none"> a. Use relative pronouns (<i>who, whose, whom, which, that</i>) and relative adverbs (<i>where, when, why</i>). b. Form and use the progressive (e.g., <i>I was walking; I am walking; I will be walking</i>) verb aspects. c. Use modal auxiliaries (e.g., <i>can, may, must</i>) to convey various conditions. d. Order adjectives within sentences according to conventional patterns (e.g., <i>a small red bag</i> rather than <i>a red small bag</i>). e. Form and use prepositional phrases. f. Produce complete sentences, recognizing and correcting rhetorically poor fragments and run-ons.* g. Correctly use frequently confused words (e.g., <i>to, too, two; there, their</i>).* | <p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ol style="list-style-type: none"> a. Explain the function of conjunctions, prepositions, and interjections in general and their function in particular sentences. b. Form and use the perfect (e.g., <i>I had walked; I have walked; I will have walked</i>) verb aspects. c. Use verb tense and aspect to convey various times, sequences, states, and conditions. d. Recognize and correct inappropriate shifts in verb tense and aspect.* e. Use correlative conjunctions. |
| <p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ol style="list-style-type: none"> a. Capitalize important words in titles. b. Use commas in addresses. c. Use commas and quotation marks in dialogue. d. Form and use possessives. e. Use conventional spelling for high-frequency and other studied words and for adding suffixes to base words (e.g., <i>sitting, smiled, cries, happiness</i>). f. Use spelling patterns and generalizations (e.g., word families, position-based spellings, syllable patterns, ending rules, meaningful word parts) in writing words. g. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings. | <p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ol style="list-style-type: none"> a. Use correct capitalization. b. Use commas and quotation marks to mark direct speech and quotations from a text. c. Use a comma before a coordinating conjunction in a compound sentence. d. Spell grade-appropriate words correctly, consulting references as needed. | <p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ol style="list-style-type: none"> a. Use punctuation to separate items in a series.* b. Use a comma to separate an introductory element from the rest of the sentence. c. Use a comma to set off the words <i>yes</i> and <i>no</i> (e.g., <i>Yes, thank you</i>), to set off a tag question from the rest of the sentence (e.g., <i>It's true, isn't it?</i>), and to indicate direct address (e.g., <i>Is that you, Steve?</i>). d. Use underlining, quotation marks, or italics to indicate titles of works. e. Spell grade-appropriate words correctly, consulting references as needed. |

Effective Language Use

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| <p>3. Use language to achieve particular effects when writing or speaking.</p> <ol style="list-style-type: none"> a. Choose words and phrases for effect.* | <p>3. Use language to enhance meaning and achieve particular effects when writing or speaking.</p> <ol style="list-style-type: none"> a. Choose words and phrases to convey ideas precisely.* b. Use punctuation for effect.* | <p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ol style="list-style-type: none"> a. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style. |
|--|--|---|

Grade 3 students:	Grade 4 students:	Grade 5 students:
Vocabulary Acquisition and Use		
<p>4. Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on <i>grade 3 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use sentence-level context as a clue to the meaning of a word or phrase. Determine the meaning of the new word formed when a known affix is added to a known word (e.g., <i>agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat</i>). Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., <i>company, companion</i>). Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases. 	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 4 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., <i>telegraph, photograph, autograph</i>). Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. 	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 5 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., <i>photograph, photosynthesis</i>). Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
<p>5. Demonstrate understanding of word relationships and nuances in word meanings.</p> <ol style="list-style-type: none"> Distinguish the literal and nonliteral meanings of words and phrases in context (e.g., <i>take steps</i>). Identify real-life connections between words and their use (e.g., describe people who are <i>friendly</i> or <i>helpful</i>). Distinguish shades of meaning among related words that describe states of mind or degrees of certainty (e.g., <i>knew, believed, suspected, heard, wondered</i>). 	<p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Explain the meaning of simple similes and metaphors (e.g., <i>as pretty as a picture</i>) in context. Recognize and explain the meaning of common idioms, adages, and proverbs. Demonstrate understanding of words by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms). 	<p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figurative language, including similes and metaphors, in context. Recognize and explain the meaning of common idioms, adages, and proverbs. Use the relationship between particular words (e.g., synonyms, antonyms, homographs) to better understand each of the words.
<p>6. Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific vocabulary, including words and phrases that signal spatial and temporal relationships (e.g., <i>After dinner that night we went looking for them</i>).</p>	<p>6. Acquire and use accurately grade-appropriate general academic and domain-specific vocabulary, including words and phrases that signal precise actions, emotions, or states of being (e.g., <i>quizzed, whined, stammered</i>) and words and phrases basic to a particular topic (e.g., <i>wildlife, conservation, and endangered</i> when discussing animal preservation).</p>	<p>6. Acquire and use accurately grade-appropriate general academic and domain-specific vocabulary, including words and phrases that signal contrast, addition, and other logical relationships (e.g., <i>however, although, nevertheless, similarly, moreover, in addition</i>).</p>

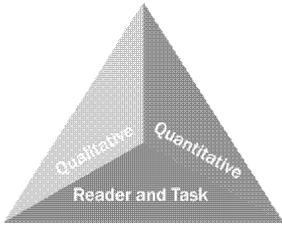
Language Progressive Skills, by Grade

The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.

Skill	3	4	5	6	7	8	9–10	11–12
Ensure subject-verb and pronoun-antecedent agreement.								
Choose words and phrases for effect.								
Produce complete sentences, recognizing and correcting rhetorically poor fragments and run-ons.								
Correctly use frequently confused words (e.g., <i>to/too/two; there/their</i>).								
Choose words and phrases to convey ideas precisely.								
Use punctuation for effect.								
Recognize and correct inappropriate shifts in verb tense and aspect.								
Use punctuation to separate items in a series.								
Recognize and correct inappropriate shifts in pronoun number and person.								
Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
Vary sentence patterns for meaning, reader/listener interest, and style.								
Maintain consistency in style and tone.								
Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
Choose language that expresses ideas precisely and concisely, eliminating wordiness and redundancy.								
Recognize and correct inappropriate shifts in verb voice and mood.								
Use parallel structure.								

Standard 10: Range, Quality, and Complexity of Student Reading K–5

Measuring Text Complexity: Three Factors



Qualitative evaluation of the text: Levels of meaning, structure, language conventionality and clarity, and knowledge demands

Quantitative evaluation of the text: Readability measures and other scores of text complexity

Matching reader to text and task: Reader knowledge, motivation, and interests as well as the complexity generated by the tasks assigned and the questions posed

Note: More detailed information on text complexity and how it is measured is contained in Appendix A.

Range of Text Types for K–5

Students in K–5 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.

Literature		Informational Text	
Stories	Dramas	Poetry	Literary Nonfiction and Historical, Scientific, and Technical Texts
Includes children's adventure stories, folktales, legends, fables, fantasy, realistic fiction, and myth	Includes staged dialogue and brief familiar scenes	Includes nursery rhymes and the subgenres of the narrative poem, limerick, and free verse poem	Includes biographies and autobiographies; books about history, social studies, science, and the arts; technical texts, including directions, forms, and information displayed in graphs, charts, or maps; and digital sources on a range of topics

Texts Illustrating the Complexity, Quality, and Range of Student Reading K–5

* Read-aloud
** Read-along

	Literature: Stories, Drama, Poetry	Informational Texts: Literary Nonfiction and Historical, Scientific, and Technical Texts
K ¹	<ul style="list-style-type: none"> ▪ <i>Over in the Meadow</i> by John Langstaff (traditional) (c1800)* ▪ <i>A Boy, a Dog, and a Frog</i> by Mercer Mayer (1967) ▪ <i>Pancakes for Breakfast</i> by Tomie DePaola (1978) ▪ <i>A Story A Story</i> by Gail E. Haley (1970)* ▪ <i>Kitten’s First Full Moon</i> by Kevin Henkes (2004)* 	<ul style="list-style-type: none"> ▪ <i>My Five Senses</i> by Alike (1962)* ▪ <i>Truck</i> by Donald Crews (1980) ▪ <i>I Read Signs</i> by Tana Hoban (1987) ▪ <i>What Do You Do With a Tail Like This?</i> by Steve Jenkins and Robin Page (2003)* ▪ <i>Amazing Whales!</i> by Sarah L. Thomson (2005)*
1 ¹	<ul style="list-style-type: none"> ▪ “Mix a Pancake” by Christina G. Rossetti (1893)** ▪ <i>Mr. Popper’s Penguins</i> by Richard Atwater (1938)* ▪ <i>Little Bear</i> by Else Holmelund Minarik, illustrated by Maurice Sendak (1957)** ▪ <i>Frog and Toad Together</i> by Arnold Lobel (1971)** ▪ <i>Hi! Fly Guy</i> by Tedd Arnold (2006) 	<ul style="list-style-type: none"> ▪ <i>A Tree Is a Plant</i> by Clyde Robert Bulla, illustrated by Stacey Schuett (1960)** ▪ <i>My Five Senses</i> by Alike (1962)** ▪ <i>Follow the Water from Brook to Ocean</i> by Arthur Dorros (1991)** ▪ <i>From Seed to Pumpkin</i> by Wendy Pfeffer, illustrated by James Graham Hale (2004)* ▪ <i>How People Learned to Fly</i> by Fran Hodgkins and True Kelley (2007)*
2–3	<ul style="list-style-type: none"> ▪ “Who Has Seen the Wind?” by Christina G. Rossetti (1893) ▪ <i>Charlotte’s Web</i> by E. B. White (1952)* ▪ <i>Sarah, Plain and Tall</i> by Patricia MacLachlan (1985) ▪ <i>Tops and Bottoms</i> by Janet Stevens (1995) ▪ <i>Poppleton in Winter</i> by Cynthia Rylant, illustrated by Mark Teague (2001) 	<ul style="list-style-type: none"> ▪ <i>A Medieval Feast</i> by Alike (1983) ▪ <i>From Seed to Plant</i> by Gail Gibbons (1991) ▪ <i>The Story of Ruby Bridges</i> by Robert Coles (1995)* ▪ <i>A Drop of Water: A Book of Science and Wonder</i> by Walter Wick (1997) ▪ <i>Moonshot: The Flight of Apollo 11</i> by Brian Floca (2009)
4–5	<ul style="list-style-type: none"> • <i>Alice’s Adventures in Wonderland</i> by Lewis Carroll (1865) • “Casey at the Bat” by Ernest Lawrence Thayer (1888) • <i>The Black Stallion</i> by Walter Farley (1941) • “Zlateh the Goat” by Isaac Bashevis Singer (1984) • <i>Bud, Not Buddy</i> by Christopher Paul Curtis (1999) • <i>The Birchbark House</i> by Louise Erdrich (1999) • <i>Where the Mountain Meets the Moon</i> by Grace Lin (2009) 	<ul style="list-style-type: none"> ▪ <i>Discovering Mars</i> by Melvin Berger (1992) ▪ <i>Hurricanes: Earth’s Mightiest Storms</i> by Patricia Lauber (1996) ▪ <i>A History of US</i> by Joy Hakim (2005) ▪ <i>Horses</i> by Seymour Simon (2006) ▪ <i>Quest for the Tree Kangaroo: An Expedition to the Cloud Forest of New Guinea</i> by Sy Montgomery (2006)

Note: Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a wide range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of K–5 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth. On the next page is an example of progressions of texts building knowledge across grade levels.

¹Children at the kindergarten and grade 1 levels should be expected to read texts independently that have been specifically written to correlate to their reading level and their word knowledge. Many of the titles listed above are meant to supplement carefully structured independent reading with books to read along with a teacher or that are read aloud to students to build knowledge and cultivate a joy in reading.

Staying on Topic Within a Grade and Across Grades: How to Build Knowledge Systematically in English Language Arts K–5

Building knowledge systematically in English language arts is like giving children various pieces of a puzzle in each grade that, over time, will form one big picture. At a curricular or instructional level, texts—within and across grade levels—need to be selected around topics or themes that systematically develop the knowledge base of students. Within a grade level, there should be an adequate number of titles on a single topic that would allow children to study that topic for a sustained period. The knowledge children have learned about particular topics in early grade levels should then be expanded and developed in subsequent grade levels to ensure an increasingly deeper understanding of these topics. Children in the upper elementary grades will generally be expected to read these texts independently and reflect on them in writing. However, children in the early grades (particularly K–2) should participate in rich, structured conversations with an adult in response to the written texts that are read aloud, *orally* comparing and contrasting as well as analyzing and synthesizing, in the manner called for by the *Standards*.

Preparation for reading complex informational texts should begin at the very earliest elementary school grades. What follows is one example that uses domain-specific nonfiction titles across grade levels to illustrate how curriculum designers and classroom teachers can infuse the English language arts block with rich, age-appropriate content knowledge and vocabulary in history/social studies, science, and the arts. Having students listen to informational read-alouds in the early grades helps lay the necessary foundation for students' reading and understanding of increasingly complex texts on their own in subsequent grades.

Exemplar Texts on a Topic Across Grades	K	1	2–3	4–5
<p>The Human Body</p> <p>Students can begin learning about the human body starting in kindergarten and then review and extend their learning during each subsequent grade.</p>	<p>The five senses and associated body parts</p> <ul style="list-style-type: none"> ▪ <i>My Five Senses</i> by Aliko (1989) ▪ <i>Hearing</i> by Maria Rius (1985) ▪ <i>Sight</i> by Maria Rius (1985) ▪ <i>Smell</i> by Maria Rius (1985) ▪ <i>Taste</i> by Maria Rius (1985) ▪ <i>Touch</i> by Maria Rius (1985) <p>Taking care of your body: Overview (hygiene, diet, exercise, rest)</p> <ul style="list-style-type: none"> ▪ <i>My Amazing Body: A First Look at Health & Fitness</i> by Pat Thomas (2001) ▪ <i>Get Up and Go!</i> by Nancy Carlson (2008) ▪ <i>Go Wash Up</i> by Doering Tourville (2008) ▪ <i>Sleep</i> by Paul Showers (1997) ▪ <i>Fuel the Body</i> by Doering Tourville (2008) 	<p>Introduction to the systems of the human body and associated body parts</p> <ul style="list-style-type: none"> ▪ <i>Under Your Skin: Your Amazing Body</i> by Mick Manning (2007) ▪ <i>Me and My Amazing Body</i> by Joan Sweeney (1999) ▪ <i>The Human Body</i> by Gallimard Jeunesse (2007) ▪ <i>The Busy Body Book</i> by Lizzy Rockwell (2008) ▪ <i>First Encyclopedia of the Human Body</i> by Fiona Chandler (2004) <p>Taking care of your body: Germs, diseases, and preventing illness</p> <ul style="list-style-type: none"> ▪ <i>Germs Make Me Sick</i> by Marilyn Berger (1995) ▪ <i>Tiny Life on Your Body</i> by Christine Taylor-Butler (2005) ▪ <i>Germ Stories</i> by Arthur Kornberg (2007) ▪ <i>All About Scabs</i> by Genichiro Yagu (1998) 	<p>Digestive and excretory systems</p> <ul style="list-style-type: none"> ▪ <i>What Happens to a Hamburger</i> by Paul Showers (1985) ▪ <i>The Digestive System</i> by Christine Taylor-Butler (2008) ▪ <i>The Digestive System</i> by Rebecca L. Johnson (2006) ▪ <i>The Digestive System</i> by Kristin Petrie (2007) <p>Taking care of your body: healthy eating and nutrition</p> <ul style="list-style-type: none"> ▪ <i>Good Enough to Eat</i> by Lizzy Rockwell (1999) ▪ <i>Showdown at the Food Pyramid</i> by Rex Barron (2004) <p>Muscular, skeletal, and nervous systems</p> <ul style="list-style-type: none"> ▪ <i>The Mighty Muscular and Skeletal Systems</i> Crabtree Publishing (2009) ▪ <i>Muscles</i> by Seymour Simon (1998) ▪ <i>Bones</i> by Seymour Simon (1998) ▪ <i>The Astounding Nervous System</i> Crabtree Publishing (2009) ▪ <i>The Nervous System</i> by Joelle Riley (2004) 	<p>Circulatory system</p> <ul style="list-style-type: none"> ▪ <i>The Heart</i> by Seymour Simon (2006) ▪ <i>The Heart and Circulation</i> by Carol Ballard (2005) ▪ <i>The Circulatory System</i> by Kristin Petrie (2007) ▪ <i>The Amazing Circulatory System</i> by John Burstein (2009) <p>Respiratory system</p> <ul style="list-style-type: none"> ▪ <i>The Lungs</i> by Seymour Simon (2007) ▪ <i>The Respiratory System</i> by Susan Glass (2004) ▪ <i>The Respiratory System</i> by Kristin Petrie (2007) ▪ <i>The Remarkable Respiratory System</i> by John Burstein (2009) <p>Endocrine system</p> <ul style="list-style-type: none"> ▪ <i>The Endocrine System</i> by Rebecca Olien (2006) ▪ <i>The Exciting Endocrine System</i> by John Burstein (2009)

Standards for English Language Arts

6-12

DRAFT

College and Career Readiness Anchor Standards for Reading

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented graphically, visually, orally, and multimodally as well as in words within and across print and digital sources.
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see “Research to Build Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Note on range and content of student reading

To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students’ own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts.

Reading Standards for Literature 6–12

[RL]

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a theme or central idea of a text and analyze its development over the course of the text; summarize the text.	2. Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; summarize the text.	2. Determine a theme or central idea of a text and analyze its development over the course of the text, including how it is conveyed through particular details; provide an accurate summary of the text distinct from personal opinions or judgments.
3. Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.	3. Analyze how particular elements of a story or drama interact (e.g., how setting shapes the characters or plot).	3. Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figures of speech and the connotations (associations) of particular words and phrases; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.	4. Determine the meaning of words and phrases as they are used in a text, including analogies or allusions to other texts; analyze the impact of specific word choices on meaning and tone.
5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.	5. Analyze how a drama's or poem's form or structure (e.g., sonnet, soliloquy) contributes to its meaning.	5. Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style.
6. Explain how an author establishes and develops the point of view of the narrator or speaker in a text.	6. Analyze how an author establishes and contrasts the points of view of different characters or narrators in a text.	6. Explain how differences in the point of view of characters and the audience or reader (e.g., created through the use of dramatic irony) creates such effects as suspense or humor.
Integration of Knowledge and Ideas		
7. Compare and contrast the experience of reading a story, poem, or drama to listening to or viewing an audio, video, or live version of the text, including contrasting what they "see" and "hear" when reading the text to what they perceive when they listen or watch.	7. Compare and contrast a story, poem, or drama to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, camera focus and angles).	7. Analyze the extent to which a filmed or live production of a story or drama stays faithful to or departs from the text or script, evaluating the choices made by the director or actors.
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)

Grade 6 students:	Grade 7 students:	Grade 8 students:
<i>Integration of Knowledge and Ideas</i>		
<p>9. Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.</p>	<p>9. Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.</p>	<p>9. Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new.</p>
<i>Range of Reading and Level of Text Complexity</i>		
<p>10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p>	<p>10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as necessary at the high end of the range.</p>	<p>10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band independently and proficiently.</p>

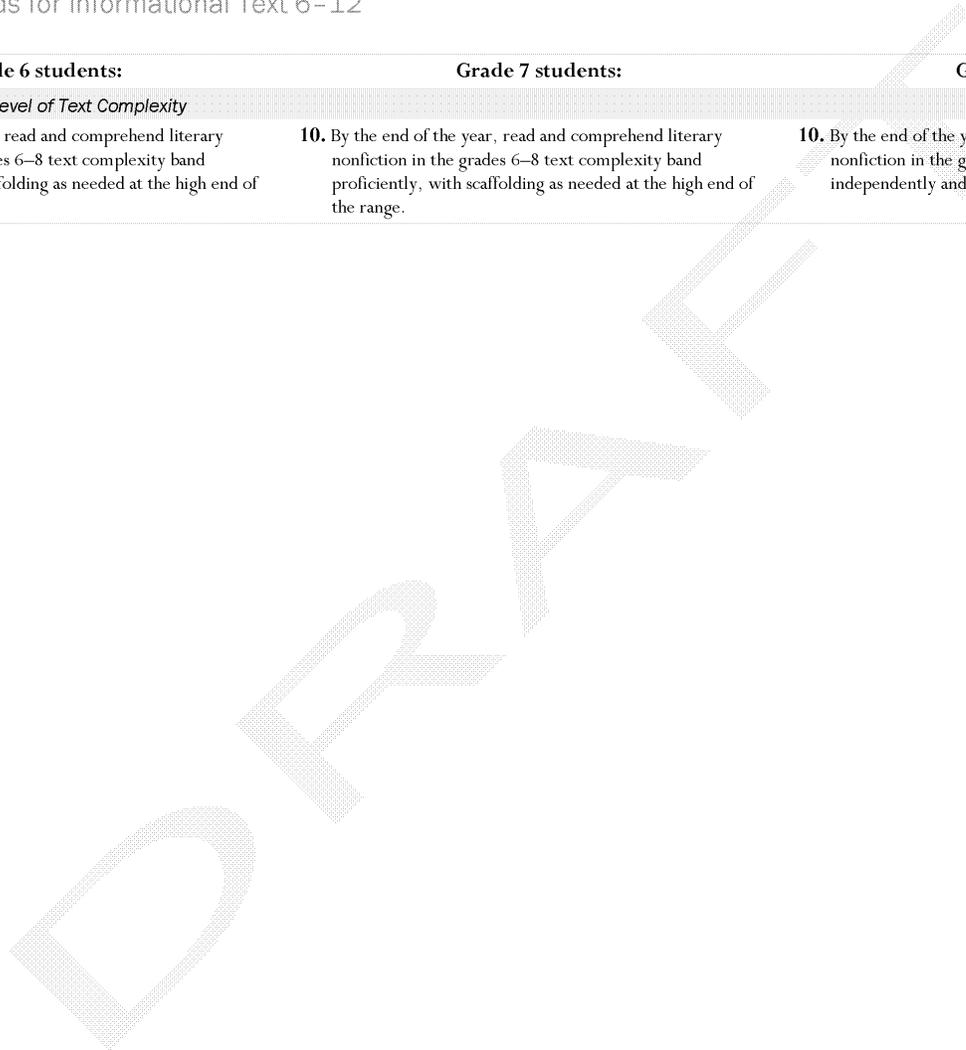
Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details	
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
2. Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.
3. Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	3. Evaluate various explanations for characters' actions or for events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.
Craft and Structure	
4. Determine the meaning of words and phrases as they are used in the text and analyze the cumulative impact of several word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).	4. Determine the meaning of words and phrases as they are used in the text and analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)
5. Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.	5. Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice at what point to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.
6. Analyze a case in which grasping point of view requires distinguishing what is directly stated from what is implied (e.g., through the use of satire, sarcasm, irony, or understatement).	6. Analyze differences and similarities in points of view or cultural experience as reflected in various works from different countries, drawing on a wide reading of world literature.
Integration of Knowledge and Ideas	
7. Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden's "Musée des Beaux Arts" and Breughel's <i>Landscape with the Fall of Icarus</i>).	7. Analyze multiple interpretations of a story or drama (e.g., recorded or live production of a play or novel), evaluating how each version interprets the source text. (Include at least one play by Shakespeare as well as one play by an American dramatist.)
8. (Not applicable to literature)	8. (Not applicable to literature)
9. Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, drawing on how two or more texts from the same period treat similar themes or topics.	9. Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare draws on Ovid or the Bible or how a later author draws on a play by Shakespeare) in order to evaluate how the texts treat similar themes or topics.
Range of Reading and Level of Text Complexity	
10. By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Informational Text 6–12

[RI]

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a central idea of a text and analyze its development over the course of the text; summarize the text.	2. Determine two or more central ideas in a text and analyze their development over the course of the text and their relationship to one another; summarize the text.	2. Determine a central idea of a text and analyze its development over the course of the text, including how it is conveyed through particular details; provide an accurate summary of the text distinct from personal opinions or judgments.
3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).	3. Analyze how a text makes connections among and distinctions between key individuals, ideas, or events (e.g., through comparisons, analogies, or categories).
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including analogies or allusions to other texts; analyze the impact of specific word choices on meaning and tone.
5. Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.	5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.	5. Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.
6. Determine an author's point of view or purpose in a text and explain how it is conveyed in the text.	6. Determine an author's point of view or purpose in a text and analyze how the author distinguishes his or her point of view from that of others.	6. Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.
Integration of Knowledge and Ideas		
7. Integrate information presented in different formats (e.g., print or digital text, video, multimedia) to develop a coherent understanding of a topic or issue.	7. Compare and contrast the experience of reading a text to experiencing an audio, video, or multimedia version of it, analyzing the text's portrayal in each medium (e.g., how the delivery of a speech affects the impact of the words).	7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
8. Delineate and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.	8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is sufficient to support the claims.	8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient and identifying when irrelevant evidence is introduced.
9. Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).	9. Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.	9. Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.

Grade 6 students:	Grade 7 students:	Grade 8 students:
<i>Range of Reading and Level of Text Complexity</i>		
10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band independently and proficiently.



Grades 9–10 students:

Grades 11–12 students:

Key Ideas and Details

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|---|--|
| <ol style="list-style-type: none"> 1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. 2. Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. 3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them. | <ol style="list-style-type: none"> 1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. 2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text. 3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text. |
|---|--|

Craft and Structure

- | | |
|--|---|
| <ol style="list-style-type: none"> 4. Determine the meaning of words and phrases as they are used in a text and analyze the cumulative impact of several word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper). 5. Analyze in detail how an author’s ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter). 6. Analyze documents of historical and literary significance, including seminal U.S. documents (e.g., the Declaration of Independence, the Preamble to the Constitution, the Bill of Rights), for their premises and purposes. | <ol style="list-style-type: none"> 4. Determine the meaning of words and phrases as they are used in a text and analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines <i>faction</i> in <i>Federalist</i> No. 10). 5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging. 6. Analyze how various authors express different points of view on similar events or issues, assessing the authors’ assumptions, use of evidence, and reasoning, including analyzing seminal U.S. documents (e.g., <i>The Federalist</i>, landmark U.S. Supreme Court majority opinions and dissents). |
|--|---|

Integration of Knowledge and Ideas

- | | |
|---|--|
| <ol style="list-style-type: none"> 7. Evaluate the accounts of a subject in different mediums (e.g., a person’s life story told in print or digital text, film, or multimedia), analyzing each version for which details are emphasized and how the account unfolds. 8. Delineate and evaluate the argument and claims in a text, assessing the relevance and sufficiency of the evidence and the validity of the reasoning and identifying false statements and fallacious reasoning. 9. Analyze a case in which authors disagree with or otherwise respond to one another’s ideas or accounts of events, evaluating the strength of each author’s evidence, reasoning, and interpretation. | <ol style="list-style-type: none"> 7. Integrate and evaluate multiple sources of information presented in different formats (e.g., print or digital text, video, multimedia) in order to address a question or solve a problem, resolving conflicting information when possible. 8. Delineate and evaluate the argument and claims in a text, assessing the relevance and sufficiency of the evidence and the validity of the reasoning, identifying and evaluating stated and unstated premises and assumptions. 9. Synthesize information, explanations, and arguments from a range of sources to provide a coherent account of events or ideas, resolving conflicting information when possible. |
|---|--|

Range of Reading and Level of Text Complexity

- | | |
|---|--|
| <ol style="list-style-type: none"> 10. By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.
By the end of grade 10, read and comprehend literary nonfiction in the grades 9–10 text complexity band independently and proficiently. | <ol style="list-style-type: none"> 10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.
By the end of grade 12, read and comprehend literary nonfiction in the grades 11–CCR text complexity band independently and proficiently. |
|---|--|

College and Career Readiness Anchor Standards for Writing

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Text Types and Purposes¹

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.²
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

¹These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

²See standards 1–3 in Language, pages 53–57, for specific editing expectations.

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within argument and explanation within narrative—to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

Writing Standards 6–12

[W]

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades. The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

Grade 6 students:

Grade 7 students:

Grade 8 students:

Text Types and Purposes

- | | | |
|--|---|---|
| <p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ol style="list-style-type: none">Introduce claim(s) and organize the reasons and evidence clearly.Support claim(s) with clear reasons and relevant evidence, demonstrating an understanding of the topic or text.Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.Establish and maintain a formal style.Provide a concluding statement or section that follows from the argument presented. | <p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ol style="list-style-type: none">Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.Support claim(s) with logical reasoning and relevant evidence, demonstrating an understanding of the topic or text.Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.Establish and maintain a formal style.Provide a concluding statement or section that follows from and supports the argument presented. | <p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ol style="list-style-type: none">Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.Support claim(s) with logical reasoning and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.Establish and maintain a formal style.Provide a concluding statement or section that follows from and supports the argument presented. |
| <p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ol style="list-style-type: none">Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.Use appropriate transitions to clarify the relationships among ideas and concepts.Use precise language and domain-specific vocabulary to inform about or explain the topic.Establish and maintain a formal style.Provide a concluding statement or section that follows from the information or explanation presented. | <p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ol style="list-style-type: none">Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.Use precise language and domain-specific vocabulary to inform about or explain the topic.Establish and maintain a formal style.Provide a concluding statement or section that follows from and supports the information or explanation presented. | <p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ol style="list-style-type: none">Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.Use precise language and domain-specific vocabulary to inform about or explain the topic.Establish and maintain a formal style.Provide a concluding statement or section that follows from and supports the information or explanation presented. |

Grade 6 students:

Grade 7 students:

Grade 8 students:

Text Types and Purposes (continued)

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| <p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events. e. Provide a conclusion that follows from the narrated experiences or events. | <p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events. | <p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events. |
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Production and Distribution of Writing

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| <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> | <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> | <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> |
| <p>5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.</p> | <p>5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.</p> | <p>5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.</p> |
| <p>6. Use technology, including the Internet, to produce and publish a minimum of three pages of writing as well as to interact and collaborate with others.</p> | <p>6. Use technology, including the Internet, to produce and publish a minimum of four pages of writing as well as to interact and collaborate with others.</p> | <p>6. Use technology, including the Internet, to produce and publish a minimum of five pages of writing as well as to interact and collaborate with others.</p> |

Grade 6 students:	Grade 7 students:	Grade 8 students:
Research to Build and Present Knowledge		
<p>7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.</p>	<p>7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.</p>	<p>7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.</p>
<p>8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.</p>	<p>8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p>	<p>8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p>
<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 6 Reading standards</i> to literature (e.g., “Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.”).</p> <p>b. Apply <i>grade 6 Reading standards</i> to literary nonfiction (e.g., “Delineate and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not”).</p>	<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 7 Reading standards</i> to literature (e.g., “Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history”).</p> <p>b. Apply <i>grade 7 Reading standards</i> to literary nonfiction (e.g., “Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is sufficient to support the claims”).</p>	<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 8 Reading standards</i> to literature (e.g., “Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new”).</p> <p>b. Apply <i>grade 8 Reading standards</i> to literary nonfiction (e.g., “Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient and identifying when irrelevant evidence is introduced”).</p>
Range of Writing		
<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

Grades 9–10 students:

Grades 11–12 students:

Text Types and Purposes

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
 - a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.
 - b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level and concerns.
 - c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - e. Provide a concluding statement or section that follows from and supports the argument presented.

2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
 - a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
 - b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
 - c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
 - d. Use precise language and domain-specific vocabulary to manage the complexity of the topic.
 - e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
 - a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.
 - b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level, concerns, values, and possible biases.
 - c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - e. Provide a concluding statement or section that follows from and supports the argument presented.

2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
 - a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
 - b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
 - c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
 - d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
 - e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Grades 9–10 students:

Grades 11–12 students:

Text Types and Purposes (continued)

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| <p>3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative. | <p>3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative. |
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Production and Distribution of Writing

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| <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> | <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> |
| <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p> | <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p> |
| <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p> | <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> |

Research to Build and Present Knowledge

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| <p>7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> | <p>7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> |
| <p>8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p> | <p>8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> |

Grades 9–10 students:

Grades 11–12 students:

Research to Build and Present Knowledge (continued)

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| <p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <ul style="list-style-type: none"> a. Apply <i>grades 9–10 Reading standards</i> to literature (e.g., “Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, drawing on how two or more texts from the same period treat similar themes or topics”). b. Apply <i>grades 9–10 Reading standards</i> to literary nonfiction (e.g., “Delineate and evaluate the argument and claims in a text, assessing the relevance and sufficiency of the evidence and the validity of the reasoning and identifying false statements and fallacious reasoning”). | <p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <ul style="list-style-type: none"> a. Apply <i>grades 11–12 Reading standards</i> to literature (e.g., “Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare draws on Ovid or the Bible or how a later author draws on a play by Shakespeare) in order to evaluate how the texts treat similar themes or topics”). b. Apply <i>grades 11–12 Reading standards</i> to literary nonfiction (e.g., “Delineate and evaluate the argument and claims in a text, assessing the relevance and sufficiency of the evidence and the validity of the reasoning, identifying and evaluating stated and unstated premises and assumptions”). |
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Range of Writing

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| <p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.</p> | <p>10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.</p> |
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College and Career Readiness Anchor Standards for Speaking and Listening

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Comprehension and Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate content from multiple graphical, visual, oral, or multimodal sources.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Note on range and content of student speaking and listening

To become college and career ready, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains. They must be able to contribute appropriately to these conversations, to make comparisons and contrasts, and to analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline. Whatever their intended major or profession, high school graduates will depend heavily on their ability to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.

New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. The Internet has accelerated the speed at which connections between speaking, listening, reading, and writing can be made, requiring that students be ready to use these modalities nearly simultaneously. Technology itself is changing quickly, creating a new urgency for students to be adaptable in response to change.

Speaking and Listening Standards 6–12

[SL]

The following standards for grades 6–12 offer a focus for instruction in each year to help ensure that students gain adequate mastery of a range of skills and applications. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Comprehension and Collaboration		
<p>1. Engage effectively in a range of collaborative discussions (one-on-one and in groups) on <i>grade 6 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <p>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.</p> <p>b. With guidance and support from adults, work with peers to set rules for collegial discussions, clear goals and deadlines, and individual roles as needed.</p> <p>c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.</p> <p>d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.</p>	<p>1. Engage effectively in a range of collaborative discussions (one-on-one and in groups) on <i>grade 7 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <p>a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.</p> <p>b. Work with peers to set rules for collegial discussions, clear goals and deadlines, and individual roles as needed.</p> <p>c. Pose questions that elicit elaboration and respond to others’ questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.</p> <p>d. Acknowledge new information expressed by others and, when warranted, modify their own views and understanding.</p>	<p>1. Engage effectively in a range of collaborative discussions (one-on-one and in groups) on <i>grade 8 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <p>a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.</p> <p>b. Work with peers to set rules for collegial discussions, clear goals and deadlines, and individual roles as needed.</p> <p>c. Pose questions that connect the ideas of several speakers and elicit elaboration, and respond to others’ questions and comments with relevant evidence, observations, and ideas.</p> <p>d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views and understanding in light of the evidence presented.</p>
<p>2. Interpret information presented in graphical, oral, visual or multimodal formats and explain how it contributes to a topic, text, or issue under study.</p>	<p>2. Analyze the main ideas and supporting details presented in graphical, oral, visual, or multimodal formats and explain how the ideas clarify a topic, text, or issue under study.</p>	<p>2. Determine the purpose of information in graphical, oral, visual, or multimodal formats and evaluate the motives (e.g., social, commercial, political) behind its presentation.</p>
<p>3. Delineate a speaker’s argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.</p>	<p>3. Delineate a speaker’s argument and specific claims, evaluating the soundness of the reasoning and the relevance of the evidence.</p>	<p>3. Delineate a speaker’s argument and specific claims, evaluating the validity of the reasoning and sufficiency of the evidence.</p>
Presentation of Knowledge and Ideas		
<p>4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.</p>	<p>4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.</p>	<p>4. Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.</p>
<p>5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.</p>	<p>5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.</p>	<p>5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.</p>
<p>6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See standards 1–3 in Language, pages 53–57, for specific expectations.)</p>	<p>6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See standards 1–3 in Language, pages 53–57, for specific expectations.)</p>	<p>6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See standards 1–3 in Language, pages 53–57, for specific expectations.)</p>

Grades 9–10 students:**Grades 11–12 students:****Comprehension and Collaboration**

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one and in groups) on *grades 9–10 topics, texts, and issues*, building on others' ideas and expressing their own clearly and persuasively.
 - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
 - b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.
 - c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
 - d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.
2. Synthesize information from multiple graphical, visual, or multimodal sources with other information presented orally, noting any discrepancies among the data.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one and in groups) on *grades 11–12 topics, texts, and issues*, building on others' ideas and expressing their own clearly and persuasively.
 - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
 - b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.
 - c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
 - d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
2. Integrate information from multiple graphical, oral, visual, or multimodal sources in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and resolving conflicting information when possible.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.

Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See standards 1–3 in Language, pages 53–57, for specific expectations.)

4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
6. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See standards 1–3 in Language, pages 53–57, for specific expectations.)

College and Career Readiness Anchor Standards for Language

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Conventions

1. Demonstrate command of the conventions of standard English grammar and usage.
2. Demonstrate command of the conventions of capitalization, punctuation, and spelling.

Effective Language Use

3. Use language to enhance meaning, convey style, and achieve particular effects when writing and speaking.

Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of word relationships and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific vocabulary sufficient for reading, writing, speaking, and listening at the college and career readiness level.

Note on range and content of student language use

To be college and career ready in language, students must have firm control over the conventions of grammar, usage, and mechanics. At the same time, they must come to appreciate that language is as at least as much a matter of craft as of rules and be able to use words, syntax, and punctuation to achieve particular rhetorical effects. They must also have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content. They need to become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them. They must learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.

Language Standards 6–12

[L]

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades. Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 57 for a complete listing and Appendix A for an example of how these skills develop in sophistication.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Conventions		
<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Ensure that pronouns are in the proper case (subjective, objective, possessive). b. Use intensive pronouns (e.g., <i>myself</i>, <i>ourselves</i>). c. Recognize and correct inappropriate shifts in pronoun number and person.* d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).* e. Recognize variations from standard English in their own and others’ writing and speaking, and identify and use strategies to improve expression in conventional language.* 	<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Explain the function of phrases and clauses in general and their function in specific sentences. b. Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas. c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.* 	<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences. b. Form and use verbs in the active and passive voice. c. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood. d. Recognize and correct inappropriate shifts in verb voice and mood.*
<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.* b. Spell correctly. 	<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Use a comma to separate coordinate adjectives (e.g., <i>It was a fascinating, enjoyable movie</i> but not <i>He wore an old[,] green shirt</i>). b. Spell correctly. 	<p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break. b. Use an ellipsis to indicate an omission. c. Spell correctly.
Effective Language Use		
<p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ul style="list-style-type: none"> a. Vary sentence patterns for meaning, reader/listener interest, and style.* b. Maintain consistency in style and tone.* 	<p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ul style="list-style-type: none"> a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.* 	<p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ul style="list-style-type: none"> a. Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact).

Grade 6 students:	Grade 7 students:	Grade 8 students:
Vocabulary Acquisition and Use		
<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 6 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use context (e.g., the overall meaning of a sentence or paragraph; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., <i>audience, auditory, audible</i>). Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figures of speech (e.g., personification) in context. Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., <i>stingy, scrimping, economical, unwise, thrifty</i>). <p>6. Acquire and use accurately grade-appropriate general academic and domain-specific vocabulary.</p>	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 7 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use context (e.g., the overall meaning of a sentence or paragraph; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., <i>belligerent, bellicose, rebel</i>). Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figures of speech (e.g., literary, biblical, and mythological allusions) in context. Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., <i>refined, respectful, polite, diplomatic, condescending</i>). <p>6. Acquire and use accurately grade-appropriate general academic and domain-specific vocabulary.</p>	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on <i>grade 8 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> Use context (e.g., the overall meaning of a sentence or paragraph; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., <i>precede, recede, secede</i>). Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figures of speech (e.g. verbal irony, puns) in context. Use the relationship between particular words to better understand each of the words. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., <i>bullheaded, willful, firm, persistent, resolute</i>). <p>6. Acquire and use accurately grade-appropriate general academic and domain-specific vocabulary.</p>

Grades 9–10 students:	Grades 11–12 students:
Conventions	
<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Use parallel structure.* b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to add variety and interest to writing or presentations. <p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses. b. Use a colon to introduce a list or quotation. c. Spell correctly. 	<p>1. Observe conventions of grammar and usage when writing or speaking.</p> <ul style="list-style-type: none"> a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested. b. Resolve issues of complex or contested usage, consulting references (e.g., <i>Merriam-Webster's Dictionary of English Usage</i>, <i>Garner's Modern American English</i>) as needed. <p>2. Observe conventions of capitalization, punctuation, and spelling when writing.</p> <ul style="list-style-type: none"> a. Observe hyphenation conventions. b. Spell correctly.
Effective Language Use	
<p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ul style="list-style-type: none"> a. Write and edit work so that it conforms to the guidelines in a style manual (e.g., <i>MLA Handbook</i>, <i>Turabian's Manual for Writers</i>) appropriate for the discipline and writing type. 	<p>3. Use language to enhance meaning, convey style, and achieve particular effects when writing or speaking.</p> <ul style="list-style-type: none"> a. Vary syntax for effect, consulting references (e.g., Tufte's <i>Artful Sentences</i>) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.
Vocabulary Acquisition and Use	
<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grades 9–10 reading and content</i>, choosing flexibly from a range of strategies.</p> <ul style="list-style-type: none"> a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., <i>analyze, analysis, analytical; advocate, advocacy</i>). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ul style="list-style-type: none"> a. Interpret figures of speech (e.g., satire, sarcasm) in context and analyze their role in the text. b. Analyze nuances in the meaning of words with similar denotations. <p>6. Acquire and use accurately general academic and domain-specific vocabulary sufficient for reading, writing, speaking, and listening at the college and career readiness level.</p>	<p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grades 11–12 reading and content</i>, choosing flexibly from a range of strategies.</p> <ul style="list-style-type: none"> a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., <i>conceive, conception, conceivable</i>). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ul style="list-style-type: none"> a. Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text. b. Analyze nuances in the meaning of words with similar denotations. <p>6. Acquire and use accurately general academic and domain-specific vocabulary sufficient for reading, writing, speaking, and listening at the college and career readiness level.</p>

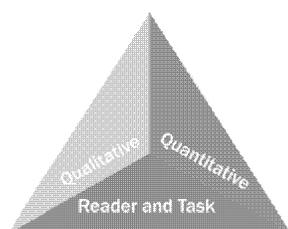
Language Progressive Skills, by Grade

The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.

Skill	3	4	5	6	7	8	9–10	11–12
Ensure subject-verb and pronoun-antecedent agreement.								
Choose words and phrases for effect.								
Produce complete sentences, recognizing and correcting rhetorically poor fragments and run-ons.								
Correctly use frequently confused words (e.g., <i>to/too/two; there/their</i>).								
Choose words and phrases to convey ideas precisely.								
Use punctuation for effect.								
Recognize and correct inappropriate shifts in verb tense and aspect.								
Use punctuation to separate items in a series.								
Recognize and correct inappropriate shifts in pronoun number and person.								
Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
Vary sentence patterns for meaning, reader/listener interest, and style.								
Maintain consistency in style and tone.								
Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
Choose language that expresses ideas precisely and concisely, eliminating wordiness and redundancy.								
Recognize and correct inappropriate shifts in verb voice and mood.								
Use parallel structure.								

Standard 10: Range, Quality, and Complexity of Student Reading 6–12

Measuring Text Complexity: Three Factors



Qualitative evaluation of the text: Levels of meaning, structure, language conventionality and clarity, and knowledge demands

Quantitative evaluation of the text: Readability measures and other scores of text complexity

Matching reader to text and task: Reader knowledge, motivation, and interests as well as the complexity generated by the tasks assigned and the questions posed

Note: More detailed information on text complexity and how it is measured is contained in Appendix A.

Range of Text Types for 6–12

Students in grades 6–12 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.

Literature			Informational Text
Stories	Drama	Poetry	Literary Nonfiction
Includes the subgenres of adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, and graphic novels	Includes one-act and multiact plays, both in written form and on film	Includes the subgenres of narrative poems, lyrical poems, free verse poems, sonnets, odes, ballads, and epics	Includes the subgenres of exposition, argument, and functional text in the form of personal essays, speeches, opinion pieces, essays about art or literature, biographies, memoirs, journalism, and historical, scientific, or economic accounts (including digital sources) written for a broad audience

Texts Illustrating the Complexity, Quality, and Range of Student Reading 6–12

	Literature: Stories, Dramas, Poetry	Informational Texts: Literary Nonfiction
6–8	<ul style="list-style-type: none"> ▪ <i>Little Women</i> by Louisa May Alcott (1869) ▪ <i>The Adventures of Tom Sawyer</i> by Mark Twain (1876) ▪ “The Road Not Taken” by Robert Frost (1915) ▪ <i>The Dark Is Rising</i> by Susan Cooper (1973) ▪ <i>Dragonwings</i> by Laurence Yep (1975) ▪ <i>Roll of Thunder, Hear My Cry</i> by Mildred Taylor (1976) 	<ul style="list-style-type: none"> ▪ “Letter on Thomas Jefferson” by John Adams (1776) ▪ <i>Narrative of the Life of Frederick Douglass, an American Slave</i> by Frederick Douglass (1845) ▪ <i>Harriet Tubman: Conductor on the Underground Railroad</i> by Ann Petry (1955) ▪ <i>Travels with Charley: In Search of America</i> by John Steinbeck (1962) ▪ <i>The Great Fire</i> by Jim Murphy (1995) ▪ <i>This Land Was Made for You and Me: The Life and Songs of Woody Guthrie</i> by Elizabeth Partridge (2002)
9–10	<ul style="list-style-type: none"> ▪ <i>The Tragedy of Romeo and Juliet</i> by William Shakespeare (1592) ▪ “Ozymandias” by Percy Bysshe Shelley (1817) ▪ “The Raven” by Edgar Allan Poe (1845) ▪ “The Gift of the Magi” by O. Henry (1906) ▪ <i>The Grapes of Wrath</i> by John Steinbeck (1939) ▪ <i>Fahrenheit 451</i> by Ray Bradbury (1953) ▪ <i>The Killer Angels</i> by Michael Shaara (1975) 	<ul style="list-style-type: none"> ▪ “Speech to the Second Virginia Convention” by Patrick Henry (1775) ▪ The Declaration of Independence by Thomas Jefferson (1776) ▪ “Second Inaugural Address” by Abraham Lincoln (1865) ▪ “State of the Union Address” by Franklin Delano Roosevelt (1941) ▪ <i>Cod: A Biography of the Fish That Changed the World</i> by Mark Kurlansky (1997) ▪ <i>The Race to Save Lord God Bird</i> by Phillip Hoose (2004)
11–CCR	<ul style="list-style-type: none"> ▪ “Ode on a Grecian Urn” by John Keats (1820) ▪ <i>Jane Eyre</i> by Charlotte Brontë (1848) ▪ “Because I Could Not Stop for Death” by Emily Dickinson (1890) ▪ <i>The Great Gatsby</i> by F. Scott Fitzgerald (1925) ▪ <i>Their Eyes Were Watching God</i> by Zora Neale Hurston (1937) ▪ <i>A Raisin in the Sun</i> by Lorraine Hansberry (1959) ▪ <i>The Namesake</i> by Jhumpa Lahiri (2003) 	<ul style="list-style-type: none"> ▪ <i>The Crisis</i> by Thomas Paine (1776) ▪ <i>Walden</i> by Henry David Thoreau (1854) ▪ “Society and Solitude” by Ralph Waldo Emerson (1857) ▪ “Gettysburg Address” by Abraham Lincoln (1863) ▪ “Letter from Birmingham Jail” by Martin Luther King, Jr. (1964) ▪ <i>Google Hacks: Tips & Tools for Smarter Searching</i> by Tara Calishain and Rael Dornfest (2004) ▪ <i>America’s Constitution: A Biography</i> by Akhil Reed Amar (2005)

Note: Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of grades 6–12 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth.

**Standards for Literacy
in History/Social Studies,
Science, and Technical Subjects**

6-12

College and Career Readiness Anchor Standards for Reading

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented graphically, visually, orally, and multimodally as well as in words within and across print and digital sources.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see “Research to Build and Present Knowledge” in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Note on range and content of student reading

Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College- and career-ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with *independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.*

Reading Standards for Literacy in History/Social Studies 6–12

[RH]

The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of primary and secondary sources. 2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions. 3. Identify key steps in a text’s description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered). 	<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information. 2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text. 3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them. 	<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole. 2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas. 3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.
Craft and Structure		
<ol style="list-style-type: none"> 4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies. 5. Describe how a text presents information (e.g., sequentially, comparatively, causally). 6. Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts). 	<ol style="list-style-type: none"> 4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science. 5. Analyze how a text uses structure to emphasize key points or advance a point of view. 6. Compare the point of view of two or more authors by comparing how they treat the same or similar history/social science topics, including which details they include and emphasize in their respective accounts. 	<ol style="list-style-type: none"> 4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines <i>faction</i> in <i>Federalist</i> No. 10). 5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole. 6. Evaluate authors’ differing points of view on the same historical event or issue by assessing the authors’ claims, reasoning, and evidence.
Integration of Knowledge and Ideas		
<ol style="list-style-type: none"> 7. Integrate visual information (e.g., pictures, videos, maps) with other information within or across print or digital texts. 8. Distinguish among fact, opinion, and reasoned judgment in a text. 9. Analyze the relationship between a primary and secondary source on the same topic. 	<ol style="list-style-type: none"> 7. Integrate quantitative or technical information (e.g., charts, research data) with other information within or across print or digital texts. 8. Assess the extent to which the evidence in a text supports the author’s claims. 9. Compare and contrast treatments of the same topic in several primary and secondary sources. 	<ol style="list-style-type: none"> 7. Integrate and evaluate multiple sources of information presented in different formats (e.g., print or digital text, video, multimedia) in order to address a question, resolving conflicting information when possible. 8. Evaluate an author’s premises, claims, and evidence by corroborating or challenging them with other sources of information. 9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.
Range of Reading and Level of Text Complexity		
<ol style="list-style-type: none"> 10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently. 	<ol style="list-style-type: none"> 10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently. 	<ol style="list-style-type: none"> 10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–12 text complexity band independently and proficiently.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of science and technical texts. 2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. 3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. 	<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. 2. Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. 3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text. 	<ol style="list-style-type: none"> 1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. 2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. 3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
Craft and Structure		
<ol style="list-style-type: none"> 4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6–8 texts and topics</i>. 5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. 	<ol style="list-style-type: none"> 4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9–10 texts and topics</i>. 5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms pertaining to important ideas and processes (e.g., <i>force, friction, reaction force, energy</i>). 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. 	<ol style="list-style-type: none"> 4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. 5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved or uncertain.
Integration of Knowledge and Ideas		
<ol style="list-style-type: none"> 7. Integrate quantitative or technical information provided by the words in a text with a version of that information expressed graphically (e.g., in a flowchart, diagram, model, graph, or table). 8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. 9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. 	<ol style="list-style-type: none"> 7. Demonstrate understanding of quantitative or technical information by translating information provided by the words in a text into graphical form (e.g., a table or chart) or translating information expressed graphically or mathematically (e.g., in an equation) into words. 8. Assess the extent to which the evidence in a text supports a claim or a recommendation for solving a scientific or technical problem. 9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. 	<ol style="list-style-type: none"> 7. Integrate and evaluate multiple sources of information presented in different formats (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem, resolving conflicting information when possible. 8. Evaluate the hypotheses, data, and conclusions in a science or technical text, verifying data and corroborating or challenging conclusions when possible by using other sources of information. 9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Range and Level of Text Complexity		
<ol style="list-style-type: none"> 10. By the end of grade 8, read and comprehend 	<ol style="list-style-type: none"> 10. By the end of grade 10, read and comprehend 	<ol style="list-style-type: none"> 10. By the end of grade 12, read and comprehend

science/technical texts in the grades 6–8 text complexity band independently and proficiently.

science/technical texts in the grades 9–10 text complexity band independently and proficiently.

science/technical texts in the grades 11–12 text complexity band independently and proficiently.

DRAFT

College and Career Readiness Anchor Standards for Writing

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They relate to their College and Career Readiness (CCR) counterparts by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Text Types and Purposes¹

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.²
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

¹These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.

The standards below begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
<i>Text Types and Purposes</i>		
<p>2. Write arguments focused on <i>discipline-specific content</i>.</p> <ul style="list-style-type: none"> a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. f. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. g. Establish and maintain a formal style. c. Provide a concluding statement or section that follows from and supports the argument presented. 	<p>1. Write arguments focused on <i>discipline-specific content</i>.</p> <ul style="list-style-type: none"> f. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. g. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns. h. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. i. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. j. Provide a concluding statement or section that follows from or supports the argument presented. 	<p>1. Write arguments focused on <i>discipline-specific content</i>.</p> <ul style="list-style-type: none"> f. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. g. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases. h. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. i. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. j. Provide a concluding statement or section that follows from or supports the argument presented.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
<i>Text Types and Purposes (continued)</i>		
<p>4. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <ul style="list-style-type: none"> g. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. h. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. i. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. j. Use precise language and domain-specific vocabulary to inform about or explain the topic. k. Establish and maintain a formal style and objective tone. l. Provide a concluding statement or section that follows from and supports the information or explanation presented. 	<p>3. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <ul style="list-style-type: none"> g. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. h. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. i. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. j. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. k. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. l. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). 	<p>3. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <ul style="list-style-type: none"> a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
<p>3. Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations that others can replicate them and (possibly) reach the same results.</p>	<p>3. Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations that others can replicate them and (possibly) reach the same results.</p>	<p>3. Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations that others can replicate them and (possibly) reach the same results.</p>

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
<i>Production and Distribution of Writing</i>		
<p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.</p> <p>6. Use technology, including the Internet, to produce and publish a minimum of five pages of writing as well as to interact and collaborate with others.</p>	<p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p> <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p>	<p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p> <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p>
<i>Research to Build and Present Knowledge</i>		
<p>7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.</p> <p>8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.</p> <p>10. Draw evidence from informational texts to support analysis, reflection, and research.</p>	<p>7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p> <p>9. Draw evidence from informational texts to support analysis, reflection, and research.</p>	<p>7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p>9. Draw evidence from informational texts to support analysis, reflection, and research.</p>
<i>Range of Writing</i>		
<p>10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>	<p>10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>

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Introduction

Toward greater focus and coherence

Mathematics experiences in early childhood settings should concentrate on (1) number (which includes whole number, operations, and relations) and (2) geometry, spatial relations, and measurement, with more mathematics learning time devoted to number than to other topics. [M]athematical process goals should be integrated in these content areas.

National Research Council, 2009

The composite standards [of Hong Kong, Korea and Singapore] have a number of features that can inform an international benchmarking process for the development of K–6 mathematics standards in the U.S. First, the composite standards concentrate the early learning of mathematics on the number, measurement, and geometry strands with less emphasis on data analysis and little exposure to algebra. The Hong Kong standards for grades 1–3 devote approximately half the targeted time to numbers and almost all the time remaining to geometry and measurement.

Ginsburg, Leinwand and Decker, 2009

Because the mathematics concepts in [U.S.] textbooks are often weak, the presentation becomes more mechanical than is ideal. We looked at both traditional and non-traditional textbooks used in the US and found this conceptual weakness in both.

Ginsburg et al., 2005

There are many ways to organize curricula. The challenge, now rarely met, is to avoid those that distort mathematics and turn off students.

Steen, 2007

For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is ‘a mile wide and an inch deep.’ These Standards are a substantial answer to that challenge.

It is important to recognize that “fewer standards” are no substitute for *focused* standards. Achieving “fewer standards” would be easy to do by resorting to broad, general statements. Instead, these Standards aim for clarity and specificity.

Assessing the coherence of a set of standards is more difficult than assessing their focus. William Schmidt and Richard Houang (2002) have said that content standards and curricula are coherent if they are:

*articulated over time as a sequence of topics and performances that are logical and reflect, where appropriate, the sequential or hierarchical nature of the disciplinary content from which the subject matter derives. That is, what and how students are taught should reflect not only the topics that fall within a certain academic discipline, **but also the key ideas** that determine how knowledge is organized and generated within that discipline. This implies that “to be coherent,” a set of content standards must evolve from particulars (e.g., the meaning and operations of whole numbers, including simple math facts and routine computational procedures associated with whole numbers and fractions) to deeper structures inherent in the discipline. This deeper structure then serves as a means for connecting the particulars (such as an understanding of the rational number system and its properties). (emphasis added)*

These Standards endeavor to follow such a design, not only by stressing conceptual understanding of key ideas, but also by continually returning to organizing principles such as place value or the laws of arithmetic to structure those ideas.

In addition, the ‘sequence of topics and performances’ that is outlined in a body of mathematics standards must also respect what is known about how students learn. As Confrey (2007) points out, developing “sequenced obstacles and challenges for students... absent the insights about meaning that derive from careful study of learning, would be unfortunate and unwise.” In recognition of this, the development of these Standards began with research-based learning progressions detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time.

Understanding mathematics

These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student’s mathematical maturity, *why* a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.

The Standards begin on the next page with eight Standards for Mathematical Practice.

How to read the grade level standards

Domain

Number and Operations in Base Ten

Understand place value

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
 - a. 100 can be thought of as a bundle of ten tens — called a “hundred.”
 - b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
2. Count within 1000; skip-count by 5s, 10s, and 100s.
3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand

Cluster

Standard

Standards define what students should understand and be able to do. **Clusters** summarize groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject. **Domains** are larger groups of related standards. Standards from different domains may sometimes be closely related.

Dotted Underlines: Dotted underlines, for example, associative property, indicate terms that are defined in the Glossary. In each grade, underlining is used for the first occurrence of a defined term, but not in subsequent occurrences.

Mathematics | Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education: the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections; and the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

1 Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. Key related processes: Problem solving. Key related proficiencies: Conceptual understanding, strategic competence, productive disposition.

2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. Key related processes: Problem solving, Representation. Key related proficiencies: Strategic competence, productive disposition.

3 Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. Key related processes: Problem solving, Representation. Key related proficiencies: Strategic competence, productive disposition.

4 Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. Key related processes: Representation. Key related proficiencies: Adaptive reasoning.

5 Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer algebra system, statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts. Key related processes: Problem solving. Key related proficiencies: Strategic competence.

6 Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. Key related processes: Problem solving, Representation. Key related proficiencies: Procedural fluency.

7 Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y . Key related processes: Reasoning and proof. Key related proficiencies: Adaptive reasoning.

8 Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through $(1, 2)$ with slope 3, middle school students might abstract the equation $(y - 2)/(x -$

$1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results. Key related processes: Problem solving, Reasoning and proof. Key related proficiencies: Adaptive reasoning.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content

The Standards for Mathematical Practice describe ways in which developing student-practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curriculum, assessment, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word “understand” are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential “points of intersection” between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve curriculum, instruction, assessment, professional development, and student achievement in mathematics.

Mathematics | Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as $5 + 2 = 7$ and $7 - 2 = 5$. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Grade Level Overview

Counting and Cardinality	<ul style="list-style-type: none"> • Know number names and the count sequence. • Count to tell the number of objects. • Compare numbers. 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 	Mathematical Practices
Operations and Algebraic Thinking	<ul style="list-style-type: none"> • Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. 	<ol style="list-style-type: none"> 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 	
Number and Operations in Base Ten	<ul style="list-style-type: none"> • Work with numbers 11-19 to gain foundations for place value. 	<ol style="list-style-type: none"> 8. Look for and express regularity in repeated reasoning. 	
Measurement and Data	<ul style="list-style-type: none"> • Describe and compare measurable attributes. • Classify objects and count the number of objects in each category 		
Geometry	<ol style="list-style-type: none"> 1. Identify and describe shapes. 2. Analyze, compare, create, and compose shapes. 		

Counting and Cardinality K.CC

Know number names and the count sequence.

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
 - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
 - b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
 - c. Understand that each successive number name refers to a quantity that is one larger.
5. Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle; or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.¹
7. Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking K.OA

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

1. Represent addition and subtraction with objects, fingers, mental images, drawings,² sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).
4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
5. Fluently add and subtract within 5.

Number and Operations in Base Ten K.NBT

Work with numbers 11-19 to gain foundations for place value.

1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Measurement and Data K.MD

Describe and compare measurable attributes.

1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
2. Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller / shorter.*

Classify objects and count the number of objects in each category.

3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.³

¹ Include groups with up to ten objects.

² Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

Identify and describe shapes (such as squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.
2. Correctly name shapes regardless of their orientations or overall size.
3. Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).

Analyze, compare, create, and compose shapes.

4. Analyze and compare a variety of two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/“corners”) and other attributes (e.g., having sides of equal length).
5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
6. Compose simple shapes to form larger shapes.

² Limit category counts to be less than or equal to 10.

Mathematics | Grade 1

In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., “making tens”) to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

(2) Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

(3) Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.⁴

(4) Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Grade Level Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Mathematical Practices

⁴ Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.

Represent and solve problems involving addition and subtraction.

1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.⁵
2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Understand and apply properties of operations and the relationship between addition and subtraction.

3. Apply properties of operations as strategies to add and subtract.⁶ *Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)*
4. Understand subtraction as an unknown-addend problem. *For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.*

Add and subtract within 20.

5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

Work with addition and subtraction equations.

7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.*
8. Determine the unknown number in a whole-number addition or subtraction equation. *For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = \square - 3$, $6 + 6 = \square$.*

Number and Operations in Base Ten 1.NBT

Extend the counting sequence.

1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Understand place value.

2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
 - a. 10 can be thought of as a bundle of ten ones — called a “ten.”
 - b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
 - c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

Use place value understanding and properties of operations to add and subtract.

4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

⁵ See Glossary, Table 1.⁶ Students need not use formal terms for these properties.

Measure lengths indirectly and by iterating length units.

1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.
2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

Tell and write time.

3. Tell and write time in hours and half-hours using analog and digital clocks.

Represent and interpret data.

4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Geometry 1.G

Reason with shapes and their attributes.

1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size) for a wide variety of shapes; build and draw shapes to possess defining attributes.
2. Compose two-dimensional shapes (such as rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (such as cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.⁷
3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

⁷ Students do not need to learn formal names such as “right rectangular prism.”

Mathematics | Grade 2

In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

(1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

(3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Grade Level Overview

Operations and Algebraic Thinking	<ul style="list-style-type: none"> • Represent and solve problems involving addition and subtraction. • Add and subtract within 20. • Work with equal groups of objects to gain foundations for multiplication. 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	Mathematical Practices
Number and Operations in Base Ten	<ul style="list-style-type: none"> • Understand place value. • Use place value understanding and properties of operations to add and subtract. 		
Measurement and Data	<ul style="list-style-type: none"> • Measure and estimate lengths in standard units. • Relate addition and subtraction to length. • Work with time and money. • Represent and interpret data. 		
Geometry	<ul style="list-style-type: none"> • Reason with shapes and their attributes. 		

Operations and Algebraic Thinking 2.OA

Represent and solve problems involving addition and subtraction.

1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.⁸

Add and subtract within 20.

2. Fluently add and subtract within 20. By end of Grade 2, know from memory all sums of two one-digit numbers.

Work with equal groups of objects to gain foundations for multiplication.

3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Number and Operations in Base Ten 2.NBT

Understand place value.

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
 - a. 100 can be thought of as a bundle of ten tens — called a “hundred.”
 - b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
2. Count within 1000; skip-count by 5s, 10s, and 100s.
3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract.

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
8. Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.
9. Explain why addition and subtraction strategies work, using place value and the properties of operations.⁹

Measurement and Data 2.MD

Measure and estimate lengths in standard units.

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
3. Estimate lengths using units of inches, feet, centimeters, and meters.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.

⁸ See Glossary, Table 1.

⁹ Explanations may be supported by drawings or objects.

5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
6. Represent whole numbers as lengths from 0 on a **number line diagram** with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences on a number line diagram.

Work with time and money.

7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately.
Example: If you have 2 dimes and 3 pennies, how many cents do you have?

Represent and interpret data.

9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a **line plot**, where the horizontal scale is marked off in whole-number units.
10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems¹⁰ using information presented in a bar graph.

Geometry 2.6

Reason with shapes and their attributes.

1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.¹¹ Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

¹⁰ See Glossary, Table 1.

¹¹ Sizes are compared directly or visually, not compared by measuring.

Mathematics | Grade 3

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

(2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole; for example, $\frac{1}{2}$ of the paint in a large bucket could be less paint than $\frac{1}{3}$ of the paint in a smaller bucket; but $\frac{1}{3}$ of a ribbon is longer than $\frac{1}{5}$ of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

(3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

(4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Grade Level Overview

Operations and Algebraic Thinking	<ul style="list-style-type: none"> • Represent and solve problems involving multiplication and division. • Understand properties of multiplication and the relationship between multiplication and division. • Multiply and divide within 100. • Solve problems involving the four operations, and identify and explain patterns in arithmetic. 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	Mathematical Practices
Number and Operations in Base Ten	<ul style="list-style-type: none"> • Use place value understanding and properties of operations to perform multi-digit arithmetic. 		
Number and Operations—Fractions	<ul style="list-style-type: none"> • Develop understanding of fractions as numbers. 		
Measurement and Data	<ul style="list-style-type: none"> • Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. • Represent and interpret data. • Geometric measurement: understand concepts of area and relate area to multiplication and to addition. • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. 		
Geometry	<ul style="list-style-type: none"> • Reason with shapes and their attributes. 		

Represent and solve problems involving multiplication and division.

1. Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .
2. Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.¹²
4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \square \div 3$, $6 \times 6 = ?$.

Understand properties of multiplication and the relationship between multiplication and division.

5. Apply properties of operations as strategies to multiply and divide.¹³ Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (*Commutative property of multiplication.*) $3 \times 5 \times 2$ can be found by multiplying $3 \times 5 = 15$ then multiplying $15 \times 2 = 30$, or by multiplying $5 \times 2 = 10$ then multiplying $3 \times 10 = 30$. (*Associative property of multiplication.*) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (*Distributive property.*)
6. Understand division as an unknown-factor problem. For example, divide $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Multiply and divide within 100.

7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By end of Grade 3, know from memory all products of one-digit numbers.

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity; assess the reasonableness of answers using mental computation and estimation strategies including rounding.¹⁴
9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

Number and Operations in Base Ten 3.NBT

Use place value understanding and properties of operations to perform multi-digit arithmetic.¹⁵

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

Number and Operations—Fractions¹⁶ 3.NF**Develop understanding of fractions as numbers.**

1. Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$.
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.

¹² See Glossary, Table 2.¹³ Students need not use formal terms for these properties.¹⁴ This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order.¹⁵ A range of algorithms may be used.¹⁶ Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8.

- a. Represent a fraction $\frac{1}{b}$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.
 - b. Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.
3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- a. Recognize and generate simple equivalent fractions (e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$); explain why the fractions are equivalent, e.g., by using a visual fraction model.
 - b. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form $3 = \frac{3}{1}$; recognize that $\frac{6}{1} = 6$; locate $\frac{4}{4}$ and 1 at the same point of a number line diagram.*
 - c. Compare two fractions with the same numerator or the same denominator, by reasoning about their size; recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Measurement and Data 3.MD

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

1. Tell and write time to the nearest minute and measure time intervals in minutes; solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (L).¹⁷ Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.¹⁸

Represent and interpret data.

3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 1 pet, 5 pets, or 10 pets.*
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
 - a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
 - b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
6. Measure areas by counting unit squares, using square cm, square m, square in, square ft, and improvised units.
7. Relate area to the operations of multiplication and addition.
 - a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
 - b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems; represent whole-number products as rectangular areas in mathematical reasoning.
 - c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$; use area models to represent the distributive property in mathematical reasoning.
 - d. Recognize area as additive; find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

8. Solve real-world and mathematical problems involving perimeters of polygons, such as finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.

Geometry 3.G

¹⁷ Excludes compound units such as cm^3 and finding the geometric volume of a container.

¹⁸ Excludes multiplicative comparison problems (problems involving notions of “times as much”; see Glossary, Table 2).

Reason with shapes and their attributes.

1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals); recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part is $\frac{1}{4}$ of the area of the shape.*

Mathematics | Grade 4

In Grade 4, instructional time should focus on four critical areas: (1) developing understanding and fluency with whole number multiplication, and developing understanding of whole number division; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) continuing to develop understanding of area; and (4) understanding that geometric figures can be analyzed and classified based on their properties such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They use understandings of multiplication and division to develop fluency with multiplication and division of whole numbers. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $15/9 = 5/3$), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

(3) Students develop their understanding of area. They understand and apply the area formula for rectangles and also find areas of shapes that can be decomposed into rectangles. They select appropriate units, strategies (e.g., decomposing shapes), and tools for solving problems that involve estimating and measuring area.

(4) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Grade Level Overview

Operations and Algebraic Thinking	<ul style="list-style-type: none"> Use the four operations with whole numbers to solve problems. Gain familiarity with factors and multiples. Generate and analyze patterns. 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	Mathematical Practices
Number and Operations in Base Ten	<ul style="list-style-type: none"> Generalize place value understanding for multi-digit whole numbers. Use place value understanding and properties of operations to perform multi-digit arithmetic. 		
Number and Operations—Fractions	<ul style="list-style-type: none"> Extend understanding of fraction equivalence and ordering. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. Understand decimal notation for fractions, and compare decimal fractions. 		
Measurement and Data	<ul style="list-style-type: none"> Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. Represent and interpret data. Geometric measurement: understand concepts of angle and measure angles. 		
Geometry	<ul style="list-style-type: none"> Draw and identify lines and angles, and classify shapes by properties of their lines and angles. 		

Use the four operations with whole numbers to solve problems.

1. Interpret a multiplication equation as a comparison, e.g., interpret $5 \times 7 = 35$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.¹⁹
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity; assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Gain familiarity with factors and multiples.

4. Find the factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

Generate and analyze patterns.

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example: Given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Number and Operations in Base Ten²⁰ 4.NBT**Generalize place value understanding for multi-digit whole numbers.**

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*
2. Read and write multi-digit whole numbers using base-ten numerals, number names, and **expanded form**. Compare two multi-digit numbers based on meanings of the digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
3. Use place value understanding to round multi-digit whole numbers to any place.

Use place value understanding and properties of operations to perform multi-digit arithmetic.²¹

4. Add and subtract multi-digit whole numbers accurately and efficiently using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
6. Find **whole-number quotients** and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Number and Operations—Fractions²² 4.NF**Extend understanding of fraction equivalence and ordering.**

1. Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size; use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$; recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

¹⁹ See Glossary, Table 2.²⁰ Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.²¹ A range of algorithms may be used.²² Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
 - a. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation (e.g., $3/8 = 1/8 + 1/8 + 1/8$ and $3/8 = 1/8 + 2/8$). Justify decompositions, e.g., by using a visual fraction model.
 - b. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
 - c. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
 - a. Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.
 - b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)
 - c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example: *If each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.²³ For example, express $3/10$ as $30/100$ and add $3/10 + 4/100 = 34/100$.
6. Interpret a two-digit decimal as a fraction and use decimal notation for parts of wholes; round decimals to the nearest whole number by reasoning about their size. For example, rewrite 1.62 as $1\ 62/100$; describe a length as 1.62 meters; locate 1.62 on a number line diagram and round 1.62 to 2.
7. Compare two decimals to hundredths by reasoning about their size; recognize that valid comparisons rely on the two decimals referring to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

Measurement and Data 4.MD

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; ℓ , ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table. For example: *Know that 1 ft is 12 times as long as 1 in; express the length of a 4 ft snake as 48 in; generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
3. Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. For example, *find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Represent and interpret data.

4. Make a line plot to display a data set of measurements in fractions of a unit ($1/2, 1/4, 1/8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, *from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

Geometric measurement: understand concepts of angle and measure angles.

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

²³ Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

- a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.
 - b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
6. Measure angles in whole-number degrees using a protractor; sketch angles of specified measure.
 7. Recognize angle measure as additive; when an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Geometry 4.G

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines; identify these in two-dimensional figures.
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of specified size. Recognize right triangles as a category, and identify right triangles.
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts; identify line-symmetric figures and draw lines of symmetry.

Mathematics | Grade 5

In Grade 5, instructional time should focus on four critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) developing fluency with whole number operations; (3) integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths; and (4) developing understanding of volume.

(1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

(2) Students develop fluency with multi-digit addition, subtraction, and multiplication, and develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations.

(3) Students apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

(4) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real-world and mathematical problems.

Grade Level Overview

Operations and Algebraic Thinking	<ul style="list-style-type: none"> Write and interpret numerical expressions. Analyze patterns and relationships. 	1. Make sense of problems and persevere in solving them.	Mathematical Practices
Number and Operations in Base Ten	<ul style="list-style-type: none"> Understand the place value system. Perform operations with multi-digit whole numbers and with decimals to hundredths. 	2. Reason abstractly and quantitatively.	
Number and Operations—Fractions	<ul style="list-style-type: none"> Use equivalent fractions as a strategy to add and subtract fractions. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. 	3. Construct viable arguments and critique the reasoning of others.	
Measurement and Data	<ul style="list-style-type: none"> Convert like measurement units within a given measurement system. Represent and interpret data. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. 	4. Model with mathematics.	
Geometry	<ul style="list-style-type: none"> Graph points on the coordinate plane to solve real-world and mathematical problems. Classify two-dimensional figures into categories based on their properties. 	5. Use appropriate tools strategically.	
		6. Attend to precision.	
		7. Look for and make use of structure.	
		8. Look for and express regularity in repeated reasoning.	

Operations and Algebraic Thinking 5.OA

Write and interpret numerical expressions.

1. Interpret grouping symbols in numerical expressions and evaluate expressions with grouping symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$; recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.*

Analyze patterns and relationships.

3. Generate two numerical patterns using two given rules. Graph pairs of corresponding terms on a coordinate plane, and identify apparent relationships between corresponding terms. *For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*

Number and Operations in Base Ten 5.NBT

Understand the place value system.

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $1/10$ of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use positive integer exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.
 - a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
 - b. Compare two decimals to thousandths based on meanings of the digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
4. Use place value understanding to round decimals to any place.

Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently add, subtract, and multiply multi-digit whole numbers using the standard algorithm for each operation.
6. Find quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division; express the quotient as a fraction or mixed number. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
7. Add, subtract, multiply, and divide decimals of one or two digits, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Number and Operations—Fractions 5.NF

Use equivalent fractions as a strategy to add and subtract fractions.

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)*
2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result $2/5 + 1/2 = 3/7$ by observing that $3/7 < 1/2$.*

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3. Interpret a fraction as the result of dividing the numerator by the denominator ($a/b = a \div b$); solve word problems involving division of whole numbers leading to fractional answers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
 - a. Interpret the product $(\frac{a}{b}) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(\frac{2}{3}) \times 4 = \frac{8}{3}$, and create a story context for this equation; do the same with $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$. (In general, $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$.)
 - b. Find the area of a rectangle with fractional side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths; multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5. Interpret multiplication as scaling (resizing), including by:
 - a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
 - b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $\frac{a}{b} = \frac{(n \times a)}{(n \times b)}$ to the effect of multiplying $\frac{a}{b}$ by 1.
6. Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.²⁴
 - a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(\frac{1}{3}) \div 4$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(\frac{1}{3}) \div 4 = \frac{1}{12}$ because $(\frac{1}{12}) \times 4 = \frac{1}{3}$.
 - b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (\frac{1}{5})$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $4 \div (\frac{1}{5}) = 20$ because $20 \times (\frac{1}{5}) = 4$.
 - c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, How much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$ -cup servings are in 2 cups of raisins?

Measurement and Data 5.MD

Convert like measurement units within a given measurement system.

1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step real-world problems.

Represent and interpret data.

2. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
 - a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.
 - b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5. Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume.
 - a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent three-fold whole-number products as volumes, e.g., to represent the associative property of multiplication.

²⁴ Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

- b. Apply the formulas $V = \ell w h$ and $V = b h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems;
- c. Recognize volume as additive; find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.

Geometry 5.G

Graph points on the coordinate plane to solve real-world and mathematical problems.

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x -axis and x -coordinate, y -axis and y -coordinate).
2. Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Classify two-dimensional figures into categories based on their properties.

3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
4. Classify two-dimensional figures in a hierarchy based on properties.

Mathematics | Grade 6

In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions; (3) developing understanding of and using formulas to determine areas of two-dimensional shapes and distinguishing between volume and surface area of three-dimensional shapes; and (4) writing, interpreting, and using expressions and equations.

(1) Students use reasoning about multiplication and division of quantities to solve ratio and rate problems. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students extend multiplication and division to ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they build on their understanding of fractions to understand ratios. Students solve a wide variety of problems involving ratios and rates.

(2) Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students are able to use these operations to solve problems.

(3) Students reason about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposition into pieces whose area they can determine. They reason about right rectangular prisms with rational sides to extend the formula for its volume to rational side lengths. They prepare for work on scale drawings and constructions in Grade 8 by drawing polygons in the coordinate plane.

(4) Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

Students in Grade 6 develop their ability to think statistically. Students recognize that a typical data distribution does not have a definite center, and so different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed fairly, and also in the sense that it is a balance point. Students learn to describe and summarize distributions of data, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data was collected.

Grade Level Overview

Ratios and Proportional Relationships	<ul style="list-style-type: none"> Understand ratio concepts and use ratio reasoning to solve problems. 	1. Make sense of problems and persevere in solving them.	Mathematical Practices
The Number System	<ul style="list-style-type: none"> Apply and extend previous understandings of multiplication and division to divide fractions by fractions. Apply and extend previous understandings of numbers to the system of rational numbers. 	2. Reason abstractly and quantitatively.	
Expressions and Equations	<ul style="list-style-type: none"> Apply and extend previous understandings of arithmetic to algebraic expressions. Reason about and solve one-variable equations and inequalities. Represent and analyze quantitative relationships between dependent and independent variables. 	3. Construct viable arguments and critique the reasoning of others.	
Geometry	<ul style="list-style-type: none"> Solve real-world and mathematical problems involving area, surface area, and volume. 	4. Model with mathematics.	
Statistics and Probability	<ul style="list-style-type: none"> Develop understanding of statistical variability. Summarize and describe distributions. 	5. Use appropriate tools strategically.	
		6. Attend to precision.	
		7. Look for and make use of structure.	
		8. Look for and express regularity in repeated reasoning.	

Understand ratio concepts and use ratio reasoning to solve problems.

1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”*
2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar.” “We paid \$75 for 15 paperbacks, which is a rate of \$5 per paperback.”¹*
3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
 - a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
 - b. Solve unit rate problems including unit pricing and constant speed. *For example, “If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?”*
 - c. Find a percentage of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole given a part and the percentage.
 - d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

The Number System 6.NS**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?*
2. Fluently divide multi-digit numbers using the standard algorithm for each operation.

Apply and extend previous understandings of numbers to the system of rational numbers.

3. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
4. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate planes familiar from previous grades to represent negative numbers and their distance from 0.
 - a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
 - b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
 - c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
5. Understand the ordering of rational numbers.
 - a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.*
 - b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C .*
6. Understand absolute value and its relationship to the order of rational numbers.

¹ Expectations for unit rates in this grade are limited to non-complex fractions.

- a. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write $|-30| = 30$ to describe the size of the debt in dollars.*
 - b. Distinguish comparisons of absolute value from statements of order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.*
7. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane, including using coordinates and absolute value reasoning to find distances between points with the same first coordinate or the same second coordinate.

Expressions and Equations 6.EE

Apply and extend previous understandings of arithmetic to algebraic expressions.

1. Evaluate numerical expressions involving whole-number exponents.
2. Write, read, and evaluate expressions in which letters stand for numbers.
 - a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as $5 - y$.*
 - b. Identify parts of an expression using mathematical language (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.*
 - c. Evaluate expressions by substituting values for their variables, including when using formulas in real-world problems. Perform arithmetic operations (including those involving whole-number exponents) in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.*
3. Apply the properties of operations as strategies to generate equivalent expressions. *For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.*
4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.*

Reason about and solve one-variable equations and inequalities.

5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6. Use variables to stand for numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can be used in cases where a number is unknown, or where, for the purpose at hand, it can be any number in a specified set.
7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
8. Write a statement of inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities graphically on a number line diagram.

Represent and analyze quantitative relationships between dependent and independent variables.

9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.*

Geometry 6.G

Solve real-world and mathematical problems involving area, surface area, and volume.

1. Find area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the

- prism. Apply the formulas $V = \ell w h$ and $V = b h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
 4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Statistics and Probability 6.SP

Develop understanding of statistical variability.

1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.*
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its overall shape, center and spread.
3. Recognize that a measure of center for a numerical data set summarizes all of its values using a single number, while a measure of variation describes how its values vary using a single number.

Summarize and describe distributions.

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
5. Summarize numerical data sets in relation to their context, such as by:
 - a. Reporting the number of observations.
 - b. Describing the nature of the attribute of investigation, including how it was measured and its units of measurement.
 - c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
 - d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

Mathematics | Grade 7

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and solving linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

(1) Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

(2) Students develop a unified understanding of number, recognizing fractions, decimals, and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division and their properties to all rational numbers, including integers and numbers represented by complex fractions and negative fractions. By applying the properties of operations, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain why the rules for adding, subtracting, multiplying, and dividing with negative numbers make sense. They use the arithmetic of rational numbers as they formulate and solve linear equations in one variable and use these equations to solve problems.

(3) Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by taking slices. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects made up from triangles, quadrilaterals, polygons, cubes and right prisms.

(4) Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

Grade Level Overview

Ratios and Proportional Relationships	<ul style="list-style-type: none"> Analyze proportional relationships and use them to solve real-world and mathematical problems. 	1. Make sense of problems and persevere in solving them.	Mathematical Practices
The Number System	<ul style="list-style-type: none"> Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. 	2. Reason abstractly and quantitatively.	
Expressions and Equations	<ul style="list-style-type: none"> Use properties of operations to generate equivalent expressions. Solve real-life and mathematical problems using numerical and algebraic expressions and equations. 	3. Construct viable arguments and critique the reasoning of others.	
Geometry	<ul style="list-style-type: none"> Draw, construct and describe geometrical figures and describe the relationships between them. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. 	4. Model with mathematics.	
Statistics and Probability	<ul style="list-style-type: none"> Use random sampling to draw inferences about a population Draw informal comparative inferences about two populations. Investigate chance processes and develop, use, and evaluate probability models. 	5. Use appropriate tools strategically.	
		6. Attend to precision.	
		7. Look for and make use of structure.	
		8. Look for and express regularity in repeated reasoning.	

Ratios and Proportional Relationships 7.RP

Analyze proportional relationships and use them to solve real-world and mathematical problems.

1. Compute unit rates associated with ratios of nonnegative rational numbers, including ratios of lengths, areas and other quantities measured in like or different units. *For example, If a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1}{2} \div \frac{1}{4}$ miles per hour, equivalently 2 miles per hour.*
2. Recognize and represent proportional relationships between covarying quantities.
 - a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
 - b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
 - c. Represent proportional relationships by equations. *For example, total cost, t , is proportional to the number, n , purchased at a constant price, p ; this relationship can be expressed as $t = pn$.*
 - d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
3. Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

The Number System 7.NS

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
 - a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
 - b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
 - c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
 - d. Apply properties of operations as strategies to add and subtract rational numbers.
2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
 - a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
 - b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p/q is a rational number, then $-(p/q) = (-p)/q = p/(-q)$. Interpret products of rational numbers by describing real-world contexts.
 - c. Apply properties of operations as strategies to multiply and divide rational numbers.
 - d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
3. Solve real-world and mathematical problems involving the four operations with rational numbers.²

Expressions and Equations 7.EE

Use properties of operations to generate equivalent expressions.

1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.*

² Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”*

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger.*
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies for calculating with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $1/10$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
 - Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare the algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*
 - Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example, As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.*

Geometry 7.G

Draw, construct, and describe geometrical figures and describe the relationships between them.

- Solve problems involving scale drawings of geometric figures in the coordinate plane, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- Draw (freehand, with ruler and protractor, and with technology) geometric shapes from given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the triangle is uniquely defined, ambiguously defined or nonexistent.
- Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Statistics and Probability 7.SP

Use random sampling to draw inferences about a population.

- Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Draw informal comparative inferences about two populations

3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean average deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*
4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

Investigate chance processes and develop, use, and evaluate probability models.

5. Understand that the probability of a chance event is a number between 0 and 1 expressing the likelihood of that event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
 - a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*
 - b. Develop a possibly non-uniform probability model by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*
8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
 - a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
 - b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes for which the event occurs.
 - c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: if 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*

Mathematics | Grade 8

In Grade 8, instructional time should focus on three critical areas: (1) solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

(1) Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize proportions ($y/x = m$ or $y = mx$) as a special case of linear equations, $y = mx + b$, understanding that the constant of proportionality (m) is the slope and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x -coordinate changes by an amount A , the output or y -coordinate changes by the amount $m \cdot A$. Students also formulate and solve linear equations in one variable and use these equations to solve problems. Students also use a linear equation to describe the association between two quantities in a data set (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question.

Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.

(2) Students grasp the concept of a function as a rule that assigns to each element of its domain exactly one element of its range. They use function notation and understand that functions describe situations where one quantity determines another. They can translate among verbal, tabular, graphical, and algebraic representations of functions (noting that tabular and graphical representations are usually only partial representations), and they describe how aspects of the function are reflected in the different representations.

(3) Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students prove that the angles in a triangle add up to a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem is valid, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

Grade Level Overview

The Number System	<ul style="list-style-type: none">Know that there are numbers that are not rational, and approximate them by rational numbers.	1. Make sense of problems and persevere in solving them.	Mathematical Practices
Expressions and Equations	<ul style="list-style-type: none">Work with radicals and integer exponents.Understand the connections between proportional relationships, lines, and linear equations.Analyze and solve linear equations and pairs of simultaneous linear equations.	2. Reason abstractly and quantitatively.	
Functions	<ul style="list-style-type: none">Define, evaluate, and compare functions.Use functions to model relationships between quantities.	3. Construct viable arguments and critique the reasoning of others.	
Geometry	<ul style="list-style-type: none">Understand congruence and similarity using physical models, transparencies, or geometry software.Understand and apply the Pythagorean Theorem.Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.	4. Model with mathematics.	
Statistics and Probability	<ul style="list-style-type: none">Investigate patterns of association in bivariate data.	5. Use appropriate tools strategically.	
		6. Attend to precision.	
		7. Look for and make use of structure.	
		8. Look for and express regularity in repeated reasoning.	

The Number System 8.NS

Know that there are numbers that are not rational, and approximate them by rational numbers.

1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

Expressions and Equations 8.EE

Work with radicals and integer exponents.

1. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
2. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Understand the connections between proportional relationships, lines, and linear equations.

3. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*
4. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .

Analyze and solve linear equations and pairs of simultaneous linear equations.

5. Solve linear equations in one variable.
 - a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
 - b. Solve linear equations with rational number coefficients, including equations that require expanding expressions using the distributive property and collecting like terms.
6. Analyze and solve pairs of simultaneous linear equations.
 - a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
 - b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*
 - c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

Functions 8.F

Define, evaluate, and compare functions.

1. Understand that a function from one set (called the domain) to another set (called the range) is a rule that assigns to each element of the domain (an input) exactly one element of the range (the corresponding output). The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.³
2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*

³ Function notation is not required in Grade 8.

3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points $(1,1)$, $(2,4)$ and $(3,9)$, which are not on a straight line.*

Use functions to model relationships between quantities.

4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship; from two (x, y) values, including reading these from a table; or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
5. Describe qualitatively the functional relationship between two quantities by reading a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Geometry 8.G

Understand congruence and similarity using physical models, transparencies, or geometry software.

1. Verify experimentally the properties of rotations, reflections, and translations:
 - a. Lines are taken to lines, and line segments to line segments of the same length.
 - b. Angles are taken to angles of the same measure.
 - c. Parallel lines are taken to parallel lines.
2. Understand that a plane figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
3. Describe the effect of dilations, translations, rotations and reflections on figures using coordinates.
4. Understand that a plane figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar figures, describe a sequence that exhibits the similarity between them.
5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, and about the angles created when parallel lines are cut by a transversal. *For example, arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so.*

Understand and apply the Pythagorean Theorem.

6. Explain a proof of the Pythagorean Theorem and its converse.
7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

9. Know the formulas for the volume of cones, cylinders and spheres and solve real-world and mathematical problems.

Statistics and Probability 8.SP

Investigate patterns of association in bivariate data.

1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*
4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

Mathematics Standards for High School

Where is the College and Career Readiness line drawn?

The high school standards specify the mathematics that all students should study in order to be college and career ready. Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by (+), as in this example:

(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers).

Standards with a (+) symbol are beyond the college and career readiness threshold, but may appear in courses intended for all students. Any standard without a (+) symbol is intended to be in the common mathematics curriculum for all college and career ready students.

How are the high school standards organized?

The high school standards are listed in conceptual categories:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability.

Conceptual categories portray a coherent view of core high school mathematics; a student's work with functions, for example, crosses a number of traditional course boundaries, potentially up through and including calculus.

Modeling standards

Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (*).

Mathematics | High School—Number and Quantity

Numbers and Number Systems. During the years from kindergarten to eighth grade, students must repeatedly extend their conception of number. At first, “number” means “counting number”: 1, 2, 3. . . . Soon after that, 0 is used to represent “none” and the whole numbers are formed by the counting numbers together with zero. The next extension is fractions. At first, fractions are barely numbers and tied strongly to pictorial representations. Yet by the time students understand division of fractions, they have a strong concept of fractions as numbers and have connected them, via their decimal representations, with the base-ten system used to represent the whole numbers. During middle school, fractions are augmented by negative fractions to form the rational numbers. In Grade 8, students extend this system once more, augmenting the rational numbers with the irrational numbers to form the real numbers. In high school, students will be exposed to yet another extension of number, when the real numbers are augmented by the imaginary numbers to form the complex numbers.

This ascent through number systems makes it fair to ask: what does the word *number* mean that it can mean all of these things? One possible answer is that a number is something that can be used to do mathematics: calculate, solve equations, or represent measurements.

With each extension of number, the meanings of addition, subtraction, multiplication, and division are extended. In each new number system—integers, rational numbers, real numbers, and complex numbers—the four operations stay the same in two important ways: They have the commutative, associative, and distributive properties and their new meanings are consistent with their previous meanings. For example, multiplication by a whole number can be interpreted as repeated addition of the multiplicand in extensions of the whole numbers.

Extending the properties of whole-number exponents leads to new and productive notation. For example, properties of whole-number exponents suggest that $(5^{1/3})^3$ should be $5^{(1/3) \cdot 3} = 5^1 = 5$ and that $5^{1/3}$ should be the cube root of 5.

Calculators can provide ways for students to become better acquainted with these new number systems and their notation. They can be used to generate data for numerical experiments, to help understand the workings of matrix, vector, and complex number algebra, and to experiment with non-integer exponents.

Quantities. In their work in measurement up through Grade 8, students primarily measure commonly used attributes such as length, area, and volume. In high school, students encounter a wider variety of units in modeling, e.g., acceleration, currency conversions, derived quantities such as person-hours and heating degree days, social science rates such as per-capita income, and rates in everyday life such as points scored per game or batting averages. They also encounter novel situations in which they themselves must conceive the attributes of interest. For example, to find a good measure of overall highway safety, they might propose measures such as fatalities per year, fatalities per year per driver, or fatalities per vehicle-mile traveled. Such a conceptual process might be called quantification. Quantification is important for science, as when surface area suddenly “stands out” as an important variable in evaporation. Quantification is also important for companies, which must conceptualize relevant attributes and create or choose suitable measures for them.

Content Overview

<p>The Real Number System</p> <p>Quantities</p> <p>The Complex Number System</p> <p>Vector and Matrix Quantities</p>	<ul style="list-style-type: none"> • Extend the properties of exponents to rational exponents • Classify numbers as rational or irrational • Reason quantitatively and use units to solve problems • Perform arithmetic operations with complex numbers • Represent complex numbers and their operations on the complex plane • Use complex numbers in polynomial identities and equations • Represent and model with vector quantities • Perform operations on vectors • Perform operations on matrices and use matrices in applications 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	<p>Mathematical Practices</p>
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The Real Number System N-RN

Extend the properties of exponents to rational exponents

1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Use properties of rational and irrational numbers

3. Explain why sums and products of rational numbers are rational, that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational.

Quantities* N-Q

Reason quantitatively and use units to solve problems

1. Compare measurements of two quantities of the same type (e.g., two lengths or two weights) expressed in different units to decide which quantity is larger.
2. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
3. Define appropriate quantities for the purpose of descriptive modeling.
4. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

The Complex Number System N-CN

Perform arithmetic operations with complex numbers

1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Represent complex numbers and their operations on the complex plane

4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. *For example, $(1 - \sqrt{3}i)^3 = 8$ because $(1 - \sqrt{3}i)$ has modulus 2 and argument 120° .*
6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

Use complex numbers in polynomial identities and equations

7. Solve quadratic equations with real coefficients that have complex solutions.
8. (+) Extend polynomial identities to the complex numbers. *For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.*
9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

(+) Vector and Matrix Quantities N-VM

Represent and model with vector quantities.

1. Understand that vector quantities have both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., \mathbf{v} , $|\mathbf{v}|$, $\|\mathbf{v}\|$, v).
2. Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
3. Solve problems involving velocity and other quantities that can be represented by vectors.*

Perform operations on vectors.

4. Add and subtract vectors.
 - a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.
 - b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.
 - c. Understand that vector subtraction $\mathbf{v} - \mathbf{w}$ is defined as $\mathbf{v} + (-\mathbf{w})$, where $-\mathbf{w}$ is the additive inverse of \mathbf{w} , with the same magnitude as \mathbf{w} and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.
5. Multiply a vector \mathbf{v} by a scalar.
 - a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.
 - b. Compute the magnitude of a scalar multiple $c\mathbf{v}$ using $\|c\mathbf{v}\| = |c|v$.
 - c. Understand that when $|c|v \neq 0$, the direction of $c\mathbf{v}$ is either along \mathbf{v} (for $c > 0$) or against \mathbf{v} (for $c < 0$).

Perform operations on matrices and use matrices in applications.*

6. Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
7. Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
8. Add, subtract, and multiply matrices of appropriate dimensions.
9. Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
10. Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.
11. Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Understand a matrix as a transformation of vectors.
12. Understand a 2×2 matrix as a transformation of the plane, and interpret the absolute value of the determinant in terms of area.

Mathematics | High School—Algebra

Expressions. An expression is a record of a computation with numbers and symbols that represent numbers, arithmetic operations, exponentiation, and, at more advanced levels, the operation of evaluating a function. Conventions about the use of parentheses and the order of operations assure that each expression is unambiguous. Creating an expression that describes a computation involving a general quantity requires the ability to express the computation in general terms, abstracting from specific instances.

Reading an expression with comprehension involves analysis of its underlying structure. This may suggest a different but equivalent way of writing the expression that exhibits some different aspect of its meaning. For example, $p + 0.05p$ can be interpreted as the addition of a 5% tax to a price p . Rewriting $p + 0.05p$ as $1.05p$ shows that adding a tax is the same as multiplying the price by a constant factor.

Algebraic manipulations are governed by the properties of operations and exponents, and the conventions of algebraic notation. At times, an expression is the result of applying operations to simpler expressions. For example, $p + 0.05p$ is the sum of the simpler expressions p and $0.05p$. Viewing an expression as the result of operation on simpler expressions can sometimes clarify its underlying structure.

A spreadsheet or a computer algebra system can be used to experiment with algebraic expressions, perform complicated algebraic manipulations, and understand how algebraic manipulations behave.

Equations and inequalities. An equation is a statement of equality between two expressions, often viewed as a question asking for which values of the variables the expressions on either side are in fact equal. These values are the solutions to the equation. An identity is true for all numbers; identities are often developed by rewriting an expression in an equivalent form.

The solutions of an equation in one variable form a set of numbers; the solutions of an equation in two variables form a set of ordered pairs of numbers, which can be plotted in the coordinate plane. Two or more equations and/or inequalities form a system. A solution for such a system must satisfy every equation and inequality in the system.

An equation can often be solved by successively deducing from it one or more simpler equations. For example, one can add the same constant to both sides without changing the solutions, but squaring both sides might lead to extraneous solutions. Strategic competence in solving includes looking ahead for productive manipulations and anticipating the nature and number of solutions.

Some equations have no solutions in a given number system, but have a solution in a larger system. For example, the solution of $x + 1 = 0$ is an integer, not a whole number; the solution of $2x + 1 = 0$ is a rational number, not an integer; the solutions of $x^2 - 2 = 0$ are real numbers, not rational numbers; and the solutions of $x^2 + 2 = 0$ are complex numbers, not real numbers.

The same solution techniques used to solve equations can be used to rearrange formulas. For example, the formula for the area of a trapezoid, $A = ((b_1 + b_2)/2)h$, can be solved for h using the same deductive process.

Inequalities can be solved by reasoning about the properties of inequality. Many, but not all, of the properties of equality continue to hold for inequalities and can be useful in solving them.

Connections to Functions and Modeling. Expressions can define functions, and equivalent expressions define the same function. Asking when two functions have the same value for the same input leads to an equation; graphing the two functions allows for finding approximate solutions of the equation. Converting a verbal description to an equation, inequality, or system of these is an essential skill in modeling.

Content Overview

<p>Seeing Structure in Expressions</p> <p>Arithmetic with Polynomials and Rational Functions</p> <p>Creating Equations</p> <p>Reasoning with Equations and Inequalities</p>	<ul style="list-style-type: none"> • Interpret the structure of expressions • Write expressions in equivalent forms to solve problems • Perform arithmetic operations on polynomials • Understand the relationship between zeros and factors of polynomials • Use polynomial identities to solve problems • Rewrite and graph rational functions • Create equations that describe numbers or relationships • Understand solving equations as a process of reasoning and explain the reasoning • Solve equations and inequalities in one variable • Solve systems of equations • Represent and solve equations and inequalities graphically 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	<p>Mathematical Practices</p>
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Seeing Structure in Expressions A-SSE

Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context.*
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P .*
2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Write expressions in equivalent forms to solve problems

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*
 - a. Factor a quadratic expression to reveal the zeros of the function it defines.
 - b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
 - c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*
4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.**

Arithmetic with Polynomials and Rational Expressions A-APR

Perform arithmetic operations on polynomials

1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Understand the relationship between zeros and factors of polynomials

- Understand the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
- Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems

- Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.*
- (+) Understand that the Binomial Theorem gives the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.

Rewrite rational expressions

- Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
- (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Creating Equations* A-CED

Create equations that describe numbers or relationships

- Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*
- Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

Reasoning with Equations and Inequalities A-REI

Understand solving equations as a process of reasoning and explain the reasoning

- Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Solve equations and inequalities in one variable

- Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. Graph the solution set of an inequality on a number line.
- Solve quadratic equations in one variable.
 - Understand that the method of completing the square transforms any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. This leads to the quadratic formula.
 - Solve by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

Solve systems of equations

- Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.*
- (+) Represent a system of linear equations as a single matrix equation in a vector variable.

9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

Represent and solve equations and inequalities graphically

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a straight line).
11. Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*
12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Mathematics | High School—Functions

Functions describe situations where one quantity determines another. For example, the return on \$10,000 invested at an annualized percentage rate of 4.25% is a function of the length of time the money is invested. Because we continually make theories about dependencies between quantities in nature and society, functions are important tools in the construction of mathematical models.

In school mathematics, functions usually have numerical inputs and outputs and are often defined by an algebraic expression. For example, the time in hours it takes for a car to drive 100 miles is a function of the car's speed in miles per hour, v ; the rule $T(v) = 100/v$ expresses this relationship algebraically and defines a function whose name is T .

The set of inputs to a function is called its domain. We often infer the domain to be all inputs for which the expression defining a function has a value, or for which the function makes sense in a given context.

A function can be described in various ways, such as by a graph (e.g., the trace of a seismograph); by a verbal rule, as in, "I'll give you a state, you give me the capital city;" by an algebraic expression like $f(x) = a + bx$; or by a recursive rule. The graph of a function is often a useful way of visualizing the relationship of the function models, and manipulating a mathematical expression for a function can throw light on the function's properties.

Functions presented as expressions can model many important phenomena. Two important families of functions characterized by laws of growth are linear functions, which grow at a constant rate, and exponential functions, which grow at a constant percent rate. Linear functions with a constant term of zero describe proportional relationships.

A graphing utility or a computer algebra system can be used to experiment with properties of these functions and their graphs and to build computational models of functions, including recursively defined functions.

Connections to Expressions, Equations, Modeling, and Coordinates. Determining an output value for a particular input involves evaluating an expression; finding inputs that yield a given output involves solving an equation. Questions about when two functions have the same value for the same input lead to equations, whose solutions can be visualized from the intersection of their graphs. Because functions describe relationships between quantities, they are frequently used in modeling. Sometimes functions are defined by a recursive process, which can be displayed effectively using a spreadsheet or other technology.

Content Overview

Interpreting Functions	<ul style="list-style-type: none"> • Understand the concept of a function and use function notation • Interpret functions that arise in applications in terms of the context • Analyze functions using different representations 		<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	Mathematical Practices
Building Functions	<ul style="list-style-type: none"> • Build a function that models a relationship between two quantities • Build new functions from existing functions 			
Linear, Quadratic, and Exponential Models	<ul style="list-style-type: none"> • Construct and compare linear and exponential models and solve problems • Interpret expressions for functions in terms of the situation they model 			
Trigonometric Functions	<ul style="list-style-type: none"> • Extend the domain of trigonometric functions using the unit circle • Model periodic phenomena with trigonometric functions • Prove and apply trigonometric identities 			

Interpreting Functions F-IF

Understand the concept of a function and use function notation

1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
3. Understand that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.*

Interpret functions that arise in applications in terms of the context

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.**
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*

Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*
 - a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
 - b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
 - c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
 - d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
 - e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
 - a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
 - b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.*
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

Building Functions F-BF

Build a function that models a relationship between two quantities

1. Write a function that describes a relationship between two quantities.*
 - a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
 - b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*
 - c. (+) Compose functions. *For example, if $f(t)$ is the height of a falling body after t seconds, $f(t - 12)$ is the height of the same body dropped 12 seconds later.*
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

Build new functions from existing functions

3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
4. Find inverse functions.
 - a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.*
 - b. (+) Verify by composition that one function is the inverse of another.
 - c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.
 - d. (+) Produce an invertible function from a non-invertible function by restricting the domain.

Linear, Quadratic, and Exponential Models* F-LQE

Construct and compare linear, quadratic, and exponential models and solve problems

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
 - a. Understand that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.
 - b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
 - c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
4. For exponential models, express as a logarithm the solution to $a b^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

Interpret expressions for functions in terms of the situation they model

5. Interpret the parameters in a linear, quadratic, or exponential function in terms of a context.

Trigonometric Functions F-TF

Extend the domain of trigonometric functions using the unit circle

1. Understand that the radian measure of an angle is the length of the arc on the unit circle subtended by the angle.
2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number.
4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Model periodic phenomena with trigonometric functions

5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*
6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.*

Prove and apply trigonometric identities

8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.
9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

Mathematics | High School—Modeling

Modeling links classroom mathematics and statistics to everyday life, work, and decision-making. Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social, and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data.

A model can be very simple, such as writing total cost as a product of unit price and number bought, or using a geometric shape to describe a physical object like a coin. Even such simple models involve making choices. It is up to us whether to model a coin as a three-dimensional cylinder, or whether a two-dimensional disk works well enough for our purposes. Other situations—modeling a delivery route, a production schedule, or a comparison of loan amortizations—need more elaborate models that use other tools from the mathematical sciences. Real-world situations are not organized and labeled for analysis; formulating tractable models, representing such models, and analyzing them is appropriately a creative process. Like every such process, this depends on acquired expertise as well as creativity.

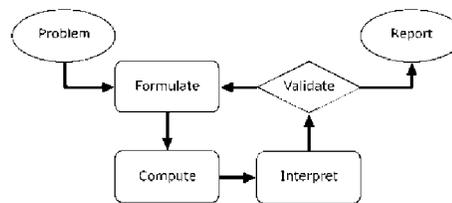
Some examples of such situations might include:

- Estimating how much water and food is needed for emergency relief in a devastated city of 3 million people, and how it might be distributed.
- Planning a table tennis tournament for 7 players at a club with 4 tables, where each player plays against each other player.
- Designing the layout of the stalls in a school fair so as to raise as much money as possible.
- Analyzing stopping distance for a car.
- Modeling savings account balance, bacterial colony growth, or investment growth.
- Critical path analysis, e.g., applied to turnaround of an aircraft at an airport.
- Risk situations, such as extreme sports, pandemics, and terrorism.
- Relating population statistics to individual predictions.

In situations like these, the models devised depend on a number of factors: How precise an answer do we want or need? What aspects of the situation do we most need to understand, control, or optimize? What resources of time and tools do we have? The range of models that we can create and analyze is also constrained by the limitations of our mathematical, statistical, and technical skills, and our ability to recognize significant variables and relationships among them. Diagrams of various kinds, spreadsheets and other technology, and algebra are powerful tools for understanding and solving problems drawn from different types of real-world situations.

One of the insights provided by mathematical modeling is that essentially the same mathematical or statistical structure can sometimes model seemingly different situations. Models can also shed light on the mathematical structures themselves, for example, as when a model of bacterial growth makes more vivid the explosive growth of the exponential function.

The basic modeling cycle is summarized in the diagram. It involves (1) identifying variables in the situation and selecting those that represent essential features, (2) formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, (3) analyzing and performing operations on these relationships to draw conclusions, (4) interpreting the results of the mathematics in terms of the original situation, (5) validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, (6) reporting on the conclusions and the reasoning behind them. Choices, assumptions, and approximations are present throughout this cycle.



In descriptive modeling, a model simply describes the phenomena or summarizes them in a compact form. Graphs of observations are a familiar descriptive model—for example, graphs of global temperature and atmospheric CO₂ over time.

Analytic modeling seeks to explain data on the basis of deeper theoretical ideas, albeit with parameters that are empirically based; for example, exponential growth of bacterial colonies (until cut-off mechanisms such as pollution or starvation intervene) follows from a constant reproduction rate. Functions are an important tool for analyzing such problems.

Graphing utilities, spreadsheets, computer algebra systems, and dynamic geometry software are powerful tools that can be used to model purely mathematical phenomena (e.g., the behavior of polynomials) as well as physical phenomena.

Modeling Standards

Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol ().*

Mathematics | High School—Geometry

An understanding of the attributes and relationships of geometric objects can be applied in diverse contexts—interpreting a schematic drawing, estimating the amount of wood needed to frame a sloping roof, rendering computer graphics, or designing a sewing pattern for the most efficient use of material.

Although there are many types of geometry, school mathematics is devoted primarily to plane Euclidean geometry, studied both synthetically (without coordinates) and analytically (with coordinates). Euclidean geometry is characterized most importantly by the Parallel Postulate, that through a point not on a given line there is exactly one parallel line. (Spherical geometry, in contrast, has no parallel lines.)

During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms.

The concepts of congruence, similarity, and symmetry can be understood from the perspective of geometric transformation. Fundamental are the rigid motions: translations, rotations, reflections, and combinations of these, all of which are here assumed to preserve distance and angles (and therefore shapes generally). Reflections and rotations each explain a particular type of symmetry, and the symmetries of an object offer insight into its attributes—as when the reflective symmetry of an isosceles triangle assures that its base angles are congruent.

In the approach taken here, two geometric figures are defined to be congruent if there is a sequence of rigid motions that carries one onto the other. This is the principle of superposition. For triangles, congruence means the equality of all corresponding pairs of sides and all corresponding pairs of angles. During Grade 8, through experiences with geometric constructions and drawing triangles from given conditions, some students notice ways to specify enough measures in a triangle to ensure that all triangles drawn with those measures are congruent. Once these triangle congruence criteria (ASA, SAS, and SSS) are established using rigid motions, they can be used to prove theorems about triangles, quadrilaterals, and other geometric figures.

Similarity transformations (rigid motions followed by dilations) define similarity in the same way that rigid motions define congruence, and lead to the criterion for triangle similarity that two pairs of corresponding angles are congruent.

The definitions of sine, cosine, and tangent for acute angles are founded on right triangles and similarity, and, with the Pythagorean Theorem, are fundamental in many real-world and theoretical situations. The Pythagorean Theorem is generalized to non-right triangles by the Law of Cosines. Together, the Laws of Sines and Cosines embody the triangle congruence criteria for the cases where three pieces of information suffice to completely solve a triangle. Furthermore, these laws yield two possible solutions in the ambiguous case, illustrating that Side-Side-Angle is not a congruence criterion.

Analytic geometry connects algebra and geometry, resulting in powerful methods of analysis and problem solving. Just as the number line associates numbers with locations in one dimension, a pair of perpendicular axes associates pairs of numbers with locations in two dimensions. This correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof. Geometric transformations of the graphs of equations correspond to algebraic changes in their equations.

Dynamic geometry environments provide students with experimental and modeling tools that allow them to investigate geometric phenomena in much the same way as computer algebra systems allow them to experiment with algebraic phenomena.

Connections to Equations. The correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof.

Content Overview

<p>Congruence</p> <p>Similarity, Right Triangles, and Trigonometry</p> <p>Circles</p> <p>Expressing Geometric Properties with Equations</p> <p>Geometric Measurement and Dimension</p> <p>Modeling with Geometry</p>	<ul style="list-style-type: none"> • Experiment with transformations in the plane • Understand congruence in terms of rigid motions • Prove geometric theorems • Make geometric constructions • Understand similarity in terms of similarity transformations • Prove theorems involving similarity • Define trigonometric ratios and solve problems involving right triangles • Apply trigonometry to general triangles • Understand and apply theorems about circles • Find arc lengths and areas of sectors of circles • Translate between the geometric description and the equation for a conic section • Use coordinates to prove simple geometric theorems algebraically • Explain volume formulas and use them to solve problems • Visualize relationships between two-dimensional and three-dimensional objects • Apply geometric concepts in modeling situations 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	<p>Mathematical Practices</p>
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Congruence G-CO

Experiment with transformations in the plane

1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions

- Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
- Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems

- Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*
- Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*
- Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

Make geometric constructions

- Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*
- Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Similarity, Right Triangles, and Trigonometry G-SRT

Understand similarity in terms of similarity transformations

- Verify experimentally the properties of dilations:
 - A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
 - The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
- Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems involving similarity

- Prove theorems about triangles using similarity transformations. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*
- Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles

- Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- Explain and use the relationship between the sine and cosine of complementary angles.
- Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

(+) Apply trigonometry to general triangles

- Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
- Prove the Laws of Sines and Cosines and use them to solve problems.
- Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Circles G-C

Understand and apply theorems about circles

- Prove that all circles are similar.

- Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
- Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- (+) Construct a tangent line from a point outside a given circle to the circle.

Find arc lengths and areas of sectors of circles

- Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Expressing Geometric Properties with Equations G-GPE

Translate between the geometric description and the equation for a conic section

- Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
- Derive the equation of a parabola given a focus and directrix.
- (+) Derive the equations of ellipses and hyperbolas given two foci for the ellipse, and two directrices of a hyperbola.

Use coordinates to prove simple geometric theorems algebraically

- Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.*
- Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*

Geometric Measurement and Dimension G-GMD

Explain volume formulas and use them to solve problems

- Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*
- (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
- Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*

Visualize relationships between two-dimensional and three-dimensional objects

- Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Modeling with Geometry G-MG

Apply geometric concepts in modeling situations

- Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*
- Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*
- Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*

Mathematics | High School—Statistics and Probability*

Decisions or predictions are often based on data—numbers in context. These decisions or predictions would be easy if the data always sent a clear message, but the message is often obscured by variability. Statistics provides tools for describing variability in data and for making informed decisions that take it into account.

Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. Quantitative data can be described in terms of key characteristics: measures of shape, center, and spread. The shape of a data distribution might be described as symmetric, skewed, flat, or bell shaped, and it might be summarized by a statistic measuring center (such as mean or median) and a statistic measuring spread (such as standard deviation or interquartile range). Different distributions can be compared numerically using these statistics or compared visually using plots. Knowledge of center and spread are not enough to describe a distribution. Which statistics to compare, which plots to use, and what the results of a comparison might mean, depend on the question to be investigated and the real-life actions to be taken.

Randomization has two important uses in drawing statistical conclusions. First, collecting data from a random sample of a population makes it possible to draw valid conclusions about the whole population, taking variability into account. Second, randomly assigning individuals to different treatments allows a fair comparison of the effectiveness of those treatments. A statistically significant outcome is one that is unlikely to be due to chance alone, and this can be evaluated only under the condition of randomness. The conditions under which data are collected are important in drawing conclusions from the data; in critically reviewing uses of statistics in public media and other reports, it is important to consider the study design, how the data were gathered, and the analyses employed as well as the data summaries and the conclusions drawn.

Random processes can be described mathematically by using a probability model: a list or description of the possible outcomes (the sample space), each of which is assigned a probability. In situations such as flipping a coin, rolling a number cube, or drawing a card, it might be reasonable to assume various outcomes are equally likely. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability, which can be approached through the analysis of two-way tables.

Technology plays an important role in statistics and probability by making it possible to generate plots, regression functions, and correlation coefficients, and to simulate many possible outcomes in a short amount of time.

Connections to Functions and Modeling. Functions may be used to describe data; if the data suggest a linear relationship, the relationship can be modeled with a regression line, and its strength and direction can be expressed through a correlation coefficient.

Content Overview

<p>Interpreting Categorical and Quantitative Data</p> <p>Making Inferences and Justifying Conclusions</p> <p>Conditional Probability and the Rules of Probability</p> <p>Using Probability to Make Decisions</p>	<ul style="list-style-type: none"> • Summarize, represent, and interpret data on a single count or measurement variable • Summarize, represent, and interpret data on two categorical and quantitative variables • Interpret linear models • Understand and evaluate random processes underlying statistical experiments • Make inferences and justify conclusions from sample surveys, experiments and observational studies • Use the concepts of independence and conditional probability to interpret data • Use the rules of probability to compute probabilities of compound events in a uniform probability model • Calculate expected values and use them to solve problems • Use probability to evaluate outcomes of decisions 	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	<p>Mathematical Practices</p>
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Interpreting Categorical and Quantitative Data S-ID

Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Summarize, represent, and interpret data on two categorical and quantitative variables

5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
 - a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.*
 - b. Informally assess the fit of a function by plotting and analyzing residuals.
 - c. Fit a linear function for scatter plots that suggest a linear association.

Interpret linear models

7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

8. Compute (using technology) and interpret the correlation coefficient of a linear fit.
9. Distinguish between correlation and causation.

Making Inferences and Justifying Conclusions s-ic

Understand and evaluate random processes underlying statistical experiments

1. Understand that statistics allows inferences to be made about population parameters based on a random sample from that population.
2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

Make inferences and justify conclusions from sample surveys, experiments, and observational studies

3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
6. Evaluate reports based on data.

Conditional Probability and the Rules of Probability s-cp

Understand independence and conditional probability and use them to interpret data

1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).
2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
3. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*
5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

Use the rules of probability to compute probabilities of compound events in a uniform probability model

6. Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in terms of the model.
7. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
8. (+) Apply the general Multiplication Rule in a uniform probability model, $P(A \text{ and } B) = P(A)P(B|A) = P(B)P(A|B)$, and interpret the answer in terms of the model.
9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

(+) Using Probability to Make Decisions

S-MD

Calculate expected values and use them to solve problems

1. Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.
2. Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.
3. Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. *For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.*
4. Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. *For example, find a current data distribution on the number of TV sets per household in the*

United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?

Use probability to evaluate outcomes of decisions

5. Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.
 - a. Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.*
 - b. Evaluate and compare strategies on the basis of expected values. *For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*
6. Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
7. Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

Postscript: A Note on High School Courses

The high school standards in this document do not specify how content should be organized into a sequence of high school courses.

However, it is expected that model course sequences based on these standards will become available in both a traditional sequence (Algebra 1, Geometry, and Algebra 2) as well as an integrated sequence (Integrated 1, Integrated 2, Integrated 3).

Glossary

Addition and subtraction within 5, 10, 20, 100, or 1000. Addition or subtraction of two whole numbers with whole number answers, and with sum or minuend in the range 0-5, 0-10, 0-20, or 0-100, respectively. Example: $8 + 2 = 10$ is an addition within 10, $14 - 5 = 9$ is a subtraction within 20, and $55 - 18 = 37$ is a subtraction within 100.

Additive inverses. Two numbers whose sum is 0 are additive inverses of one another. Example: $\frac{3}{4}$ and $-\frac{3}{4}$ are additive inverses of one another because $\frac{3}{4} + (-\frac{3}{4}) = (-\frac{3}{4}) + \frac{3}{4} = 0$.

Associative property of addition. See Table 3 in this Glossary.

Associative property of multiplication. See Table 3 in this Glossary.

Bivariate data. Pairs of linked numerical observations. Example: a list of heights and weights for each player on a football team.

Box plot. A method of visually displaying a distribution of data values by using the median, quartiles, and extremes of the data set. A box shows the middle 50% of the data.¹

Commutative property. See Table 3 in this Glossary.

Complex fraction. A fraction $\frac{A}{B}$ where A and/or B are fractions (B nonzero).

Computation algorithm. A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. See also: *computation strategy*.

Computation strategy. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. See also: *computation algorithm*.

Congruent. Two plane or solid figures are congruent if one can be obtained from the other by rigid motion (a sequence of rotations, reflections, and translations).

Counting on. A strategy for finding the number of objects in a group without having to count every member of the group. For example, if a stack of books is known to have 8 books and 3 more books are added to the top, it is not necessary to count the stack all over again; one can find the total by *counting on*—pointing to the top book and saying “eight,” following this with “nine, ten, eleven. There are eleven books now.”

Dot plot. See *line plot*.

Dilation. A transformation that moves each point along the ray through the point emanating from a fixed center, and multiplies distances from the center by a common scale factor.

Expanded form. A multidigit number is expressed in expanded form when it is written as a sum of single-digit multiples of powers of ten. For example, $643 = 600 + 40 + 3$.

Expected value. For a random variable, the weighted average of its possible values, with weights given by their respective probabilities.

First quartile. For a data set with median M , the first quartile is the median of the data values less than M . Example: For the data set $\{1, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the first quartile is 6.² See also *median*, *third quartile*, *interquartile range*.

Fraction. A number expressible in the form $\frac{a}{b}$ where a is a whole number and b is a positive whole number. (The word *fraction* in these standards always refers to a nonnegative number.) See also *rational number*.

Identity property of 0. See Table 3 in this Glossary.

Independently combined probability models. Two probability models are said to be combined independently if the probability of each ordered pair in the combined model equals the product of the original probabilities of the two individual outcomes in the ordered pair.

Integer. A number expressible in the form a or $-a$ for some whole number a .

Interquartile Range. A measure of variation in a set of numerical data, the interquartile range is the distance between the first and third quartiles of the data set. Example: For the data set $\{1, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the interquartile range is $15 - 6 = 9$. See also *first quartile*, *third quartile*.

Line plot. A method of visually displaying a distribution of data values where each data value is shown as a dot or mark above a number line. Also known as a dot plot.³

Mean. A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list.⁴ Example: For the data set $\{1, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the mean is 21.

Mean absolute deviation. A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values. Example: For the data set $\{2, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the mean absolute deviation is 20.

¹ Adapted from Wisconsin Department of Public Instruction, <http://dpi.wi.gov/standards/mathglos.html>, accessed March 2, 2010.

² Many different methods for computing quartiles are in use. The method defined here is sometimes called the Moore and McCabe method. See Langford, E., “Quartiles in Elementary Statistics,” *Journal of Statistics Education* Volume 14, Number 3 (2006).

³ Adapted from Wisconsin Department of Public Instruction, *op. cit.*

⁴ To be more precise, this defines the *arithmetic mean*.

Median. A measure of center in a set of numerical data. The median of a list of values is the value appearing at the center of a sorted version of the list—or the mean of the two central values, if the list contains an even number of values. Example: For the data set $\{2, 3, 6, 7, 10, 12, 14, 15, 22, 90\}$, the median is 11.

Midline. In the graph of a trigonometric function, the horizontal line half-way between its maximum and minimum values.

Multiplication and division within 100. Multiplication or division of two whole numbers with whole number answers, and with product or dividend in the range 0-100. Example: $72 \div 8 = 9$.

Multiplicative inverses. Two numbers whose product is 1 are multiplicative inverses of one another. Example: $\frac{3}{4}$ and $\frac{4}{3}$ are multiplicative inverses of one another because $\frac{3}{4} \times \frac{4}{3} = \frac{4}{3} \times \frac{3}{4} = 1$.

Number line diagram. A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity.

Percent rate of change. A rate of change expressed as a percent. Example: if a population grows from 50 to 55 in a year, it grows by $\frac{5}{50} = 10\%$ per year.

Probability distribution. The set of possible values of a random variable with a probability assigned to each.

Properties of operations. See Table 3 in this Glossary.

Properties of equality. See Table 4 in this Glossary.

Properties of inequality. See Table 5 in this Glossary.

Properties of operations. See Table 3 in this Glossary.

Probability. A number between 0 and 1 used to quantify likelihood for processes that have uncertain outcomes (such as tossing a coin, selecting a person at random from a group of people, tossing a ball at a target, testing for a medical condition).

Probability model. A probability model is used to assign probabilities to outcomes of a chance process by examining the nature of the process. The set of all outcomes is called the sample space, and their probabilities sum to 1. See also *uniform probability model*.

Random variable. An assignment of a numerical value to each outcome in a sample space.

Rational expression. A quotient of two polynomials with non-zero denominator.

Rational number. A number expressible in the form $\frac{a}{b}$ or $-\frac{a}{b}$ for some fraction $\frac{a}{b}$. The rational numbers include the integers.

Rectilinear figure. A polygon all angles of which are right angles.

Rigid motion. A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions are here assumed to preserve distances and angle measures.

Repeating decimal. The decimal form of a rational number. See *terminating decimal*.

Sample space. In a probability model for a random process, a list of the individual outcomes that are to be considered.

Scatter plot. A graph in the coordinate plane representing a set of bivariate data. For example, the heights and weights of a group of people could be displayed on a scatter plot.⁵

Similarity transformation. A rigid motion followed by a dilation.

Tape diagram. A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model.

Terminating decimal. A decimal is called terminating if its repeating digit is 0.

Third quartile. For a data set with median M , the third quartile is the median of the data values greater than M . Example: For the data set $\{2, 3, 6, 7, 10, 12, 14, 15, 22, 120\}$, the third quartile is 15. See also *median*, *first quartile*, *interquartile range*.

Transitivity principle for indirect measurement. If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C. This principle applies to measurement of other quantities as well.

Uniform probability model. A probability model which assigns equal probability to all outcomes. See also *probability model*.

Vector. A quantity with magnitude and direction in the plane or in space, defined by an ordered pair or triple of real numbers.

Visual fraction model. A tape diagram, number line diagram, or area model.

Whole numbers. The numbers 0, 1, 2, 3, ...

⁵ Adapted from Wisconsin Department of Public Instruction, *op. cit.*

TABLE 1. Common addition and subtraction situations.⁶

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$

	Total Unknown	Addend Unknown	Both Addends Unknown ⁷
Put Together/ Take Apart⁸	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$

	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare⁹	(“How many more?” version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? (“How many fewer?” version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$	(Version with “more”): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with “fewer”): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?, 3 + 2 = ?$	(Version with “more”): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with “fewer”): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?, ? + 3 = 5$

⁶ Adapted from Box 2-4 of National Research Council (2009, op. cit., pp. 32, 33).

⁷ These *take apart* situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean *makes or results in* but always does mean *is the same number as*.

⁸ Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation especially for small numbers less than or equal to 10.

⁹ For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using *more* for the bigger unknown and using *less* for the smaller unknown). The other versions are more difficult.

TABLE 2. Common multiplication and division situations.¹⁰

	Unknown Product	Group Size Unknown (“How many in each group?” Division)	Number of Groups Unknown (“How many groups?” Division)
	$3 \times 6 = ?$	$3 \times ? = 18$ and $18 \div 3 = ?$	$? \times 6 = 18$ and $18 \div 6 = ?$
Equal Groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? <i>Measurement example.</i> You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? <i>Measurement example.</i> You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? <i>Measurement example.</i> You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays,¹¹ Area¹²	There are 3 rows of apples with 6 apples in each row. How many apples are there? <i>Area example.</i> What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? <i>Area example.</i> A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? <i>Area example.</i> A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
Compare	A blue hat costs \$6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? <i>Measurement example.</i> A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs \$18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? <i>Measurement example.</i> A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs \$18 and a blue hat costs \$6. How many times as much does the red hat cost as the blue hat? <i>Measurement example.</i> A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	$a \times b = ?$	$a \times ? = p$ and $p \div a = ?$	$? \times b = p$ and $p \div b = ?$

¹⁰ The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.

¹¹ The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

¹² Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

TABLE 3. The properties of operations. Here a , b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.

<i>Associative property of addition</i>	$(a + b) + c = a + (b + c)$
<i>Commutative property of addition</i>	$a + b = b + a$
<i>Additive identity property of 0</i>	$a + 0 = 0 + a = a$
<i>Existence of additive inverses</i>	For every a there exists $-a$ so that $a + (-a) = (-a) + a = 0$.
<i>Associative property of multiplication</i>	$(a \times b) \times c = a \times (b \times c)$
<i>Commutative property of multiplication</i>	$a \times b = b \times a$
<i>Multiplicative identity property of 1</i>	$a \times 1 = 1 \times a = a$
<i>Existence of multiplicative inverses</i>	For every $a \neq 0$ there exists $1/a$ so that $a \times 1/a = 1/a \times a = 1$.
<i>Distributive property of multiplication over addition</i>	$a \times (b + c) = a \times b + a \times c$

TABLE 4. The properties of equality. Here a , b and c stand for arbitrary numbers in the rational, real, or complex number systems.

<i>Reflexive property of equality</i>	$a = a$
<i>Symmetric property of equality</i>	If $a = b$, then $b = a$.
<i>Transitive property of equality</i>	If $a = b$ and $b = c$, then $a = c$.
<i>Addition property of equality</i>	If $a = b$, then $a + c = b + c$.
<i>Subtraction property of equality</i>	If $a = b$, then $a - c = b - c$.
<i>Multiplication property of equality</i>	If $a = b$, then $a \times c = b \times c$.
<i>Division property of equality</i>	If $a = b$ and $c \neq 0$, then $a \div c = b \div c$.
<i>Substitution property of equality</i>	If $a = b$, then b may be substituted for a in any expression containing a .

TABLE 5. The properties of inequality. Here a , b and c stand for arbitrary numbers in the rational or real number systems.

Exactly one of the following is true: $a < b$, $a = b$, $a > b$.
If $a > b$ and $b > c$ then $a > c$.
If $a > b$, then $b < a$.
If $a > b$, then $-a < -b$.
If $a > b$, then $a \pm c > b \pm c$.
If $a > b$ and $c > 0$, then $a \times c > b \times c$.
If $a > b$ and $c < 0$, then $a \times c < b \times c$.
If $a > b$ and $c > 0$, then $a \div c > b \div c$.
If $a > b$ and $c < 0$, then $a \div c < b \div c$.

Sample of Works Consulted

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Appendix B-4

International Benchmarking and the Common Core¹

The Common Core State Standards (CCSS) are designed to be **college- and career-ready** and **internationally benchmarked**. To that end, the development process included the review and consideration of many sources, including research studies, existing standards from the U.S and abroad, and the professional judgment of teachers, content area experts, and college faculty. This paper will briefly describe how international benchmarking was used to develop the CCSS.

What documents were used to ensure that the CCSS were internationally benchmarked?

To ensure that the standards prepare students to be globally competitive, the development team used a number of sources, including: the frameworks for PISA and TIMSS; the International Baccalaureate syllabi; the American Institutes for Research report , *Informing Grades 1-6 Mathematics Standards Development: What Can Be Learned From High-Performing Hong Kong, Korea, and Singapore* and; the A+ Composite found in *A Coherent Curriculum: The Case for Mathematics* by Bill Schmidt, Richard Houang, and Leland Cogan.

In addition, the development team looked to the standards of a number of individual countries and provinces to inform the content, structure and language of the CCSS. In *mathematics*, twelve set of standards were selected to help guide the writing of the standards: Belgium, Canada [Alberta], China, Chinese Taipei, England, Finland, Hong Kong, India, Ireland, Japan, Korea, and Singapore.ⁱ In *English language arts*, the writing team looked closely at ten sets of standards from Australia (New South Wales and Victoria), Canada (Alberta, British Columbia, and Ontario), England, Finland, Hong Kong, Ireland, and Singapore.ⁱⁱ

How were the international benchmarks used to inform the development of the CCSS?

The goal of the international benchmarking in the common core state standards development process was to ensure that the CCSS are as rigorous as comparable standards in the high-performing and other countries. However, the use of international benchmarks as evidence is no easy feat; it is not simply a matter of identifying the “best” source and copying it, or of aggregating all viable sources to find some set of shared expectations. Rather, international benchmarks were used to guide critical decisions in the following areas:

- *Whether particular content should be included*: One of the principal ways international standards were used in this development process was as a guide when making tough decisions about whether content should be included or excluded.

¹ This document is provided by the CCSSO

- *When content should be introduced and how that content should progress:* The progression of topics in the international mathematics standards helped the development team make decisions about when to introduce topics in the CCSS as well as when to stop focusing on them.
- *Ensuring focus and coherence:* Standards from other countries tend to be very focused, including only what is absolutely necessary.
- *Organizing and formatting the standards:* Certain organizational aspects or characteristics of international standards that promoted clarity and ease of reading and use served as a model for the CCSS.
- *Determining emphasis on particular topics in standards:* Where emphasis on particular topics was found repeatedly in international standard, this was instructive in determining their importance for inclusion in the CCSS.

* * * * *

When the final version of the K-12 Common Core State Standards is released, it will be accompanied by a discussion of the evidence that was used in their development. In the meantime, the evidence from the September 2009 draft of the College and Career Ready Standards is available: The URL for the ELA document is <http://www.corestandards.org/Files/ELAEvidence.pdf>, and the URL for the mathematics document is <http://www.corestandards.org/Files/MathEvidence.pdf>.

ⁱ Eight of these were high-performers on either TIMSS, PISA or both: Belgium, Canada [Alberta], Chinese Taipei, Finland, Hong Kong, Japan, Korea, and Singapore. England and Ireland, which have uneven performances on international assessments, were included because of their cultural links to the United States. China and India were included because of their growing global competitiveness.

ⁱⁱ Differences in language have a greater impact on the teaching and learning of language arts than of mathematics, so the teams looked primarily at English-speaking countries. All were high-performers on PISA except Singapore, which did not participate, and England, which as in mathematics was selected partly for its cultural links to the United States.

Appendix B-5

Final-Omitted Regulations Process under Pennsylvania Law

A final-omitted regulation is a regulation promulgated by an agency without formal prior publication of a notice of proposed rulemaking in the *Pennsylvania Bulletin*. There is no formal opportunity for comment by the public, legislative oversight committees (Committees) and the Independent Regulatory Review Commission (IRRC) before the agency adopts the regulation in final-form. However, under the Regulatory Review Act (RRA), the procedure for review of final-omitted regulations is exactly the same as it is for final-form regulations. *See 71 P.S. §§ 745.5a, 745.6.*

Section 204 of the Commonwealth Documents Law (CDL) establishes limited circumstances under which an agency is permitted to promulgate a final-omitted regulation, including those circumstances when the agency finds that notice is impracticable, unnecessary or contrary to the public interest. *See 45 P.S. § 1204(3).*¹ Regulations that have a significant and an immediate fiscal impact, and regulations that respond to emergencies, fall under the categories of “impracticable” and “contrary to the public interest.”

Although a final-omitted regulation has no formal public comment period, there is nothing prohibiting anyone from commenting on the regulation to the agency.

Eliminating the proposed stage saves approximately 60 days of review. Review periods under the Commonwealth Attorneys Act and RRA are also shortened to conserve time. The regulation is submitted, **on the same day**, to the Attorney General, IRRC and the Committees. This saves an additional 30 days because the Attorney General’s review occurs concurrently with IRRC’s and the Committees’ review.

¹ **§ 204. Omission of notice of proposed rule making**

Except as otherwise provided by regulations promulgated by the joint committee, an agency may omit or modify the procedures specified in sections 201 and 202, if:

...

(3) The agency for good cause finds (and incorporates the finding and a brief statement of the reasons therefor in the order adopting the administrative regulation or change therein) that the procedures specified in sections 201 and 202 are in the circumstances impracticable, unnecessary, or contrary to the public interest.

45 P.S. § 1204(3).

Appendix B-6

(Reenacted and amended June 30, 1989, P.L. 73, NO. 19)

AN ACT

Providing for independent oversight and review of regulations, creating an Independent Regulatory Review Commission, providing for its powers and duties and making repeals.

TABLE OF CONTENTS

- Section 1. Short title.
- Section 2. Legislative intent.
- Section 3. Definitions.
- Section 4. Creation of commission; membership, compensation; vacancies; removal.
- Section 5. Proposed regulation; criteria for review, existing regulations.
 - Section 5.1 Final-form regulations and final-omitted regulations; procedures and criteria for review. (Deleted by amendment)
- Section 6. Procedures for commission consideration and agency review.
 - Section 6.1 Agency action pursuant to statute. (Deleted by amendment)
- Section 7. Procedures and subsequent review.
 - Section 7.1 Classification of documents.
- Section 8. Changes in final-form regulations.
 - Section 8.1 Existing regulations.
- Section 9. Commission staff.
- Section 10. Subpoena power.
- Section 11. Rules; annual reports; hearings and advisory group meetings.
- Section 12. Clearinghouse.
 - Section 12.1 Gubernatorial review.
- Section 13. Appropriation. (Repealed)
- Section 14. Repeals.
- Section 15. Termination date. (Deleted by amendment)

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Short title.

This act shall be known and may be cited as the "Regulatory Review Act."

Section 2. Legislative intent.

(a) The General Assembly has enacted a large number of statutes and has conferred on boards, commissions, departments and agencies within the executive branch of government the authority to adopt rules and regulations to implement those statutes. The General Assembly has found that this delegation of its authority has resulted in regulations being promulgated without undergoing effective review concerning cost benefits, duplication, inflationary impact and conformity to legislative intent. The General Assembly finds that it must establish a procedure for oversight and review of regulations adopted pursuant to this delegation of legislative power in order to curtail excessive regulation and to require the executive branch to justify its exercise of the authority to regulate before imposing hidden costs upon the economy of Pennsylvania. It is the intent of this act to establish a method for ongoing and effective legislative review and oversight in order to foster executive branch accountability; to provide for primary review by a

commission with sufficient authority, expertise, independence and time to perform that function; to provide ultimate review of regulations by the General Assembly; and to assist the Governor, the Attorney General and the General Assembly in their supervisory and oversight functions. To the greatest extent possible, this act is intended to encourage the resolution of objections to a regulation and the reaching of a consensus among the commission, the standing committees, interested parties and the agency.

(b) This act is not intended to create a right or benefit, substantive or procedural, enforceable at law by a person against another person or against the Commonwealth, its agencies or its officers.

(2 amended June 25, 1997, P.L.252, No.24)

Section 3. Definitions.

The following words and phrases when used in this act shall have, unless the context clearly indicates otherwise, the meanings given to them in this section:

"Agency." Any department, departmental administrative board or commission, independent board or commission, agency or other authority of this Commonwealth now existing or hereafter created, but shall not include the Senate or the House of Representatives, the Pennsylvania Fish Commission, the Pennsylvania Game Commission or any court, political subdivision, municipal or local authority.

"Commission." The Independent Regulatory Review Commission.

"Committee." A standing committee of the Senate or the House of Representatives designated by the President pro tempore of the Senate for the Senate or by the Speaker of the House of Representatives for the House. The designation shall prescribe the jurisdiction of each standing committee over the various State agencies for purposes of this act. The designation shall be transmitted to the Legislative Reference Bureau for publication in the Pennsylvania Bulletin.

"Commonwealth Attorneys Act." The act of October 15, 1980 (P.L.950, No.164), known as the "Commonwealth Attorneys Act."

"Commonwealth Documents Law." The act of July 31, 1968 (P.L.769, No.240), referred to as the Commonwealth Documents Law.

"Designated standing committee." (Def. deleted by amendment).

"Family." A parent, spouse, child, brother or sister.

"Final-form regulation." A regulation previously published as a proposed regulation pursuant to the act of July 31, 1968 (P.L.769, No.240), referred to as the Commonwealth Documents Law, which an agency submits to the commission and the committees following the close of the public comment period.

"Final-omitted regulation." A regulation which an agency submits to the commission and the committees for which the agency has omitted notice of proposed rulemaking pursuant to section 204 of the act of July 31, 1968 (P.L.769, No.240), referred to as the Commonwealth Documents Law.

"Promulgate." To publish an order adopting a final-form or final-omitted regulation in accordance with the act of July 31, 1968 (P.L.769, No.240), referred to as the Commonwealth Documents Law.

"Proposed regulation." A document intended for promulgation as a regulation which an agency submits to the commission and the committees and for which the agency gives notice of proposed rulemaking and holds a public comment period pursuant to the act of July 31, 1968 (P.L.769, No.240), referred to as the Commonwealth Documents Law.

"Regulation." Any rule or regulation, or order in the nature of a rule or regulation, promulgated by an agency under statutory authority in the administration of any statute administered by or relating to the agency or amending, revising or otherwise altering the terms and provisions of an existing regulation, or prescribing the practice or procedure before such agency. The term shall also include actions of the Liquor Control Board which have an effect on the discount rate for retail licensees. The term shall not include a proclamation, executive order, directive or similar document issued by the Governor, but shall include a regulation which may be promulgated by an agency, only with the approval of the Governor.

"Withdrawal." Removal of a proposed, final-form or final-omitted regulation by an agency

from the review process so that the commission and the committees are prevented from taking further action on the regulation.

(3 amended June 25, 1997, P.L.252, No.24)

Compiler's Note: The name of the Pennsylvania Fish Commission, referred to in this section, was changed to the Pennsylvania Fish and Boat Commission by the Act 39 of 1991. See 30 Pa.C.S. § 308 (relating to designation of commission).

Section 4. Composition of commission; membership, compensation; vacancies; removal.

(a) The Independent Regulatory Review Commission shall consist of five members to be known as commissioners. One commissioner shall be appointed by the Governor to serve at the Governor's pleasure, one by the President pro tempore of the Senate, one by the Speaker of the House of Representatives, one by the Minority Leader of the Senate and one by the Minority Leader of the House of Representatives. A member of the General Assembly or any other officer or employee of State Government may not serve as a commissioner; but a commissioner may serve on advisory boards and commissions, or on other boards and commissions which do not promulgate any rules and regulations which may come before the commission for review pursuant to this act.

(b) Each appointment provided for by subsection (a), except for the Governor's appointment, shall be for a term of three years. ((b) amended Dec. 6, 2002, P.L.1227, No.148)

(c) An appointment to fill a vacancy for the remainder of the unexpired term shall be made in the same manner as set forth in subsection (a). Upon the expiration of a commissioner's term of office, the commissioner shall continue to hold office until a successor is appointed.

(d) The commissioner who is elected to serve as the chairperson in accordance with subsection (g) shall receive \$300 per day as compensation for services rendered to the commission. Each of the other commissioners shall receive \$250 per day as compensation for services rendered to the commission. A commissioner shall also be entitled to reimbursement for travel and other necessary expenses incurred as a result of official duties. The expenses incurred by a commissioner, or by an employee of the commission, shall be paid on the presentation of itemized vouchers therefor, which vouchers shall be subject to the approval of the commission.

(e) Except as authorized pursuant to subsection (f) or (h) and except for the Governor's appointee who shall serve at the Governor's pleasure, a commissioner may not be removed during the commissioner's term of office. The Governor may, with the approval of two-thirds of the members of the Senate, upon clear and convincing evidence of misfeasance or malfeasance in office or neglect of duty, remove a commissioner prior to the expiration of the commissioner's term. The Governor shall provide the commissioner to be removed with a detailed written statement of the reasons for removal.

(f) A commissioner formally charged before a court of record with the commission of a felony or with a misdemeanor as provided by 18 Pa.C.S. Pt. II Art. E (relating to offenses against public administration) shall immediately be suspended as a commissioner until the charge is dismissed or a verdict of acquittal is announced. If a commissioner pleads guilty or nolo contendere or is found guilty of such offense, or receives probation without verdict, disposition in lieu of trial or an accelerated rehabilitative disposition for felony or misdemeanor charges in this Commonwealth or in any other jurisdiction, that commissioner shall immediately be removed from the commission upon announcement of the verdict or disposition by the court or upon the court's acceptance of a plea of guilty or nolo contendere.

(f.1) A commissioner may not participate in deliberations regarding any regulation which significantly affects the operation or activities of any organization (except a nonprofit organization certified under section 501(c)(3) of the Internal Revenue Code of 1986 (Public Law 99-514, 26 U.S.C. § 501(c)(3)) in which the commissioner holds a nonsalaried position) in which the commissioner, or any member of the commissioner's family, owns shares of stock in excess of 5% of the total issue of the stock, has an ownership interest in excess of 5% of the total ownership or serves as an officer, director, trustee, partner or employee. Within 90 days of appointment, and annually thereafter, each commissioner shall disclose all business affiliations and financial interests. The disclosure statement shall be filed with the executive director of the commission and the Ethics Commission and shall be available for public inspection during business hours of the commission. Each commissioner's disclosure statement shall remain on file as long as the commissioner remains on the commission. If a commissioner has or may

have a conflict of interest or feels another commissioner has or may have a conflict of interest in deliberating on a regulation, the commissioner shall, prior to the vote on the regulation, disclose the conflict or potential conflict. The commissioner may request a ruling from the chairperson of the commission upon the question of whether the conflict or potential conflict disqualifies the commissioner from voting on the regulation. A commissioner may challenge the ruling of the chairperson, and, in that case, the question shall be resolved by majority vote of the commission. The chairperson or a majority of the commissioners may request the Ethics Commission to provide advice regarding conflicts of interest, and the advice, when given, shall be binding upon the commission. A commissioner commits a misdemeanor of the second degree by knowingly and intentionally violating the provisions of this subsection. The commission or its employees when acting in good faith on an opinion issued to a commissioner by the chairperson or the Ethics Commission shall not be subject to criminal or civil penalties levied under the act of October 4, 1978 (P.L.883, No.170), referred to as the Public Official and Employee Ethics Law, for so acting, provided the material facts are as stated in the request for an opinion. In addition to the requirements of this act, a commissioner is subject to the Public Official and Employee Ethics Law.

(g) The commission shall elect a chairperson, who shall serve for a term of two years and until a successor is elected. The chairperson shall preside at meetings of the commission and shall execute documents relating to the formal actions of the commission.

(h) The commission shall meet before the period for its review of regulations under this act expires and at other times as necessary to transact the business of the commission and insure an expeditious and orderly review of regulations under this act. Meetings shall be held at times and places set by the chairperson. A meeting may be scheduled by the commission upon the provision of at least ten days' notice to all affected agencies and the committees. A commissioner who does not attend three consecutive meetings without cause may be removed as a commissioner by the authority appointing the commissioner. ((h) amended Dec. 6, 2002, P.L.1227, No.148)

(i) For purposes of conducting official business, a quorum consists of three commissioners. A commissioner must be physically present to be counted toward the quorum. If the commission is unable to conduct business for lack of a quorum, the deadline for the commission to take action on a regulation in accordance with this act shall be postponed for 30 days or until the next meeting at which a quorum is in attendance, whichever first occurs.

(4 amended June 25, 1997, P.L.252, No.24)

Section 5. Proposed regulations; procedures for review.

(a) On the same date that an agency submits a proposed regulation to the Legislative Reference Bureau for publication of notice of proposed rulemaking in the Pennsylvania Bulletin as required by the Commonwealth Documents Law, the agency shall submit to the commission and the committees a copy of the proposed regulation and a regulatory analysis form which includes the following:

(1) The title of the agency and the names, office addresses and telephone numbers of the agency officials responsible for responding to questions regarding the regulation or for receiving comments relating to the regulation.

(1.1) A specific citation to the Federal or State statutory or regulatory authority or the decision of a Federal or State court under which the agency is proposing the regulation, which the regulation is designed to implement or which may mandate or affect compliance with the regulation.

(2) A concise and, when possible, nontechnical explanation of the proposed regulation.

(3) A statement of the need for the regulation.

(4) Estimates of the direct and indirect costs to the Commonwealth, to its political subdivisions and to the private sector. Insofar as the proposed regulation relates to costs to the Commonwealth, the agency may submit in lieu of its own statement the fiscal note prepared by the Office of the Budget pursuant to section 612 of the act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929."

(5) A statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

(7) A schedule for review of the proposed regulation, including the date by which the agency must receive comments; the date or dates on which public hearings will be held; the expected date of promulgation of the proposed regulation as a final-form regulation; the expected effective date of the final-form regulation; the date by which compliance with the final-form regulation will be required; and the date by which required permits, licenses or other approvals must be obtained.

(9) An identification of the types of persons, businesses and organizations which would be affected by the regulation.

(10) An identification of the financial, economic and social impact of the regulation on individuals, business and labor communities and other public and private organizations and, when practicable, an evaluation of the benefits expected as a result of the regulation.

(11) A description of any special provisions which have been developed to meet the particular needs of affected groups and persons, including minorities, the elderly, small businesses and farmers.

(12) A description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

(13) A description of the plan developed for evaluating the continuing effectiveness of the regulation after its implementation.

(b) The requirements of subsection (a) shall not diminish the requirements of section 201 of the Commonwealth Documents Law, but the information required by this section may be included in the Notice of Proposed Rulemaking published in the Pennsylvania Bulletin in lieu of the information required by paragraphs (2) and (3) of section 201 of the Commonwealth Documents Law. The agency shall hold a public comment period which shall commence with the publication of the notice of proposed rulemaking and shall continue for not less than 30 days unless section 203(1) or (2) of the Commonwealth Documents Law applies.

(c) From the date of submission of the proposed regulation, the agency shall submit to the commission and the committees, within five business days of receipt, a copy of comments which the agency receives relating to the proposed regulation. The agency shall also, upon request, submit to the commission and the committees copies of reports from advisory groups and other documents received from or disseminated to the public relating to the proposed regulation and public notices or announcements relating to solicitation of public comments or meetings which the agency held or will hold relating to the proposed regulation.

(d) The committees may, at any time prior to the submittal of the regulation in final-form, convey to the agency and the commission their comments, recommendations and objections to the proposed regulation and a copy of any staff reports deemed pertinent. The comments, recommendations and objections may refer to the criteria in section 5.2.

(e) ((e) deleted by amendment)

(f) An agency may not submit a proposed regulation to the committees for review during the period from the end of the legislative session in an even-numbered year to the date by which both committees have been designated in the next succeeding legislative session, but an agency may submit a proposed regulation and the material required under subsection (a) to the commission and the Legislative Reference Bureau during this period in accordance with subsection (a). The public comment period shall commence with the publication of the notice of proposed rulemaking and end on the date designated by the agency under subsection (b). The agency shall submit the proposed regulation and required material to the committees no later than the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin. If the agency does not deliver the proposed regulation and all material required under this section in the time prescribed in this subsection, the agency shall be deemed to have withdrawn the proposed regulation.

(g) The commission may, within thirty days after the close of the public comment period, convey to the agency and committees any comments, recommendations and objections to the proposed regulation. The comments, recommendations and objections shall specify the regulatory review criterion set forth in section 5.2 which the proposed regulation has not met. If the commission does not comment on, make recommendations regarding or object to any portion of the proposed regulation within the time provided in this subsection, the commission shall be deemed to have approved that portion of the proposed regulation. Disapproval of the

final-form regulation by the commission shall relate only to comments, recommendations and objections raised by the commission to the proposed regulation; to changes which the agency made to the proposed regulation; or to recommendations, comments or objections which a committee conveyed to the agency or the commission.

(5 amended Dec. 6, 2002, P.L.1227, No.148)

Compiler's Note: Section 5 of Act 148 of 2002, which amended section 5, provided that Act 148 shall apply to proposed, final-form and final-omitted regulations which an agency submits on or after the effective date of Act 148 to the Independent Regulatory Review Commission and to "committees" as defined in section 3.

Section 5.1. Final-form regulations and final-omitted regulations; procedures for review.

(a) The agency shall review and consider public comments and the comments of the committees and commission pursuant to this section. Within five business days of receipt of a public comment, the agency shall notify the commentator of the agency's address and telephone number where the commentator may submit a request for the information concerning the final-form regulation under subsection (b). Upon completion of the agency's review of comments, the agency shall submit to the commission and the committees a copy of its response to the comments received, the names and addresses of commentators who have requested additional information relating to the final-form regulation and the text of the final-form regulation which the agency intends to adopt. If an agency does not submit or withdraws and does not resubmit the final-form regulation within two years of the close of the public comment period but still desires to promulgate the final-form regulation, the agency shall republish the regulation as a proposed regulation with a new public comment period in accordance with the Commonwealth Documents Law. If the agency is prevented from delivering its final-form regulation to the commission and the committees within the time period provided for in this subsection because of the adjournment sine die or expiration of the legislative session in an even-numbered year, the agency shall deliver its final-form regulation in accordance with subsection (f).

(b) On the same date that the agency submits the material required in subsection (a) to the commission and the committees, the agency shall send a notice of submission and a copy of the text of the final-form regulation or a copy of all changes to the proposed regulation which are incorporated into the final-form regulation to each commentator who requested this information pursuant to subsection (a). The agency is not responsible for notifying each party whose name appears on petitions or membership lists who did not present individual comments on the regulation.

(c) The agency shall submit final-omitted regulations to the commission and the committees for review under this section on the same date that the agency submits the regulations to the Attorney General for review as provided in section 204(b) of the Commonwealth Attorneys Act. The requirements of section 5, except for the requirements for holding a public comment period and for notifying commentators, are applicable to final-omitted regulations. If the agency makes revisions pursuant to subsection (g), the agency shall deliver copies of the revisions to the Attorney General on the same date that the agency delivers the revisions to the commission and the committees.

(d) ((d) deleted by amendment)

(e) The commission may have until its next scheduled meeting which occurs no less than 30 days after receipt of the final-form or final-omitted regulation to approve or disapprove the final-form or final-omitted regulation. The commission shall notify the agency and the committees of its approval or disapproval. If the commission does not disapprove the final-form or final-omitted regulation within the time allotted in this subsection, the commission shall be deemed to have approved the final-form or final-omitted regulation.

(f) An agency may not deliver a final-form or final-omitted regulation to the commission and the committees after the adjournment sine die or expiration of the legislative session in an even-numbered year. The agency may not deliver the final-form or final-omitted regulation until the fourth Monday in January of the next year. On that date, the agency shall resubmit the final-form or final-omitted regulation and required material to the committees and the commission. If either committee has not been designated by the fourth Monday in January, the agency may not deliver the final-form or final-omitted regulation and required material to the committees and the commission until both committees are designated.

(g) Except as provided in this subsection, the agency may not make any changes to a final-form or final-omitted regulation after the agency submits the final-form or final-omitted regulation to the commission and the committees.

(1) Prior to the expiration of the date on which either of the committees takes action on the final-form or final-omitted regulation, pursuant to subsection (j.2) or (j.3) or the expiration of the commission's review period prescribed in subsection (e), whichever occurs first, the agency may, unless the commission shall object, toll the time for the commission's and the committees' review of the final-form or final-omitted regulation in order to allow time for the agency to consider revisions to the final-form or final-omitted regulation recommended by the commission or a committee.

(2) Tolling under paragraph (1) may last for up to 30 days. If within 30 days the agency does not submit revisions to the committees and the commission or does not notify the commission and the committees in writing that it will not submit revisions but wishes the commission and the committees to resume their review, the agency shall be deemed to have withdrawn the final-form or final-omitted regulation.

(3) The committees shall have the remainder of the 20-day review period or ten days from the date of receipt of the revised final-form or final-omitted regulation or written notification under paragraph (2), whichever is longer, to take action pursuant to subsection (j.2) or (j.3), and the commission may have until its next scheduled meeting which occurs after the expiration of the committee review period but not less than 15 days after receipt of the revised final-form or final-omitted regulation or written notification under paragraph (2) to review the final-form or final-omitted regulation. If the commission does not disapprove the final-form or final-omitted regulation or a committee does not notify the commission and the agency that it has disapproved the regulation or that it intends to review the regulation pursuant to subsection (j.2), within the respective time periods, the regulation shall be deemed approved.

(4) The agency may not toll the time for review of any final-form or final-omitted regulation more than one time.

(5) The agency may not submit revisions or notification that the regulation will not be revised after the adjournment sine die or the expiration of the legislative session in an even-numbered year. If the committees and the commission are prevented from completing their review pursuant to this subsection because of the adjournment sine die or the expiration of the legislative session in an even-numbered year, the agency shall resubmit the final-form or final-omitted regulation and review shall proceed in accordance within subsection (j.3).

(h) ((h) deleted by amendment)

(i) ((i) deleted by amendment)

(j) The commission shall accept public comments only up to 48 hours prior to the commission's public meeting unless the comments are submitted at the request of the commission. The commission shall receive comments from the agency or members of the General Assembly until the commission acts on the regulation. The commission shall transmit comments received during the 48-hour period prior to the commission's public meeting to the agency and the committees upon receipt. The commission shall accept additional public comments only after the public meeting has been called to order.

(j.1) A committee shall have at least 20 days from receipt of the information required under subsection (a) or receipt of the information required under subsection (c) to take action pursuant to subsection (j.2). If the committees are prevented from completing their 20-day review because of the adjournment sine die or expiration of the legislative session in an even-numbered year, their review of the final-form or final-omitted regulation shall automatically be suspended until the fourth Monday in January of the next year. On that date, the agency shall resubmit the final-form or final-omitted regulation and required material to the committees and the commission. If either committee has not been designated by the fourth Monday in January, the agency may not deliver the final-form or final-omitted regulation and required material to the commission and the committees until both committees have been designated. If the agency does not deliver the final-form or final-omitted regulation and required material to the commission and the committees by the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin, the agency shall be deemed to have withdrawn the regulation. In computing the remaining time for committee review, the

number of days in which the committees have had the final-form or the final-omitted regulation under review as of the adjournment sine die or expiration of the prior session shall be subtracted from the 20-day committee review period, but the committee review period in the next succeeding legislative session shall not be less than ten days. The commission shall not act on a regulation until the committee review period has expired. This section shall not apply to emergency-certified regulations adopted pursuant to the provisions of section 6(d).

(j.2) At any time during the commission's review period up to 24 hours prior to the opening of the commission's public meeting, a committee may notify the commission and the agency that it has approved or disapproved a final-form or final-omitted regulation or that it intends to review the regulation. If the commission approves a regulation and a committee has not notified the commission and the agency that it has disapproved the regulation or that it intends to review the regulation, the agency may promulgate the regulation. If the commission approves a regulation and a committee has notified the commission and the agency that it has disapproved the regulation or that it intends to review the regulation, the agency may not promulgate the regulation for 14 days after the committee has received the commission's approval order. During this 14-day period, the committee may take action on the regulation pursuant to section 7(d). If at the expiration of the 14-day period the committee has not taken action on the regulation pursuant to section 7(d), the agency may promulgate the regulation.

(j.3) If the committees are prevented from completing their 14-day review because of adjournment sine die or expiration of the legislative session in an even-numbered year, their review of the final-form or final-omitted regulation shall automatically be suspended until the fourth Monday in January of the next year. On that date, the agency shall resubmit the final-form or final-omitted regulation and required material to the committees and the commission. If either committee has not been designated by the fourth Monday in January, the agency may not deliver the final-form or final-omitted regulation and required material to the committees and the commission until both committees are designated. If the agency does not deliver the final-form or final-omitted regulation and required material to the commission and the committees by the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin, the agency shall be deemed to have withdrawn the final-form or final-omitted regulation. In determining the remaining time for committee review, the number of days in which the committees have had the final-form or the final-omitted regulation under review as of the adjournment sine die or expiration of the prior session shall be subtracted from the 14-day committee review period, but the committee review period in the next succeeding legislative session shall not be less than ten days. An agency may not submit a final-form or final-omitted regulation to the commission or the committees for review during the period from the adjournment sine die or expiration of the legislative session of an even-numbered year to the date by which both committees have been designated in the next succeeding legislative session. This subsection shall not apply to emergency-certified regulations adopted pursuant to the provisions of section 6(d).

(j.4) If the commission disapproves a final-form or final-omitted regulation, the commission, the committees and the agency will proceed in accordance with section 6.

(k) The commission shall note and shall make a part of the public record all comments which it receives relating to a regulation and shall retain the comments for four years after the promulgation of the regulation.

(l) Except for emergency-certified regulations adopted under section 6(d), an agency may not promulgate a regulation until completion of the review provided for in this act.

(5.1 amended Dec. 6, 2002, P.L.1227, No.148)

Compiler's Note: Section 5 of Act 148 of 2002, which amended section 5.1, provided that Act 148 shall apply to proposed, final-form and final-omitted regulations which an agency submits on or after the effective date of Act 148 to the Independent Regulatory Review Commission and to "committees" as defined in section 3.

Section 5.2. Criteria for review of regulations.

(a) In determining whether a proposed, final-form, final-omitted or existing regulation is in the public interest, the commission shall, first and foremost, determine whether the agency has the statutory authority to promulgate the regulation and whether the regulation conforms to the intention of the General Assembly in the enactment of the statute upon which the regulation

is based. In making its determination, the commission shall consider written comments submitted by the committees and current members of the General Assembly, pertinent opinions of Pennsylvania's courts and formal opinions of the Attorney General.

(b) Upon a finding that the regulation is consistent with the statutory authority of the agency and with the intention of the General Assembly in the enactment of the statute upon which the regulation is based, the commission shall consider the following in determining whether the regulation is in the public interest:

(1) Economic or fiscal impacts of the regulation, which include the following:

- (i) Direct and indirect costs to the Commonwealth, to its political subdivisions and to the private sector.
- (ii) Adverse effects on prices of goods and services, productivity or competition.
- (iii) The nature of required reports, forms or other paperwork and the estimated cost of their preparation by individuals, businesses and organizations in the public and private sectors.
- (iv) The nature and estimated cost of legal, consulting or accounting services which the public or private sector may incur.
- (v) The impact on the public interest of exempting or setting lesser standards of compliance for individuals or small businesses when it is lawful, desirable and feasible to do so.

(2) The protection of the public health, safety and welfare and the effect on this Commonwealth's natural resources.

(3) The clarity, feasibility and reasonableness of the regulation to be determined by considering the following:

- (i) Possible conflict with or duplication of statutes or existing regulations.
- (ii) Clarity and lack of ambiguity.
- (iii) Need for the regulation.
- (iv) Reasonableness of requirements, implementation procedures and timetables for compliance by the public and private sectors.

(4) Whether the regulation represents a policy decision of such a substantial nature that it requires legislative review.

(5) Comments, objections or recommendations of a committee.

(6) Compliance with the provisions of this act or the regulations of the commission in promulgating the regulation.

(5.2 added Dec. 6, 2002, P.L.1227, No.148)

Compiler's Note: Section 5 of Act 148 of 2002, which added section 5.2, provided that Act 148 shall apply to proposed, final-form and final-omitted regulations which an agency submits on or after the effective date of Act 148 to the Independent Regulatory Review Commission and to "committees" as defined in section 3.

Section 6. Procedures for disapproval of final-form and final-omitted regulations; emergency-certified regulations.

(a) If the commission disapproves a final-form or final-omitted regulation, the commission shall deliver its disapproval order to the Legislative Reference Bureau, the committees and the agency. The commission shall notify commentators who have requested additional information under section 5.1(a) of the commission's vote to disapprove. The disapproval order shall specify the regulatory review criteria which the final-form or final-omitted regulation has not met. The agency shall review the commission's order and proceed pursuant to section 7(a).

(b) The commission's order disapproving a final-form or final-omitted regulation shall bar the agency from promulgating that regulation pending subsequent review under section 7.

(c) ((c) deleted by amendment)

(d) The commission may not issue an order barring an agency from promulgating a final-form or final-omitted regulation if the Attorney General certifies that the final-form or final-omitted regulation is required pursuant to the decree of any court or to implement the provisions of a statute of the United States or regulations issued thereunder by a Federal agency or if the Governor certifies that the final-form or final-omitted regulation is required to meet an

emergency which includes conditions which may threaten the public health, safety or welfare; cause a budget deficit; or create the need for supplemental or deficiency appropriations of greater than \$1,000,000. In those cases, the final-form or final-omitted regulation may take effect on the date of publication or on a later date specified in the order adopting the final-form or final-omitted regulation. The commission and the committees shall review the final-form or final-omitted regulation pursuant to the procedures provided for in this act. If the final-form or final-omitted regulation is disapproved pursuant to those procedures, that regulation shall be rescinded after 120 days or upon final disapproval, whichever occurs later.

(6 amended Dec. 6, 2002, P.L.1227, No.148)

Compiler's Note: Section 5 of Act 148 of 2002, which amended section 6, provided that Act 148 shall apply to proposed, final-form and final-omitted regulations which an agency submits on or after the effective date of Act 148 to the Independent Regulatory Review Commission and to "committees" as defined in section 3.

Section 6.1. Agency action pursuant to statute. (6.1 deleted by amendment June 25, 1997, P.L.252, No.24).

Section 7. Procedures for subsequent review of disapproved final-form or final-omitted regulations.

(a) An agency may select one of the following options for proceeding with a regulation which has been disapproved by the commission:

(1) To proceed further with the final-form or final-omitted regulation pursuant to subsection (b).

(2) To proceed further with the final-form or final-omitted regulation pursuant to subsection (c).

(3) To withdraw the final-form or final-omitted regulation.

(a.1) ((a.1) deleted by amendment)

(b) If the agency decides to adopt the final-form or final-omitted regulation without revisions or further modifications, the agency shall submit a report to the committees and the commission within 40 days of the agency's receipt of the commission's disapproval order. The agency's report shall contain the final-form or final-omitted regulation, the commission's disapproval order and the agency's response and recommendations regarding the final-form or final-omitted regulation. If the committees are prevented from receiving the report because of adjournment sine die or expiration of the legislative session in an even-numbered year, the agency shall submit its report to the commission and the committees on the fourth Monday in January of the next year. If either committee has not been designated by the fourth Monday in January, the agency may not deliver the report to the committees and the commission until both committees are designated, but the agency shall deliver its report to the commission and the committees no later than the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin. If the agency does not deliver the report to the committees and the commission in the time prescribed in this subsection, the agency shall be deemed to have withdrawn the final-form or final-omitted regulation.

(c) If the agency decides to revise or modify the final-form or final-omitted regulation in order to respond to objections raised by the commission and adopt that regulation with revisions or modifications, the agency shall submit a report to the committees and the commission within 40 days of the agency's receipt of the commission's disapproval order. The agency's report shall contain the revised final-form or final-omitted regulation, the findings of the commission, and the agency's response and recommendations regarding the revised final-form or final-omitted regulation. If the committees are prevented from receiving the report because of adjournment sine die or expiration of the legislative session in an even-numbered year, the agency shall submit the report to the commission and the committees on the fourth Monday in January of the next year. If either committee has not been designated by the fourth Monday in January, the agency may not deliver the report to the committees and the commission until both committees are designated, but the agency shall deliver its report to the commission and the committees no later than the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin. If the agency does not deliver its report to the commission and the committees in the time prescribed in this subsection, the agency shall be deemed to have withdrawn the final-form or final-omitted

regulation.

(c.1) The commission may have until its next scheduled meeting which occurs no less than 15 days from receipt of the agency's report to approve or disapprove the agency's report. The commission shall deliver its approval or disapproval order to the committees for consideration by the General Assembly pursuant to subsection (d). If the commission is prevented from delivering its order to the committees within the time period provided for in this subsection because of the adjournment sine die or expiration of the legislative session in an even-numbered year, the commission shall deliver its order on the fourth Monday of January of the next year. If either committee has not been designated by the fourth Monday in January, the commission may not deliver its order to the committees until both committees are designated, but the commission shall deliver its order no later than the second Monday after the date by which both committee designations have been published in the Pennsylvania Bulletin. If the commission does not deliver its order disapproving the agency's report and revised final-form or final-omitted regulation in the time prescribed by this subsection, the commission shall be deemed to have approved the agency's report and the revised final-form or final-omitted regulation.

(d) Upon receipt of the commission's order pursuant to subsection (c.1) or at the expiration of the commission's review period if the commission does not act on the regulation or does not deliver its order pursuant to subsection (c.1), one or both of the committees may, within 14 calendar days, report to the House of Representatives or Senate a concurrent resolution and notify the agency. During the 14-calendar-day period, the agency may not promulgate the final-form or final-omitted regulation. If, by the expiration of the 14-calendar-day period, neither committee reports a concurrent resolution, the committees shall be deemed to have approved the final-form or final-omitted regulation, and the agency may promulgate that regulation. If either committee reports a concurrent resolution before the expiration of the 14-day period, the Senate and the House of Representatives shall each have 30 calendar days or ten legislative days, whichever is longer, from the date on which the concurrent resolution has been reported, to adopt the concurrent resolution. If the General Assembly adopts the concurrent resolution by majority vote in both the Senate and the House of Representatives, the concurrent resolution shall be presented to the Governor in accordance with section 9 of Article III of the Constitution of Pennsylvania. If the Governor does not return the concurrent resolution to the General Assembly within ten calendar days after it is presented, the Governor shall be deemed to have approved the concurrent resolution. If the Governor vetoes the concurrent resolution, the General Assembly may override that veto by a two-thirds vote in each house. The Senate and the House of Representatives shall each have 30 calendar days or ten legislative days, whichever is longer, to override the veto. If the General Assembly does not adopt the concurrent resolution or override the veto in the time prescribed in this subsection, it shall be deemed to have approved the final-form or final-omitted regulation. Notice as to any final disposition of a concurrent resolution considered in accordance with this section shall be published in the Pennsylvania Bulletin. The bar on promulgation of the final-form or final-omitted regulation shall continue until that regulation has been approved or deemed approved in accordance with this subsection. If the General Assembly adopts the concurrent resolution and the Governor approves or is deemed to have approved the concurrent resolution or if the General Assembly overrides the Governor's veto of the concurrent resolution, the agency shall be barred from promulgating the final-form or final-omitted regulation. If the General Assembly does not adopt the concurrent resolution or if the Governor vetoes the concurrent resolution and the General Assembly does not override the Governor's veto, the agency may promulgate the final-form or final-omitted regulation. The General Assembly may, at its discretion, adopt a concurrent resolution disapproving the final-form or final-omitted regulation to indicate the intent of the General Assembly but permit the agency to promulgate that regulation.

(7 amended Dec. 6, 2002, P.L.1227, No.148)

Compiler's Note: Section 5 of Act 148 of 2002, which amended section 7, provided that Act 148 shall apply to proposed, final-form and final-omitted regulations which an agency submits on or after the effective date of Act 148 to the Independent Regulatory Review Commission and to "committees" as defined in section 3.

Section 7.1. Classification of documents.

If the commission or a committee finds that a published or unpublished document should be promulgated as a regulation, the commission or committee may present the matter to the Joint Committee on Documents. The Joint Committee on Documents shall determine whether the document should be promulgated as a regulation and may order an agency either to promulgate the document as a regulation within 180 days or to desist from the use of the document in the business of the agency.

(7.1 amended June 25, 1997, P.L.252, No.24)

Section 8. Changes in final-form and final-omitted regulations.

(a) Except as provided in subsection (b), an agency may not make changes to a final-form or final-omitted regulation after that regulation has been approved or has been deemed approved by the committees or the commission pursuant to this act.

(b) Subsection (a) does not apply to changes made at the direction of the Office of Attorney General pursuant to its review under section 204(b) of the Commonwealth Attorneys Act.

(8 amended June 25, 1997, P.L.252, No.24)

Section 8.1. Existing regulations.

The commission, on its motion or at the request of any person or member of the General Assembly, may review any existing regulation which has been in effect for at least three years. If a committee of the Senate or the House of Representatives requests a review of an existing regulation, the commission shall perform the review and shall assign it high priority. The commission may submit recommendations to an agency recommending changes in existing regulations if it finds the existing regulations to be contrary to the public interest under the criteria established in section 5.2. The commission may also make recommendations to the General Assembly and the Governor for statutory changes if the commission finds that any existing regulation may be contrary to the public interest.

(8.1 amended Dec. 6, 2002, P.L.1227, No.148)

Section 9. Commission staff.

(a) The commission shall appoint and fix the compensation of a full-time executive director, who shall be responsible for the general supervision of all the affairs of the commission and for performing any administrative function or duty which the commission may delegate to the executive director. The commission shall appoint and fix the compensation of such other employees as the commission may find necessary for the proper operation of the commission.

(b) The commission shall appoint and fix the compensation of a full-time chief counsel, who shall not be subject to the supervision of the Attorney General or the General Counsel. The chief counsel shall supervise, coordinate and administer the legal services provided to the commission.

(9 amended June 25, 1997, P.L.252, No.24)

Section 10. Subpoena power.

The commission has the authority to issue subpoenas for the purpose of requiring the attendance of persons and the production of documents relating to any function which the commission or its staff is authorized to perform pursuant to this act. The chairperson or the executive director may sign a subpoena. The subpoena may be served in any manner authorized under the laws of this Commonwealth. The commission is authorized to apply to the Commonwealth Court to enforce its subpoenas.

(10 amended June 25, 1997, P.L.252, No.24)

Section 11. Regulations; annual reports; hearings and advisory group meetings.

(a) The commission, in the performance of its functions under this act, has the power to promulgate and enforce regulations necessary to carry out the purposes of this act. Regulations must be promulgated in accordance with the procedures established in the Commonwealth Documents Law. The regulations shall provide for the commission's notification of filings of final-form and final-omitted regulations to parties likely to be affected by the final-form and final-omitted regulations through publication of a notice in the Pennsylvania Bulletin. Prior to the regulations taking effect, the requirements of this act must be satisfied. For the purposes of reviewing the regulations of the commission and otherwise satisfying the requirements of this act, the Joint Committee on Documents shall exercise the rights and perform the functions of

the commission, and the commission shall exercise the rights and perform the functions of an agency under this act.

(b) On or before April 1, the commission shall file an annual report of its activities for the prior calendar year with the Governor and the General Assembly.

(c) The commission may hold public hearings on any matter before the commission and may meet with advisory groups regarding matters before the commission.

(11 amended June 25, 1997, P.L.252, No.24)

Section 12. Clearinghouse.

The commission shall act as a clearinghouse for complaints, comments and other input from members of the General Assembly and from the public regarding existing, proposed, final-form and final-omitted regulations. The commission shall maintain accurate records regarding complaints and comments it receives and shall maintain such records by departmental and subject matter categories for four years after the date of receipt by the commission. When the commission files its annual report as provided by section 11, the commission shall include within it a summary of public complaint and comment along with any recommendations the commission may offer for statutory change.

(12 amended June 25, 1997, P.L.252, No.24)

Section 12.1. Gubernatorial review.

The Governor may institute procedures for the review and approval of regulations promulgated by executive agencies prior to their submittal for review under this act, including, but not limited to, the establishment of a task force or committee, by executive order. The Governor may also establish procedures for the effective coordination of the review of regulations under the act of October 15, 1980 (P.L.950, No.164), known as the "Commonwealth Attorneys Act," and sections 612 and 2203-A of the act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929."

Section 13. Appropriation. (Deleted by amendment Feb. 21, 1986, P.L.47, No.16)

Section 14. Repeals.

(a) The following acts or parts of acts are repealed absolutely:

Section 812.2, act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929."

Second, third and fourth sentences of subsection (n) of section 4, act of May 23, 1945 (P.L.913, No.367), known as the "Professional Engineers Registration Law."

Second and third sentences of section 1410, act of June 13, 1967 (P.L.31, No.21), known as the "Public Welfare Code."

Subsection (c) of section 11, act of November 30, 1976 (P.L.1207, No.265), known as the "Emergency Medical Services Systems Act."

Subsections (c) and (d) of section 224, act of July 1, 1978 (P.L.700, No.124), known as the "Bureau of Professional and Occupational Affairs Fee Act."

Subsections (c) and (d) of section 601, act of July 19, 1979 (P.L.130, No.48), known as the "Health Care Facilities Act."

Third and fourth sentences of subsection (a) and subsection (b) of section 404, act of February 19, 1980 (P.L.15, No.9), known as the "Real Estate Licensing and Registration Act."

Section 107, act of July 7, 1980 (P.L.380, No.97), known as the "Solid Waste Management Act."

Section 6103(b) of Title 75 of the Pennsylvania Consolidated Statutes (relating to promulgation of rules and regulations by department).

(b) All other acts or parts of acts are repealed insofar as they provide for consideration by the General Assembly or its committees of proposed regulations.

Section 15. Termination date (15 deleted by amendment June 25, 1997, P.L.252, No.24)

Appendix B-7



COMMONWEALTH OF PENNSYLVANIA STATE BOARD OF EDUCATION

Timeline for State Board’s Adoption of Common Core Academic Standards

Pennsylvania’s State Board of Education has ultimate authority for promulgating academic standards in accordance with the state’s Public School Code, Commonwealth Attorneys Act, Commonwealth Documents Law, and Regulatory Review Act.

Within this context, the Board is strongly committed to considering and adopting rigorous academic standards in both math and reading that are consistent with the principles outlined in the attached memorandum of understanding. The Board will pursue an expedited, “final-omitted” regulatory promulgation and plans to adopt Common Core at its June 30 and July 1, 2010 meetings. To ensure a meaningful public comment process in advance of this vote, the Board is holding a series of roundtables across the Commonwealth to gather feedback from education stakeholders.

The timeline below charts the Board’s plan for considering and adopting Common Core, contingent on receipt of the final standards by June 2. While the Board’s Phase I timeline was predicated on receipt of a final version of Common Core by March 2010, the schedule has been revised – without sacrificing opportunities for public comment – to once again meet the August 2 target.

Activity:	Date (all dates 2010)
<ul style="list-style-type: none"> • PA Department of Education receives public drafts of Common Core • State Board of Education commissions independent study to compare Common Core with state academic standards. 	March 2010
<ul style="list-style-type: none"> • Dr. Suzanne Lane from the University of Pittsburgh’s School of Education convenes educator panels to perform alignment study. 	April 2010
<ul style="list-style-type: none"> • Adam Schott (State Board Executive Director) and Dane 	May 4, 2010

<p>Lane (Director, Education Division, NGA Center for Best Practices) provide testimony on Common Core before the PA Senate Education Committee</p> <ul style="list-style-type: none"> • Professor Lane presents preliminary results of alignment study at public meeting of the State Board (Harrisburg) • State Board holds three public roundtables to gather stakeholder feedback on common standards (Pittsburgh, State College, Philadelphia) 	<p>May 6</p> <p>May 21, 27 and June 9</p>
<ul style="list-style-type: none"> • PA Department of Education in receipt of final versions of Common Core • Final Common Core standards posted to Department and State Board websites for public comment • State Board in receipt of final draft of alignment study; study is posted on State Board website • Consistent with Sunshine Act provisions, State Board publishes notice of anticipated vote on June 30th • State Board's Academic Standards Committee makes recommendation on adoption to the Council of Basic Education; Council of Basic Education makes recommendation to full Board 	<p>June 2</p> <p>June 3</p> <p>June 7</p> <p>June 11</p> <p>June 30</p>
<ul style="list-style-type: none"> • State Board votes to adopt Common Core • State Board and Department issue communication to education stakeholders • State Board transmits regulation and accompanying statement of policy regarding implementation to <i>PA Bulletin</i> for publication 	<p>July 1</p> <p>July 1</p> <p>July 9</p>

The timeline above outlines an ambitious adoption process to meet the August 2, 2010 target specified in the Race to the Top application. The Board is committed to adopting common standards through the final-omitted rulemaking process and plans to publish notice of its adoption of the common core standards in the *Pennsylvania Bulletin* no later than July 31, 2010.

Appendix B-8

Pennsylvania's Existing System of Assessments

Pennsylvania has invested in the development of a customized set of assessments that are linked to PA curriculum standards. For ELA and mathematics, these measures will be realigned to Common Core standards following State Board adoption. Pennsylvania system of assessments includes:

- Summative Assessments
 - Keystone Exams, adopted through regulation in 2009, are state-level end-of-course exams, tied to college- and career-ready standards that can satisfy state-level graduation requirements. The first set of Keystone Exams – in Algebra 1, Biology and literature – will be rolled out in SY 2010-2011. Already, many of the largest districts in the state – including Philadelphia, Pittsburgh, Reading, Allentown and Chester-Upland – have signaled intent to use Keystone Exams.
 - PA System of School Assessment (PSSA) in reading, writing, mathematics, and science are currently used by all districts for state and federal accountability purposes.
- Benchmark Assessments: 4Sight, Acuity, and Assess2Know
 - The 4Sight assessment, designed in partnership with Johns Hopkins University, aligns with the PSSA and is currently used by 310 districts statewide.
 - In 2009, 4Sight was used to inform instruction in 22,780 reading classrooms and 22,448 math classrooms for grades 3 through 11.
- Formative Assessments
 - Pennsylvania is developing an online bank of assessment items to be used by teachers in a formative manner; these will be derived from standards and aligned with the PSSA. Use of this assessment bank will allow teachers to select items and create customized formative assessments to inform instruction for each student.
 - Beginning the start of the 2010-11 school year, formative assessment results will be available to schools and classrooms, along with links to model units and lessons plans.
- Diagnostic/Screening Assessments
 - Pennsylvania is developing computer adaptive, standards-aligned diagnostics that provide information in real time on each student's strengths, weaknesses, knowledge, and skills.
 - Diagnostic assessment results will be provided to school leaders and classroom teachers with links to materials and resources aligned to identified areas of instructional intervention.

Appendix B-9

MOU for a State Consortium Developing Balanced Assessments of the Common Core Standards

This Non-Binding Memorandum of Understanding (“MOU”) is entered into by and between the Balanced Assessment Consortium and _Pennsylvania (“Your State”). The purpose of this agreement is to establish a framework of collaboration for states in supporting assessment of the common core standards. The agreement also articulates tasks in support of a Multi-State Consortium in its implementation of an approved Standards and Assessment Section of a Race to the Top grant. The MOU outlines a set of working principles, the roles of states and local districts within the consortium, and a set of tasks that the Consortium would undertake.

Working Principles

A consortium of states developing a balanced assessment system for evaluating the common core standards would start with working principles derived from an examination of successful state systems in the U.S. and high-achieving systems internationally. For example:

1) Assessments are grounded in a thoughtful, standards-based curriculum and are managed as part of a tightly integrated system of standards, curriculum, assessment, instruction, and teacher development.

- Curriculum guidance is lean, clear, and focused on what students should know and be able to *do* as a result of their learning experiences. Assessment expectations are described in the curriculum frameworks or course syllabi and are exemplified by samples of student work.
- Curriculum and assessments are organized around a well-defined set of learning progressions within subject areas. These guide teaching decisions, classroom-based assessment, and external assessment.
- Teachers and other curriculum experts are involved in developing curriculum and assessments which guide professional learning and teaching. Thus, everything that comes to schools is well-aligned and pulling in the same direction.

2) Assessments elicit evidence of actual student performance on challenging tasks that prepare students for the demands of college and career in the 21st century. Curriculum and assessments seek to teach and evaluate a broad array of skills and competencies that generalize to higher education and work settings. They emphasize deep knowledge of core concepts within and across the disciplines, including problem solving, analysis, synthesis, and critical thinking, and include essays and open-ended tasks and problems, as well as selected response items.

3) Teachers are involved in the development of curriculum and the development and scoring of assessments. Scoring processes are moderated to ensure consistency and to enable teachers to deeply understand the standards and to develop stronger curriculum and instruction leading to greater student proficiency. The moderated scoring process is a strong professional learning experience that helps drive the instructional improvements that enable student learning, as teachers become more skilled at their own assessment practices and their development of

curriculum to teach the standards. The assessment systems are designed to increase the capacity of teachers to prepare students for the contemporary demands of college and career.

4) **Assessments are structured to continuously improve teaching and learning**. Assessment *as, of, and for* learning is enabled by several features of assessment systems:

- The use of school-based, curriculum-embedded assessments provides teachers with models of good curriculum and assessment practice, enhances curriculum equity within and across schools, and allows teachers to see and evaluate student learning in ways that can feed back into instructional and curriculum decisions.
- Close examination of student work and moderated teacher scoring of both school-based components and externally developed open-ended examinations are sources of ongoing professional development that improve teaching.
- Developing both school-based and external assessments around learning progressions allows teachers to see where students are on multiple dimensions of learning and to strategically support their progress.

5) **Assessment and accountability systems are designed to improve the quality of learning and schooling**. Assessments aim to encourage and support the learning of ambitious intellectual skills in the way they are designed and used for informing teaching, learning, and schooling. Accountability systems publicly report outcomes and take these into account, along with other indicators of school performance, in a well-designed system focused on continual improvement for schools.

6) **Assessment and accountability systems use multiple measures to evaluate students and schools.**

Multiple measures of learning and performance are used to evaluate skills and knowledge. Students engage in a variety of tasks and tests that are both curriculum-embedded and on-demand, providing many ways to demonstrate and evaluate their learning. These are combined in reporting systems at the school and beyond the school level. School reporting and accountability are also based on multiple measures. Assessment data are combined with other information about schools' resources, capacities, practices, and outcomes to design intensive professional development supports and interventions that improve school performance.

7) **New technologies enable greater assessment quality and information systems that support accountability.**

New technologies enhance and transform the way the assessment process is developed, delivered, and used, providing adaptive tools and access to information resources for students to demonstrate their learning, and providing appropriate feedback by supporting both teacher scoring and computer-based scoring (now possible for both selected response and some forms of constructed-response items). By using technology to reduce costs for delivery of more open-ended assessment formats, scoring, and reporting, resources can be redirected to improvements in assessment quality.

Technology also organizes data about student learning, enhancing system accountability for instruction and reporting by providing more efficient, accurate, and timely information to teachers, parents, administrators, and policymakers. Technology helps to integrate information at as part of longitudinal data systems, contributing to a rich profile of accomplishment for every student.

State and Local Roles within a Consortium

States working within the Consortium would:

- Adopt and augment the Common Core standards as appropriate to their context.
- Create and deploy curriculum frameworks that address the standards—drawing on exemplars and tested curriculum models.
- Build and manage an assessment system that includes both on-demand and curriculum-embedded assessments that evaluate the full range of standards and allow evaluation of student progress. The Consortium may develop both joint assessments (commonly implemented by states) as well as other assessment tasks and items linked to the standards (and grounded in curriculum units) that can be incorporated into states’ individual assessment plans for formative or summative purposes.
- Develop rubrics that embody the standards, and clear examples of good work, benchmarked to performance standards.
- Create oversight / moderation / audit systems for ensuring the comparability of locally managed and scored assessment components.
- Ensure that teacher and leader education and development infuse knowledge of learning, curriculum, and assessment.
- Implement high-quality professional learning focused on examination of student work, curriculum and assessment development, and moderated scoring.

Districts and schools would:

- Examine the standards and evaluate current curriculum, assessment, and instructional practice in light of the standards.
- Evaluate state curriculum guidance, and further develop and adapt curriculum to support local student learning, select and augment curriculum materials, and continually evaluate and revise curriculum in light of student learning outcomes.
- Incorporate formative assessments into the curriculum, organized around the standards, curriculum, and learning sequences to inform teaching and student learning.
- Participate in administering and scoring relevant portions of the on-demand and curriculum-embedded components of the assessment system, and examining student work and outcomes.
- Help design and engage in professional development around learning, teaching, curriculum, & assessment.
- Engage in review and moderation processes to examine assessments and student work, within and beyond the school.

Tasks the Consortium Would Undertake

The consortium of states would build on successful efforts already launched in a number of states, seeking to integrate the best knowledge and exemplars from existing efforts, so as to use resources efficiently, take advantage of well-tested approaches, and avoid reinventing the wheel. It would bring together leading curriculum and assessment experts to advise and support efforts to create a system for evaluating the Common Core, building on the most credible and well-vetted knowledge available in the field. With these supports, the Consortium could:

1. Support the Development of Curriculum Frameworks: When the Common Core standards have been released, vetted, and adopted, consortia of states would work with curriculum and assessment experts to develop (or adapt from previously successful work) curriculum

frameworks, syllabi, and other materials mapped to the standards. There has been enormous investment in the United States in high-quality curriculum, for example through NSF and other organizations at the national level, and in many states and districts. Other English-speaking nations have also developed high quality curriculum materials linked to standards and learning progressions that could be evaluated in this process. This effort would inventory and cull from efforts with a strong evidence base of success to support states in building out curriculum frameworks around which they can organize deeper curriculum development at the local level, state and local assessment development, instructional supports, and professional development.

2. Create a Digital Curriculum and Assessment Library: The results of this effort should ultimately be made available on-line in a digital platform that offers materials for curriculum building and, eventually, model syllabi for specific courses linked to the standards, formative and summative assessment tasks and instruments linked to the curriculum materials, and materials for training teachers and school leaders in both strategies for teaching specific curriculum concepts / units and assessment development and scoring. In addition, as described below, an electronic scoring platform supporting training, calibrating, benchmarking, and reporting would be developed and made available across the states.

3. Develop State and Local Assessments: The state consortium would work to create a **common reference examination, which includes selected-response, constructed response and performance components** aimed at higher-order skills, linked to the Common Core standards for grades 3-8, like the NECAP assessment recently developed by a set of New England states. This assessment would be designed to incorporate more rigorous and analytic multiple-choice and open-ended items than many tests currently include and would include strategically selected curriculum-embedded performance assessments at the classroom level that can be part of the summative evaluation, while also providing formative information.

These curriculum-embedded components would be developed around core concepts or major skills that are particularly salient in evaluating students' progress in English language arts and mathematics. (Eventually, work on science could be included.) Exemplars to evaluate and build upon are already available in many states and in nations like England that have developed a set of "tests and tasks" for use in classrooms that help teachers evaluate students' learning in relation to well-described learning progressions in reading, writing, mathematics, and other subjects.

Curriculum-embedded components would link to the skills evaluated in the "on-demand" test, allowing for more ambitious tasks that take more time and require more student effort than can be allocated in a 2 or 3-hour test on a single day; these components would evaluate skills in ways that expect more student-initiated planning, management of information and ideas, interaction with other materials and people, and production of more extended responses that reveal additional abilities of students (oral presentations, exhibitions, and product development, as well as written responses) that are associated with college and career success.

In the context of summative assessments, curriculum-embedded tasks would be standardized, scored in moderated fashion, and scores would be aggregated up to count as part of the external assessment. Curriculum-embedded assessments would also include marker tasks that are designed to be used formatively to check for essential understandings and to give teachers useful information and feedback as part of ongoing instruction. Thoughtful curriculum guidance would

outline the scaffolding and formative assessment needed to prepare students to succeed on the summative assessments.

All components of the system would incorporate **principles of universal design** that seek to remove construct-irrelevant aspects of tasks that could increase barriers for non-native English speakers and students with other specific learning needs. In addition, designers who are skilled at developing linguistically supportive assessments and tests for students with learning disabilities would be engaged from the beginning in considering how to develop the assessments for maximum access, as well as how to design appropriate accommodations and modifications to enable as many students as possible to be validly assessed within the system.

The emphasis on evaluating **student growth over time** and on tying standards to a conception of learning progressions should encourage a growth oriented frame for both the “on-demand” examination and the more extended classroom assessments. The Consortium may consider the viability of incorporating computer-based adaptive testing that creates vertically scaled assessments based on the full range of learning progressions in ELA and math. This would allow students to be evaluated in ways that give greater information about their abilities and their growth over time. This approach would not preclude the evaluation of grade-level standards, which could be part of any students’ assessment, nor would it preclude a significant number of constructed response, open-ended items, as the technology for machine-scoring structured open-ended items is now fairly well-developed. Strategic use of partial teacher scoring for these items would also be a desirable element of the system to support teachers’ understanding of the standards and assessments, and their planning for instruction.

The emphasis on evaluating student growth should also inform the development of the curriculum-embedded elements of the system, which should be selected or developed to strategically evaluate students’ progress along the learning continuum. Centrally developed tasks administered and scored by teachers with moderation (see below), using common rubrics, would be part of the set of reported scores. In states with experience and capacity, it may be possible to begin to incorporate information about student learning that teachers develop from their own classroom evidence, linked to the standards and learning progressions and guided by the curriculum frameworks. This could be an optional aspect of the Consortium’s work for states and communities with interest and capacity.

At the **high school level**, the Consortium might explore one or both of two options for assessment:

- **Course- or syllabus-based systems** like those in England, Australia, Singapore, Hong Kong, Alberta (Canada), as well as the International Baccalaureate. Generally conceptualized as end-of-course-exams in this country, this approach should become a more comprehensive course assessment approach like that pursued in these other countries. Such an approach would include within-course performance assessments that count toward the examination score, as well as high-quality assessment end-of-course components that feature constructed response as well as selected response items. Within-course performance assessments would tap central modes of inquiry in the disciplines, ensuring that students have the opportunity to engage in scientific investigations, literary analyses and other genres of writing, speaking and listening; mathematical modeling and applications; social scientific research. Such an approach might require an ELA and math assessment at a key juncture that evaluates an

appropriate benchmark level for high school standards, and then, as in high-achieving nations, allow for pursuit of other courses/ assessments that are selected by students according to their interests and expertise. These could serve as additional information on the diploma for colleges and employers.

- **Standards-driven systems** that might include a more comprehensive benchmark assessment in ELA and mathematics complemented by collections of evidence that demonstrate students' abilities to meet certain standards within and across the disciplines. This set of assessments would allow more curriculum flexibility in how to meet the standards. Systems like these are used in some provinces in Canada and Australia, in states like Rhode Island, Wyoming, Nebraska, and New Hampshire, and in systems of schools like the New York Performance Standards Consortium, the Asia Society, and Envision Schools. Sometimes these sets of evidence are organized into structured portfolios, such as the Technology portfolio in New Hampshire and the broader Graduation portfolios in these sets of schools that require specific tasks in each content area, scored with common rubrics and moderation.
- **A mixed model** could combine elements of both course- and standards-driven models, allowing some demonstrations of proficiency to occur in any one of a range of courses (rather than a single, predetermined course) or even outside the bounds of a course, like the efforts by some states to allow students to pass courses via demonstrations of competence rather than seat time (e.g. NH, OH). Such a system could also include specific components intended to develop and display research and inquiry skills that might also be interdisciplinary, such as the Project Work requirements in England, Singapore, and the International Baccalaureate, and the Senior Project requirements in Pennsylvania and Ohio.

4. Develop Moderation and Auditing Systems for Teacher-Scored Work: The consortium would develop protocols for managing moderation and auditing systems and training scorers so as to enable comparable, consistent scoring of performance assessments. In other nations' and states' systems that include these features routinely, procedures have been developed to ensure both widespread teacher involvement – often as part of professional development time – and to create common standards and high levels of reliability in evaluating student work. A range of models are possible, and the consortium would serve as a resource to individual states in developing and implementing strong, efficient approaches.

5. Develop Technology to Support the Assessment System: Technology should be used to enhance these assessments in a number of ways: by delivering the assessments; in on-line tasks of higher-order abilities, allowing students to search for information or manipulate variables and tracking information about the students' problem-solving processes; in some cases, scoring the results or delivering the responses to trained scorers / teachers to assess from an electronic platform. Such a platform may also support training and calibration of scorers and moderation of scores, as well as efficient aggregation of results in ways that support reporting and research about the responses. This use of technology is already being used in the International Baccalaureate assessment system, which includes both on-demand and classroom-based components.

In order to gain the efficiency and cost benefits of machine scoring and the teaching and learning benefits of teachers' moderated scoring, a mixed system could be developed where computer-based scoring is incorporated on constructed response tasks where useful – though teachers

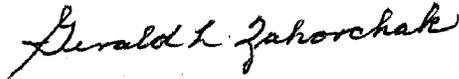
would score some of these tasks for anchoring and learning purposes – while other tasks that require human scoring engage most teachers in scoring to support improvements in instruction.

RESPONSIBILITIES OF ALL SEAs PARTICIPATING IN THE CONSORTIUM

- 1) Each participating SEA in the Consortium will appoint a key contact person.
- 2) These key contacts from each State will maintain frequent communication with the parties administering the Balanced Assessment Consortium to facilitate cooperation under this MOU.
- 3) Participating SEA grant personnel will work together to determine appropriate timelines for project updates and status reports throughout the whole grant period.

This Non-binding Memorandum of Understanding shall be effective beginning with the date of the last signature hereon:

**SEA Superintendent/- Participating State
Chief/Commissioner (or equivalent authorized signatory)**



Signature

Date 1/8/10

Print Name Gerald L. Zahorchak, D.Ed.

Title Secretary of Education

Please email this signed page to

**Tammy Morrill
Tammy.Morrill@maine.gov**

****PLEASE email this signed page only by January 7, 2010****

Appendix B-9

**States Participating in the SMARTER Balanced Consortium
(as of 5/12/10)**

State	Date	Member/Governing State
Colorado	May 12	Member
Connecticut	April 13	Member
Delaware	April 14	Member
Georgia	April 28	Member
Hawaii	April 15	Member
Idaho	April 15	Governing
Illinois	April 15	Member
Iowa	April 14	Member
Kansas	April 15	Governing
Kentucky	April 15	Member
Maine	April 14	Governing
Michigan	April 16	Governing
Minnesota	April 27	Governing
Missouri	April 14	Governing
Montana	April 14	Member
Nebraska	April 13	Member
Nevada	April 19	Member
New Hampshire	April 19	Member
New Jersey	April 15	Member
New Mexico	April 13	Member
North Carolina	April 15	Governing
North Dakota	April 15	Member
Ohio	April 20	Member
Oregon	April 15	Governing
Pennsylvania	April 27	Member
South Carolina	April 20	Member
South Dakota	April 15	Member
Utah	April 14	Governing
Vermont	April 15	Governing
Washington	April 14	Governing
West Virginia	April 13	Governing
Wisconsin	April 14	Governing
Wyoming	April 14	Member
Total		Member 33 Governing 13

PARTNERSHIP FOR ASSESSMENT OF READINESS FOR COLLEGE AND CAREERS MEMORANDUM OF UNDERSTANDING

Purpose. This document commits states to participate in the Partnership for Assessment of Readiness for College and Career, a state-led consortium that will collaborate on the development of common, high-quality assessments aligned to the Common Core State Standards (CCSS) in English language arts and mathematics for grades 3-8 and high school. The primary goal of the Partnership's work is to measure and document students' college and career readiness against common academic standards and to measure students' progress toward this target throughout the rest of the system.

While participating in the Partnership demonstrates the state's commitment to pursue a common assessment system that enables comparisons against the CCSS across all Partnership states, it does not commit the state to a specific assessment design at this point. Partnership states are still considering several options for the design of a common assessment system in pursuit of the Race to the Top (RTTT) Comprehensive Assessments Grant and will not be asked to commit to the Partnership's application until a later date. Until that time, all participating states will have the opportunity to contribute to and shape the Partnership's proposal.

Preliminary Design Principles. Partnership states have identified the following major purposes and uses for the assessment system. As the Partnership collaborates to develop its application for the RTTT assessment competition, these purposes will guide its work.

- The primary purpose is to measure and document students' **college and career readiness** and to measure students' progress toward this target throughout the rest of the system. Students meeting the college and career readiness standards will be eligible for placement into entry-level credit-bearing, rather than remedial, courses in public 2- and 4-year postsecondary institutions in participating states.
- Additionally, the partnership is committed to ensuring that the assessment results:
 - Are **comparable across states** at the student level;
 - Meet **internationally rigorous benchmarks**;
 - Support valid assessment of **student longitudinal growth**; and
 - Serve as a **signal for good instructional practices**.
- The results must be able to support multiple levels and forms of accountability including:
 - Decisions about **promotion and graduation for individual students**,
 - **Teacher and leader evaluations**, and
 - **School accountability** determinations.

Roles and Responsibilities of Partnership States. The Partnership will employ a multi-level governance and management structure designed to guide the partnership through the submission of the proposal.

- The **Governing States** are comprised of a representative group of leaders from Partnership states that are committed to implementing the assessment system developed by the partnership, should it win a grant from the Race to the Top Comprehensive Assessment System competition, and are responsible for guiding the proposal development process. Each Governing State will commit a team comprised of the chief, assessment director, and other key officials from the SEA, Governor's office, and higher education as appropriate.
- The **Proposal Design Team** will include officials from partnership states who will work with an advisory group of national and international experts to create an assessment system design for the Partnership's proposal. The design team will include as many states as are interested in and capable of contributing to and shaping the design of the proposed next generation assessment system.

- **Participating States** will include other partnership states that are unable to provide staff time to the design team but will provide rapid feedback on drafts of the proposal through the development phase.

State Commitment. This memorandum of understanding is voluntary and non-binding for states. States signing this MOU should do so with the intent of continuing in the Partnership through the proposal development, assessment development, and implementation phases. However, there will be an opportunity for states re-assess their participation in the Partnership before it submits its application for a Race to the Top Comprehensive Assessment Systems Grant by June 23, 2010.

Agreement. The undersigned state leader agrees to the process and structure as described above and attests accordingly by his/her signature below.

Signature(s) for the State of Pennsylvania	
Authorized State Signature: 	
Name: Thomas Gluck	Date: May 11, 2010
Title: Acting Secretary of Education	

Appendix B-9

PARTNERSHIP FOR ASSESSMENT OF READINESS FOR COLLEGE AND CAREERS

PARTICIPATING STATES

MAY 25, 2010

1. Alabama
2. Arizona
3. Arkansas
4. California
5. Colorado
6. Delaware
7. District of Columbia
8. Florida
9. Georgia
10. Hawaii
11. Illinois
12. Indiana
13. Kentucky
14. Louisiana
15. Maryland
16. Massachusetts
17. Mississippi
18. New Hampshire
19. New Jersey
20. New York
21. North Dakota
22. Ohio
23. Oklahoma
24. Pennsylvania
25. Rhode Island
26. South Carolina
27. Tennessee

Memorandum of Understanding The State Consortium on Board Examination Systems

The purpose of this Memorandum of Understanding is to reflect the mutual understandings that the state partners and the National Center on Education and the Economy (NCEE) have of the purposes of the State Consortium on Board Examination Systems and the obligations of the member states and NCEE during the initial planning period. The description of the system design presented here is not intended to be legally binding on the states. The signature of the chief state school officer on this document is intended to signify that the chief state school officer intends to make his or her best effort to achieve the goals described below, it being understood that realization of those goals will require the subsequent action of many people, including legislators, the governor, the state board of education, key figures in the higher education community, major stakeholders in the elementary and secondary education community, the business community and so on. Similarly the signature of the president of the National Center on Education and the Economy on this document signifies a pledge by NCEE to do everything it can do to reach the goals described below.

Purposes

Overall, the aim of the members of the consortium is to install in the member states a system based on international best practice that will greatly raise the proportion of their high school students who leave high school ready to do college-level work. The principle features of that system can be found in the Brief Prospectus for a State Board Examination System, available from NCEE.

Near term, in the Consortium's first year of operation, our goal is to conduct the initial planning and research needed to prepare for implementation of the plan put forward in the Brief Prospectus in ten to twenty high schools in each member state. Each of these demonstration high schools will:

- offer at least one board examination system (as that term is defined in the Brief Prospectus) at the lower secondary (freshman and sophomore year) level and one at the upper division (junior and senior year) level. These board exam systems will be chosen from a list approved by the state, and these in turn will be chosen from a list approved by the Consortium, and
- offer the lower division secondary examinations no later than the end of students' sophomore year, and annually thereafter for those students who do not pass on their first attempt
- analyze the subscores of students who fail the exams and use that data to prepare a program for that student addressed to that student's weaknesses, so that that student will stand a much better chance of passing on the next attempt.

The state will:

- establish policies such that, as soon as students pass their lower secondary exams, they will be able to go at the beginning of the following academic year to any open-admissions postsecondary institution in the state without having to take any remedial courses, if they choose to do so, and
- waive current requirements for the high school diploma for students who pass their lower division board examinations to give force to the move-on-when-ready policy just described.

The initial work of the Consortium

To get to the point at which a significant number of states have such systems in place, the following tasks need to be accomplished in the first year:

- a governing body needs to be established, one in which the states have the major voice, so that the policy decisions that will collectively set the rules for the operation of the system as a whole can be made,
- a Technical Advisory Committee must be established, to make sure that the technical decisions that will have to be taken by the governing body are informed by the best technical advice available anywhere,
- a series of technical studies must be carried out so that the examinations, when administered by the states can withstand intensive scrutiny with respect to issues of fairness and accuracy,
- requirements must be established that will apply to the providers of the board examination curriculum, materials, assessments and teacher training, and the staff must be in a position to communicate those requirements to the providers on behalf of the Consortium members and make sure that they are met,
- the states will need to involve many key policy makers and stakeholders in the discussion as to whether the state will commit to the overall Consortium design and provide the resources needed to properly implement that design and NCEE and its partners must provide the technical assistance and other support that the state leaders will need to make the case and come up with the necessary data, and
- the state in the first implementation cohort will need to take the policy decisions needed to begin the pilot, find the funds needed, recruit pilot districts and schools and organize delivery of necessary services to initiate the pilots.

During the initial year, the state agrees to:

- organize and lead an outreach effort to persuade key policy makers and stakeholders in the state to adopt the Consortium program and commit to implementing that program, if that has not already been done (this includes agreement by the higher education community in the state that it will accept the cut-off score on the board examinations approved by the Consortium governing

body as the basis for admission to the open-admissions institutions without remediation),

- participate in the work of the governing body,
- decide whether to be a member of the cohort of states beginning implementation in the 2010-11 school year or the cohort beginning implementation in the 2011-2012 school year, and begin the organizational work needed to implement the program in the chosen cohort year,
- work with NCEE to include language about the Consortium's program in its Race to the Top proposal and other similar proposals as appropriate, as well as requests for funds to support both the state's expenses and NCEE's expenses in connection with this program

During the initial year, NCEE agrees to:

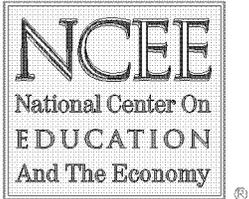
- recruit the states and organize the work of the Consortium
- raise the money required to fund the work of the Consortium, from both federal and foundation sources,
- recruit the Technical Advisory Committee, staff it and carry out those of its recommendations that are approved by the governing body
- create the governing body and act as its staff,
- provide support to the leaders in the member states as they seek to build support for the Consortium program among policymakers, key stakeholders and the public.
- negotiate with the board examination providers to persuade them to modify their offering to reflect the needs of Consortium states and to get the best prices for their products and services for Consortium members.
- provide the Consortium with high quality analysis to support the continued development of the standards, curriculum, assessments and teacher training delivered to the schools. and
- provide the Consortium with high quality analysis of the Consortium's program as it evolves over time and is actually experienced by schools, teachers, students and communities, to provide accurate feedback to the governing body as the basis of a program of continuing improvements to the system.

The participants expect that, during the first year, some states will join the Consortium and others will drop out. As the first cohorts of implementing states start implementation, new issues will arise. The shape of the Consortium program may change as a consequence. Thus this Memorandum of Understanding is intended as a fluid document that will certainly change over time. It is intended therefore not as a constitution but rather as the basis for initial action.

Commissioner of Education



5/27/2010



27 May 2010

State Consortium on Board Examination Systems

Member States as of 5/27/10

BOARD OF TRUSTEES

Ray Marshall
Chair

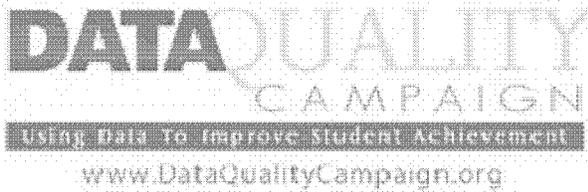
Sue. S. Stewart
Treasure

David J. Barram
VanBuren N. Hansford, Jr
Marion W. Pines
Lewis H. Spence
Vivien Stewart
Marc S. Tucker

Marc S. Tucker
President

Arizona
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DATA QUALITY CAMPAIGN RECOGNIZES LEADERS Building and Using Longitudinal Data Systems

PA Gov. Rendell and Secretary of Education Zahorchak jointly awarded *DQC 2008 Leadership Award*

Austin, TX — Nov. 15, 2008 — Four state and district leaders were honored by the Data Quality Campaign (DQC) during the Council of Chief State School Officers' (CCSSO) Annual Policy Forum. The DQC, a national partnership to improve the quality, accessibility and use of data in education, recognized the award winners for their leadership and innovation in championing the vital need for quality education data. The DQC also released its third annual report on the progress states are making on building longitudinal data systems.

The DQC accepted nominations from across the country for leaders in the field of longitudinal data systems at the local and state levels. On behalf of its managing partners, the DQC is proud to announce the recipients of the following *DQC 2008 Leadership Award*:

- ***State Policymaker of the Year: Gov. Edward G. Rendell and Secretary of Education Gerald Zahorchak, Pennsylvania***

Pennsylvania has benefited greatly from statewide leadership focused on education data. Under the governor's and secretary's direction, Pennsylvania has made tremendous progress in building its data system. In 2005, the state had only two of the 10 elements identified by the DQC as essential for longitudinal data systems. In 2008, it has seven of the 10. The Pennsylvania Department of Education continues to make great strides in building systems and processes that share and use data across the education pipeline, from prekindergarten into higher education. To create demand for this new information, the Department has created videos demonstrating how using data helps teachers and principals improve instruction. The collaborative and effective leadership of Gov. Rendell and Secretary Zahorchak demonstrates the value of political champions for investing in and using education data.

Kathy Gosa, director of information technology in Kansas, was awarded the State Data Director of the Year, and Joe Kitchens, superintendent of Western Heights Public Schools in Oklahoma, was recognized as the District Data Leader of the Year.

To nominate a state or local leader for a *2009 DQC Leadership Award*, please e-mail Info@DataQualityCampaign.org.

The DQC is a national, collaborative effort to encourage and support state policymakers to improve the collection, availability and use of high-quality education data and to implement state longitudinal data systems to improve student achievement. The campaign provides tools and resources that assist state development of quality longitudinal data systems while providing a national forum for reducing duplication of effort and promoting greater coordination and consensus among the organizations focusing on improving data quality, access and use.

For more information on the DQC, its tools and resources, and the 2008 survey results, visit www.DataQualityCampaign.org or e-mail Info@DataQualityCampaign.org.

The campaign is managed by the National Center for Educational Achievement (NCEA). The Bill & Melinda Gates Foundation is the founding funder; additional support has been provided by the Casey Family Programs and the Lumina Foundation for Education.

In September 2008, NCEA conducted a survey about state data systems to determine the number of states that have built the infrastructure to tap into the power of longitudinal data. NCEA conducted similar surveys in 2003, 2004, 2005, 2006 and 2007.

Progress on the 10 Essential Elements of Longitudinal Data Systems

Longitudinal data — data gathered on the same student from year to year — make it possible to follow individual student academic growth, determine the value-added of specific programs, and identify consistently high-performing schools and systems. The DQC has identified the following 10 essential elements of a longitudinal data system and annually reports state progress in implementing each element:

1. A unique statewide student identifier that connects student data across key databases across years *(48 states report having this element, up from 36 in 2005)*
2. Student-level enrollment, demographic and program participation information *(49, up from 38 in 2005)*
3. The ability to match individual students' test records from year to year to measure academic growth *(48, up from 32 in 2005)*
4. Information on untested students and the reasons they were not tested *(41, up from 25 in 2005)*
5. A teacher identification system with the ability to match teachers to students *(21, up from 13 in 2005)*
6. Student-level transcript information, including information on courses completed and grades earned *(17, up from 7 in 2005)*
7. Student-level college readiness test scores *(29, up from 7 in 2005)*
8. Student-level graduation and dropout data *(50, up from 34 in 2005)*
9. The ability to match student records between the P-12 and postsecondary systems *(28, up from 12 in 2005)*
10. A state audit system assessing data quality, validity and reliability *(45, up from 19 in 2005)*

DQC Managing and Endorsing Partners

Managing Partners

Achieve, Inc.
Alliance for Excellent Education
Council of Chief State School Officers
Education Commission of the States
The Education Trust
National Association of State Boards of Education
National Association of System Heads
National Center for Educational Achievement
National Center for Higher Education Management Systems
National Governors Association Center for Best Practices
Schools Interoperability Framework Association
Standard & Poor's School Evaluation Services
State Educational Technology Directors Association
State Higher Education Executive Officers

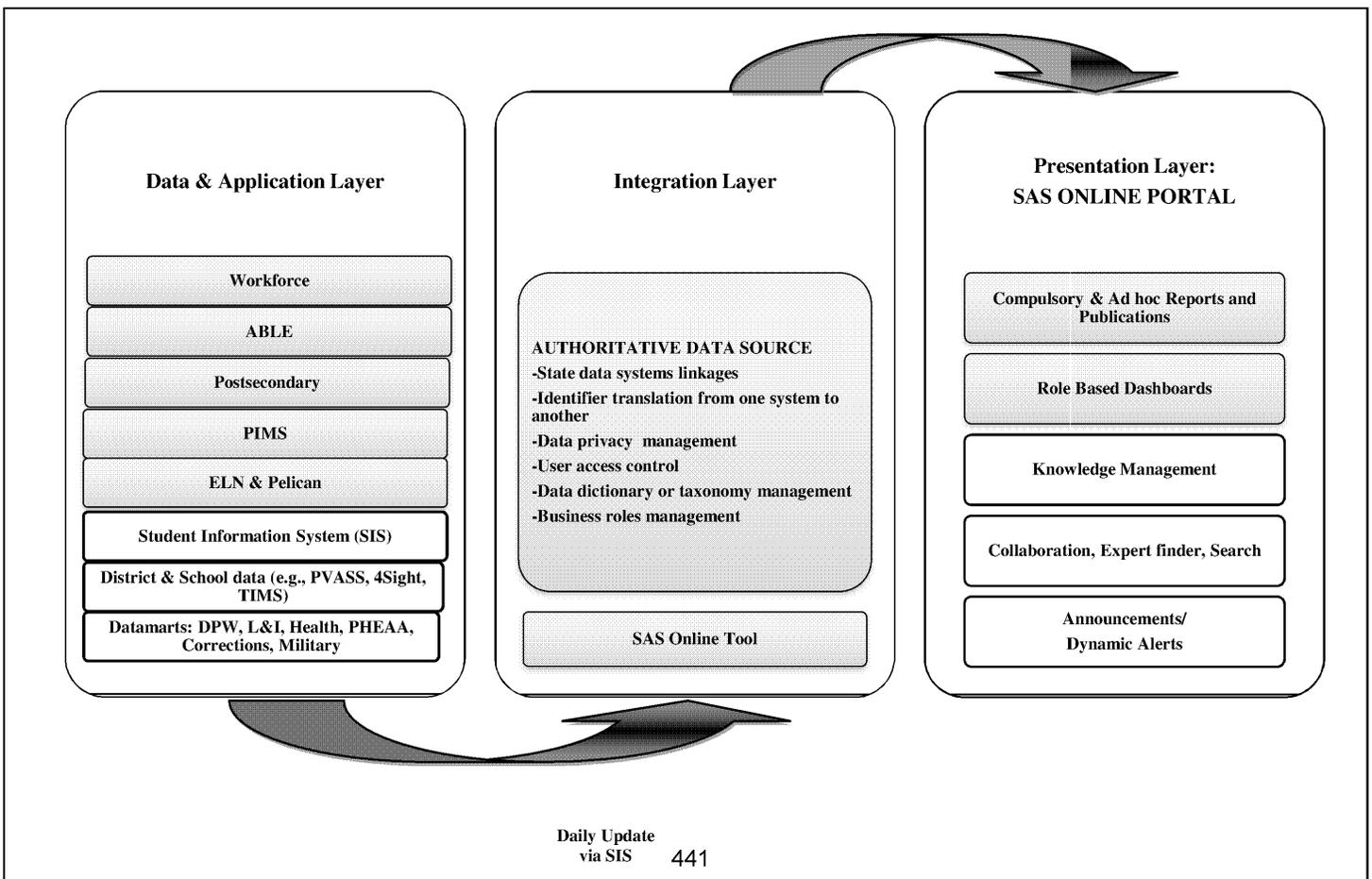
Endorsing Partners

ACT
Alliance for Quality Teaching
American Association of Colleges for Teacher Education
American Association of State Colleges and Universities
American Board for Certification of Teacher Excellence
American Youth Policy Forum
APQC
Business-Higher Education Forum
Center for Teaching Quality
College Summit
Consortium for School Networking
Educational Policy Institute
ETS
GreatSchools
Institute for a Competitive Workforce (An Affiliate of the U.S. Chamber of Commerce)
Institute for Educational Leadership
James B. Hunt, Jr. Institute for Educational Leadership and Policy
Jobs for the Future
Knowledge Alliance
League of Education Voters Foundation
Learning Point Associates
Midwestern Higher Education Compact
National Alliance for Public Charter Schools
National Association of Secondary School Principals
The National Center for Public Policy and Higher Education
National Council for Accreditation of Teacher Education
National Student Clearinghouse
New England Board of Higher Education
Pathways to College Network
Postsecondary Electronic Standards Council
Pre-K Now
Roads to Success
Southern Regional Education Board
Western Interstate Commission for Higher Education

For more information, visit the DQC Web site at www.DataQualityCampaign.org.

Appendix C-2

Conceptual Blueprint for Pennsylvania Data System



Appendix C-3

Pennsylvania High School Feedback Report Class of 2007 – 2008

**Pennsylvania SD
Pennsylvania HS**

The purpose of this report is to provide information about this school's 2007-2008 class of high school graduating seniors and their subsequent enrollment in a postsecondary institution. Statistics are also provided for the entire Local education Agency's (LEA) senior class as well as the entire state. For more information on this report please refer to one of the following two companion documents: [Pennsylvania High School Feedback Report Guide to Interpreting Metrics](#) and [Pennsylvania High School Feedback Report Frequently Asked Questions \(FAQ\)](#).

A. Basic Information About the Graduating Class

(Data sources: PreK-12 PIMS, National Student Clearinghouse)

	School		LEA		State	
1. Number of High School Graduates	200		200		131,714	
2. Mean High School GPA	2.70		2.70		2.81	
3. Number and percentage of graduates that took the ACT	27	13.5%	27	13.5%	20,007	15.2%
Mean ACT English	17.5		17.5		18.8	
Mean ACT Reading	19.4		19.4		19.4	
Mean ACT Mathematics	17.9		17.9		18.1	
Mean ACT Science	19.3		19.3		19.1	
Mean ACT Composite	18.6		18.6		18.8	
4. Number and percentage of graduates that took the SAT	108	54.0%	108	54.0%	75,142	57.0%
Mean SAT Reading	496		496		501	
Mean SAT Writing	482		482		481	
Mean SAT Math	503		503		504	
5. Number and percentage of graduates who took an AP exam	37	18.5%	37	18.5%	17,781	13.5%
6. Graduate 11 th Grade PSSA Performance Summary						
Reading						
Advanced	54	27.0%	54	27.0%	34,640	26.3%
Proficient	65	32.5%	65	32.5%	41,358	31.4%
Basic	57	28.5%	57	28.5%	42,007	31.9%
Below Basic	24	12.0%	24	12.0%	13,709	10.4%
Math						
Advanced	54	27.0%	54	27.0%	34,640	26.3%
Proficient	65	32.5%	65	32.5%	41,358	31.4%
Basic	57	28.5%	57	28.5%	42,007	31.9%
Below Basic	24	12.0%	24	12.0%	13,709	10.4%
Science						
Advanced	54	27.0%	54	27.0%	34,640	26.3%
Proficient	65	32.5%	65	32.5%	41,358	31.4%
Basic	57	28.5%	57	28.5%	42,007	31.9%
Below Basic	24	12.0%	24	12.0%	13,709	10.4%
Writing						
Advanced	54	27.0%	54	27.0%	34,640	26.3%
Proficient	65	32.5%	65	32.5%	41,358	31.4%
Basic	57	28.5%	57	28.5%	42,007	31.9%
Below Basic	24	12.0%	24	12.0%	13,709	10.4%

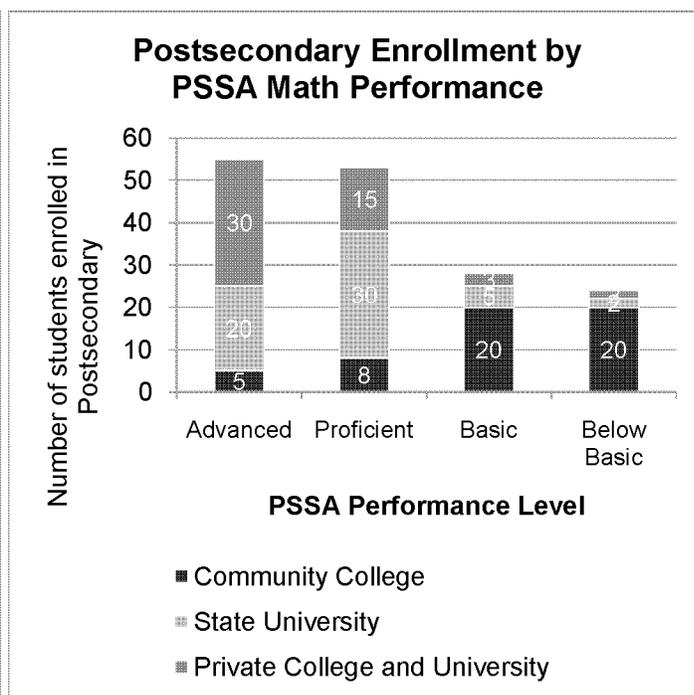
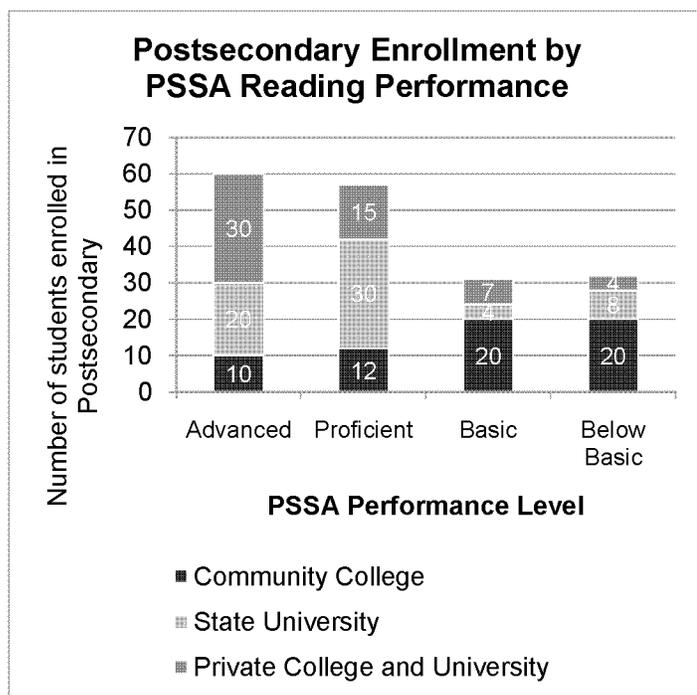
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Pennsylvania High School Feedback Report Class of 2007 – 2008

Pennsylvania SD
Pennsylvania HS

7. Number and percentage of students who participated in at least one dual enrollment course	15	7.5%	15	7.5%	8,429	6.4%
Number and percentage of those students enrolled in postsecondary	15	100%	15	100%	8,327	98.8%
8. Overall college-going rate		59.5%		59.5%		61.3%
9. In-state college-going rate*		49.5%		49.5%		50.4%
10. Overall one semester retention rate		88.5%		88.5%		87.9%
11. In-State one semester retention rate*		89.5%		89.5%		88.4%
12. Total One Year Retention Rate		73.5%		73.5%		74.0%
13. In-State One Year Retention Rate*		74.5%		74.5%		74.7%

* These statistics are derived based on enrollment data from the National Student Clearinghouse. These include all Pennsylvania institutions, not just those institutions that participate in Postsecondary PIMS.



Appendix C-3

Pennsylvania High School Feedback Report Class of 2007 – 2008

Pennsylvania SD
Pennsylvania HS

B. Overall Postsecondary Enrollment Information

(Data sources: National Student Clearinghouse, PreK-12 PIMS)

	School		LEA		State	
1. Postsecondary Enrollment By Institution Type						
Less than two year	10	8.4%	10	8.4%	5,975	7.4%
Two year	50	42.0%	50	42.0%	31,247	38.7%
Four year	59	49.6%	59	49.6%	43,519	53.9%
2. Gender						
Male	56	47.1%	56	47.1%	41,097	51.0%
Female	63	52.9%	63	52.9%	39,644	49.0%
3. Race						
American Indian/Alaskan Native	2	1.7%	2	1.7%	250	.3%
Asian	7	5.9%	7	5.9%	1,687	2.1%
Black or African American, non-Hispanic	32	26.9%	32	26.9%	10,399	12.9%
Hispanic of any race	11	9.2%	11	9.2%	3,771	4.7%
Native Hawaiian or other Pacific Islander	2	1.7%	2	1.7%	90	.1%
Race or ethnicity unknown	10	8.4%	10	8.4%	6,699	8.3%
Two or more races	5	4.2%	5	4.2%	543	.7%
White, non-Hispanic	50	42.0%	50	42.0%	57,302	71.0%
4. Full Time/Part Time Status						
Full Time	73	61.3%	73	61.3%	48,202	59.7%
Part Time	46	38.7%	46	38.7%	32,539	40.3%

C. In-State Postsecondary Enrollment Information

(Data source: Postsecondary PIMS)

	School		LEA		State	
1. Postsecondary Enrollment By Institution Type						
State University	33	33.3%	33	33.3%	25,353	31.4%
Private College and University	20	20.2%	20	20.2%	19,378	24.0%
Community College	46	46.5%	46	46.5%	36,010	44.6%
2. Degree Seeking Type/Status						
Unknown/Undecided						
Diploma	1	1.0%	1	1.0%	565	.7%
Certificate	4	4.0%	4	4.0%	2,171	2.7%
Associates	43	43.4%	43	43.4%	31,408	38.9%
Terminal Associates	15	15.2%	15	15.2%	12,483	15.5%
Bachelor's	35	35.4%	35	35.4%	28,017	34.7%
Non-Degree Seeking/Taking courses for credit	1	1.0%	1	1.0%	3,093	3.8%

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Pennsylvania High School Feedback Report Class of 2007 – 2008

Pennsylvania SD
Pennsylvania HS

D. In-State Postsecondary Performance

(Data source: Postsecondary PIMS)

	School		LEA		State	
1. One year retention rate						
All students	73.6%		73.6%		74.5%	
Students needing remediation in at least one subject	66.9%		66.9%		67.1%	
Students without remediation needs	78.7%		78.7%		78.1%	
2. Mean number of credits earned in first postsecondary year						
All students	24.1		24.1		25.3	
Students needing remediation in at least one subject	21.7		21.7		22.4	
Students without remediation needs	26.5		26.5		27.8	
3. Number and percentage of graduates enrolled in PA institutions earning a GPA above 2.0						
Community Colleges	35	76.1%	35	76.1%	27,224	78.6%
State Universities	27	81.8%	27	81.8%	19,927	78.6%
Private University/College	16	80.0%	16	80.0%	15,754	81.3%
4. Number and percentage of students enrolled in and passed a college level math course in their first two years						
All students	71	71.7%	71	71.7%	17,125	72.4%
Students with an Advanced PSSA score in Math	16	76.2%	16	76.2%	18,851	79.7%
Students with a Proficient PSSA score in Math	19	70.4%	19	70.4%	21,283	71.0%
Students with a Basic PSSA score in Math	11	64.7%	11	64.7%	11,112	60.0%
Students with a Below Basic PSSA score in Math	3	50.0%	3	50.0%	4,570	53.0%
5. Number and Percentage of students who enrolled in and passed a college level English course in their first two years						
All students	71	71.7%	71	71.7%	17,125	72.4%
Students with an Advanced PSSA score in Reading	16	76.2%	16	76.2%	18,851	79.7%
Students with a Proficient PSSA score in Reading	19	70.4%	19	70.4%	21,283	71.0%
Students with a Basic PSSA score in Reading	11	64.7%	11	64.7%	11,112	60.0%
Students with a Below Basic PSSA score in Reading	3	50.0%	3	50.0%	4,570	53.0%

E. Pennsylvania Institutions Students Entered

(Data source: Postsecondary PIMS)

Institution Type	Institution	Number and Percentage of Students	
Community College	Community College of Allegheny County	20	25.3%
	Community College of Beaver County	21	26.6%
	Lehigh Carbon Community College	5	6.3%
	California University of Pennsylvania	6	7.6%
	Cheyney University of Pennsylvania	2	2.5%
State University	Clarion University of Pennsylvania	3	3.8%
	Edinboro University of Pennsylvania	7	8.9%
	Indiana University of Pennsylvania	6	7.6%
	Lock Haven University of Pennsylvania	5	6.3%
	Slippery Rock University of Pennsylvania	4	5.1%

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Pennsylvania High School Feedback Report Class of 2007 – 2008

Pennsylvania SD
Pennsylvania HS

F. Postsecondary Majors (In-State)

(Data source: Postsecondary PIMS)

Major (Program)	Number and Percentage of Students	
Biological and Biomedical Sciences	3	3.8%
Business, Management, Marketing, and Related Support Services	12	15.2%
Communication, Journalism and Related Programs	3	3.8%
Computer and Information Sciences and Support Services	1	1.3%
Education	7	8.9%
Engineering Technologies/Technicians	3	3.8%
English Language and Literature/Letters	1	1.3%
Family and Consumer Sciences/Human Sciences	1	1.3%
Health Professions and Related Clinical Sciences	11	13.9%
Liberal Arts and Sciences, General Studies and Humanities	16	20.3%
Mathematics and Statistics	1	1.3%
Mechanic and Repair Technologies/Technicians	1	1.3%
Other	8	10.1%
Parks, Recreation, Leisure and Fitness Studies	2	2.5%
Physical Sciences	2	2.5%
Psychology	1	1.3%
Security and Protective Services	3	3.8%
Social Sciences	1	1.3%
Visual and Performing Arts	2	2.5%

G. Time to Degree

(Data source: National Student Clearinghouse)

Two Year Institution Time to Degree	Number and Percentage	
Number and Percentage graduating in 2 or fewer years	29	63.0%
Number and Percentage graduating in 2 ½ or fewer years	Cannot be calculated yet	
Number and Percentage graduating in 3 or fewer years	Cannot be calculated yet	
Number and Percentage graduating in 3 ½ or fewer years	Cannot be calculated yet	
Four Year Institution Time to Degree	Number and Percentage	
Number and Percentage graduating in 4 or fewer years	Cannot be calculated yet	
Number and Percentage graduating in 5 or fewer years	Cannot be calculated yet	
Number and Percentage graduating in 6 or fewer years	Cannot be calculated yet	

H. Postsecondary Degrees Awarded by Type (In-State)

(Data source: Postsecondary PIMS)

Degree Type	Number and Percentage Degrees Awarded	
Certificate	4	13.8%
Diploma	6	20.7%
Associates	9	31.0%

Appendix C-3

Pennsylvania High School Feedback Report Class of 2007 – 2008

Pennsylvania SD
Pennsylvania HS

Terminal Associates	10	34.5%
Bachelors	0	0.0%
Summary		29

Data Source Notes

Note that the postsecondary information presented within this report is based on two sources:

1. Basic enrollment data available from the National Student Clearinghouse for virtually all postsecondary institutions in the U.S.
2. Detailed student enrollment, degree attainment and course data available in the Postsecondary Pennsylvania Information Managements System (PIMS). Currently the 14 Pennsylvania State System of Higher Education (PASSHE) universities, the 14 Pennsylvania community colleges and two other private institutions participate in PIMS.

Appendix C-4

PENNSYLVANIA DEPARTMENT OF EDUCATION

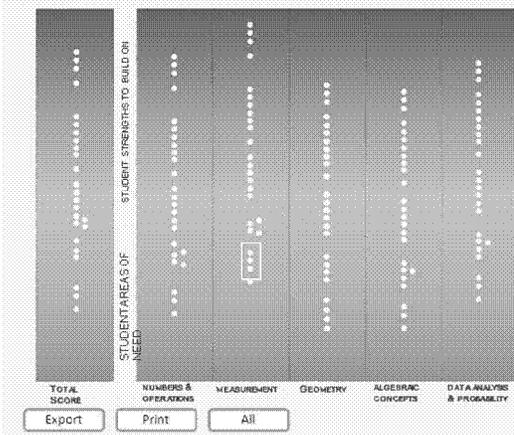
TEACHER NAME: SYLVIA WHITE
GRADE: 7
GROUP: FIRST PERIOD MATH CLASS
SUBJECT: MATHEMATICS
TEST DATE: DECEMBER 2010



Group Diagnostic Map

Assessment 2

25 of 30 STUDENTS COMPLETED ASSESSMENT



INSTRUCTIONAL STRATEGIES

THIS REPORT SHOWS at this stage that the student(s) will benefit from enrichment in the following areas:

-
-
-

LINKS TO ALIGNED MATERIALS AND RESOURCES

• **MS.6.1.1.1:** Select the appropriate unit for measuring weight (mass), capacity, length, perimeter, and area.

• **MS.6.1.2.1:** Convert using linear measurements, capacity, and weight (mass) within the same system to the unit immediately above or below the given unit (using only the units below – use a conversion chart or a “hint” with problems e.g., hint: 16oz = 1lb).



Appendix C-5

In 2005, the Philadelphia Education Fund (Ed Fund) and Johns Hopkins University (JHU) tracked 13,000 students from sixth grade through one year past on-time graduation. This groundbreaking research identified four Early Warning Indicators that correlate most strongly with students dropping out of school: poor attendance, poor behavior, a failing grade in math or literacy. The Ed Fund and JHU moved the research into action and created an Early Warning Indicator System for middle and high schools called *Diplomas Now*. A partnership among the School District of Philadelphia, the Ed Fund, JHU, City Year, and Communities In Schools, *Diplomas Now* designs, implements, and monitors a comprehensive, three-tiered set of interventions for students who demonstrate Early Warning Indicators in project schools. *Diplomas Now* is being replicated in four other cities: Chicago, Los Angeles, New Orleans, and San Antonio. The data below demonstrate the project's promising results in year one of the full partnership in Jay Cooke Elementary School, Feltonville School of Arts and Sciences, and Thurgood Marshall School.

Diplomas Now:

Early Warning Indicators Project

DN Philadelphia, Students Carrying Off-track Indicator, June 2008-June 2009

Off-track Indicator	# Students with indicator, June 2008	# Students with indicator, June 2009	% Change, Students with Indicator
Attendance	90 Students		-62%
Behavior	112 Students		-37%
Failing Math	44 Students		-80%
Failing Literacy	30 Students		-70%

	Attendance	Behavior	Academics [Math & Literacy]
Off-Track to Graduation	< 80%	3 or more negative behavior comments	Report Card grade of F
Sliding	80 to 90%	1 to 2 negative behavior comments	Report Card grade of D
On-Track to Graduation	>90%	0 negative behavior comments	Report Card grade of A, B, or C
Unknown	Move or transfer	Teacher did not input comments	No final grade available



The New Teacher Project's Practitioner Teacher Programs pioneer new ways of preparing effective teachers for high-need schools. Emerging research has shown that teachers certified by the Practitioner Teacher Program outperform even experienced teachers in raising student achievement in some content areas.

The Problem: Inadequate Teacher Preparation

Teaching in high-poverty urban districts presents even the most talented new teacher with unique challenges. Yet, most traditional certification programs don't focus on preparing graduates to be immediately effective in this environment, and few programs are tailored to the needs of career changers making the switch to teaching.

In its work across the country, TNTP has heard common concerns from districts and teachers – including TNTP's Teaching Fellows – about traditional certification courses. They reported that these courses are:

- **not relevant** to teaching in high-need schools, where students are often two to three grade levels behind;
- **not structured** to meet the needs of teachers who have deep content knowledge from professional or academic experience; and
- **disconnected** from experiences in the classroom, with a heavy emphasis on theory.

As a result, thousands of new teachers enter high-need classrooms each year without the optimal training needed to maximize their effectiveness on day one. This further disadvantages the students who need great teachers most and betrays the promise of a quality education for all.

The Solution: Rigorous Training for Challenging Classrooms

TNTP's Practitioner Teacher Program (PTP) provides rigorous, relevant training that prepares career changers to have an immediate impact on student achievement in high-poverty schools.

Research has shown that the PTP's innovative preparation consistently produces highly effective teachers. As a *New York Times* editorial said in 2008, "high-quality programs like...The New Teacher Project have a big role to play in the effort to improve teacher preparation nationally."

In a national survey,
62% of education school
alumni said the schools fail to
prepare their graduates to
cope with classroom reality.

69% of alumni
said they wanted a better
balance between subject
matter preparation and
field experience.

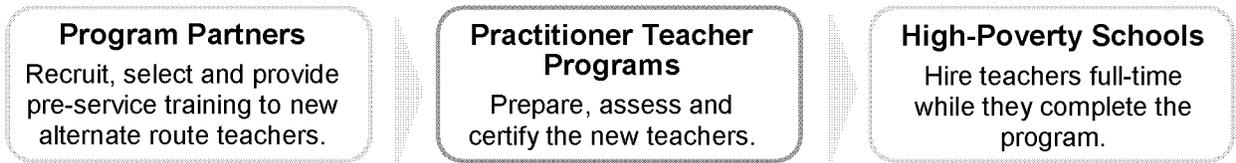
Source: Educating School Teachers, Levine 2006.

(b)(6)

From Climbing to the Classroom

Throughout his diverse two decade career – with stints in rock climbing, construction management, and outdoor education – Kevin Cieszkowski found his math and science skills invaluable. In 2005, he put his skills to work teaching ninth grade physics while **earning his certification through TNTP's Practitioner Teacher Program.**

Cieszkowski, who teaches at Berkner High School in Richardson, TX (near Dallas), says he uses physics "to explain how to solve everyday problems" and interest his students in the "rules of the Universe." For the past two years, his students have outperformed others on the science portion of state tests. In 2009, Cieszkowski won the Innovations in Science, Technology, Engineering and Mathematics Teaching Award, for his use of innovative teaching methods and technology to enhance instruction and learning.



How It Works: Four Key Components

The Practitioner Teacher Program is grounded in a simple premise: Effective teachers can and must close the achievement gap. To that end, all program components are designed specifically to support new teachers in delivering quality instruction in high-need schools and subject areas.

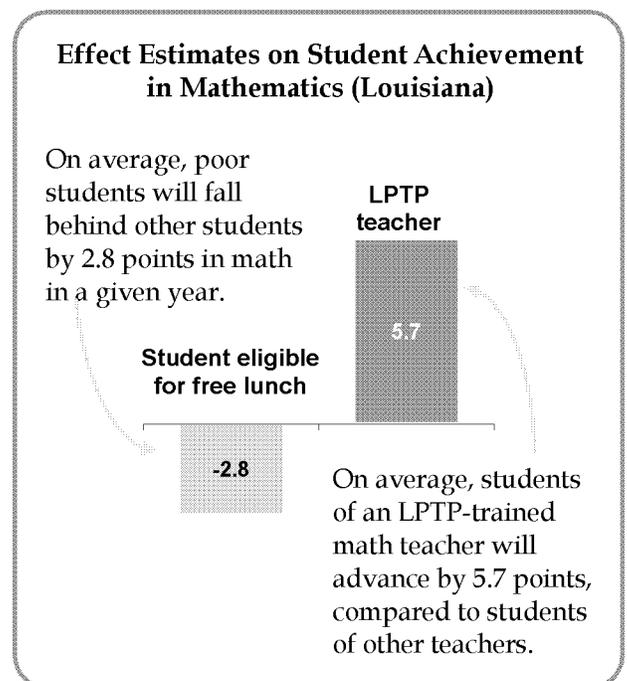
- 1. Partnerships with teacher recruitment programs.** PTP program partners, such as TNTP’s Teaching Fellows Programs and Teach For America, recruit and provide summer pre-service training to new alternate route teachers. At the end of the summer, participants start teaching full-time and begin their certification coursework through the Practitioner Teacher Program, rather than a local university.
- 2. Practical training and classroom practice.** Once in the classroom, participants attend bi-weekly evening seminars led by outstanding district teachers who are carefully selected and trained by TNTP. The seminars emphasize the way excellent practitioners teach specific content in high-need schools, strategies that participants can apply immediately in their own classrooms. Teachers also participate in a district mentorship program while completing the PTP, receiving valuable feedback from experienced peers.
- 3. Research-based curriculum.** TNTP’s unique *Teaching for Results* curriculum helps teachers become effective at understanding the content their students must master, delivering focused instruction, and using assessment tools to gauge student progress. With a clear picture of where students are and where they need to be, the new teachers can plan, teach, re-teach when necessary, and adjust their practice in order to close the achievement gap. The curriculum currently provides training in 14 subject areas.
- 4. Certification recommendation.** After participants have completed all program requirements, *Teaching for Results* coursework and their first year in the classroom, TNTP decides whether to recommend for state certification. Importantly, certification decisions incorporate comprehensive assessments of teacher candidates, and can include principal observations of participants in the classroom and documented evidence of student academic achievement. Average time to certification is 12-16 months.

The Results: Effective Teachers

Since 2001, TNTP has certified approximately **2,100 teachers**. TNTP is currently approved to certify teachers in six jurisdictions – California, Louisiana, Maryland, Texas, Rhode Island, and the District of Columbia.

TNTP-certified teachers say the training improves their practice: In 2009, 88 percent of participants said the *Teaching for Results* seminars increased their effectiveness in the classroom.

This endorsement is validated by independent research. The 2009 results of a value-add study of Louisiana’s teacher preparation programs gave the Louisiana Practitioner Teacher Program (LPTP) the highest possible rating for teacher effectiveness in the core content areas of math and reading. Teachers certified through the LPTP **outperformed new and experienced teachers** in these areas. In math, LPTP teachers had a positive effect on achievement that could outweigh the negative impact of student poverty.



Source: "Value Added Assessment of Teacher Preparation in Louisiana: 2005-2006 to 2007-2008." Louisiana State University.

In more than 20 cities nationwide, The New Teacher Project's highly selective Teaching Fellows programs transform accomplished career changers and high-achieving college grads into dedicated teachers, diversifying local teacher talent pipelines and bringing great teachers to the students who need them most.

The Problem: Unequal Access to Effective Teachers

Teacher quality matters more than any other school-based factor in student success or failure. But the students who need great teachers the most are the least likely to get them.

High-poverty urban schools fight to hire the best possible teachers. They face frequent shortages of strong teachers willing to teach in challenging schools, especially in subject areas like math, science and special education.

According to the Education Trust, students in high-poverty schools are twice as likely to have teachers without certification or academic majors in their field. Four in 10 mathematics classes in high-poverty secondary schools are taught by out-of-field teachers.

As a result, a persistent gap in academic achievement separates poor and minority students from White students. This gap undermines the hopes of millions for a better life and betrays the promise of a quality education for all.

By the end of high school,
African-American and
Hispanic students
write and do math
at the level of White 8th graders.

The gap between students taught
by less effective teachers and
those taught by better teachers
may grow as large as
50 percentile points on tests
in as few as three years –
a life-altering difference.

Source: NAEP 2004; Sanders and Rivers, 1996.

The Solution: Tapping New Teacher Talent

TNTP's Teaching Fellows programs streamline the path to teaching for accomplished career changers and recent graduates, building a pool of talented teachers specifically for high-need schools and subjects.

The pathway is praised by both districts and policymakers for its rigor and selectivity. Secretary of Education Arne Duncan has cited the Teaching Fellows programs as a "pioneer in expanding teacher recruitment," and *Education Week* called it "one of the best alternative teacher-preparation routes out there today."

(b)(6)

From a Cubicle to a Classroom

Jaime McLaughlin used to do people's taxes. Now he teaches math to sixth graders at Albert R. Sabin Magnet School, a Spanish-language school in Chicago. McLaughlin spent 10 years at Anderson Consulting and Ernst & Young before joining the **Chicago Teaching Fellows** program in 2007, in his late 30s.

He says he is motivated by the intellectual development he sees in his students over the course of the year. During his first year at Sabin, McLaughlin was the only teacher to use a new mobile computer lab to lead students in a stock market competition. That year, his students' SAT-10 scores averaged 15 percent gains.

How It Works: Five Key Strategies

TNTP's Teaching Fellows programs employ five key strategies to recruit and train outstanding individuals looking to make a long-term career of teaching in high-need schools.

- 1. Aggressively recruit quality candidates.** Teaching Fellows programs use proven marketing practices – advertising, compelling messages, grassroots outreach and trained recruiters – to pique the interest of accomplished individuals and build a diverse applicant pool. In 2009, Teaching Fellows programs drew nearly 42,000 applications nationwide.
- 2. Select only the best candidates.** Teaching Fellows must meet extraordinarily high standards before entering the classroom. Each candidate is assessed against seven key character traits of successful teachers through a three-phase selection process that includes a day-long interview. In 2009, Teaching Fellows programs accepted 9.7 percent of all applicants, comparable in selectivity to top U.S. universities.
- 3. Provide intensive training.** Accepted Fellows enroll in TNTP's full-time, six-week training institute, which specifically focuses on effective teaching strategies in high-need schools. TNTP's proprietary, research-based curriculum pairs instructional techniques and classroom management skills, which Fellows apply right away by leading summer school classes and working with experienced teachers.
- 4. Support matches between teachers and schools.** Together with its district partners, TNTP helps Fellows locate high-poverty schools that need them and interview with principals that want them. TNTP's patented application tracking software connects candidates and principals, streamlining the interview process and helping to create a mutual fit.
- 5. Ensure effectiveness and certification.** TNTP ensures that Fellows demonstrate subject matter competency before they begin teaching, and all Fellows have a sharp focus on being effective from day one. Once in the classroom, Fellows complete certification coursework and earn full certification within about two years.

2009 Teaching Fellow Profile



85% teach high-need subjects



81% teach in high-poverty (Title I) schools



35% are people of color

The Results: A New Teacher Pipeline

Since 2001, TNTP's Teaching Fellows programs have trained more than **24,000 teachers** for America's largest urban areas – including Baltimore, Chicago, New Orleans, New York and Philadelphia.

Today TNTP is one of the **country's largest providers** of new math, science and special education teachers. Each year, Teaching Fellows programs contribute more new math and science teachers than some large states.

And Fellows' impact only grows over time, with retention rates that surpass the estimated national averages for new teachers in urban schools. They help build a critical mass of exceptional teachers in disadvantaged schools, so that all students – regardless of skin color or socioeconomic status – receive an excellent education, year after year.

NYC Teaching Fellows: Flooding a District with Talent

TNTP's ten-year partnership with the New York City Department of Education has profoundly transformed teacher quality in the nation's largest urban district.

More than 9,100 NYC Teaching Fellows – 11 percent of New York's teaching force – work in the city's schools, most serving low-income students. Fellows now account for more than one-quarter of New York's math teachers.

A 2007 Urban Institute study found that Fellows are largely responsible for a "remarkable narrowing" of the gap in teacher qualifications between high- and low-poverty schools. Today, a student attending school in the Bronx – where failing schools were once widespread – is statistically more likely to have a qualified teacher than one going to public school on Manhattan's Upper West Side.

The New Teacher Project's Model Staffing Initiatives help low-performing schools build strong instructional teams and open the school year fully staffed. TNTP gives principals the tools and support they need to hire top talent – a key to raising student achievement.

The Problem: Inefficient Hiring Practices

For low-performing schools, effective teachers are critically important. Every new teacher hired represents an opportunity to strengthen a school and raise student achievement. Yet in school districts across the country, teacher hiring receives scant attention.

Hiring delays and inefficiencies drive away the strongest teacher candidates. As TNTP documented in its 2003 *Missed Opportunities* report, the most motivated candidates apply in early spring, but many urban districts don't hire until August. Frustrated by months in limbo, up to 58 percent of candidates withdraw, including those who are most qualified to teach in high-demand subject areas like math and science.

What's more, though building a strong, collaborative instructional team is central to any school leader's success, principals receive little formal training in teacher hiring at any point in their careers.

As a result, schools miss a critical opportunity to shape their teacher workforce and transform student outcomes. Hundreds of thousands of students begin school each year with unqualified temporary or substitute teachers every year, further disadvantaging those who need great teachers most.

The Solution: Early, Strategic Hiring

How and *when* teachers are hired can have a dramatic impact on teacher quality. Through its Model Staffing Initiatives, TNTP helps historically struggling schools hire as early and effectively as possible.

TNTP's Model Staffing Initiatives provide intensive support to a district's hardest-to-staff schools, ensuring that the schools open each year fully staffed with excellent teachers.

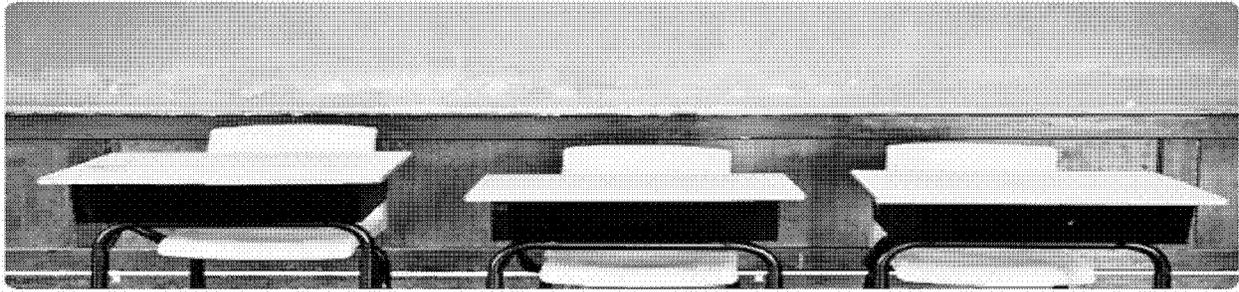
In a TNTP study of hiring in four urban districts, **more than five applicants** applied for every open spot.

But **31-58%** of candidates withdrew from the hiring process in August.

And **50-70%** cited late hiring timelines as a major reason they found other jobs.

Source: *Missed Opportunities*, TNTP 2003.

"I can't imagine where our school would be without the support of TNTP... Their emphasis on finding a 'good fit' and developing a culture that supports staff has helped me think about how to induct and support teachers, which has definitely led toward better retention. In general, I'm finding that there is a better candidate pool out there, which of course helps us identify strong teachers who share our vision for student success." –Principal, San Francisco Unified School District



How It Works: Four Core Strategies

1. **Direct priority applicants to target schools.** When it comes to identifying talent, TNTP puts struggling schools at the front of the line. Drawing from the district’s existing teacher applicant pool, TNTP staff prioritize and cultivate promising teacher applicants in shortage subject areas—including math, science and special education—and match the best with participating schools. Where necessary, TNTP also supplements the existing applicant pool through targeted teacher recruitment.
2. **Train principals in effective hiring.** TNTP gives school leaders the tools they need to make smart hiring decisions. Through an intensive workshop series, principals learn how to market their schools to prospective candidates, identify and select for desired teacher qualities, and develop and employ effective interviewing techniques.
3. **Provide personalized staffing assistance.** Principals inundated with daily demands can let hiring fall by the wayside. TNTP works side-by-side with school leaders to project vacancies, create strategic staffing plans and refer candidates, adding capacity and ensuring a constant focus on hiring.
4. **Analyze and address policy barriers.** Some hiring barriers lie outside schools’ control. TNTP works with its district partners to streamline staffing processes, secure earlier budgets, advance hiring timelines and give participating schools the flexibility to hire the teachers they need to improve student outcomes.

The Results: Staffing Success

In 2009, TNTP provided intensive, targeted staffing support in eight school districts: Baltimore, Chicago, Denver, Milwaukee, Nashville, New Orleans, New York and San Francisco.

Across districts, 93 percent of principals agreed participation in the Model Staffing Initiatives increased their ability to staff their schools with high-quality teachers.

Overall, Model Staffing Initiatives filled 1,295 vacancies in 137 low-performing schools in 2009, giving an estimated 62,000 students a chance to learn from the best possible teacher...from day one.

Patterson High School, Baltimore

In 2005, Patterson High School was one of Baltimore’s lowest-performing, losing one-quarter of its staff each year. More than **600 students lacked a qualified teacher** in a core subject area on the first day of school.

That year, TNTP’s Baltimore Model Staffing initiative began working with Principal Laura D’Anna, helping her develop a staffing plan, identify vacancies earlier, and assess potential teacher candidates.

By 2008, Patterson had opened for **three consecutive years fully staffed**. Teacher turnover declined dramatically, with the number of new vacancies down by 79 percent. Most importantly, **student passing rates** on key tests jumped from 7.5 to 33 percent, a promising initial improvement.



May 26, 2010

Thomas E. Gluck
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126

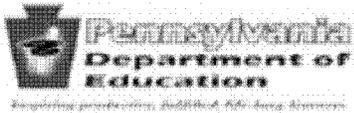
Dear Secretary Gluck:

The New Teacher Project applauds the efforts of the Pennsylvania Department of Education to increase and diversify the pipeline of effective teachers by encouraging and allowing innovative teacher preparation programs to be offered by a variety of providers, including non-profit organizations. If the amendment to Senate Bill 441 (or a similar bill) passes, we anticipate applying to become a postbaccalaureate instructional intern certification program provider. We look forward to working with the state to launch certification programs that are focused on recruiting and training highly-qualified and motivated individuals with diverse backgrounds to teach in high-need schools and subject areas.

Sincerely,



Ariela Rozman
CEO
The New Teacher Project



Ensuring proficiency, building life-long learners

333 Market Street
Harrisburg, PA 17126

Pennsylvania Value-Added Assessment System (PVAAS)

PVAAS: 2002-Present

PENNSYLVANIA
Value-Added
Assessment System

PVAAS

(717) 606-1911
www.pde.state.pa.us
pdepvaas@iui13.org

Statewide PVAAS Reporting: Summary of Results

Why Pennsylvania Considered Value-Added Assessment?

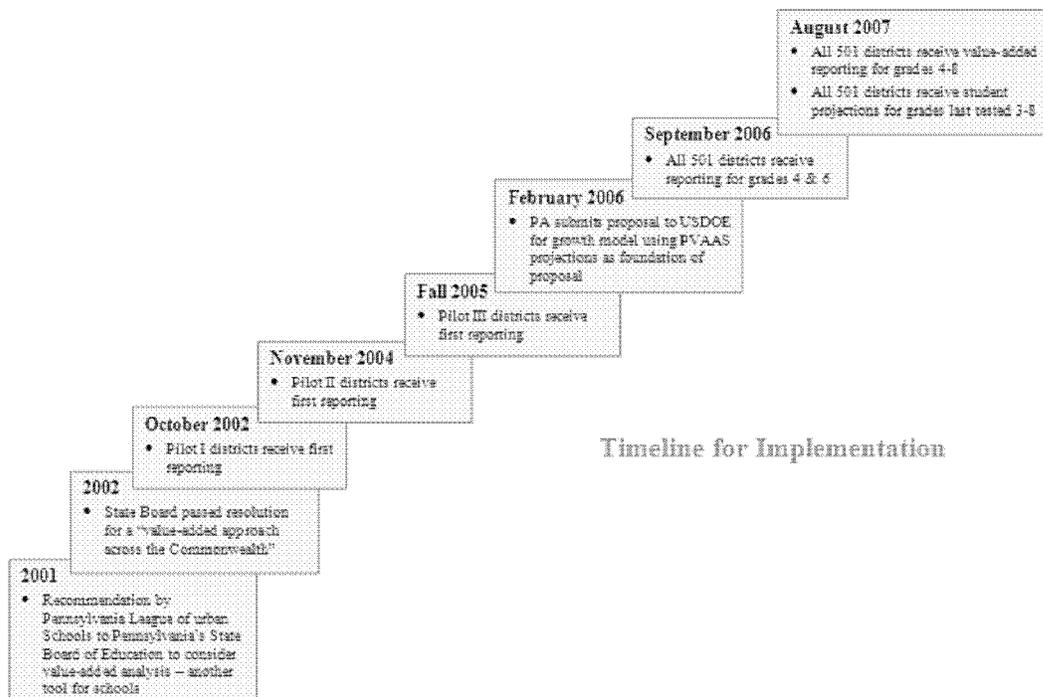
Pennsylvania has had a history of using “status” measures such as the PSSA and/or local assessments that indicate if students are proficient or not. These achievement data represent a single point in time for student learning. Unfortunately, Pennsylvania districts/schools did not have a means to look at progress/growth - whether or not student learning is heading in the right direction.

In 2002, the Pennsylvania League of Urban Schools (PLUS) recommended a value-added approach to the State Board of Education. The model selected for value-added analysis within Pennsylvania was the Educational Value-Added Assessment System (EVAAS™) model. This model is now known as the Pennsylvania Value-Added Assessment System (PVAAS). Pennsylvania districts and schools now have the Power of 2: Progress & Achievement! While our state assessment, PSSA, tells us where student learning is on a specific day – PVAAS tells us: Are we headed in the right direction with student learning with all students - proficient and non-proficient? Are our students on the trajectory to proficiency on a future PSSA? Achievement data alone do not tell the whole story about student learning; however, Achievement Data and Progress Data yield a more comprehensive view of learning in districts and schools.



Pennsylvania and Value-Added Analysis History

In 2002, Pennsylvania partnered with SAS, Inc. to provide value-added reporting to 31 pilot districts across the Commonwealth. During the initial pilot phases between 2002 and 2005, 100 districts received value-added reporting. In SY05-06, all 501 districts across the Commonwealth received limited reporting, via a secure web-based system, for grades 4 and 6. In August 2007, all 501 districts received full PVAAS reporting for grades 4 through 8. This reporting statewide has continued statewide since 2007.



SAS, Inc. Provides Pennsylvania's PVAAS Reporting

SAS, Inc. is the world's largest privately held prepackaged software company. It's customers include 96 of the top 100 Fortune Global 500[®] companies, as well as numerous educational entities across the country.

- SAS, Inc. provides data analysis and reporting in several programs to Pennsylvania:
 - Pennsylvania Value-Added Assessment System (PVAAS) - 2002+ (500 Districts)
 - Educational Assistance Program/Tutoring (EAP) –SY06-07 to present (172 Districts)
- It's core business is data integration, storage and analytics within a comprehensive and secure enterprise level system
- SAS, Inc. reporting supports a systematic evaluation of policy and programs to ensure that education dollars are spent wisely
- Statistical methodology has been federally reviewed and approved by USDOE; hig reliability with results published on USDE website

Why SAS, Inc. for PVAAS

SAS, Inc. has had a history of statewide implementation of a growth model in Tennessee and now Ohio. Their history and experience provided a foundation for Pennsylvania's implementation of Value-Added across the Commonwealth.

SAS analysis:

- Uses existing assessment data, no additional testing needed
- Provides reporting at district, school, grade, subgroup and student levels (see Table 1)
- Provides web reporting to districts
- Uses all available data on all students
 - This is important because missing test scores is common in high mobility districts – students miss school and as a result miss testing days
 - EVAAS[™] does NOT “throw out” students who have fractured records as other value-added models do
 - EVAAS[™] statistical methodology can handle these types of records, so schools get true reporting on all of the students they serve

The EVAAS[™] model does NOT control for demographics as there is NO relationship between socio-economic status and growth; or race and growth; as a result this *takes away* the argument that students from these subgroups cannot achieve significant gains (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Ross, Wang, Sanders, Wright & Springfield, 1999; Wright, Horn, & Sanders, 1999).

Table 1: SAS, Inc. Reporting for Pennsylvania

	PVAAS Reporting (2002+)	EAP Reporting (SY06-07+)
Reporting Grades	Grades 4-8, 11	Grades K-12
Sources for Data Analysis	PSSA statewide file Reading, Math, Science, Writing	EAP Approved Assessments; PSSA statewide file; Demographics; Eligibility; Cost
State, District, School Level Reporting	Value-Added Growth Report on Cohorts Grades 4-8, 11	Statewide and District Level reporting on EAP Eligibility, Participation, Progress, Value-Added (Impact), Projections to Proficiency expected for end of year reporting for SY07-08, Performance Level Changes in PSSA; Costs
Student Level Reporting	Projections to Proficiency	Projections to Proficiency expected for end of year reporting for SY07-08
Access to Reporting	Via Web Interface ○ PDE, IUs ○ Districts, Schools	Via Web Interface – Goal is to integrate EAP Value-Added Reporting (impact) into PVAAS website. Aggregate reports sent to PDE. ○ PDE ○ Districts - Web

Supporting PVAAS Statewide in Pennsylvania

Pennsylvania has consistently sought to include a wide range of stakeholders as it developed its plan for the use of PVAAS statewide. In October 2004, the Pennsylvania Secretary of Education, formed a statewide work group of over 50 education, legislative, association, parent advocacy, and business leaders to assist with the implementation of PVAAS in Pennsylvania. This group provided ongoing advisement to the Department regarding communications about PVAAS, as well as statewide implementation and professional development. This group provided support and feedback in the development of Pennsylvania's proposal to USDE for a growth model as a part of its Accountability Workbook. Through the use of this powerful partnership, the Pennsylvania Department of Education has sought to strengthen the use of PVAAS in accomplishing their shared goals of improved student achievement and progress.

Successful implementation of a statewide growth measure is much more than the provision of a growth metric. Communications, professional development and technical assistance are essential components for successful implementation. Pennsylvania has three years of experience of providing statewide communications, extensive statewide professional development and district/school-level technical assistance to its schools as part of the PVAAS pilot program. Pennsylvania had resources allocated and committed to support these areas for statewide implementation since 2002.

- **Communication Materials:** The Pennsylvania Department of Education has produced a series of communication materials designed to provide an overview of PVAAS. This communications kit is available on the PDE website to stakeholders across the Commonwealth. These materials have been disseminated to all 500 district superintendents, curriculum directors, special education coordinators, over 3,000 building principals, and intermediate units, as well as statewide organizations. The communication kit includes the following materials: *Introductory Guide for Pennsylvania Educators, PVAAS History, Intent and Timeline for Implementation Tri-fold, PVAAS Pilot Districts/Map, Educator Testimonials, Value-Added FAQ, PVAAS FAQ, Press Release for Districts, Tips on Communicating with Your School Board and Community about PVAAS, Benefits for District Administrators, Benefits for Building Principals, Benefits for Teachers and Pilot District Stories*
- **Professional Development:** A cadre of materials that assist with navigation of the PVAAS website, interpretation of PVAAS reports and the integration of PVAAS with other statewide initiatives has been provided to all 500 districts/school in Pennsylvania.
- **Technical Assistance:** A statewide core team of consultants was extensively trained in the methodology of PVAAS and the interpretation of PVAAS reports. This team has provided district/school level technical assistance in the interpretation and use of the PVAAS growth measures. Annually this core team provides “train the trainer” workshops to intermediate units and school districts in the principles and use of the PVAAS model.

- Communications: In addition to supporting those participating in the PVAAS pilot, the core team has presented extensively at national, state and local conferences sponsored by professional organizations on the principles of PVAAS.

This extensive commitment to the understanding and use of a growth model allows Pennsylvania a unique “head start” in formalizing the concept of growth paired with its accountability plan. Pennsylvania is poised and willing to serve as a national model for the comprehensive use of a growth model as a part of Race to the Top.

Integration of PVAAS in the Pennsylvania System

Pennsylvania has actively been pursuing the integration of assessment data for instructional decision-making since 2001. Through the Pennsylvania Department of Education’s efforts, the following data tools continue to be implemented throughout the Commonwealth:

- PVAAS – The Pennsylvania Value-Added Assessment System provides insight into the academic growth of students in addition to the status measures provided by the PSSA and provides projections to proficiency of future performance for all students.
- Assessing to Learn: Pennsylvania Benchmark Assessment System – 4Sight Benchmark assessments focusing on achievement of proficiency on the Pennsylvania State Standards in mathematics and reading have been implemented in over 300 districts (approximately 18,000 classrooms) in grades 3 through 11.
- eMetric – A sophisticated, secure web-based data tool for analyzing status measures from the PSSA has been available to districts.
- PA AYP – This web-based tool allows access to AYP data for all educators and the general public for all districts and schools in the Commonwealth.
- Pennsylvania Achievement Reports –A secure web-based data tool available to educators containing status data with recommendations and support materials for school use. A non-secure version can be accessed by the general public and includes information for parents and the community.

Pennsylvania is striving to support districts in using an integrated implementation of all of these sources of status, improvement and growth data to inform curricular and instructional decision-making focused on the achievement of proficiency of all students. Pennsylvania has identified that PVAAS is an established and reliable measure of academic growth that provides an important complement to status measures in this regard. The use of both status and growth measures has demonstrated benefits in deliberations for educational improvements for all students at all levels and stages of development. Pennsylvania is integrating PVAAS into the following statewide improvement efforts:

- School Improvement Planning process and documents required by AYP determinations
- Education Assistance Programs (EAP) to support efforts with students in need of additional support - Tutoring
- Statewide Benchmark Assessment Implementation

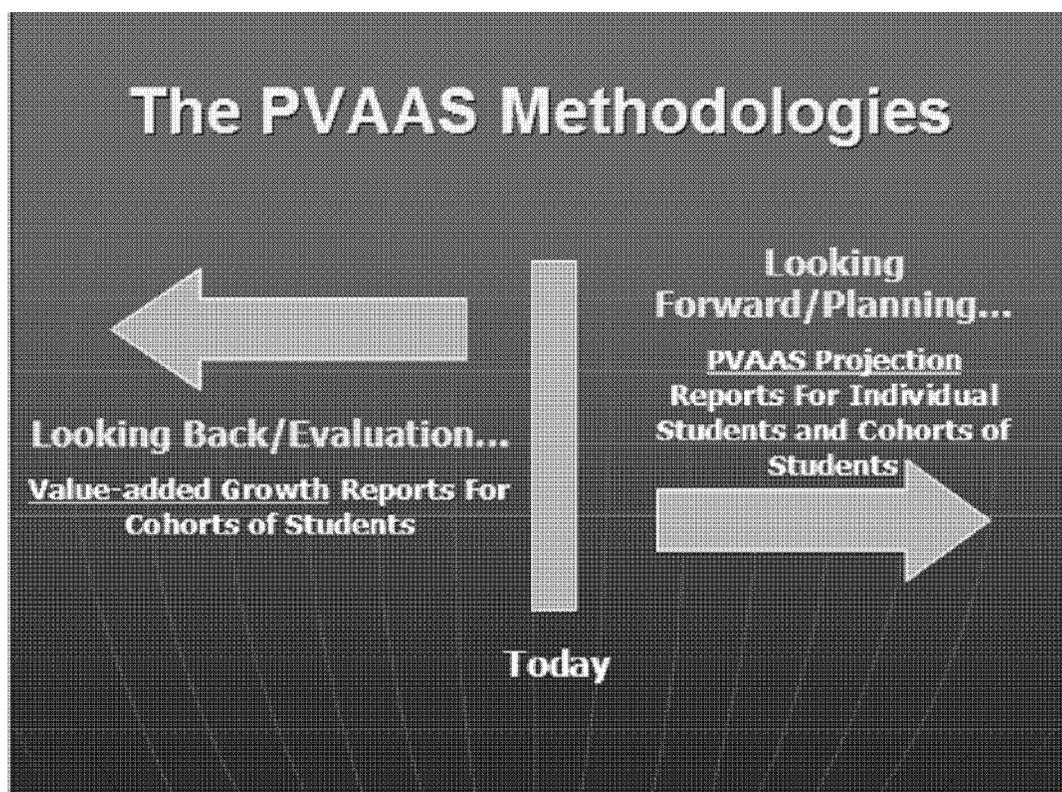
- Statewide Progress Monitoring Initiatives
- Statewide Mathematics Initiatives
- Statewide Reading Initiatives
- Statewide Response to Instruction and Intervention (RTII)
- Distinguished Educator Supports - Technical assistance supports to schools in Corrective Action
- Governor's Institutes: Professional Development Institutes on Accountability and School Improvement
- Higher Education
- Pennsylvania Inspired Leadership (PIL)– a leadership program for school principals

PVAAS Reporting

PVAAS provides two types of information, *value-added/growth data* on cohorts of students and student level *projection data*. The value-added, or growth analyzes available data from previous years (looking back) to help schools to evaluate how much cohorts of students have gained in a school year by answering questions such as: Did a cohort/subgroup of students make a year's worth of growth for a year's worth of schooling?

The projection data uses the data already analyzed to help schools project (looking forward) for the future by answering questions such as: What is the % likelihood of a student being proficient on a future PSSA? Projections data can be used for intervention planning and resource reallocation.

Both PVAAS methodologies serve different purposes, and both are equally important for continuous school improvement.



All 500 districts in the Commonwealth receive web-based reporting annually that includes:

- Value-added reports for grades 4 through 8 and 11. These reports are available at both the district and school level in reading and mathematics, science and writing. Subgroup reporting is also available.
- Projection reports with projections to basic, proficient and advanced levels on future PSSAs.
 - Last grade tested - Grade 3 to 4 or 5 (future PSSA)
 - Last grade tested - Grade 4 to 5 or 6 (future PSSA)
 - Last grade tested - Grade 5 to 6 or 7 (future PSSA)
 - Last grade tested - Grade 6 to 7 or 8 (future PSSA)
 - Last grade tested - Grade 7 to 8 (future PSSA)
 - Last grade tested - Grade 8 to 11 (future PSSA)

Consistency of high growth is a key strategy for moving all students to proficiency and meeting AYP. Pennsylvania measures what matters!

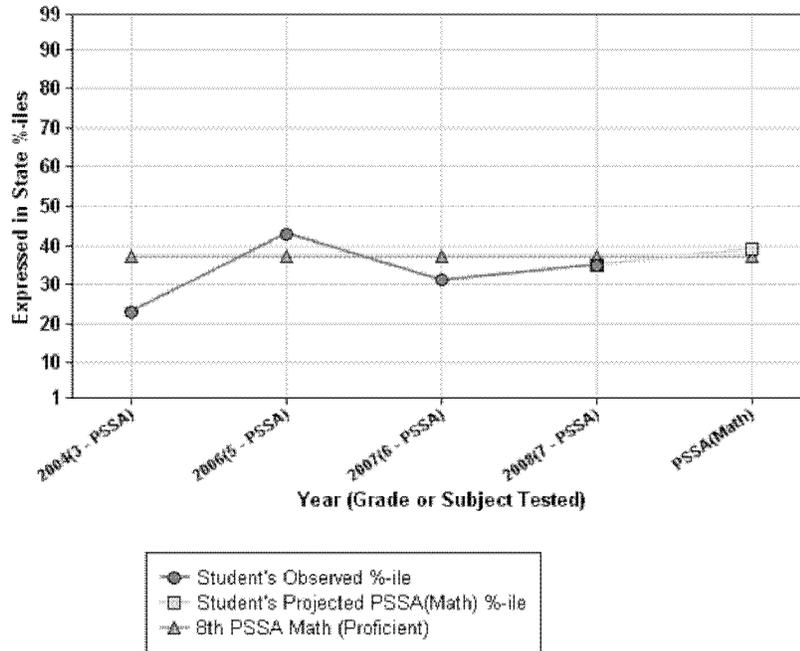
**Examples of
Reports provided
to
Districts/ Schools**

Projections Methodology

Student Projection Report

The Student Projection Report shows an individual student's observed performance over a period of time. Based on the student's history and achievement pattern, the report provides a projection of the student's likelihood of scoring at a particular proficiency level on a future PSSA. The most important consideration is that the projection methodology uses all of the available data in both reading and math in its' projection calculations due to the relationship found in student performance between reading and math.

8th PSSA Math (Proficient) Projection Report for CAMILLE ARNN



Subject: Math					
	Year (Grade or Subject Tested)				
	PSSA (Math)				8th PSSA Math (Proficient)
	2004(3)	2006(5)	2007(6)	2008(7)	Projection (Probability)
State NCE 1 Score	28	45	41	46	
%-ile	23	43	31	35	39 (55.0%)

Sample report provided from PVAAS demo site.

Based on Camille's history and achievement pattern, she has a 55% likelihood of scoring Proficient on the 8th grade PSSA Math. The purple reference line represents the percentile necessary to reach proficiency.

Questions this report may help to answer:

1. Is the projection at a level that creates confidence that the student will be successful?
2. What are the implications for instructional planning for this student to ensure she reaches proficiency?

PVAAS Projection Reports for Groups of Students

To assist districts and schools in identifying individual students and/or groups of students who may be in need of instructional interventions, the PVAAS reporting provides a Student Search report feature. This feature allows users to create lists based on filtering for specific subgroups or projected proficiency levels. The report is particularly helpful when looking for patterns of performance across a school or district and when attempting to identify students with high or low probability of achieving a proficient rating.

Home Search Admin My Account Help Contact Us Logout

Back Reports

Student Last Name:

Restrict Search by Grade Last Tested? Yes No

5

Restrict Search by District and/or School? Yes No

Restrict Search by Race? Yes No

Restrict Search by Sex? Yes No

Restrict Search by Demographics? Yes No

Economically Disadvantaged Special Education Title 1 Title 3
 Not Enrolled Full Year Limited English Proficiency Migrant Gifted
 504 Plan Tutor Eligible Tutor Received

Restrict Search by Projected Proficiency Level? Yes No

PSSA 6th PSSA Math (Proficient) Lower: 70 % Upper: 100 %

Restrict Search by Projected Proficiency Level? Yes No

Search

This search will report all students tested in grade 5 last year, who are coded as economically disadvantaged, and have between a 70 and 100% likelihood of being proficient on their 6th grade PSSA math.

Districts can do searches on all students, as well as subgroups, as indicated in the above search.

When the parameters of the search have been submitted, a report is generated that lists the students that meet the particular criteria outlined in the student search.

Sample report provided from PVAAS demo site.

Questions this report may help to answer:

1. Who are the special ed students who have a low probability of being proficient on the 7th grade PSSA Reading (PA1) and/or Math (PA2)?
2. Which students may need accelerated instruction?
3. Which students need interventions and additional supports to ensure they reach proficiency?

Search Results: 1 - 100 out of 632

Student	District	School	Sex	Race	Grade	Gif	LEP	ED	SpED	PA1	PA2
(b)(6)	Liberty Bell School District	Grove Elementary School	F	B	5	N	N	Y	Y	28.7	20.6
	Liberty Bell School District	Elm Elementary School	F	B	5	N	N	Y	Y	37.4	7.1
	Liberty Bell School District	Carter Elementary School	M	B	5	N	N	N	Y	55.0	79.7
	Liberty Bell School District	Elm Elementary School	M	B	5	N	N	Y	Y	43.4	36.4
	Liberty Bell School District	Carter Elementary School	F	B	5	N	N	Y	Y	4.6	0.4
	Liberty Bell School District	Alaska Elementary School	M	B	5	N	N	Y	Y	0.6	2.5
	Liberty Bell School District	New Mexico Elementary School	M	B	5	N	N	Y	Y	71.5	86.2
	Three Rivers School District	North Elementary School	F	W	5	N	N	Y	Y	42.8	15.8
	Liberty Bell School District	Riley Elementary School	F	B	5	N	N	N	Y	53.2	18.5
	Independence Hall School District	Maple Elementary School	M	B	5	N	N	Y	Y	57.1	10.3
	Independence Hall School District	Earhart Elementary School	M	W	5	N	N	N	Y	89.8	86.7
	Hemlock School District	Pecan Elementary School	M	W	5	N	N	N	Y	67.3	53.2
	Liberty Bell School District	Powell Elementary School	M	B	5	N	N	Y	Y	1.5	0.2
	Liberty Bell School District	Quincy Elementary School	M	B	5	N	N	Y	Y	36.8	9.6
	Independence Hall School District	Idaho Elementary School	F	W	5	N	N	Y	Y	74.6	61.2
	Liberty Bell School District	New Mexico Elementary School	M	B	5	N	N	Y	Y	9.5	0.5
	Three Rivers School District	South Dakota Elementary School	M	B	5	N	N	Y	Y	12.9	10.6
	Hemlock School District	Kissinger Elementary School	F	W	5	N	N	N	Y	0.0	0.0
	Hemlock School District	License Elementary School	F	W	5	N	N	Y	Y	76.8	50.5
	Hemlock School District	Cabot Elementary School	M	W	5	N	N	N	Y	65.9	70.2
	Liberty Bell School District	Alaska Elementary School	M	B	5	N	N	Y	Y	46.6	34.5
	Liberty Bell School District	Dole Elementary School	M	W	5	N	N	Y	Y	6.0	1.4
	Independence Hall School District	Atlantic Elementary School	M	B	5	N	N	Y	Y	40.6	54.0
	Liberty Bell School District	Powell Elementary School	M	B	5	N	N	Y	Y	21.1	16.9
	Liberty Bell School District	Alaska Elementary School	M	H	5	N	N	Y	Y	12.2	8.5
	Three Rivers School District	Hurricane Elementary School	M	W	5	N	N	N	Y	53.9	59.3

Value-Added Methodology

District Value-Added Summary

The Value Added Summary Report indicates how effective each school in the district has been in the most recent year. All grades for the currently selected test and subject are displayed in the table. The Mean Gain for the school is provided for each grade for the most recent year tested and the average of the most recent three years, when available.

2007 Value Added Summary Report PSSA Math

School Name		4	5	6	7	8
Elementary School	2007	4.5	-2.3	--	--	--
Middle School	2007	--	--	-4.7	2.8	3.8
Elementary School	2007	8.3	2.4	--	--	--
Elementary School	2007	8.3	-1.1	--	--	--
Middle School	2007	--	--	0.2	5.8	2.5
Middle School	2007	--	--	3.0	4.7	2.8
Elementary School	2007	1.5	1.1	--	--	--
Elementary School	2007	2.1	6.9	--	--	--
Elementary School	2007	11.0	-13.8	--	--	--

-  Estimated mean NCE gain equal to or greater than growth standard.
-  Estimated mean NCE gain below growth standard, but by less than one standard error.
-  Estimated mean NCE gain below growth standard by at least one, but less than two, standard errors.
-  Estimated mean NCE gain below growth standard by at least two standard errors.
- The school does not have data for this test and subject in the most recent year.

This report is an actual Value Added Summary Report from the PVAAS website.

Questions this report may help to answer:

1. Which schools made a year's worth of growth (green)?
2. Which schools did not make a year's worth of growth (yellow, rose, red)?
3. What other data in PVAAS (and other data sources) is needed to determine the cause of the growth or lack of growth?

(b)(6)



District/ School Value-Added Report

These reports allow districts/ schools to observe the mean gain of cohorts within the district or a particular school. In addition, it allows for a comparison of the district's/school's progress rate for a grade to the expected growth standard and the state 3-year average (available in the future), as well as a comparison of the district's/ school's achievement level to the state's achievement in the base year (2006).

This report is an actual district report from the PVAAS website.

Questions this report may help to answer:

1. What is our gain rating for each grade and subject?
2. How does this year's gain rating compare to previous years?
3. How does this data match data from other sources?

Sample Report Interpretation: In this example, grades 4, 6, and 8 received a 'green' rating indicating that cohorts in those grades made at least one year of growth in math. These students as a cohort met or exceeded the growth standard. However, students in grades 5 and 7 fell behind their peers. In fact, the red indicator tells us that there is significant evidence that this cohort of students made little progress during this past school year.

2007 Pennsylvania District Report PSSA Math

Estimated Mean NCE Gain							
Grade:	3	4	5	6	7	8	Mean NCE Gain over Grades Relative to
Growth Standard:		0.0	0.0	0.0	0.0	0.0	
State 3-Yr-Avg:							Growth Standard
2005 Mean NCE Gain:							State
Std Error:							
2006 Mean NCE Gain:		4.9 R*		6.0 G			0.5
Std Error:		1.7		1.5			1.1
2007 Mean NCE Gain:		1.0 G	-1.9 R	0.7 G	-10.1 R*	5.5 G	-1.0
Std Error:		1.9	1.4	1.3	1.4	1.3	0.7
3-Yr-Avg NCE Gain:							
Std Error:							
Estimated District Mean NCE Scores							
Grade:	3	4	5	6	7	8	
State Base Year (2006):	50.0	50.0	50.0	50.0	50.0	50.0	
State 3-Yr-Avg:							
2004 Mean:							
2005 Mean:	49.3		48.3			50.0	
2006 Mean:	46.9	44.4	49.5	54.4	47.1	46.3	
2007 Mean:	52.8	47.9	42.4	50.1	44.3	52.6	

G - Estimated mean NCE gain equal to or greater than growth standard.

Y - Estimated mean NCE gain below growth standard, but by less than one standard error.

R - Estimated mean NCE gain below growth standard by at least one, but less than two, standard errors.

R* - Estimated mean NCE gain below growth standard by at least two standard errors.

District/ School Diagnostic Report

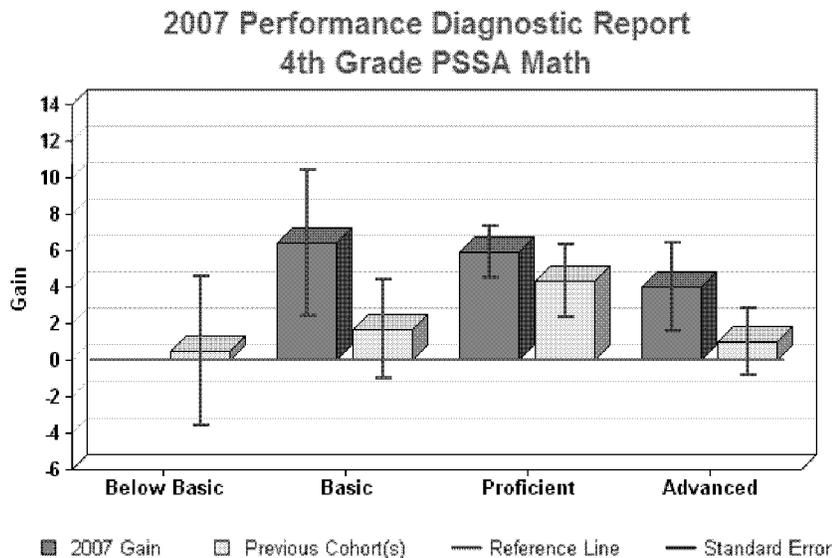
The Diagnostic Report is used to identify patterns or trends of progress among cohorts of students at different proficiency levels. The same report is available to look at growth with cohorts of subgroups such as special education, economically disadvantaged, ELL, gifted and many others.

Questions this report may help to answer?

1. Where are we doing well? Which groups are showing a significant positive gain?
2. Where are we not doing so well? Which groups are showing negative gain?
3. What patterns are you seeing across grades?

Sample Report Interpretation: This particular report suggests:

- The students who were predicted to be Basic, Proficient and Advanced in math exceeded the Growth Standard – their confidence band was above the green line. This indicates that these students increased their position in the performance distribution of all students from their position at the end of the 3rd grade to the end of 4th grade.
- Diagnostic reports will be generated for subgroups that consist of 5 or more students.
- The goal of the district or school is to have significantly positive bars for all students. This district has met that goal on the District Diagnostic Report. To determine if the goal has been met for “all” students/groups, the district would want to look at the diagnostic reports for subgroups as well.



Note: Green line = Meeting the Growth Standard.

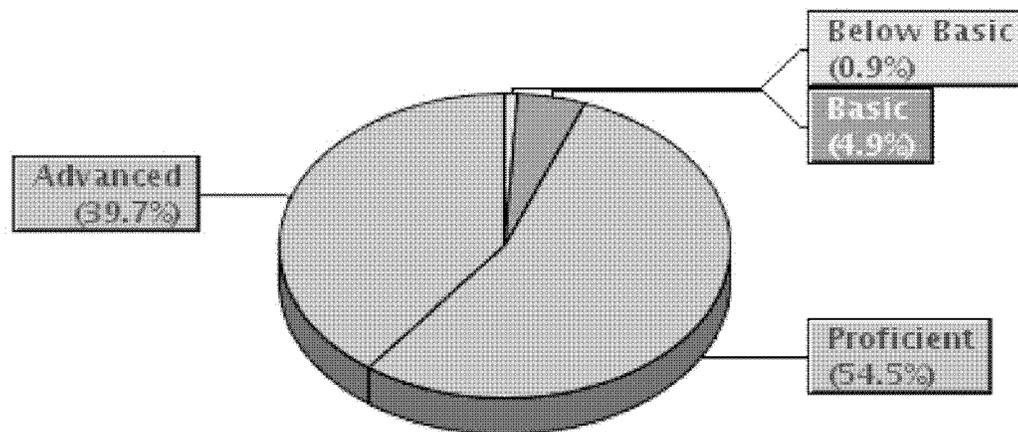
		Predicted Proficiency Group				
		Below Basic	Basic	Proficient	Advanced	
Math	Reference Line	0.0	0.0	0.0	0.0	
	2007	Gain		6.4	5.9	4.0
		Std Err		4.0	1.4	2.4
		Nr of Students	2	6	37	38
		% of Students	2.4	7.2	44.6	45.8
	Previous Cohort(s)	Gain	0.5	1.7	4.3	1.0
		Std Err	4.1	2.7	2.0	1.8
		Nr of Students	6	10	33	30
		% of Students	7.6	12.7	41.8	38.0

Percent of Students by Projected Performance Level

By clicking on the hot link, “% of Students”, on the Diagnostic Report, users can receive the same information in a more detailed pie chart. This diagnostic pie chart visually displays the percent of students who were predicted to be in each of the four performance levels. In this case the majority of students (54.5%) were predicted to perform at the proficient level while another 39.7% were predicted to be advanced. The color of each piece of the pie indicates the progress for each performance group.

- A green indicates the group of students met or exceeded the growth standard (Basic).
- A yellow indicates the group of students grew less than the standard (Below Basic).
- A rose, or pink, indicates the group of students did not meet the growth standard, meaning they are falling behind their peers (Proficient, Advanced).

**% of Students by Projected Performance Level for
Hemlock School District
8th Grade PSSA Math
2007 Students**



	The subgroup's progress was at least one standard error above the Reference Line.
	The subgroup's progress was within one standard error of the Reference Line.
	The subgroup's progress was at least one standard error below the Reference Line.
	There were not enough students to define progress.

Appendix D-4

Teacher Evaluation Sample Rubric

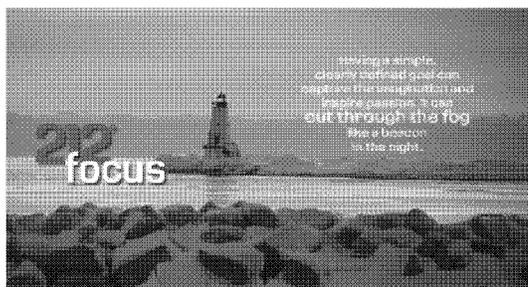
The evaluation system will utilize *multiple rating instruments and sources of data*, specifically including student achievement gains through a range of assessments both quantitative and qualitative. The rubrics in the system will place equal value on instructional practice and content knowledge and coverage. Measures must also include how the professional utilizes student data and the resulting knowledge of students' learning styles and progress to modify their instructional practices with a focus on the effectiveness of their work in this area.

We will work with teachers unions and other stakeholder groups to build out a transparent rubric by which teachers' progress against the standards are measured (see **sample** rubric below for the Planning and Preparation Standard). Metrics will be collected through multiple avenues, including observations, principal assessments and data systems

Standard	Evidence	Entry	Emerging	Achieving	Highly Effective I	Highly Effective II
Content Knowledge						
• Reflects use of Student Standards and Benchmarks in lessons and teaching						
• Demonstrates advanced knowledge of content in planning						
• Sets appropriate instructional outcomes as the basis for planning						
Assessment						
• Uses all forms of assessment at appropriate times						
• Designs appropriate formative assessments						
• Uses formative assessment regularly during lessons and work with students						
• Analyzes student data regularly and is conversant on the progress of every						

Standard	Evidence	Entry	Emerging	Achieving	Highly Effective I	Highly Effective II
student						
<ul style="list-style-type: none"> • Modifies lessons and student work based on long term and short term data 						
Pedagogy and Best Practice						
<ul style="list-style-type: none"> • Shows evidence of continuing professional development to improve teaching practice 						
<ul style="list-style-type: none"> • Demonstrates knowledge of the SAS system to ensure that students are receiving knowledge based on best practice toward mastering standards and benchmarks 						
<ul style="list-style-type: none"> • Develops coherent long-term instructional plan 						
<ul style="list-style-type: none"> • Maintains a toolbox of multiple strategies and materials to provide appropriate teaching methods for each student and situation 						
<ul style="list-style-type: none"> • Demonstrates knowledge of student development through classroom techniques, classroom management, student interaction and guidance to parents 						

Quakertown School District
Teacher Performance Incentive Goals 2009-2010 School Year



Teacher Performance Incentive: Goals for 2009-2010

***Adopted September 29, 2009
from District Goals and the QCSD Strategic Plan***

Student Achievement

Result #1:

All schools meet AYP benchmarks in reading and math PSSA assessments.

Result #2:

The percent of PSSA “Advanced” and “Proficient” students in the sub-groups that have a minimum of 15 students and are presently not making AYP benchmarks district-wide for Math and Reading will increase by 5% from present level.

Result #3:

Implementation of standards-based instruction and assessment (including implementation of correlated programs such as *SpringBoard*, *Blended Schools*, *SRA*, *ADAPT*, etc.) as measured by 95% of QCSD teachers rated “Proficient” on 3e (Informed and Appropriate use of Formal and Informal Assessments to Meet Goals and Monitor Student Learning) on the Professional Staff Rating report.

Communications

Result #1:

Professional communication to and from parents and students as part of the implementation of standards-based instruction and assessment as measured by 95% of QCSD teachers rated “Proficient” on 4c (Communicating with Families) and 4f (Showing Professionalism) on the Staff Rating report.

Result #2:

Implementation of *PowerSchool*, *PowerTeacher*, and *IEP Writer*, including Big Ideas/Learning Targets and the Parent Portal, as measured by 100% of QCSD teachers rated “Proficient” on 4b (Maintaining Accurate Records) on the Staff Rating report.

Staff Development

Result #1:

Participation in professional development conducted to increase awareness of ethnic, gender-based, physical, cultural, academic, and economic issues among students and staff, including increased evidence of differentiation with consideration of learner profiles and interests.



To: The Honorable Tom Gluck
PDE Acting Secretary of Education

From: James P. Testerman *J.P.T.*
President, PSEA

Date: May 28, 2010

Subject: Alternative Compensation Career
Ladder Plan

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After completing a two-year project reviewing the research on alternative compensation systems, the Pennsylvania State Education Association (PSEA) has developed an innovative alternative compensation and career ladder framework that incorporates research on effective practices and knowledge of what works, as well as incorporating the requirements of RTTT. PSEA represents 191,000 education employees across the Commonwealth.

Based on its previous work and expertise in the area of compensation, PSEA has been working collaboratively with PDE. The RTTT goals included in PSEA's framework for a career ladder compensation plan include a link between teacher compensation and fair and valid measures of student growth; additional career advancement based on achievements that enhance the learning environment; group-based student growth rewards; and a focus on critical needs such as hard-to-staff schools. The PSEA framework provides guidance to assist a school district and a local association in their efforts to reach agreement. PSEA will provide support to local associations in developing and implementing a career ladder compensation plan.

The career ladder compensation framework outlined by PSEA creates a 3-dimensional salary schedule to supplement the current single salary schedule. The existing salary schedule will remain intact for "entry," "emerging," and "achieving" teachers, as defined under the PDE proposed evaluation system. The existing salary schedule will continue to be funded by non-competitive and recurring resources.

Two additional salary levels (ladders) will be added, funded with alternative revenue sources:

Highly Effective I – Professional employees could qualify for Highly Effective I status in one of two ways:

- 1) Be designated as a Highly Effective I teacher through the proposed PDE evaluation system which will be designed to include: consistent, transparent, valid, and reliable measures of effective teacher practice; and multiple, fair, transparent, and valid measures of student growth; or
- 2) Receive points on an agreed-upon rubric for achievements or activities that contribute to overall student growth in the school or district (e.g., serve as a Mentor Teacher of new teachers, develop or deliver professional development programs, achieve National Board certification).

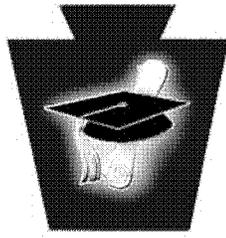
The PSEA Mission

To advocate for quality public education and our members through collective action.

Highly Effective II – In order to qualify for Highly Effective II status, each professional employee would have to be designated as a Highly Effective I employee and agree to assume additional responsibilities (e.g., work as highly qualified teacher in hard-to-staff schools, work as a side-by-side mentor, teach in a turnaround school).

In addition to individual rewards for achieving Highly Effective I and Highly Effective II status, the career ladder compensation plan provides for group-based salary rewards (e.g., grade-level or building-based rewards) for the achievement of student growth goals. Such rewards can encourage collaboration among all members of the group to increase student achievement.

It is PSEA's position, which we attribute to our research, that our proposed framework avoids the pitfalls that have caused the failure of previous alternative compensation plans. PSEA commits to work with PDE, our affiliated local associations, and other RTTT stakeholders to finalize a career ladder framework.



Pennsylvania
Department of
Education

Inspiring productive, fulfilled, life-long learners

THE FRAMEWORK FOR GRADES 4-8
PROGRAM GUIDELINES
PENNSYLVANIA DEPARTMENT OF EDUCATION

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WHY QUALITY TEACHER PREPARATION PROGRAMS ARE IMPORTANT

The fundamental purpose of a teacher preparation program approved by the Commonwealth of Pennsylvania is to admit, prepare, and support candidates for the teaching profession who, upon graduation, have the knowledge and skills to enable Pre K-12 students in Pennsylvania to achieve academic success. Pennsylvania's preparation of new teachers is one component of a Standards-Based Instructional System.



The six components of the Standards-Based Instructional System do not stand in isolation as supports for Pre K-12 student achievement in the Commonwealth of Pennsylvania. Design and delivery of high quality teacher preparation programs are functions of an aligned instructional system; institutional success in producing new teachers with the knowledge and skills to promote student learning is the ultimate outcome of the overall system. High quality teacher preparation programs are an essential part of Pennsylvania's efforts to build capacity for an aligned Pre K-16 system.

PHILOSOPHY FOR PREPARING HIGHLY EFFECTIVE PENNSYLVANIA TEACHERS

Six linked circles in the above standards-based system define core elements of Pennsylvania's emerging instructional system: standards, curriculum, instruction, materials and resources for instruction, fair assessments, and appropriate interventions. Together, these system components are intended to produce strong results for students. For this to happen, the work encompassed in each circle—such as instruction—must build capacity for the activities captured by the other five circles.

In the case of teacher preparation programs and their contribution to **(1) instruction**, all programs are expected to align their course content with **(2) state standards**. All teacher preparation programs are expected to provide all candidates with the knowledge and skills to teach a **(3) standards-based curriculum** effectively and successfully. Through university coursework and extensive, well-designed clinical experiences, all candidates for the profession are expected to learn how to use **(4) materials and resources for instruction** (including technology) to meet the individual needs of each student in their classroom. Each teacher preparation program is expected to give considerable attention to helping all candidates acquire and use **(5) assessment skills**, enabling them to understand and respond to pupil results on standardized tests (PSSA and others), local school or district assessments, and individualized assessments of the achievements and challenges of each pupil. Taken together, this set of knowledge and teaching skills must enable every candidate for the teaching profession in the Commonwealth to implement **(6) appropriate interventions** in the classroom to improve student learning. Teacher preparation programs and the new teachers who complete them will be judged according to their success in achieving the six key goals described above.

Since program and candidate success do not happen by accident, program design, the components of that design, and the ongoing assessment of their effectiveness must all point in the same direction. The needs and interests of Pre K-12 students and their schools are at the center of the program. This means that Pre K-12 teachers and administrators must be involved in program assessment activities, decisions about selection and use of clinical sites, and asked regularly for their feedback on candidate and program performance. Program outcomes must include strong subject matter content preparation, more extensive clinical experiences for students, and the use of technology in curriculum and instruction.

Because teaching is a clinical profession, candidates for the profession should spend extensive time in school settings—beginning early in their teacher preparation program sequence—guided by university faculty and appropriately prepared Pre K-12 mentor teachers. Teacher preparation programs must be able to demonstrate how they use evidence about program graduates and evidence about the Pre K-12 students of their graduates to make continuous program improvements.

INTRODUCTION

Pennsylvania's Elementary/Middle Level (referred to as "middle level" or "4-8" throughout the guidelines) preparation program guidelines include two design options. The first option allows for concentration in one academic area and three "generalist" academic content areas. The second option requires a concentration in two academic content areas. Both of these options require a Professional Core of courses, field experiences and student teaching. Courses in higher level content within the same area can be substituted for lower level content in mathematics, sciences, language arts and social studies if the college or university can demonstrate the candidate mastered the content outlined in these preparation program guidelines.

These guidelines discuss the 4-8 Program design, professional core rationale, candidate competencies, Pennsylvania standards, assessments in a standards aligned system, faculty, field experiences and student teaching, new teacher support, and appendices with design examples and course content information. Each content area for the 4-8 certification program corresponds with specific competencies that must be included in the preparation program design.

PROGRAM DESIGN

The Professional Core courses, competencies and experiences for the grade 4-8 teacher preparation program should be designed to address the broad set of issues, knowledge and competencies that are relevant to middle level teaching and learning. The program must prepare teachers who will be able to ensure students' mastery of academic standards and the content assessment anchors. The Professional Core component of the program design must be maintained regardless of the configuration or options that the training program selects, either from samples in this document or others it develops. The Professional Core in the 4-8 programs consists of a recommended 27 credit hours, and includes field experiences. A minimum 12-week student teaching experience is an additional requirement of the 4-8 Program. Programs have flexibility in how they address adaptations, accommodations, and cognitive development of diverse students in an inclusive setting (9 credits or 270 hours, plus 3 credits or 90 hours, or equivalent combination). See Appendix B.

Professional Core for middle level teacher preparation must include:

- The organization and philosophy of middle school education.
- Young adolescent development.
- The fourth through eighth grade curriculum.
- Skills necessary for middle level instruction.
- Use of data for assessment.
- Effective classroom management strategies.
- Current skills in the use of education technology.
- Design of successful interventions responsive to the needs of individual middle level students.
- Experience with monitoring the results of interventions designed to address the needs of individual middle level students.

The Professional Core of courses, competencies, and experiences for the Middle Level Teacher Preparation program must be designed to address the issues and knowledge that are relevant for middle level teaching and learning. The philosophy and standards (Pennsylvania standards as well as those of the National Middle School Association) must permeate the candidates' course experiences as well as their field experiences and student teaching.

4-8 Professional Core

Development, Cognition and Learning (middle level cognitive development, early adolescent and adolescent development and learning theory)

Subject Matter Content and Pedagogy (middle level methods)

Assessment (assessment methods I: observation and informal, assessment methods II: interventions, summative, formative, diagnostic, benchmark)

Adaptations and Accommodations for Diverse Students in an Inclusive Setting and Meeting the Needs of English Language Learners

Institutions are charged with producing evidence to demonstrate that their graduates understand and apply the knowledge, concepts, and skills essential for successful grade 4-8 instruction. The program design must describe clearly how the relevant set of knowledge, skills and competencies inform the program design, and the application must also indicate how the institution will assess whether candidates have acquired the required knowledge skills, and competencies.

For candidates preparing to be 4-8 grade teachers, all courses should be grounded in adolescent development and enable them to gain the knowledge and experience to work successfully with family members and the broader community. Faculty who teach in the professional core must have demonstrated expertise in education methods appropriate to the 4-8 grade content they are teaching, as well as advanced degrees in disciplines appropriate to teaching in the program.

Table 1

Recommended Program for 4-8 Professional Core Courses and Credit Hours

Professional Core and Program Areas	Course Credit Recommendations
Development, Cognition and Learning	9
Middle Level Cognitive Development*	3
Early Adolescent and Adolescent Development and Learning Theory	6
Subject Matter Content and Pedagogy	6
Middle Level Methods*	6
Assessment	6
Assessment Methods I*	3
Assessment Methods II*	3
Minimum Core Course Credit Recommendations (6 credits TBD by institution)	27 (21+6)
General Education Recommendations (Note: 33 of 48 Gen. Ed. credits incorporated into Concentrations)	15
Concentration Credit Recommendations (2 Options) See note above regarding Gen. Ed.	66
Student Teaching (minimum of 12 weeks)	TBD by institution
Accommodations & Adaptations for Diverse Learners (TBD by institution as credits, hours, or combination)	9 credits/270 hours 3 credits/90 hours

*Courses not required for the Special Education K-8 Dual Certification Program. Core Course Program examples and Concentration Options Examples can be found in Appendix A.

Program Options

The following two options give an overview of each concentration the candidate chooses in conjunction with the professional core. Table layouts of the options are found in Appendix A content guidance can be found in Appendixes B-E. Content must be co-developed through collaboration by faculty in the Arts and Sciences, along with current practicing teachers and administrators. Co-teaching is encouraged but not required.

Option 1: One concentration and three generalist academic content areas

This option for teacher candidates is to complete a recommended minimum of 30 credit hours in one of the four content areas of mathematics, science, English/language arts and reading or social studies. In addition to the concentration, candidates are also recommended to complete:

- 12 credit hours in each of the remaining three areas;
- 27 credit hours in the Professional Core; and
- 12 weeks of student teaching.

These recommendations total 120 credits, assuming the general education requirement is met via the alignment of 33 general education credits with preparation program requirements, plus 12 weeks of student teaching experience. Additional credits are at the discretion of the institute of higher education. Breadth of content is more important in content areas that span multiple disciplines—e.g., science and social studies. In contrast, content areas that focus on a single discipline or more narrow content—e.g., mathematics and English/language arts—will require comparatively more depth and less breadth. Examples of single option program designs can be found in Appendix A.

Option 2: Concentration in two content areas

The second option permitted under the Elementary/Middle Level program design requires a concentration in two content areas. Teacher candidates are recommended to complete a minimum of 21 credits in each content area concentration, as well as a recommended 12 credits in each of the two remaining content areas. As with each Option 1, the two-concentration option recommends 27 credit hours in the Professional Core, and at least 12 weeks of student teaching. These recommendations total 120 credits assuming a recommended 48 credits of general education, 12 weeks of student teaching, and the alignment of a recommended 33 general education credits with preparation program requirements. Candidates who choose Option 2 are required to choose either mathematics or science as one of the two concentration areas.

Concentration combinations possible under Option 2:

1. Mathematics and Science
2. Mathematics and English/Language Arts & Reading
3. Mathematics and Social Studies
4. Science and English/Language Arts & Reading
5. Science and Social Studies

As in Option 1 described above, the following design models are organized to emphasize either breadth or depth of content. Breadth of content is more important in content areas that span multiple disciplines—e.g., science and social studies. In contrast, content areas that focus on a single discipline or more narrow content—e.g., mathematics and English/language arts—will require comparatively more depth and less breadth. Examples of single option program designs can be found in Appendix A.

Program Delivery

The Department of Education believes that 4-8 Certificate Preparation Programs should be comprehensive and delivered through a combination of university classroom and school settings. While some online courses may be a component of the program, programs that are delivered completely online will not be approved.

PROFESSIONAL CORE RATIONALE

For Pennsylvania teachers, Title 22 of the Pennsylvania Code, §354.25(3), as well as §354.32 (a)(1) and §354.33(1)(i)(A)-(H) enumerate aspects of the knowledge and skills that candidates for teaching in the Commonwealth are expected to learn and demonstrate. While this set of knowledge and skills is developed in university academic classroom settings and clinical practice, the program curriculum should reflect this centrality to the process of educator preparation.

The purpose of this section is to describe the rationale of the three key areas of the Professional Core which are:

1. Development, Cognition and Learning
2. Subject Matter Pedagogy
3. Assessment

The middle level program provides candidates with the skills, knowledge and competencies necessary to meet the needs of students. The adolescent development courses as well as their field work and student teaching must enable candidates to gain the knowledge and experience to work successfully with family members and with the broader community. Through their content courses and experiences in middle level school fieldwork, middle level teacher candidates must learn and be able to apply the major concepts and theories related to young adolescent development. This includes demonstrated understanding of the research on adolescent development, motivation, and learning styles. Cognitive and adolescent development coursework and field experiences must be designed and delivered so that faculty and students are able to make explicit connections with middle level content areas, cognitive development, literacy, special education, and English language learning. Course content, competencies and assessed outcomes must be aligned with the PDE 430 (particularly categories II and III), and with the National Middle School Association (NMSA) performance standards for middle level teacher preparation.

Preparation programs are charged with producing evidence to demonstrate that their graduates understand and apply the knowledge, concepts, and skills essential for successful middle level instruction. This means that the program design must describe clearly how the relevant set of knowledge and skills inform the program design, and the application also must indicate how institutions will assess whether candidates have acquired this knowledge and skills.

Development, Cognition, and Learning

Through the content and experiences in the 4- 8 programs, candidates for middle level certification must develop and be able to apply the major concepts and theories associated with young adolescent development. Candidates must become familiar with the research on adolescent development, motivation, and learning styles. The courses must be designed and taught in such a way that faculty and candidates are able to make explicit connections with middle level content areas, cognitive development, literacy, special education, and English language learning.

Subject Matter Content and Pedagogy

Each of the core subject areas have important content to master; middle level methods courses supplement that content with evidence-based methods for engaging middle level students with the content. Programs should take into consideration the range of reading

abilities in grades 4-8, and provide candidates with strategies to meet the literacy needs of these learners.

English/Language arts and reading overview

The middle level preparation program design in the area of English/language arts is intended to prepare prospective teachers for the challenging work of developing the literacy skills of their students. The recommendations are based on two key assumptions:

1. Some—perhaps many—middle level students will need foundational work (normally addressed in early childhood and elementary education) because of educational deficits, individual learning challenges, and other issues; and
2. As a result of this student need, middle level teachers need deep knowledge, understanding, and practical experience in addressing adolescent literacy instruction for students having a wide range of abilities.

To be approved by PDE, middle level program course content must be aligned with Pennsylvania's Academic Standards and with the Assessment Anchor Content Standards in reading established for grades 3-8 and 11. Successful alignment and course content development will require university faculty to collaborate with practicing middle level teachers and administrators to design and develop coursework. Middle level program proposals submitted for review by PDE will be expected to include evidence of successful alignment and evidence of significant collaboration.

Courses must be designed to enable new teachers to understand and use effective instructional strategies, including cooperative learning and other evidenced-based best practices. Coursework, field experiences, skills in assessment, and skills in developing intervention strategies need to be organized coherently to address the literacy areas. The sequence of courses and related experiences also must include direct and specific linkages to content courses in mathematics, the sciences, and social science so that candidates acquire and demonstrate knowledge and skills for domain-specific literacy instruction, assessment, and interventions.

Although course content about instructional methods and materials is included in other literacy courses required for middle level program approval, focused attention to these issues requires a dedicated block of credit hours, class time, and practice opportunities. Learning how to teach this complex material, creating a successful learning environment for students, incorporating technology into instruction, and acquiring expert knowledge of materials must be core elements of this content. The International Reading Association (IRA) argues that, "Effective literacy instruction does not occur in a vacuum. Teachers engage learners with instructional materials and other texts inside a rich literary environment that supports their teaching. They know and can apply strategies to create this high-quality classroom environment—that includes attention to children's and young adult literature, classic texts in different genres, commercial reading series, electronic-based information sources, and locally created materials—and to engage students within it" (IRA, 2007, page 5). Among the methods and technologies to develop instructional skills supported by research is the use of videos, role-playing, coaching, reflection, and further guided practice. Instruction must directly address seven of the nine elements of instructional improvement in adolescent literacy (Biancarosa & Snow, 2006):

1. Direct, explicit comprehension instruction
2. Effective instructional principles embedded in content
3. Motivation and self-directed learning;
4. Text-based collaborative learning;

5. Strategic tutoring;
6. Diverse texts; and,
7. Technology as both a tool and a topic of instruction.

Mathematics overview

The middle level program design in the area of mathematics is intended to prepare prospective teachers for a wide variety of middle level students: those who have mastered third grade arithmetic and are making the transition from arithmetic to mathematics; those rising fourth graders and other middle level students who have not yet mastered arithmetic but must do so in order to understand and perform successfully more rigorous mathematics; and middle level students who will need to master progressively more rigorous mathematical content as they move through middle grades toward high school.

Courses in this sequence must be designed to enable new teachers to understand and use effective instructional strategies, including cooperative learning and other evidenced-based best practices, as they apply their knowledge of mathematics to teach in Pennsylvania middle level classrooms. Through the mathematics courses, the methods course, and the professional core for middle level teacher preparation, new middle level teachers and their students will develop the depth and breadth of knowledge to understand and solve real world problems with mathematics.

The principle of the curriculum is to integrate instructional theory, learning theory and developmental theory through the mathematics courses, the methods courses, field experiences and the cognitive science courses by providing the candidate with opportunities to experience and practice this integration directly through classroom field experiences. There must be a strong and direct linkage between content and methods: the mathematics courses required by the program must be linked explicitly to learning theory and methods courses and to Pennsylvania's Academic Standards for mathematics and Assessment Anchor Content Standards for grades 3 through 8 and 11. This will enable candidates to understand and practice what they are learning about mathematics, about teaching, and about how children develop and acquire knowledge. Program design must include school-based methods courses to maximize the likelihood that content knowledge, pedagogical content knowledge, and teaching skills in mathematics will be developed in optimal ways by each candidate.

Science overview

The middle level preparation program design in the area of science is intended to prepare prospective teachers for a wide variety of middle level students, those coming to middle school with previous exposure to high quality science instruction, those with learning challenges in numeracy and literacy, and students whose innate curiosity about the world around them has yet to be tapped by effective science instruction. In all these cases, science learning in the classroom requires curricula based on factual knowledge and conceptual development, helping children build on their natural curiosity to develop skills and knowledge in the sciences. The college or university must create a structure that allows collaboration among education, science, engineering, and mathematics departments to ensure that prospective teachers have a solid foundation in the relevant science knowledge and skills each will need to be successful classroom teachers. For children to learn the sciences successfully, their teachers must know science content, know how students learn science, and understand how to plan effective instruction (National Research Council,

Taking Science to School: Learning and Teaching Science in Grades K-8, chapter 11, page 10).

The goal of teacher preparation for middle level science instruction is to enable teachers to “evaluate each child’s knowledge and conceptual and skill development, as well as the child’s level of meta-cognition about his or her own knowledge, skills, and concepts. A key question for instruction is thus how to adapt the instructional goals to the existing knowledge and skills of the learners, as well as how to choose instructional techniques that will be the most effective” (National Research Council, *Taking Science to School*, chapter 2, page 8). Courses must include effective instructional strategies, including cooperative learning and other evidenced-based best practices as they apply to the sciences. In general, teachers will be effective instructors in the schools of Pennsylvania when they complete the science component in the middle level preparation program curriculum with the knowledge and skills to: “know, use, and interpret scientific explanations of the natural world; generate and evaluate scientific evidence and explanations; understand the nature and development of scientific knowledge; [and] participate productively in scientific practices and discourse” (NRC, *Taking Science to School*, page 11-2). Only when their teachers have this capacity will students develop the same set of age appropriate knowledge and skills.

The authors of *How Students Learn: History, Mathematics, and Science in the Classroom* argue that all students and teachers come to science education with preconceptions that make effective instruction more difficult. They also make the case that many students and their teachers have “weak foundational knowledge” about science (page 545). Methods courses, the science content courses, clinical experiences, and support from program faculty are needed along the way so that teachers: understand the students’ learning context in science; learn how to recognize and respond to preconceptions and limited knowledge; and have extensive opportunities to practice instructional strategies to address these issues. As with the mathematics sequence for the middle level certificate, there must be a strong and direct linkage between content and methods: the sciences courses required by the program must be linked explicitly to learning theory and methods courses. This will enable candidates to understand and practice what they are learning about science content and the scientific process, about teaching, and about how children develop and acquire knowledge. Program design must include school-based methods courses to maximize the likelihood that content knowledge, pedagogical content knowledge, and teaching skills in science will be developed in optimal ways by each candidate.

Social Studies overview

While Pennsylvania has not adopted academic standards devoted specifically to social studies as a content area, students are expected to learn a variety of content knowledge at different grade levels. The public school curriculum in Pennsylvania includes content in five Academic Standards that are related to social studies disciplines:

1. *Geography*.—defined as “the science of space and place on Earth’s surface” and including attention given to basic geography understanding, physical characteristics of places and regions, human characteristics associated with places and regions, and interaction between people and places.
2. *History*.—including
 - a. *Pennsylvania History*.—Identify and explain the political and cultural contributions of individuals and groups to Pennsylvania history from Beginnings to 1824; identify and explain primary documents, material artifacts and historic sites important in Pennsylvania history from Beginnings to 1824;

- identify and explain how continuity and change have influenced Pennsylvania history from the Beginnings to 1824;
- b. *United States and World History*.—including tools to comprehend, interpret, and conduct historical research.
4. *Economics*.—a basic understanding of economic systems, markets, economic interdependence, and economic aspects of work and earnings.
5. *Civics and government*.—the principles, structures, and operation of government in a democratic society, citizenship rights and responsibilities, and international components of government and policy.

These are interdisciplinary subjects across the social sciences, but successful teaching also requires explicit, detailed knowledge of the sciences, mathematics, and literacy. Middle level preparation programs approved in Pennsylvania must build candidate knowledge, teaching skills, and assessment skills in and across these subject areas. Courses must be designed to enable new teachers to understand and use effective instructional strategies in social studies, including cooperative learning and other evidenced-based best practices.

Effective instruction in social studies depends on teachers with knowledge in the social science disciplines; knowledge about the ways in which students learn these disciplines; the ability to plan and deliver effective instruction; and skills in assessing student learning in order to modify instruction and deliver successful interventions.

The authors of *How Students Learn: History, Mathematics, and Science in the Classroom* argue that all students and teachers come to social studies education with preconceptions that make effective instruction more difficult. In addition, new insights from the cognitive sciences make it clear that teaching and learning in social studies involves much more than discovering and memorizing “the facts.”

In social studies, values and debates about values influence teaching, texts, curricula, and assessment. The teaching of history, like all aspects of historical study, involves choice and selection: One cannot avoid choices; one cannot simply ‘include more.’ Methods courses, the social studies content courses, clinical experiences, and support from program faculty are needed along the way so that teachers:

- understand the student learning context in social studies;
- learn how to recognize and respond to preconceptions and limited knowledge; and
- have extensive opportunities to practice instructional strategies to address these issues. (The competencies for these areas are presented in Appendix B , in the document entitled “Accommodations and Adaptations for Students with Disabilities in an Inclusive Setting and Meeting the Needs of English Language Learners.”)

Assessment Overview

Assessment skills, extensive practice, and the application of assessment results to design effective individualized interventions are essential middle level teaching skills. Successful demonstration of these abilities is an expected outcome through the PDE 430, *Pennsylvania Statewide Evaluation Form for Student Professional Knowledge and Practice*. Assessment knowledge has an important role in the standards and rubrics adopted by the National Middle School Association (NMSA). The “Assessment in a Standards Aligned System” section of this document has an overview of the types of assessments used in Pre K-12 settings and competencies for all professional education candidates.

The preparation program coursework content should be organized to provide candidates with the knowledge and skills to recognize students having difficulty, identify student challenges, design interventions (with collaborative assistance from colleagues when needed) and test the effectiveness of appropriate interventions. Course content must enable candidates to learn how to understand and use data about student learning (standardized tests and other assessment practices), adapt and modify instruction, use technology appropriately, and adapt curriculum successfully. Translating diagnostic information about student learning into successful teaching strategies that will improve student learning requires formal preparation, proficiency with assessment tools, and extensive practice under careful supervision and mentoring. The content must also include explicit attention to Pennsylvania's Academic Standards and Assessment Anchor Content Standards for grades 4 through 8, as well as be consistent with authentic, screening, diagnostic, formative, benchmark, and summative diagnostic assessments.

Definitions of Assessments

The following definitions describe different types of assessments used in classroom settings. The definitions for diagnostic, benchmark, formative, and summative can be found on the "Standards Aligned System" web pages on the PDE Education Hub, at http://www.portal.state.pa.us/portal/server_pt?open=512&objID=4228&mode=2. This web portal contains resources helpful to teacher candidates as well as classroom teachers on designing standards based curriculum and assessments. Candidates are expected to understand the differences between screening, authentic, diagnostic, formative and summative assessments. The program design of a program must include instruction and assessments of candidates demonstrating the appropriate use of each type of assessment.

Authentic. A form of assessment in which, students are asked to perform real world tasks that demonstrate meaningful application of essential knowledge and skills. The assessment usually includes a task for students to perform and a rubric is used to evaluate their performance.

Screening. Screening assessments are used to determine which students may be at risk. Poor performance on the screening assessment identifies those students needing additional, in-depth assessment of strengths and weaknesses. The primary purpose of screening assessments is to identify children early who need additional instructional (or behavioral) intervention. An essential element of using a screening assessment is implementing additional identified intervention(s) (instructional, behavioral, or medical).

Diagnostic. The purpose of diagnostic assessments is to ascertain, prior to instruction, each student's strengths, weaknesses, knowledge, and skills. Using diagnostic assessments enable the instructor to remediate students and adjust the curriculum to meet each pupil's unique needs. (Examples of diagnostic assessments are: DRA's, Running Records, GRADE, GMADE)

Formative. Pennsylvania defines formative assessment as classroom based assessment that allows teachers to monitor and adjust their instructional practice in order to meet the individual needs of their students. Formative assessment can consist of formal instruments or informal observations. The key is how the results are used. Results should be used to shape teaching and learning. Black and Wiliam (1998) define formative assessment broadly to include instructional formats that teachers utilize in order to get information that when used diagnostically alter instructional practices and have a direct impact on student

learning and achievement. Under this definition, formative assessment encompasses questioning strategies, active engagement check-ins, (such as response cards, white boards, random selection, think-pair-share, popsicle sticks for open-ended questions, and numbered heads) and analysis of student work based on set rubrics and standards including homework and tests. Assessments are formative when the information is used to adapt instructional practices to meet individual student needs as well as providing individual students corrective feedback that allows them to “reach” set goals and targets. Ongoing formative assessment is an integral part of effective instructional routines that provide teachers with the information they need to differentiate and make adjustments to instructional practice in order to meet the needs of individual students.

When teachers know how students are progressing and where they are having trouble, they can use this information to make necessary instructional adjustments, such as re-teaching, trying alternative instructional approaches, or offering more opportunities for practice. The use of ongoing formative classroom assessment data is an imperative. Effective teachers seamlessly integrate formative assessment strategies into their daily instructional routines.

Benchmark. Assessments that are designed to provide feedback to both the teacher and the student about how the student is progressing toward demonstrating proficiency on grade level standards. Well-designed benchmark and standards-based assessments:

- measure the degree to which students have mastered a given concept
- measure concepts, skills, and/or applications
- are reported by referencing the standards, not other students' performance
- serve as a test to which teachers want to teach
- measure performance regularly, not only at a single moment in time

(Examples of benchmark assessments are: 4Sight, DIBELS, Work Sampling System)

Summative. Summative assessments seek to make an overall judgment of progress at the end of a defined period of instruction. Often these assessments occur at the end of a school level, grade, or course, or are administered at certain grades for purposes of state or local accountability. These are considered high-stakes assessments and the results are often used in conjunction with federal and state accountability, such as for the No Child Left Behind Act (NCLB) and Adequate Yearly Progress (AYP). They are designed to produce clear data on the student’s accomplishments at key points in his or her academic career. Performance on these assessments are often part of the student’s permanent record and serve as an indication of overall performance on a set of standards. Results from summative assessments are of interest to parents, faculty, administration, the press, and the public. The data from summative assessments are the basis of accountability systems. (Examples of summative assessments: PSSA, Terra Nova)

CANDIDATE COMPETENCIES:

This section outlines the competencies required for certification by Chapter 354: "The preparing institution shall ensure that candidates complete a well planned sequence of professional educator courses and field experiences to develop an understanding of the structure, skills, core concepts, facts, methods of inquiry and application of technology related to each academic discipline the candidates plan to teach or in the academic disciplines related to the non-instructional certificate categories in which they plan to serve." (22 Pa. Code §354.25(b) (3)).

I. Middle Level Education

Candidates will demonstrate their ability and understanding of:

A. Philosophy of middle school education

1. Believe that all young adolescents can learn and accept responsibility to help them do so;
2. Hold high, realistic expectations for the learning and behavior of all young adolescents;
3. Implement the middle level curriculum;
4. Distinguish the rationale and characteristic components of developmentally responsive middle level schools;
5. Translate the implications of young adolescent development in the context of the school organization and components of successful middle level programs and schools;
6. Assist and be supportive of all young adolescents developing to their full potential;
7. Implement the philosophical foundations of developmentally responsive middle level programs and schools;
8. Participate fully in the team process as a structure for school improvement and student learning.

B. Adolescent development

1. Recognize and implement the major concepts, principles, theories, and research related to young adolescent development;
2. Identify the range of individual differences of all young adolescents and the implications of these differences for teaching and learning;
3. Describe issues of young adolescent health and sexuality;
4. Identify how the development of all young adolescents occurs in the context of classrooms, families, peer groups, communities and society;
5. Respect and appreciate the range of individual developmental differences of all young adolescents;
6. Utilize student assistance and student support programs that attend to the social and emotional needs of young adolescents.

C. Student transition

1. Design and implement strategies that provide students with appropriate skills in making the transition from an elementary school environment to the middle school environment and then to the high school environment;
2. Develop supports for students moving to an environment with multiple teachers, changing classrooms and required course decisions;
3. Recognize and plan for supporting student adjustment to the changing relationships with teachers and the impact of peer pressure;

4. Incorporate knowledge of adolescent development into educating students in goal setting and decision making;

E. Instructional strategies

1. Employ teaching/learning strategies that take into consideration and capitalize upon the developmental characteristics of all young adolescents;
2. Create positive, productive learning environments where developmental differences are respected and supported, and individual potential is encouraged;
3. Create learning opportunities that reflect an understanding of the development of all young adolescent learners;
4. Engage young adolescents in activities related to their interpersonal, community, and societal responsibilities;
5. Deliver curriculum that is relevant, challenging, integrative, and exploratory;
6. Make connections among subject areas when planning and delivering curriculum;
7. Incorporate young adolescents' ideas, interests, and experiences into instruction;
8. Use direct and explicit comprehension instruction;
9. Use effective instructional principles explicitly in course content;
10. Motivate students within the context of each subject;
11. Design successful interventions responsive to the needs of individual middle level students;
12. Strategically tutor students whose assessments indicate the need for additional instruction.

F. Technology and materials

1. Incorporate technology into instruction on a regular and frequent basis;
2. Use materials designed explicitly for middle level grades;
3. Engage students with instructional text to support teaching in specific subjects;
4. Utilize children's and young adult literature, classic texts in different genres, commercial reading series, electronic-based information and locally created materials;
5. Make decisions about curriculum and resources that reflect an understanding of young adolescent development;
6. Integrate technology in curriculum planning and in lesson delivery;
7. Assess and select curriculum materials that are academically challenging and personally motivating for young adolescents;
8. Integrate a range of technologies in curriculum, instruction, and assessment;
9. Use appropriate technology during instruction to enhance the understanding of subject matter.

G. Classroom management

1. Create and maintain supportive learning environments that promote the healthy development of all young adolescents;
2. Demonstrate effective adolescent behavior strategies for the classroom;
3. Use appropriate organizational techniques for the classroom;

H. Professionalism

1. Act as positive role models, coaches, and mentors for all young adolescents;
2. Communicate deep content knowledge in subjects taught;
3. Serve on advisory program, co-curricular activities and other programs supporting the curriculum;
4. Uphold high professional standards;

5. Interact with various professionals that serve young adolescents (e.g., school counselors, social service workers, home-school coordinators);
6. Participate fully in teaming and collaborative grade and building level structures;
7. Utilize research/data-based decision-making.

II. Subject Matter Content and Pedagogy

Candidates will be able to:

A. English/Language arts and reading

1. Foundations in Research
 - a. Demonstrate expertise in language and reading development;
 - b. Implement foundational knowledge from current literacy research;
 - c. Provide effective instruction in word-level strategies that result in student literacy gains;
 - d. Demonstrate an understanding of the relationship between decoding and comprehension in reading instruction, critical literacy knowledge and skills in decoding;
 - e. Implement effective instructional principles embedded in content, including language arts teachers using content-area texts and content-area teachers providing instruction and practice in reading and writing skills specific to their subject area;
 - f. Demonstrate concepts, knowledge, and skills essential for direct and explicit reading instruction, particularly in comprehension;
2. Word Level Instruction
 - a. Provide phonemic awareness and phonics instruction for students who struggle in decoding;
 - b. Provide instruction in deep syntax, semantics, morphology and speaking in vocabulary development;
3. Text Level Comprehension
 - a. Explicitly address comprehension instruction directly to academic anchors and standards, conduct assessment and design appropriate interventions;
 - b. Provide instruction in vocabulary and text comprehension;
 - c. Provide direct explicit comprehension instruction in the strategies proficient readers use to understand what they read, e.g., summarizing, monitoring one's own comprehension;
 - d. Implement text-based collaborative learning, which involves students interacting with one another around a variety of texts;
 - e. Demonstrate proficiency with strategic tutoring, which provides students with intense individualized reading, writing, and content instruction based on assessment;
 - f. Provide instruction from multiple sources of diverse texts, which are texts at a variety of difficulty levels and on a variety of topics;
4. Reading-Writing Connection
 - a. Develop effective skills in writing;
 - b. Provide intensive writing instruction including instruction connected to the kinds of writing tasks students will have to perform well in high school and beyond;
 - c. Supply prompts that support thinking;
 - d. Develop ideas in writing that go beyond the superficial;
 - e. Direct instruction in reading strategies for the content areas;
 - f. Use content-area texts and content-area instruction and practice in reading and writing skills specific to subject areas;

- g. Make overt connections between and across the curriculum, students' lives, literature, and literacy;
- h. Provide strategies for reading content;
- i. Provide rubrics that students review, use, and even develop;
- 5. Instructional Approaches and Materials
 - a. Design models and guides that lead students to understand how to approach each task;
 - b. Include technology as a tool for and a topic of literacy instruction, including using technology-based reading materials;
 - c. Utilize a variety of text material at different difficulty levels and on a variety of topics;
 - d. Adapt and modify instruction, use technology appropriately, and adapt curriculum successfully;
 - e. Design follow-up lessons that cause students to move beyond their initial thinking.
 - f. Develop skills in listening;
 - g. Plan lessons that connect with each other, with test demands, and with students' growing knowledge and skills;
- 6. Assessment in Literacy
 - a. Conduct ongoing, formative assessment of students, which is informal, and often daily assessment of how students are progressing under current instructional practices;
 - b. Apply assessment skills, extensive practice, and the application of assessment results to design effective individualized interventions that are essential literacy teaching skills;
 - c. Recognize students having difficulty in reading, writing and speaking, and assist in diagnosing their areas of need;
 - d. Design and test the effectiveness of appropriate interventions;
 - e. Translate diagnostic information about student learning into successful teaching strategies which require formal preparation.

B. Mathematics

- 1. Develop, implement, assess and modify curriculum and lessons as evidenced by their ability to teach students how to:
 - a. Demonstrate factual knowledge needed to have students understand a mathematical problem or phenomenon;
 - b. Demonstrate the conceptual knowledge necessary to enable a student to determine what kind of a math problem is presented through a coherent representation of the situation;
 - c. Demonstrate strategic knowledge of the approaches needed to solve problems;
 - d. Implement procedural knowledge (or computational skill) such as addition, subtraction, or solving equations;
 - e. Model procedural skills that require teachers to have deep content knowledge in order to understand and apply mathematical concepts to a wide range of classroom learning situations and to help middle level students at all levels of ability and achievement to improve their knowledge of mathematics.
- 2. Numbers and Operations, Algebra and Functions—candidates will be able to develop, implement, assess and modify curriculum and lessons as evidenced by their ability to teach students how to:
 - a. Illustrate the different roles numbers and operations play;
 - b. Illustrate the structure of the rational number system and the real number

- system;
- c. Develop a deep understanding of rational numbers and operations on rational numbers;
 - d. Teach the mathematics that underlies standard algorithms;
 - e. Make sense of large and small numbers and use scientific notation;
 - f. Demonstrate mastery in the different roles algebra plays as a study of patterns, as a symbolic language useful in many areas of life, and as a tool for problem solving;
 - g. Develop a deep expertise of variables and functions;
 - h. Represent physical situations symbolically:
 - i. Graph linear, quadratic, exponential functions and their inverses;
 - ii. Solve linear and quadratic equations and inequalities;
 - iii. Exhibit fluency in working with symbols.
3. Geometry and Measurement—candidates will be able to develop, implement, assess and modify curriculum and lessons as evidenced by their ability to teach students how to:
 - a. Represent the roles geometry and measurement play in middle level mathematics;
 - b. Identify two- and three-dimensional shapes and know their properties;
 - c. Develop spatial reasoning through physical and mental activities;
 - d. Connect geometry to other mathematical topics;
 - e. Connect geometry to nature and to art;
 - f. Apply measurement processes;
 - g. Use measurement techniques and formulas proficiently.
 4. Data Analysis, Statistics, and Probability—candidates will be able to develop, implement, assess and modify curriculum and lessons as evidenced by their ability to teach students how to:
 - a. Operationalize and experience data analysis, probability and statistics in real world everyday applications;
 - b. Design simple investigations and collect data (through random sampling or random assignment to treatments) to answer specific questions;
 - c. Use a variety of ways to display data, including bar graphs and pie charts for categorical data, interpret and use histograms, line graphs, stem-and-leaf plots, and box plots for continuous data, and interpret and use scatter plots, regression lines, and correlations for bivariate data;
 - d. Explore and interpret data by observing patterns and departures from patterns in data displays, with particular emphasis on shape, center, and spread;
 - e. Anticipate patterns by studying, through theory and simulation, those produced by simple probability models;
 - f. Draw conclusions with measures of uncertainty by applying basic concepts of probability;
 - g. Demonstrate and provide examples about current uses of statistics and probability in fields relevant to middle level teaching and learning such as the sciences and social studies.
 5. Calculus Concepts and Applications
 - a. Demonstrate mastery of functions, including logarithmic, exponential, and trigonometric function;
 - b. Apply data analysis and matrices;
 - c. Introduce finite mathematics and discrete mathematics.

6. Mathematical Modeling and Applications of Mathematical Understanding — candidates will be able to develop, implement, assess and modify curriculum and lessons as evidenced by their ability to teach students how to:
 - a. Build new mathematical knowledge through problem solving, solve problems that arise in math and other discipline areas, and know how to apply appropriate strategies to solve these problems;
 - b. Provide ways in which mathematics can be applied to a variety of real world situations;
 - c. Use reasoning and proof successfully, make and investigate mathematical conjectures, develop and test arguments and proofs, and use various forms of reasoning in mathematics and related applied contexts;
 - d. Make mathematical connections, enabling middle level students to recognize and use connections among ideas in mathematics, apply math in contexts outside of mathematics, and demonstrate their understanding of how mathematical ideas interconnect within and outside the discipline;
 - e. Represent and apply representations of mathematical ideas, select and apply mathematical representations to solve problems, and use them to interpret phenomena from math, the sciences, and the social sciences; and
 - f. Use technology in mathematics instruction and learning.

C. Science

1. Develop, implement, assess and modify curriculum and lessons as evidenced by their ability to:
 - a. Demonstrate proficiency with science learning that requires curricula based on factual knowledge and conceptual development;
 - b. Assist students to build on their natural curiosity to develop skills and knowledge in the sciences;
 - c. Effectively assess each child's knowledge and conceptual skill development;
 - d. Adapt instructional goals to the existing knowledge and skills of the learners, as well as choose instructional techniques that will be the most effective;
 - e. Use and interpret scientific explanations of the natural world;
 - f. Generate and evaluate scientific evidence and explanations;
 - g. Understand the nature and development of scientific knowledge and participate productively in scientific practices and discourse;
 - h. Implement pedagogy for the concepts that students find most difficult, as well as ways to support their understanding of those concepts;
 - i. Use curriculum materials that are particularly effective for teaching specific topics;
 - j. Assess student knowledge in multiple ways;
 - k. Provide unifying themes incorporated into science content and methods to include concepts such as systems, models, patterns, scale, change, and the importance of evidence and measurement;
 - l. Implement research-based instruction to develop professional knowledge and skills in science and science teaching with a curriculum and management that reflects the importance of science teaching as an essential profession with its own specialized needs and functions;
 - m. Demonstrate proficiency with sufficient laboratory, computer technology, curriculum, and other resources to support the most effective teaching of science at a designated level of teaching specialization;
 - n. Develop descriptions, explanations, predictions, and models using evidence, recognizing and analyzing alternative explanations and predictions;

- o. Use prior knowledge to pose problems and generate data rather than thinking about science as truths to be memorized;
 - p. Explicitly teach data collection, interpreting data, testing inferences, and the search for patterns in data;
 - q. Directly have students test ideas through experimentation;
 - r. Provide explanatory frameworks for students to study: systems, order, and organization; evidence, models and explanation; evolution and equilibrium; form and function;
 - s. Explain observations and test models against additional data and identify strengths and limitations of various explanatory models;
 - t. Use patterns in observations to develop explanations and predictions;
 - u. Develop causal models to explain patterns in observed or collected data;
 - v. Demonstrate scientific arguments and reasoning in order to make ideas public and learn to revise models in light of data that do not work;
 - w. Categorize conceptions and preconceptions of science and scientific knowledge;
 - x. Clarify misunderstandings of science and scientific inquiry processes;
 - y. Recognize student preconceptions, student reasoning patterns, problematic explanations for observed phenomena;
 - z. Promote conceptual change in student understanding of scientific knowledge and processes;
2. Standards – apply their knowledge of established local, Pennsylvania, and national standards (e.g., those published by the National Science Education Teachers Association, the PA Academic Standards, etc.) and incorporate those standards in their teaching:
- a. Unifying themes and processes in science;
 - b. Science as inquiry;
 - c. Physical science, chemistry and physics;
 - d. Biological science;
 - e. Earth and space science;
 - f. Science and technology;
 - g. Science in personal and social perspectives;
3. Ecology standards – understand and know Pennsylvania’s grade 4 - 8 Academic Standards for Environment and Ecology including:
- a. Watersheds and wetlands;
 - b. Renewable and non-renewable resources;
 - c. Environmental health;
 - d. Agriculture and society;
 - e. Integrated pest management;
 - f. Threatened, endangered and extinct species;
 - g. Humans and environment;
 - h. Environmental laws and regulations.
4. Physical sciences—demonstrate an understanding of the nature of science by specific applications to the physical sciences regarding:
- a. Forces and motion;
 - b. Physical properties of matter;
 - c. Chemical properties of matter;
 - d. Energy and interactions between matter and energy (light, heat, electricity, magnetism, sound);
 - e. Laboratory investigations in the physical sciences.
5. Life sciences—demonstrate an understanding the nature of science by specific applications to the life sciences regarding:

- a. Structure and function of living things (characteristics of organisms);
 - b. Reproduction and heredity;
 - c. Adaptation and evolution (organisms and their environments);
 - d. Ecological behavior and systems (regulation and behavior);
 - e. Relationships between organisms and the environment;
 - f. Laboratory investigations in the life sciences.
6. Earth and space sciences—demonstrate an understanding of the nature of science, applied to earth and space sciences regarding:
- a. Structure and function of earth systems;
 - b. Earth features and processes;
 - c. Cycles in earth systems;
 - d. Energy;
 - e. Weather and climate;
 - f. Solar system and the universe (objects in the sky, changes in the earth and sky);
 - g. Investigations in the earth and space sciences.
7. Science and inquiry:
- a. Teach science as a process of inquiry;
 - b. Illustrate the process of scientific inquiry by having students think critically and logically to make the relationships between evidence and explanations;
 - c. Model how scientists “do science” in different disciplines, such as scientific inquiry and methods in the physical, life, earth, and space sciences; types of scientific investigations;
 - d. Explore approaches to scientific reasoning and investigative strategies through learner-centered principles of instruction such as engaging students in activities or discussions;
 - e. Demonstrate scientific reasoning through showing how scientists develop, analyze, and test different explanations for their findings;
 - f. Communicate scientific procedures and explanations by using the range of scientific investigations appropriate to a discipline and to a problem;
 - g. Represent the historical development of science and the role of logical reasoning and verifiable evidence;
 - h. Construct scientific arguments and present and defend results of a scientific investigation.

D. Social studies

1. Develop, implement, assess and modify curriculum and lessons as evidenced by their ability to apply the standards and thematic strands of social studies as identified by the National Council for the Social Studies (<http://www.ncss.org/standards/>) including:
 - a. The study of culture;
 - b. Time, continuity and change—helping students to know how to understand and reconstruct the past;
 - c. People, places, and environments—giving students the perspective of a world beyond “their personal locations”;
 - d. Individual development and identity—affected by culture, groups, and by institutions;
 - e. Individuals, groups, and institutions—knowledge about how institutions (social, economic, religious, governmental) are formed and operate;
 - f. Power, authority, and governance—the historical development and functions of governmental institutions, the exercise of power, individual rights, and related concepts;

- g. Production, distribution, and consumption—focuses on the economy, production of goods and services, resource allocation, and labor, capital, and management;
 - h. Science, technology, and society—deals with the development and use of technology, the pace of change and its impact on society, and promoting broader access to technology within and across societies;
 - i. Global connections—theme of interdependence;
 - j. Civic ideals and practices—described as topics, values, and issues related to citizenship, rights and responsibilities;
2. Principles – demonstrate implementation of the five overarching principles for social studies instruction:
- a. Social studies teaching and learning are powerful when they are meaningful;
 - b. Social studies teaching and learning are powerful when they are integrated;
 - c. Social studies teaching and learning are powerful when they are values-based;
 - d. Social studies teaching and learning are powerful when they are challenging by expecting students to strive to accomplish the instructional goals, both as individuals and as group members;
 - e. Social studies teaching and learning are powerful when the learning is active.
3. Standards –demonstrate the ability to incorporate into instructional planning the local, Pennsylvania, and national learning standards, grades 4 through grade 8, for social studies, specifically:
- a. Geography
 - b. Basic geographic literacy
 - c. Physical characteristics of places and regions
 - d. Human characteristics of places and regions
 - e. The interactions between places and people
 - f. History
 - g. Historical analysis and skills development
 - h. Pennsylvania history
 - i. United States history
 - j. Economics
 - k. Economic systems
 - l. Markets and functions of governments
 - m. Scarcity of choice
 - n. Economic interdependence
 - o. Work and earnings
 - p. Civics and government
 - q. Principles and documents of governments
 - r. Rights and responsibilities of citizenship
 - s. How governments work
4. Geography and world cultures – demonstrate proficiency in:
- a. Basic geographic literacy, including the ability to use geographic tools and knowledge of places and regions;
 - b. Physical characteristics of places and regions, with attention to understanding the physical system and its properties;
 - c. Human characteristics of places and regions—including knowledge and understanding of population, culture, exploration and settlement, economic activity and political activity;
 - d. Interactions between people and places—how physical environments affect people, and how humans affect the places where they live and work.
5. Research and history:

- a. Equip students with tools to comprehend, interpret, and conduct historical research;
 - b. Outline and delineate historical developments;
 - c. Make effective use of inquiry and analysis tools (documents, web resources, analyses, as well as relevant subject matter in other disciplines such as economics, political science, and the natural sciences);
 - d. Differentiate the contributions of individuals and groups;
 - e. Use and understand documents, artifacts, and the significance of historical places;
 - f. Describe historical implications of continuity and change;
 - g. Distinguish between conflict and cooperation among groups;
 - h. Categorize the discipline of history with key concepts such as time, change, cause and causation, evidence;
 - i. Interpret historical accounts.
6. Economics – demonstrate proficiency in representing, clarifying and imparting the basic understanding of:
- a. Economic systems;
 - b. Markets;
 - c. Economic interdependence;
 - d. Economic aspects of work and earnings.
7. Government and citizenship:
- a. Represent, clarify and communicate the principles, structures, documents, and operation of government in a democratic society
 - i. United States of America
 - ii. Commonwealth of Pennsylvania;
 - b. Represent, clarify and communicate the citizenship rights and responsibilities;
 - c. Analyze relationships among nations and peoples;
 - d. Clarify and analyze how government works, including the branches of government at the state and federal levels;
 - e. Acquire knowledge and understanding international relations
 - i. American foreign policy
 - ii. The role of the United States in world affairs, and roles of international organizations.

III. Assessment Skills

- A. Use assessment data to guide instruction;
- B. Monitor the results of interventions and alter instruction accordingly;
- C. Use multiple assessments (authentic, screening, diagnostic, formative, benchmark, and summative) that are developmentally appropriate for young adolescent learners;
- D. Implement technology in student assessment measures;
- E. Use multiple assessment strategies that effectively measure student mastery of the curriculum in more than one way;
- F. Design assessments that target academic standards and assessment anchor content standards in subject areas.

ALIGNMENT WITH PENNSYLVANIA'S ACADEMIC STANDARDS AND ASSESSMENT ANCHOR CONTENT STANDARDS

The grades 4 – 8 teacher must have deep understanding and mastery of the Academic Standards and the Assessment Anchor Content Standards for those grade levels, including Alternate Academic Content Standards (See below). Section 49.14 (iii) of the Pennsylvania School Code identifies how the Academic Standards are included in certification programs: “Institutions are able to demonstrate that educator candidates have participated in instructional activities that enable the candidates to provide instruction to students to meet the provision of Chapter 4 (relating to academic standards and assessment).” Further more, preparation programs must be designed to enable candidates to integrate general, core, and professional coursework so the candidate can teach and assist public school students in achieving the academic standards under Chapter 4 (22 Pa. Code §354.25(b)).

Pennsylvania Academic Standards (22 Pa. Code § 4.12)

- (1) Science & Technology^{*a}
- (2) Environment & Ecology^{*a}
- (3) Social Studies
 - (i) History
 - (ii) Geography
 - (iii) Civics & Government
 - (iv) Economics
- (4) Arts & Humanities
- (5) Career Education & Work
- (6) Health, Safety & Physical Education
- (7) Family & Consumer Science
- (8) Reading
 - (i) Reading^{*a}
 - (ii) Writing
 - (iii) Speaking & Listening
- (9) Mathematics^{*a}

^{*}Grade level Assessment Anchor Content Standards exist for these standards.

^aGrade span Alternate Academic Content Standards exist for these standards.

The preparing institution’s program should enable candidates to identify the difference between the Academic Standards and the Assessment Anchor Content Standards. Candidates must also be able to demonstrate their awareness of standards for the earlier and later grades to ensure that there is a continuum of Pre K-12 student academic growth. Knowing the continuum of grade level standards is especially important for the 4-8 middle level teacher, where Assessment Anchor Content Standards exist at all grade levels within the certificate. This knowledge will enable the candidate to address the needs of students who have not met the standards including students with disabilities or English Language Learners in inclusive settings.

Candidates must demonstrate mastery beyond superficial levels in order to be able to prepare students to be successful on state and local assessments. This mastery will allow the candidate to guide and assist the public school student in achieving proficiency on all

state assessments. The annual Pennsylvania System of School Assessment (PSSA) is a standards based criterion-referenced state assessment used to measure a student's attainment of the academic standards while also determining the degree to which school programs enable students to attain proficiency of the standards. Every Pennsylvania student in grades 3 through 8 and grade 11 is assessed in reading and math. Every Pennsylvania student in grades 5, 8 and 11 is assessed in writing. Every Pennsylvania student in grades 4, 8, and 11 is assessed in science.

The preparation program requirements must function together so that candidates understand and make effective use of the academic standards, have the skills to develop and implement appropriate interventions to improve student learning, have the content and pedagogical knowledge to teach the curriculum effectively, understand and make regular use of standardized and curriculum-based assessment data, and use the instructional materials and resources necessary to support standards-based instructional practices. Preparing institutions must provide evidence that there is an alignment of the candidates' course work, clinical experiences, and assessments with the standards adopted by the Commonwealth. Collaboration among "professional educator faculty and faculty from liberal arts and other academic disciplines in program planning and evaluation of all facets of the curriculum" is essential to facilitating deep understanding of the standards by candidates (as regulated by 22 Pa. Code §354.26(a)(1)).

Electronic Access to Standards

This link provides access to the State Board of Education Academic Standards website. It contains the Pennsylvania Academic Standards, the Assessment Anchor Content Standards, the Alternate Academic Content Standards, the Early Learning Standards, and the Language Proficiency Standards for English Language Learners

► http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp?a=3&Q=76716&stateboard_e dNav=|5467|&pde_internetNav=|&a and tNav=|

FACULTY

Certification programs submitted for review to the Department will include the qualifications of faculty assigned to teach each course within the professional core of the program. Faculty who teach in the professional core must have demonstrated expertise in middle level education, as well as advanced degrees in disciplines appropriate to teaching in the program. Additionally, program proposals will be expected to include evidence of successful alignment and evidence of significant collaboration between arts and sciences faculty and education faculty, along with current practicing middle level teachers and administrators in all content areas (refer to Chapter 354.25 and 354.26).

FIELD EXPERIENCES AND STUDENT TEACHING

All professional educator programs must include the components of field experiences and student teaching into the program design. As regulated by Chapter 354 of the Pennsylvania Code (Title 22), the planned sequential field experiences may begin as early as the initial semester of college enrollment, prior to the required minimum 12 week full-time student teaching experience (§354.25(d)&(f)). These experiences are to benefit the candidates preparation by providing opportunities to apply principles and theories from the program to actual practice in the classroom; provide practice with diverse populations, ages, and school settings (§354.25(d)(1-2)).

Field Experience and Student Teaching Requirements

The professional education program is required to provide evidence of the candidate's participation in developmental field experiences and student teaching, under the supervision of college personnel and cooperating teachers who are well trained, highly qualified, and who demonstrate competence in teaching and mentoring in the field of 4 – 8 education. The program must also provide evidence that the criteria and competencies required for exit from the 4 – 8 certification programs are assessed through coursework, field experiences and student teaching. In addition to incorporating a self-reflective emphasis, the program is expected to require candidates to demonstrate their knowledge and competence in fostering student learning and child well-being. To the extent possible, candidates should be assigned to field experiences and student teaching sites in which staff have Elementary or Middle Level certification or are able to provide supervision from an external certified teacher.

Definitions of Field Experience and Student Teaching

There are four stages of field experience and student teaching. Each one is progressively more intensive and requires the candidate to assume gradually more responsibility. The experiences should take place in collaborative settings to give candidates a flavor for the values, culture, and working styles of learning environments. This includes learning about the socio-emotional and academic traits of students, and gaining experience with the teaming approach to teaching through direct observation and participation in teamwork and collaboration at the elementary/middle level.

Field experiences are defined as a range of formal, required school and community activities participated in by students who are enrolled in teacher preparation programs. These activities generally do not include student teaching under the supervision and mentorship of a classroom teacher. Effective field experiences provide candidates with increasing exposure to schools, under the guidance of program faculty and trained teacher mentors, throughout the preparation program. Institutions should explain:

1. How they implement field experiences to allow candidates to progress from observing, to working with small groups of students, to teaching small groups of students under the direction of a certified teacher, to the culminating student teaching experience.
2. The duration of candidate field experiences.
3. How these experiences are closely integrated with coursework, assessment practices, and program goals.

Student teaching is defined as a set of organized and carefully planned classroom teaching experiences required of all student teachers in a preparation program. Student teachers are

assigned to one or more classrooms, closely supervised and mentored by a certified teacher, the cooperating teacher, who provides regular feedback to the student on his or her classroom teaching performance. General supervision of student teachers is provided by a university or college professional educator.

Field Experience Guiding Principles:

- Field experiences are designed and delivered for candidates to make explicit connections with content areas, cognitive development, motivation and learning styles.
- Field experiences allow teacher candidates to observe, practice, and demonstrate coursework competencies, under the supervision of education program faculty and under the mentorship of certified teachers.
- Field experiences must allow teacher candidates to progress from observation to teaching small groups of students under the mentorship of a certified educator at the pre-student teaching level, to the culminating student teaching experience.
- Field experiences are on-going throughout the program, aligned with coursework, and include varied experiences in diverse environments.
- Candidates need time to learn and demonstrate the complex competencies and responsibilities required by teachers.

Types of Field Experiences and Student Teaching

Each candidate must participate in a minimum of 190 hours of field experiences. At least one experience during Stage 3 or student teaching must include students in inclusive settings. An inclusive setting is defined as an educational setting which includes children with and without special needs. An inclusive setting includes at least one child with an IFSP/IEP. At least one experience during Stage 3 or student teaching must be in a public school setting.

The student teaching component of approved programs in the Commonwealth is expected to involve institution faculty with knowledge and expertise in the certification area being pursued by a teacher candidate. Classroom mentor teachers (sometimes called cooperating teachers), under whose direct supervision the student teachers work, are expected to be trained by the institution, preferably in 4 – 8 best practices, and to have appropriate certification.

Candidates must learn to identify and conduct themselves as members of the profession. They need to know and use ethical guidelines and other professional standards related to 4 – 8 best practices. Candidates must also have opportunities to collaborate with other professionals and become informed advocates for sound educational practice and policies.

Professional Behaviors to be Demonstrated throughout the Field Experiences

- Understand and adhere to Codes of Conduct
- Appreciate the need for, and maintain, student, family, and staff confidentiality
- Acquire and maintain appropriate clearances
- Understand and adhere to policies and procedures of the specific institution
- Advocate for high quality, child-centered teaching practices utilizing the appropriate supervisory channels, including requirements related to mandated reporter status

Field Experience Stages

The following section describes the four stages of Field experience required for all certificate areas. The descriptions include minimum time requirements. A complete summary is shown on the next page in Table 2.

Stage 1: Observation

Candidates are observers in a variety of education and education related settings (e.g., community organizations, tutoring programs). Programs are expected to design this phase so that candidates participate before formal admission to the teacher education program. Apart from community and after-school programs, there must be a range of school and classroom experiences (e.g., urban, suburban, rural; high- and low-performing schools)—all taking place in middle level grades—so that candidates have a broad experience and learn as much as possible about middle level learners and middle level education philosophy.

Stage 2: Exploration

This stage may be called the “assistant” phase of field experience—it is where the candidate works under a certified teacher’s direction with a small group of students. Activities could include tutoring, helping with reading assignments, and so forth. Ideally, this stage would also occur before admission to the teacher preparation program.

Note: Minimum time requirement for Stages 1 and 2 combined is 40 hours.

Stage 3: Pre-student teaching

Pre-student teaching is where candidates will work with small groups of students, in school or in after school settings under the supervision of a certified teacher. For this phase of clinical (field) experience, middle level candidates will be admitted to the education program, have taken at least one methods course, but will not be in full control of a class.

Note: Minimum time requirement for Stage 3 is 150 hours.

Stage 4: Student Teaching

There is a minimum of 12 weeks full-time student teaching required in §354.25(f). The student teacher must be supervised by faculty with knowledge and experience in the area of certification and a cooperating teacher with appropriate professional educator certification (3 years certified teaching experience and 1 year experience in the placement school) who is trained by the preparation program faculty (22 Pa. Code, §354.25(f)).

Table 2

Field Experiences and Student Teaching Required for Grade 4-8 Education

Stage #	1 & 2	3	4
Stage Title	Observation (1) and Exploration (2)	Pre-Student Teaching	Student Teaching
Description	Linked to certificate area's education competencies and courses that require a minimum number of hours across various grade levels and content areas.	Linked to certificate area's education competencies and courses that require a minimum number of supervised hours across various grade levels and content areas. Pre-student teaching experiences include teaching small to large groups of students under the supervision of the certificate area's higher education faculty and the mentorship of an education teacher certified in the certificate area. Pre-student teaching experiences are closely integrated with coursework, assessment practices, and program goals.	Student Teaching includes a minimum of 12 weeks full time in the classroom with increasing teaching responsibility to completely simulate the role of the educator in the certificate area. For greater than half of the student teaching experience, the teacher candidate will assume full responsibility as demonstrated by effective methods for the planning and delivery of instruction in the classroom
Hours Required	40	150	12 week minimum
Required Elements	<ol style="list-style-type: none"> 1. Observation log signed by cooperating teacher. 2. Observation write-up by teacher candidate with university instructor. 3. Group meeting once a week with university instructor so that field experience is linked to current courses and practices. This can include the class meeting time. 	<ol style="list-style-type: none"> 1. Course assignments (e.g., journal, time log, reflective teaching) with feedback provided by university instructor. 2. Observation and feedback provided by university instructor 3. Group meeting once a week with university instructor so that pre-student teaching experience is linked to current courses and practices. 	<ol style="list-style-type: none"> 1. Observation log signed by cooperating teacher. 2. Observation write-up by teacher candidate. 3. Observation feedback provided by university instructor. 4. Onsite visitation by university instructor. 5. Group meeting once a week with university instructor so that field experience is linked to current courses and practices. 6. PDE 430 Form.

* At least one experience during field experience 3 or student teaching must include students with special needs in inclusive settings. An inclusive setting is defined as an educational setting which includes children with and without special needs. An inclusive setting includes at least one child with an IFSP/IEP.

NEW TEACHER SUPPORT

According to §49.16 (22 Pa. Code), all school entities (LEAs) must submit a plan for the induction experience for first-year teachers. This plan is submitted as part of the LEA's strategic plan written every 6 years as required by Chapter 4. Preparing institutions have a role in a new teacher's induction experience. The preparing institution shall provide, "... ongoing support for novice educators in partnership with local education agencies during their induction period, including observation, consultation and assessment." (22 Pa. Code §49.14(4)(ix))

APPENDICES

Appendix A

OPTION 1 PROGRAM DESIGN EXAMPLES AND RECOMMENDATIONS

Table A1-1

Recommended Program Design with Mathematics Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Mathematics	12	18	30
Science	12	0	12
English/Lang Arts & Reading	6	6	12
Social Studies	9	3	12
Total Content	39	27	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	54	66	120

Table A1-2

Recommended Program Design with English/Language Arts Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
English/Lang Arts & Reading	12	18	30
Mathematics	6	6	12
Science	12	0	12
Social Studies	9	3	12
Total Content	39	27	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	54	66	120

Table A1-3

Recommended Program Design with Science Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Science	18	12	30
Mathematics	6	6	12
English/Lang. Arts & Reading	6	6	12
Social Studies	9	3	12
Total Content	39	27	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	54	66	120

Table A1-4***Recommended Program Design with Social Studies Concentration***

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Social Studies	15	15	30
Mathematics	6	6	12
Science	12	0	12
English/Lang. Arts & Reading	6	6	12
Total Content	39	27	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total	54	66	120
Credit Hours			

OPTION 2 PROGRAM DESIGN EXAMPLES

Table A2-1

Recommended Program Design with Mathematics and Science Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Mathematics	9	12	21
Science	12	9	21
English/Lang Arts & Reading	6	6	12
Social Studies	9	3	12
Total Content	36	30	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	51	69	120

Table A2-2

Recommended Program Design with Mathematics and English/Language Arts & Reading Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Mathematics	9	12	21
English/Lang Arts & Reading	6	15	21
Science	12	0	12
Social Studies	9	3	12
Total Content	36	30	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	51	69	120

Table A2-3

Recommended Program Design with Mathematics and Social Studies Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Mathematics	9	12	21
Social Studies	9	12	21
Science	12	0	12
English/Lang Arts & Reading	6	6	12
Total Content	36	30	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	51	69	120

Table A2-4
Recommended Program Design with Science and English/Language Arts & Reading Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Science	12	9	21
English/Lang. Arts & Reading	6	15	21
Mathematics	6	6	12
Social Studies	9	3	12
Total Content	33	33	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	48	72	120

Table A2-5
Recommended Program Design with Science and Social Studies Concentration

Content	Introductory Level Recommended Credits	Advanced Recommended Credits	Total Recommended Credits
Science	12	9	21
Social Studies	9	12	21
Mathematics	6	6	12
English/Lang. Arts & Reading	6	6	12
Total Content	33	33	66
General Education	*15		15
Professional Core		27	27
Student Teaching		12	12
Total Credit Hours	48	72	120

Appendix B

Mathematics Background Information and References:

Recommendations for essential middle level teacher content knowledge, pedagogical content knowledge, teaching skills, and clinical experience have been made by the National Council of Teachers of Mathematics (NCTM), the Education Testing Service (ETS), the Conference Board of the Mathematical Sciences (CBMS), the National Research Council (NRC), and others. References to publications and web sites are provided below. In addition to understanding and being able to apply this knowledge and skills, middle level teachers must also know a great deal about adolescent development, and about the middle school as a setting for effective teaching and learning. For the mathematics preparation of middle level teachers, ETS and the Conference Board have identified essential knowledge and skills that must be acquired and demonstrated by all middle level teachers:

ETS Middle Level Math for Pennsylvania	Conference Board Recommendations for Middle Level Teacher Preparation in Math
Arithmetic and basic algebra	Algebra and functions
Functions and graphs	
Geometry and measurement	Geometry and measurement
Data, probability and statistical concepts	Data analysis, statistics, and probability
Number theory	
The real number system and sub-systems	Numbers and operations
	Calculus concepts and applications
Application of mathematical understanding: problem-solving, reasoning and proof, connections, representations, technology	Mathematical modeling: understanding the ways in which mathematics can be applied

Mathematics Components for Middle Level Teacher Preparation

Required courses, content, competencies, and clinical skills to teach mathematics in middle level grades come from these program components:

- Mathematics courses
- Mathematics education courses
- Cognitive development
- Adolescent development
- Assessments and interventions course
- Literacy in the content area for mathematics
- Clinical skills through field experiences and student teaching

This is an interconnected set of knowledge, skills, and abilities needed by middle level teachers to ensure successful student learning. The mathematics courses are discussed in this section. The Professional Core section of the Middle Level Program describes requirements related to mathematics education, cognitive development, adolescent development, assessment knowledge and skills, and clinical skills. The English Language Arts section includes details about literacy in the middle level content areas. Drawing on the cognitive sciences, mathematics, and mathematics education, Mayer has identified five knowledge areas needed for students and their teachers to be successful in mathematics. These five areas fit well with NCTM's content and process standards, Pennsylvania's

academic standards, and studies and reports used as resources in designing the middle level program: in *The Role of Knowledge in the Development of Mathematical Reasoning* (In Robert Sternberg and Rena Subotnik, eds. Optimizing Student Success in School with the Other Three R's: Reasoning, Resilience, and Responsibility. Information Age Press, 2005), Mayer discusses the five strands of knowledge needed to support reasoning in mathematics—by students and by their teachers:

- *Factual knowledge* needed to understand a mathematical problem or phenomenon (e.g., that there are one hundred cents in a dollar), including what Mayer calls “linguistic knowledge;”
- *Conceptual knowledge* enabling a student to determine what kind of a math problem is presented through a coherent mental picture of the situation;
- *Strategic knowledge* of the strategies needed to attack a problem (“solution planning and monitoring”);
- *Procedural knowledge* (or computational skill) such as addition, subtraction, or solving equations; and
- *Attitudinal knowledge*, which refers to beliefs about solving problems (e.g., that success in mathematics is the result of hard work or because one is “born to do math”).

Middle school teachers must have gained this type of knowledge related to mathematics in order to teach successfully in a middle school. The descriptions of each knowledge domain make it clear that teachers acquire the needed knowledge from many different sources—hence the need for a carefully designed and coherent program that spans several disciplines and a broad range of teacher candidate experiences. All of this is consistent with the NCTM Standards (<http://standards.nctm.org/document/chapter3/index.htm>) identifying what students must know and be able to do, as well as the NCTM *process standards* for middle level teachers ([http://nctm.org/uploadedFiles/Math_Standards/NCTMMIDDLEStandards\(1\).pdf](http://nctm.org/uploadedFiles/Math_Standards/NCTMMIDDLEStandards(1).pdf)). These are particularly relevant to the course that addresses mathematical modeling and applications of mathematical understanding. The so-called “process standards” require teachers to have deep content knowledge in order to understand and apply process knowledge to a wide range of classroom learning situations and to help middle level students at all levels of ability and achievement to improve their knowledge of mathematics.

Mathematics—Program Components, Outcomes, and Content

Program Component	Math Content	Math Education	Cognitive Development	Adolescent Development	Content Literacy	Assessments/ Interventions	Clinical Skills
Types of Math Knowledge:							
--Factual	✓	✓			✓		✓
--Conceptual	✓	✓	✓	✓	✓		
--Strategic	✓	✓	✓				✓
--Procedural	✓	✓			✓		
--Attitudinal			✓	✓			✓
Program Outcomes							
PA Standards	✓	✓			✓	✓	✓
Content	✓	✓			✓	✓	✓

Process	✓	✓	✓	✓			✓
Knowing Math	✓	✓			✓		
Knowing How To Teach Math	✓	✓	✓	✓	✓	✓	✓

The description draws heavily on these publications:

- The work of the Conference Board of the Mathematical Sciences, particularly its 2001 publication, *The Mathematical Education of Teachers*;
- NCTM *Standards for Middle Level Mathematics Teachers*, also used by NCATE as program standards for initial preparation of mathematics teachers ([http://nctm.org/uploadedFiles/Math_Standards/NCTMMIDDLEStandards\(1\).pdf](http://nctm.org/uploadedFiles/Math_Standards/NCTMMIDDLEStandards(1).pdf));
- NCTM *Curriculum Focal Points for Mathematics in Prekindergarten through Grade 8* (<http://nctm.org/standards/focalpoints.aspx?id=298>);
- NCTM *Standards for School Mathematics, Grades 3-5, and Grades 6-8* (<http://standards.nctm.org/document/chapter3/index.htm>);
- Catherine Good and Carol Dweck, “A Motivational Approach to Reasoning, Resilience, and Responsibility” (In Robert Sternberg and Rena Subotnik, eds., *Optimizing Student Success in School with the Other Three Rs: Reasoning, Resilience, and Responsibility*. Information Age Press, 2005);
- Bridget Hamre and Robert Pianta, *Can Instructional and Emotional Support in the First-Grade Classroom Make a Difference for Children at Risk of School Failure?* (*Child Development*, September/October 2005, volume 76, number 5, pages 949-967);
- Liping Ma, “Arithmetic in American Mathematics Education: An Abandoned Arena?” From Challenges in the Mathematical Education of Teachers: Why is the Preparation of Mathematics Teachers so Difficult? Opening session of the National Summit on the Mathematical Education of Teachers, retrieved from www.cbmsweb.org/NationalSummit/Plenary_Speakers/ma.htm;
- Richard Mayer, *The Role of Knowledge in the Development of Mathematical Reasoning* (In Robert Sternberg and Rena Subotnik, eds., *Optimizing Student Success in School with the Other Three Rs: Reasoning, Resilience, and Responsibility*. Information Age Press, 2005);
- Robert S. Siegler, *Implications of Cognitive Science Research for Mathematics Education* (In Kilpatrick, Martin, and Schifter, eds., *A Research Companion to Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics, 2003);
- Sandra Simkins, Pamela Davis-Kean, and Jacquelynne Eccles, *Math and Science Motivation: A Longitudinal Examination of the Links Between Choices and Beliefs.* *Developmental Psychology* 2006, Vol. 42, No. 1, pages 70 – 83; and,
- Mark Hoover Thames, *Using Math to Teach Math: Mathematicians and Educators Investigate the Mathematics Needed for Teaching* (Berkeley, CA: Mathematical Sciences Research Institute, *Critical Issues in Mathematics Education Series, Volume 2*, 2006).

Those interested in a fuller description of the content and competencies for each required course can find this information in the appendix to this document.

* * * * *

Appendix C

English/Language Arts and Reading Background Information and References:

English Language Arts—Program Components, Outcomes, and Content

Program Component	English Content	Content Literacy	Cognitive Development	Adolescent Development	Assessments/Interventions	Clinical Skills
Critical Literacy Knowledge/Skills						
--Research & Theory		✓	✓	✓		
--Decoding		✓		✓	✓	✓
--Morphology		✓		✓	✓	
--Fluency		✓		✓	✓	✓
--Vocabulary		✓		✓	✓	
--Text Comprehension		✓		✓	✓	✓
--Writing		✓		✓	✓	✓
--Speaking		✓		✓	✓	✓
Program Outcomes						
PA Standards	✓	✓		✓	✓	✓
Literacy Knowledge	✓	✓		✓		✓
Content Area Literacy Knowledge	✓	✓		✓		✓
Diverse Learners		✓		✓	✓	
Knowing How To Teach	✓	✓	✓	✓	✓	✓
Assessment		✓	✓	✓	✓	✓
Interventions		✓	✓	✓	✓	✓
Use of technology		✓		✓	✓	✓

Through its work with the Adolescent Literacy Funders Forum, the Carnegie Corporation of New York identified 15 key elements to improve adolescent literacy achievement. Nine of these are directly relevant to middle level teacher preparation, covering knowledge and skills development that must be embedded in course design and course content. Others have to do with the skills and abilities the teacher preparation program will develop in candidates and assess at various stages during the program. These foundational requirements for adolescent literacy development are instructional skills that can only be acquired, refined, and improved by well-designed clinical practice components of the preparation program.

Content Coverage in the English/Language Arts and Reading Curriculum

Proposals for middle level teacher preparation programs may include a variety of course titles to meet the English/Language Arts component requirements, but the courses and related candidate experiences must describe clearly how the content knowledge and skills development described below is embedded in the proposed program. The program design requirements in literacy draw on recent publications about adolescent literacy and teacher preparation. These include:

- *Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction* (National Institute of Child Health and Human Development, 2000. Report of the National Reading Panel. NIH Publication No. 00-4769. Washington, DC: U.S. Government Printing Office);
- “Teacher Education and Reading Instruction,” (National Institute of Child Health and Human Development, 2000. Report of the National Reading Panel. Teaching children to read: an evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups. NIH Publication No. 00-4754. Washington, DC: U.S. Government Printing Office);
- *Adolescent Literacy and the Achievement Gap: What Do We Know and Where Do We Go From Here?* Prepared for the Carnegie Corporation of New York’s Adolescent Literacy Funders Meeting by Catherine Snow and Gina Biancarosa (www.carnegie.org/literacy);
- *The Fifteen Key Elements of Effective Adolescent Literacy Programs*, A Report to the Carnegie Corporation of New York (www.carnegie.org/literacy);
- *Teaching Literacy in the Turning Points School* (Boston: Center for Collaborative Education, retrieved from <http://turningpts.org/>);
- *Reading Next: A Vision for Action and Research in Middle and High School Literacy*, Alliance for Excellent Education, Washington, DC, 2004 (retrieved from www.carnegie.org/literacy/initiative.html)
- *Supporting Young Adolescents’ Literacy Learning: A Position Paper Jointly Adopted by the International Reading Association and National Middle School Association*, 2001 (retrieved from www.reading.org/resources/issues/positions_young_adolescents.html);
- *Intermediate and Adolescent Literacy: The State of Research and Practice*, Notes from Meeting held at Carnegie Corporation of New York, 2002 (www.carnegie.org/literacy);
- *Child and Adolescent Development Research and Teacher Education: Evidence-based Pedagogy, Policy, and Practice*, (National Institute of Child Health and Human Development, NIH, DHHS. Washington, DC: U.S. Government Printing Office, 2007). Retrieved from www.nichd.nih.gov/publications/pubs_details.cfm?from=&pubs_id=5684;
- *Teaching Reading Well: A Synthesis of the International Reading Association’s Research on Teacher Preparation for Reading Instruction*, 2007 (www.reading.org).

As the International Reading Association (IRA) recommends in *Teaching Reading Well*, teachers need a firm grounding in “language and reading development as well as deep understanding of learning and motivation theory” (IRA, 2007, page 2). This course must address directly concepts, knowledge, and skills essential for direct and explicit comprehension instruction; understanding student motivation and self-directed learning; and

learning theory relevant to the successful practice of assessment and intervention in student learning. Foundational knowledge about literacy research and theory must be embedded in other English/Language Arts course content and reflected in syllabi submitted by institutions seeking program approval.

Word and Text Comprehension

Middle level teachers must understand how to provide effective instruction in word-level strategies that result in student literacy gains. This course must include material on phonemic awareness and phonics instruction; syntax and semantics; and the roles of reading, writing, and speaking in vocabulary development. Course content must address direct, explicit comprehension instruction, skills in promoting “strategic tutoring” as defined above; and demonstrated ability to conduct assessment and design appropriate interventions. More information is available from the *Report of the National Reading Panel* (pages 7-11).

Vocabulary development, fluency, guided oral reading, independent reading, comprehension strategies, vocabulary instruction, text comprehension and instruction, critical literacy, and some exposure to reading strategies for the content areas must be addressed in this course. The domain-specific focus is developed further by additional courses outlined below. Instructional knowledge and skills in text comprehension may also include learning to implement teaching strategies such as collaborative student learning, as well as expertise in selecting and using diverse written text materials, and using technology-based reading materials. The National Reading Panel offers information on these topics (pages 11-16).

Literacy in the Content Areas

This is aimed at ensuring that middle level teachers are able to respond to the literacy needs of their students. Such topics as academic language and language acquisition would be included. It must set the stage for going much deeper into the literacy issues associated with each of the middle level content areas. The IRA comments that “specific reading instruction in areas such as science, social studies, and math leads to improved reading comprehension in students. Teachers need intensive focused preparation in how to provide instruction and feedback to students so that they acquire and use these strategies for reading text from specific disciplines” (IRA, 2007, page 4). At least five of the nine Carnegie elements for improving literacy achievement are relevant to coursework that prepares middle level teachers along these lines:

- Effective instructional principles embedded in content, including language arts teachers using content-area texts and content-area teachers providing instruction and practice in reading and writing skills specific to their subject area;
- Text-based collaborative learning, which involves students interacting with one another around a variety of texts;
- Diverse texts, which are texts at a variety of difficulty levels and on a variety of topics;
- Intensive writing, including instruction connected to the kinds of writing tasks students will have to perform well in high school and beyond; and,
- A technology component, which includes technology as a tool for and a topic of literacy instruction.

Reading, writing, and oral competencies in each of the core content areas are crucial parts of adolescent literacy development. Snow and Biancarosa note that, “students are expected to read and write across a wide variety of disciplines, genres, and materials with increasing skills, flexibility, and insight” (page 5). Domain-specific vocabulary, knowledge, and teaching skills are essential to promote successful student outcomes in the middle level content areas—these are about knowledge and skills needed by teachers, as well as requirements for their students. To ensure that middle level teachers have the knowledge and skills to promote this development, the program must include courses with explicit links between literacy and each of the main content areas.

Literacy in the Middle Level Content Areas: Mathematics, Science, and Social Studies

The content area literacy sequence must be scheduled after students have completed at least some of their content-area coursework in the middle level subject areas. It would also be helpful if the content ran simultaneously with literacy-based field experiences.

Mathematics. The relevance of literacy to mathematics learning and achievement is well established in the research literature. Content must emphasize mathematical connections with reading and writing, the use of various texts, as well as the ability to interpret and write about non-verbal representations such as graphs and charts. Using technology to link numeracy and literacy in the classroom must also be included in this course. The Center for Applied Special Technology (www.cast.org) offers resources supporting a “Universal Design for Learning.” Among them are its “Teaching Every Student” program, one of many resources that may be useful here (<http://www.cast.org/teachingeverystudent>). Other programs, strategies, and interventions are discussed by Snow and Biancarosa (pages 7-17), and by the National Reading Panel report (pages 17-18).

Science. The same needs and challenges are present in the sciences. Candidate content knowledge, as well as the ability to integrate literacy skills with content teaching of students, is essential attributes of the effective middle level teacher. Content here must focus on the integration of learning science with reading and writing, use of texts, and graphical representations. Technology-based applications and curriculum materials that build the science content-literacy bridge are widely available, including CAST, the University of Michigan initiative known as Guided Inquiry Supporting Multiple Literacies (www.soe.umich.edu/qisml), and others suggested by the National Science Teachers Association (<http://www.nsta.org/recommends>).

Social Studies. Student literacy (and numeracy) skills are essential for intellectual growth and academic achievement in the social sciences. Here, too, prospective teachers need explicitly connected preparation and practice to be effective. Content must address the five Carnegie elements, the role of technology in teaching and learning for literacy in the social sciences, and what the IRA calls “an integrated system of reading, discussion, and writing about literary and informational text” (IRA, page 4). Numerous technology-based resources are appropriate and useful in developing candidate competence in these skills. One is the Universal Design for Learning Toolkit, including model lessons for geography and social studies, and case studies in how to cope with reading challenges in social studies (<http://www.cast.org/teachingeverystudent/casestories/cs1>).

Literacy Assessments and Interventions

Assessment skills, extensive practice, and the application of assessment results to design effective individualized interventions are essential literacy teaching skills. The joint IRA/NMSA Statement on Young Adolescents' Literacy Learning argues that, "Large scale assessment programs that focus on student groups... are not sufficient. Adequate assessment measures must be supported by strong informal reading assessments that take place in classrooms and involve both teachers and students in the process. These plans must be used to shape and reshape instruction so that it meets the needs of all students" (page 2).

The content must be organized to provide candidates with the knowledge and skills to recognize students having difficulty and diagnose their challenges, and to enable candidates to design (with collaborative assistance from colleagues when needed) and test the effectiveness of appropriate interventions. Content must enable candidates to learn how to adapt and modify instruction, use technology appropriately, and adapt curriculum successfully. Translating diagnostic information about student learning into successful teaching strategies requires formal preparation, proficiency with assessment tools, and extensive practice under careful supervision and mentoring.

The course must also include explicit attention to the Pennsylvania Academic Standards and the state Assessment Anchors for reading in grades 3-8.

* * * * *

Content Sequence and Field Experiences

The required coursework in English Language Arts and Reading and literacy-related content for the middle level certificate must be organized in a sequence that builds logically on the growing knowledge of domain-specific and literacy-related concepts and skills acquired by the candidate. ***Students should take content simultaneously with relevant field experiences.*** Program design in the literacy sequence must reflect these ideas, drawn from *Teaching Reading Well* (IRA, 2007, page 10):

- Explicit explanation of the material;
- Model various thinking processes to stimulate active and engaged candidate learning;
- Multiple opportunities to practice what is learned—in the college classroom, in community settings, and in middle level classrooms.

Aside from many (and early) clinical practice opportunities in schools and other settings, these IRA principles ought to characterize the academic experiences that take place in the college and university classroom. That is, university faculty must model the teaching strategies, assessment practices, and uses of technology for instruction that their students will be expected to learn to become effective middle level teachers.

The proposed curriculum for the middle level certificate program must indicate clearly that courses in the sequence are accompanied—in the same semester—by field experiences supervised by certified reading specialists or content-certified teachers in the classrooms of certified teachers, allowing the candidate to observe and even practice some of the knowledge and skills acquired in each course. Opportunities to learn how to develop

effective intervention strategies—based on assessment of individual student learning accomplishments and challenges—must be included in coursework. Field experiences, student teaching, and faculty assessment of candidates must provide multiple chances to practice these skills, receive timely feedback, apply the results of this guidance to candidate practice, and obtain further feedback to promote continuous development of assessment and intervention skills for adolescent literacy development.

Examples of challenging and relevant clinical experience components in literacy are described in the IRA report (*Teaching Reading Well*, pages 12-13), by numerous examples in *Teaching Literacy in the Turning Points School*, and from literacy teacher preparation program curricula such as the Hunter College courses on Diagnosis of Reading Difficulties and Practicum in Remedial Reading, in which candidates do what is essentially an extended case study with one student (see www.hunter.cuny.edu/education/programs/literacy_ed/curr_course.shtml).

Appendix D

Science Background Information and References:

The science component design is based on the Pennsylvania academic standards and assessment anchors, and on what research, science organizations, and respected policy groups (like the National Science Teachers Association and the National Middle Schools Association) define as high quality middle level science teaching. Content must be aligned with the Pennsylvania academic standards and with the Assessment Anchors in science established for grades 3 and 8. Successful alignment and content development will require arts and sciences/education collaboration in design and development of coursework. Middle level program proposals submitted for review by PDE will be expected to include evidence of successful alignment and evidence of significant collaboration between arts and sciences faculty in the sciences, and with science educators.

The Pennsylvania academic standards and assessment anchors for science in grades 4 and 8 signal the content coverage required for middle level teachers to be equipped with the knowledge to teach science successfully to middle school students. The ETS Middle School Science test for Pennsylvania offers additional insights.

PA Science Standards and Anchors	Grade 4	Grade 8	ETS for PA
Nature of Science			✓
Reasoning and Analysis	✓	✓	
Processes, Procedures, and Tools	✓	✓	
Systems, Models, and Patterns	✓	✓	
Biology			✓
Structure and Function of Organisms	✓	✓	
Continuity of Life	✓	✓	
Ecological Behavior and Systems	✓	✓	
Physical Sciences			✓
Structure, Properties, and Interaction of Matter and Energy	✓	✓	
Forms, Sources, Conversion of Energy	✓	✓	
Principles of Motion and Force	✓	✓	
Earth/Space Sciences			✓
Features, Processes and Change	✓	✓	
Weather, Climate and Atmosphere	✓	✓	
Composition and Structure of the Universe	✓	✓	

For middle level students, successful achievement in science comes from their ability to develop “organized knowledge” through high quality curriculum materials and specific guidance from teachers (National Research Council, *How Students Learn: Science in the Classroom*, page 462). This requires teachers who have sufficient subject matter knowledge, including aspects of the culture of science that guide knowledge production” (NRC, page 468).

Successful preparation of middle level teachers requires programs to focus on an interconnected set of scientific knowledge, skills, and abilities. The science courses needed by middle level teachers to ensure successful student learning are discussed in this section. The Professional Core section of the Middle Level Program describes requirements related

to cognitive development, adolescent development, assessment knowledge and skills, methods courses, and clinical skills.

Science—Program Components, Outcomes, and Content

Program Component	Science Content	Science Education	Cognitive Development	Adolescent Development	Content Literacy	Assessments/ Interventions	Clinical Skills
Program Outcomes							
PA Standards	✓	✓			✓	✓	✓
--Content	✓	✓			✓	✓	✓
--Process	✓	✓	✓	✓			✓
Knowing Science:							
--Unifying Themes ¹	✓	✓				✓	✓
--Inquiry and Design ²	✓	✓				✓	✓
--Content Knowledge	✓	✓			✓	✓	
Knowing How To Teach Science	✓	✓	✓	✓	✓	✓	✓

¹Unifying themes, which must be incorporated into the science content and methods courses, include concepts such as systems, models, patterns, scale, change, and the importance of evidence and measurement. They are discussed under the heading, Understanding the Nature of Science.

²Inquiry and design concepts must also be embedded in the science content and methods courses. They include the nature of science, process skills, and the understanding and use of statistics to interpret data and findings.

Relatively weak knowledge of science and methods of scientific inquiry among students, teachers, and the general public in the United States led organizations such as the National Science Teachers Association (NSTA), the American Association for the Advancement of Science (AAAS), the National Research Council (NRC) and others to propose ways of improving curriculum, teacher education, curriculum materials, and assessment practices from elementary school through graduate and professional education. For PreK-12 teachers and the programs that prepare them, NSTA argues in its *Position Statement on Science Teacher Preparation* that these programs must demonstrate certain core traits, many of which are quite consistent with Pennsylvania's expectations for high quality programs of teacher preparation:

While these recommendations are for science teacher preparation *in general*, their application to middle level teacher education will produce, according to NSTA, middle school teachers of science who are "fully qualified to teach science in their state and have a strong knowledge of science content; attain a high level of knowledge about educational research on how middle level students learn, best practices, and effective instructional strategies for

middle level students, and [are] able to use this knowledge in the classroom; deal positively with the variability of behavior patterns of emerging adolescents; support diverse learners effectively, deal with gender/equity issues, model a multidisciplinary approach to learning, and exhibit a desire to be a lifelong learner; [and] create a safe environment in which students can engage in inquiry-based science instruction in the classroom, in the laboratory, and in field settings..." (NSTA, *Science Education for Middle Level Students*).

Understanding the Nature of Science

There is widespread consensus among researchers and experts on science education about ways to approach teaching science. As a starting point, teachers need to understand science and the scientific process. "Teaching content alone is not likely to lead to proficiency in science, nor is engaging in inquiry experiences devoid of meaningful science content" (*Taking Science to School*, page 9). The concepts and course content described for *Understanding the Nature of Science* are drawn from *How Students Learn*, Project 2061, the *Highlights Report*, and sample frameworks for middle level science teaching developed by the Education Testing Service (ETS).

This material on the nature of science ought to be embedded in the coursework developed by the institution for each of the specific science areas—the physical, life, earth, and space sciences. The "ways of doing science" outlined below ought to be modeled and taught by college and university faculty in each of the three clusters of science courses. Course components must include:

- The nature of scientific inquiry, how to judge scientific models and explanations
 - General: how to develop descriptions, explanations, predictions, and models using evidence; recognizing and analyzing alternative explanations and predictions.
 - Using prior knowledge to pose problems and generate data rather than thinking about science as "truths to be memorized."
 - Data collection, interpreting data, testing inferences, and the search for patterns in data.
 - Testing ideas through experimentation.
 - Concepts and processes within an explanatory framework: systems, order, and organization; evidence, models and explanation; evolution and equilibrium; form and function.
 - The role of models to explain observations; testing models against additional data; strengths and limitations of various explanatory models.
 - Using patterns in observations to develop explanations and predictions; developing causal models to explain patterns in observed or collected data.
 - Scientific argumentation and reasoning: making ideas public and learning to revise models in light of data that don't fit and to critiques from others.
- Conceptions and preconceptions of science and scientific knowledge
 - Misunderstandings of science and scientific inquiry processes.
 - Recognizing student preconceptions, student reasoning patterns, problematic explanations for observed phenomena.
 - Promoting conceptual change in student understanding of scientific knowledge and processes.
 - Exploring approaches to scientific reasoning and investigative strategies through learner-centered principles of instruction ("engaging students in activities or

discussions that draw out **what** they know or **how** they know,” NRC, page 414).

- The process of scientific inquiry: learning to “do science”
 - General: thinking critically and logically to make the relationships between evidence and explanations; communicating scientific procedures and explanations; understanding how to use the range of scientific investigations appropriate to a discipline and to a problem.
 - Learning about science as a process of inquiry (“rather than simply having ‘inquiry times’ that are appended to an existing curriculum,” NRC, p 405).
 - Historical development of science and the role of logical reasoning, and verifiable evidence.
 - How scientists “do science” in different disciplines: scientific inquiry and methods in the physical, life, earth, and space sciences; types of scientific investigations.
 - Scientific reasoning and making investigative choices: how scientists develop, analyze, and test different explanations for their findings.
 - Scientific argument: presenting and defending results of a scientific investigation
 - Judging scientific models and explanations.

- Metacognition—helping students to learn reflective scientific practice
 - Reflective assessment strategies and practices to build “metacognitive habits of mind” in students and their teachers.
 - Recognition of how students construct new understanding on “a foundation of existing understandings and experiences” (NRC, page 4).
 - Factual knowledge and conceptual frameworks for understanding science.
 - Learning how students learn: understanding and fostering metacognitive processes in students.
 - Writing and communicating as steps in the learning process.

* * * * *

Those interested in a fuller description of the content and competencies for each required course can find this information in the appendix to this document.

Physical sciences

Physical science investigations

- Understanding the nature of science, applied to the physical sciences
- Forces and motion (position and motion of objects)
- Physical properties of matter (objects and materials)
- Chemical properties of matter
- Energy and interactions between matter and energy (light, heat, electricity, magnetism, sound)
- Laboratory investigations in the physical sciences: 3 lab hours per week

Life sciences

Life sciences investigations

- Understanding the nature of science, applied to the life sciences.
- Structure and function of living things (characteristics of organisms).

- Reproduction and heredity.
- Adaptation and evolution (organisms and their environments).
- Ecological behavior and systems (regulation and behavior).
- Relationship between organisms and the environment.
- Laboratory investigations in the life sciences: 3 lab hours per week.

Earth and space sciences Investigations

- Understanding the nature of science, applied to earth and space sciences.
- Structure and function of earth systems.
- Earth features and processes.
- Cycles in earth systems—water.
- Energy, weather, and climate.
- Solar system and the universe (objects in the sky, changes in the earth and sky).
- Investigations in the earth and space sciences: 3 hours per week in laboratory, observatory, or related experiences.

Numeracy Skills in Teaching Science

Computational tools are essential for children in order to learn science. The mathematics component of the middle school program requirements includes rich mathematics content and applications to real world settings. The literacy component provides a required course linking mathematics and literacy, with obvious implications and benefits for science education. Prospective middle school teachers need an advanced version of the same set of computational and literacy tools.

Since mathematics is an indispensable learning tool for students—and for their teachers—to learn science, middle level program designs must sequence math and science courses in a way that promotes the logical development of mathematical knowledge in candidates. At the same time, however, innovative teacher preparation programs may want to propose interdisciplinary or other innovative combinations of math and science coursework that provide the necessary knowledge and skills.

Technology

Science education benefits from the availability of many well-developed technology resources. Candidates must know about these resources and have the opportunity to learn how to integrate them into instruction, assessment, and intervention activities. Through the work of the national Science Foundation, the National Research Council, NSTA and others, there are web-based links to a wide array of these technologies. They include—but are not limited to:

- FOSS (<http://www.fossweb.com/modulesMS/index.html>).
- Knowledge Integration Environment (<http://kie.berkeley.edu>).
- SenseMaker (<http://kie.berkeley.edu/sensemaker>).
- Belvedere (<http://belvedere.sourceforge.net>).
- Thinkertools (<http://thinkertools.org>).
- Worldwatcher (<http://www.worldwatcher.northwestern.edu/softwareWWW.htm>).
- The Progress Portfolio (<http://www.progressportfolio.northwestern.edu>).

* * * * *

Sources for the section on science include:

- Iris Weiss, Joan Pasley, P. Sean Smith, Eric Banilower, and Daniel Heck, *Highlights Report, Looking Inside the Classroom: A Study of K-12 Mathematics and Science Education in the United States*. Chapel Hill, NC: Horizon Research, Inc., 2003 (retrieved from www.horizon-research.com/reports/2003/insidetheclassroom/highlights.php)
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- National Committee on Science Education Standards, *Assessment in Science Education*. Washington, DC: National Research Council, 1996.
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- National Research Council, *Taking Science to School: Learning and Teaching Science in Grades K-8*. Washington, DC: National Academy of Sciences, 2007
- National Science Teachers Association, *Standards for Science Teacher Preparation*. Washington, DC: National Science Teachers Association, 2003
- National Science Teachers Association, *Position Statement on Science Teacher Preparation*. Washington, DC: National Science Teachers Association, 2004 (retrieved from www.nsta.org/about/positions/preparation.aspx)
- National Science Teachers Association, *Position Statement on Science Education for Middle Level Students*. Washington, DC: National Science Teachers Association, 2003 (retrieved from www.nsta.org/about/positions/middlelevel.aspx)
- Richard Shavelson, *On the Integration of Formative Assessment in Teaching and Learning: with Implications for Teacher Education*. Palo Alto, CA: Stanford education assessment Laboratory, 2003 (retrieved from www.stanford.edu/dept/SUSE/SEAL)

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Appendix E

Social Studies Background Information and References:

Content and Competencies in the Middle Level Social Sciences Curriculum

Course content must be aligned with the Pennsylvania's academic standards for geography, history, economics and civics and government. Successful alignment and course content development will require arts and sciences/education collaboration in design and development of coursework, along with current practicing middle level teachers and administrators. Middle level program proposals submitted for review by PDE will be expected to include evidence of successful alignment and evidence of significant collaboration between arts and sciences faculty in the social sciences disciplines, and with social science educators.

The National Council for the Social Studies (NCSS) has published guidance for educators and teacher preparation programs intended to promote academic achievement in the social sciences. NCSS has identified key "principles" that underpin high quality teaching in social studies. The first is that "social studies teaching and learning are powerful when they are meaningful" (National Council for the Social Studies, *National Standards for Social Studies Teachers*, 2002). This happens in classrooms when students are able to learn "connected networks of knowledge, skills, beliefs, and attitudes" with explicit connections in- and out-of-school. Classroom instruction promoting this kind of academic success puts the focus on "depth of development of important ideas," rather than rote memorization of facts. NCSS argues that teachers and students must conduct "sustained examination of a few important topics," with curriculum, instruction and assessment organized around the "most important ideas" in the material before them.

The second NCSS principle highlights the fact that "social studies teaching and learning are powerful when they are integrative" (NCSS, *National Standards*, page 12). This means that subject matter is taught across disciplines, and that instruction makes good use of technology. As noted above, integrative teaching and learning draws directly (and often) on other disciplines—especially the sciences, mathematics, and literacy. This approach supports the NCSS principle that "social studies teaching and learning are powerful when they are challenging" (NCSS, *National Standards*, page 13). Here, students are expected to respond to high expectations as individuals and as a group; teachers model "seriousness of purpose and a thoughtful approach to inquiry," use instructional strategies to bring out the same qualities in their students, and they "demand well-reasoned arguments rather than opinions." The latter is a key element of "doing science," suggesting again that a cross-disciplinary focus will pay dividends in every content area. Finally, the NCSS makes the claim that "social studies teaching and learning are powerful when the learning is active" (NCSS, *National Standards*, page 13). The focus here is on "reflective thinking and decision-making" by students and teachers, and on "interactive discourse" to promote learning for understanding.

Social Studies—Program Components, Outcomes, and Content

Program Component	A&S Content	Education Content	Cognitive Development	Adolescent Development	Content Literacy	Assessments/ Interventions	Clinical Skills
Program Outcomes							
PA Standards	✓	✓			✓	✓	✓
-Content	✓	✓			✓	✓	✓
-Process	✓	✓	✓	✓			✓
Content Areas:							
-Geography	✓	✓			✓	✓	✓
-Economics	✓	✓			✓	✓	✓
-History (PA, US, World History)	✓	✓			✓	✓	✓
-Government	✓	✓			✓	✓	✓
Know How To Teach Social Studies	✓	✓	✓	✓	✓	✓	✓

Teachers with the ability to instruct successfully in social studies are the products of preparation programs that build, assess, and support candidates as they develop these skills and the appropriate knowledge base. The result is classrooms where “teachers gradually move from providing considerable guidance by modeling, explaining, or supplying information that builds student knowledge, to a less directive role that encourages students to become independent and self-regulated learners. Teachers emphasize authentic activities that call for real-life applications using the skills and content of the field” (NCSS, *National Standards*, page 13).

This outcome—teachers with the knowledge and skills to help students become successful learners with measurable levels of academic achievement—does not happen by accident. Nor is it a routine result of teacher preparation in the social studies. Programs must provide these characteristics:

- “Substantial instruction” in the academic disciplines of the social sciences, including US and world history, political science and government, economics, geography, and behavioral science (NCSS, *National Standards*, page 48).
- One or more courses that enable candidates for the teaching profession to develop “pedagogical content knowledge that deals specifically with the nature of the social studies and with ideas, strategies, and techniques for teaching social studies” (NCSS, page 48).
- Qualified faculty, able to “demonstrate teaching that models exemplary practice for their students” (NCSS, page 49), including at least some faculty with successful PreK-12 teaching experience, and specialists in social studies education.
- “Multiple clinical experiences” in social studies classrooms, closely supervised and supported by certified and experienced social studies teachers.
- Finally, the NCSS argues that programs “preparing social studies teachers should provide and expect prospective social studies teachers to complete—in addition to

professional and major courses, general arts and science courses that reach across several areas of study—including language arts, humanities, languages, mathematics, physical sciences, and technology” (NCSS, page 50).

Courses in the social sciences sequence must be designed to enable candidates and their students to develop sufficient depth and breadth of knowledge in each of the social sciences to prepare them for success in later grades as well as for life after school, and to solve real world problems in the various social sciences. Some courses will take place in the general education component of the candidate’s degree program.

Developing numeracy skills is essential to doing and teaching social science successfully. Teachers and their students must have the mathematical knowledge to observe, measure, chart, graph, and explain historical, geographical, economic, and related phenomena. Mathematical concepts and skills ought to be infused into the social sciences courses taken by prospective middle level teachers, and the overall middle level program design places strong emphasis on numeracy skills development.

Understanding and using technology in middle level social science teaching is another critical skill. Technology must be incorporated into the design of each content course, with regular opportunities to use software, and other appropriate equipment, and learning tools. Numerous web-based resources have been developed in recent years for social studies teacher educators, teachers, and students. These kinds of resources ought to be integrated into the courses taken by candidates.

For the National Council for the Social Studies (NCSS), ten themes thread through its conception of standards in the social studies. They are summarized here as a suggested guide to unifying themes that cut across specific courses and disciplines in the required program curriculum. Learning and teaching social studies must be understood as much more than a collection of courses taken by candidates in separate academic departments on the campus—an approach which forces prospective teachers to carry the full weight of trying to synthesize and connect content knowledge and knowledge about how middle level students learn social studies. A more effective approach—which must be embedded in the program design—starts with connections and makes them an explicit component of the program.

Appendix F



ACCOMMODATIONS AND ADAPTATIONS
FOR STUDENTS WITH DISABILITIES IN AN INCLUSIVE SETTING
AND MEETING THE NEEDS OF ENGLISH LANGUAGE LEARNERS
PROGRAM GUIDELINES

INTRODUCTION

Pennsylvania's teacher preparation programs must include the competencies and skills needed to equip teachers to accommodate and adapt instruction for students with disabilities in an inclusive setting and to assist English language learners.

Final rulemaking of the State Board of Education published in the *The Pennsylvania Bulletin* on September 22, 2007 requires **all instructional and educational specialist preparation programs to include the following by January 1, 2011:**

1. At least 9 credits or 270 hours regarding accommodations and adaptations for students with disabilities in an inclusive setting (instruction in literacy skills development and cognitive skill development for students with disabilities must be included); and
2. At least 3 credits or 90 hours regarding the instructional needs of English language learners. (22 PA Code, Chapter 49, §49.13(b) (relating to policies)).¹

Competencies and skills to accommodate and adapt instruction for students with disabilities in an inclusive setting and to assist English language learners must be identifiable during the program review process. Candidates who apply for a Pennsylvania instructional and/or educational specialist certificate on or after **January 1, 2013** must have completed the credits/hours described above

DESIGN

Applicable hours are limited to a combination of seat hours of classroom instruction, field observation experiences, major research assignments and development and implementation of lesson plans with accommodations and adaptations for diverse learners in an inclusive setting. In order to help all teachers better understand ways to accommodate and adapt learning for students with disabilities in an inclusive setting, it is essential that courses and course content be developed and taught by faculty who have thorough knowledge and expertise in using evidence-based practices to teach individuals with disabilities. The preferred approach is the use of faculty with post-graduate training and certification in special education. While preparation programs may infuse the candidate competencies related to accommodations and adaptations for students with disabilities into existing courses or add additional courses as appropriate, it is the explicit application and relationship to students with disabilities that require

¹ (4) Evaluation and approval of teacher education programs leading to the certification and permitting of professional personnel.

(i) The evaluation by the Department will provide assurance that, on or before January 1, 2011, teacher education programs will require at least 9 credits or 270 hours, or an equivalent combination thereof, regarding accommodations and adaptations for students with disabilities in an inclusive setting.

Within the content of these 9 credits or 270 hours, instruction in literacy skills development and cognitive skill development for students with disabilities must be included, as determined by the institution. At least 3 credits or 90 additional hours, or an equivalent combination thereof, must address the instructional needs of English language learners. For purposes of this requirement, 1 credit equals 30 hours of coursework. Applicable hours are limited to a combination of seat hours of classroom instruction, field observation experiences, major research assignments, and development and implementation of lesson plans with accommodations and adaptations for diverse learners in an inclusive setting. (22 Pa. Code §49.13(4)(i)).

faculty who deliver the content to have thorough knowledge and expertise in Special Education. Training for higher education faculty may include the use of modules and other educational activities prepared by special education faculty.

**COMPETENCIES: ACCOMMODATIONS AND ADAPTATIONS FOR STUDENTS
WITH DISABILITIES IN AN INCLUSIVE SETTING
(9 CREDITS OR 270 HOURS)**

The following outline includes the competencies for the 9 credits or 270 course hours addressing the academic needs and adaptations for students with disabilities.

I. Types of Disabilities and Implications for Learning

Candidates will be able to:

- A. Demonstrate an understanding of and ability to plan for: type, identification and characteristics of different types of disabilities, as well as effective, evidence-based instructional practices and adaptations.
- B. Demonstrate an understanding of the legal rights and responsibilities of the teacher related to special education referral and evaluation and the rights and procedural safeguards that students are guaranteed.
- C. Demonstrate an understanding of possible causes and implications of over-representation of minorities in special education to avoid misinterpretation of behaviors that represent cultural, linguistic differences as indicative of learning problems.

II. Cognitive Skill Development to Ensure Achievement of Students with Disabilities in Standards Aligned System to include All School Environments

- A. **Cognitive** – Delineate how individuals acquire and process information.
 - 1. Design learning environments to facilitate encoding, storage and retrieval of knowledge and information for memory, attention, perception, action, and problem solving.
 - 2. Describe the developmental patterns of change, physical, cognitive, and psychosocial areas that have been identified for each stage of development.
 - 3. Apply concepts of human development to education and learning regarding attention, memory, conceptual knowledge and its formation, reasoning, decision-making, problem-solving, executive functioning, principles and mechanisms of development, intelligence, action, and motor control.
 - 4. Specify the experiences children need from birth to age eight to prepare them to learn, read, and succeed in school.
 - 5. Identify early interactions with adults and peers, the early childhood education teaching methods and curricula, and comprehensive early childhood interventions that support learning and development, specifically in domains that prepare children from diverse backgrounds for kindergarten and the early grades.
- B. **Physical** – Recognize patterns of typical physical developmental milestones and how patterns of students with disabilities may be different, and plan effectively for possible accommodations and/or modifications which may be necessary to implement effective instructional practices.
- C. **Social** – Initiate, maintain and manage positive social relationships with a range of people in a range of contexts.

1. Recognize areas of development for students with disabilities and plan effectively for: interpersonal processes, forming and maintaining relationships (including parent-child, caregiver, peer, friend, sibling), and attachment models and their effects on learning.
 2. Apply principles in social competence, social withdrawal, social role formation and maintenance, and prosocial behaviors, and aggression as they affect learning.
- D. Behavioral** – Recognize patterns of typical behavioral milestones and how patterns of students with disabilities may be different, and plan effectively for positive teaching of appropriate behaviors that facilitate learning.
- E. Language** – Apply reading predictors, analyzing the effect of individual differences in specific perceptual, linguistic, and cognitive skills and how they affect a child's ability to read.
1. Apply principles of early learning to language development in the following areas: language comprehension, language expression, language form and syntax, morphology and semantics.
 2. Apply and teach skills of spoken language as a precursor of reading and academic development.
- F. Positive Environments for Learning for Students with Disabilities**
1. Define the scientific principles influencing academic and social behavior.
 2. Implement positive behavioral interventions based on a functional analysis of behavior.
 3. Create an optimal learning environment by utilizing, evaluating, modifying and adapting the classroom setting, curricula, teaching strategies, materials, and equipment.
- G. Collaboration and Communication**
1. Identify effective co-planning and co-teaching strategies.
 2. Identify collaborative consultative skills and models (i.e., understanding role on the IEP team; teaming; parallel teaching).
 3. Identify instructional levels of students through collaboration with members of the IEP team.
 4. Understand the role of the general educator as part of the team for transition planning across transition points (i.e., preschool to school entry, grade level to grade level, school to school, to post school outcomes).
 5. Demonstrate an understanding of the meaningful roles that parents and students play in the development of the student's education program.
 6. Demonstrate sensitivity for multicultural and economic perspectives in order to encourage parent participation.
 7. Demonstrate an understanding of how to support student and family communication and meaningful participation into the student's educational program.
 8. Work collaboratively with all members of the student's instructional team including parents and non-educational agency personnel.
- III. Assessments**
Candidates will be able to:
- A.** Identify, administer, interpret, and plan instruction based on each of the following assessment components in a standards aligned system.

1. **Authentic** – A form of assessment in which, students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills. The assessment usually includes a task for students to perform, and a rubric is used to evaluate their performance.
2. **Screening**- Screening assessments are used to determine which students may be at risk. Poor performance on the screening assessment identifies those students needing additional, in-depth assessment of strengths and weaknesses. The primary purpose of screening assessments is to identify children early who need additional instructional (or behavioral) intervention. An essential element of using a screening assessment is implementing additional identified intervention(s) (instructional, behavioral, or medical).
3. **Diagnostic** – The purpose of diagnostic assessments is to ascertain, prior to instruction, each student's strengths, weaknesses, knowledge, and skills. Using diagnostic assessments enable the instructor to remediate students and adjust the curriculum to meet each pupil's unique needs. (Examples of diagnostic assessments are: DRA's; Running Records; GRADE; GMADE)
4. **Formative**- Pennsylvania defines we are defining formative assessments as are classroom based assessments that allows teachers to monitor and adjust their instructional practice in order to meet the individual needs of their students. Formative assessments can consist of formal instruments or informal observations. The key is how the results are used. Results should be used to shape teaching and learning. Black and Wiliam (1998) define formative assessments broadly to include instructional formats that teachers utilize in order to get information that are used diagnostically to alter instructional practices and have a direct impact on student learning and achievement. Under this definition, formative assessment encompasses questioning strategies, active engagement check-ins (such as response cards, white boards, random selection, think-pair-share, popsicle sticks for open-ended questions, and numbered heads), and analysis of student work based on set rubrics and standards including homework and tests. Assessments are formative when the information is used to adapt instructional practices to meet individual student needs as well as to provide individual students corrective feedback that allows them to "reach" set goals and targets. Ongoing formative assessment is an integral part of effective instructional routines that provide teachers with the information they need to differentiate and make adjustments to instructional practice in order to meet the needs of individual students. When teachers know how students are progressing and where they are having trouble, they can use this information to make necessary instructional adjustments, such as re-teaching, trying alternative instructional approaches, or offering more opportunities for practice. The use of ongoing formative classroom assessment data is an imperative. Effective teachers seamlessly integrate formative assessment strategies into their daily instructional routines.
5. **Benchmark** – Assessments that are designed to provide feedback to both the teacher and the student about how the student is progressing towards demonstrating proficiency on grade level standards. Well-designed benchmark assessments and standards-based assessments: measure the degree to which students have mastered a given concept; measure concepts, skills, and/or applications; are reported by referencing the standards, not other students' performance; serve as a test to which teachers want to teach; measure performance regularly, not only at a single moment in time. (Examples of benchmark assessments are: 4Sight, Riverside 9-12, DIBELS)
6. **Summative** –Summative Assessments seek to make an overall judgment of progress at the end of a defined period of instruction. Often these summative assessments occurs at the end of a school level, grade, or course, or is administered at certain grades for purposes of state or local accountability. These Summative assessments are considered high-stakes assessments and the results are often used in conjunction with the No Child Left Behind Act (NCLB) and Adequate Yearly Progress (AYP). They are designed to produce clear data on the student's accomplishments at key points in his or her academic career. Performance on these assessments are often part of the student's permanent record and serve as an indication of overall performance on a set of standards. Results

from summative assessments are of interest to parents, faculty, administration, the press, and the public. The data from summative assessments are the basis of accountability systems. (Examples of summative assessment: PSSA; Terra Nova)

- B. Demonstrate an understanding of the types of assessments used (e.g., screening, diagnostic, formative, summative) and the purpose of each assessment in a data-based decision making process.
- C. Demonstrate the use of formal and informal assessment data for instructional, behavioral, and possible eligibility for special education based on the type of assessment, level of the students being assessed, and the purpose of and the quality of instruction.
- D. Demonstrate an understanding of the multi-disciplinary evaluation process and an ability to articulate the findings presented in an evaluation report including grade-level equivalents, percentile rank, standard scores, and stanines.
- E. Demonstrate an understanding of the components of the Individualized Education Plan (IEP) process, with emphasis on understanding measurable goals based on present levels, specially designed instruction, adaptations, accommodations, supplementary aids and services, and supports for school personnel.
- F. Articulate differences between achievement tests, aptitude tests, and observational data used in special education placement decisions.
- G. Create an instructional plan using assessment information related to individual student achievement.
- H. Analyze and interpret formative assessment (e.g., curriculum based assessment, CBA).
- I. Demonstrate an understanding of the purpose and intent of standardized assessments and progress monitoring as one of the multiple indicators used in overall student evaluation.
- J. Systematically monitor student performance to identify areas of need.
- K. Use evaluative data on an individual, class and district level to identify and implement instructional and/or programmatic revisions for quality improvement.
- L. Demonstrate an understanding of legally acceptable modifications and accommodations for assessment for students with disabilities.
- M. Demonstrate an understanding of ethical practice for assessment.
- N. Recognized the need to consult with multi-disciplinary team when cultural, economic, or linguistic differences are present in order to avoid biased assessment.

IV. Literacy Development and Instruction in Core and Intervention Areas

Candidates will be able to:

- A. Demonstrate an ability to match instructional research-validated literacy interventions to identified student needs.
- B. Demonstrate a conceptual understanding of the components of reading and describe how these areas pose challenges for students with disabilities:
 - Phonological Awareness & Phonics
 - Fluency
 - Vocabulary
 - Comprehension
 - Language
 - Word Study (investigate & understand the patterns in words)
- C. Demonstrate an ability to review and evaluate literacy programs for purpose, quality, effectiveness, and research-base and show knowledge of commonly available programs.

- D. Identify evidence-based instructional practices to be used with students with disabilities in the area of literacy.
- E. Demonstrate an understanding of the evidence-based connection between literacy and behavior.
- F. Demonstrate a conceptual understanding of the components of writing and describe how these areas pose challenges for students with disabilities:
 - Text production
 - Spelling
 - Composition for different types of writing
- G. Clearly articulate and model the use of explicit and systematic instruction in the teaching of literacy (reading and writing) for students with disabilities across all reading levels.
- H. Clearly articulate and model the use of explicit and systematic instruction in the teaching of content area literacy for all students with disabilities across all reading levels.
- I. Demonstrate instructional strategies to enhance comprehension of material.
- J. Demonstrate an understanding of the challenges that students with specific disabilities face in content area literacy.
- K. Assess the readability of content area reading materials.
- L. Demonstrate the ability to adapt content area material to the student's instructional level.
- M. Utilize assessment tools with appropriate accommodations in the area of literacy to identify effectiveness of the standards based curriculum (core literacy program for students with disabilities).
- N. Establish and maintain progress monitoring practices aligned with the identified needs of each student to adjust instruction and provide rigor in the area of literacy for students with disabilities.
- O. Establish and maintain progress monitoring practices within the content area aligned with the identified needs of each student to adjust instruction and provide rigor in the area of literacy for all students with disabilities.

V. Effective Instructional Strategies for Students with Disabilities in Inclusive Settings

Candidates will be able to:

- A. Identify effective instructional strategies to address areas of need.
- B. Scaffold instruction to maximize instructional access to all students.
- C. Monitor student progress to provide mediated scaffolding and increase academic rigor when appropriate.
- D. Provide feedback to students at all levels to increase awareness in areas of strength, as well as areas of concern.
- E. Strategically align standard based curriculum with effective instructional practices.
- F. Identify and implement instructional adaptations based on evidence-based practices (demonstrated to be effective with students with disabilities) to provide curriculum content using a variety of methods without compromising curriculum intent.
- G. Analyze performance of all learners and make appropriate modifications.
- H. Design and implement programs that reflect knowledge, awareness and responsiveness to diverse needs of students with disabilities.
- I. Use research supported methods for academic and non-academic instruction for students with disabilities.
- J. Develop and implement universally designed instruction.
- K. Demonstrate an understanding of the range and the appropriate use of assistive technology (i.e., no tech, low tech, high tech).
- L. Demonstrate efficient differentiated instruction and an understanding of efficient planning, coordination and delivery for effective instruction required for inclusive settings.

MEETING THE INSTRUCTIONAL NEEDS OF ENGLISH LANGUAGE LEARNERS (ELL) (3 CREDITS OR 90 HOURS)

The following outline includes the competencies for the 3 credits or 90 course hours addressing the academic needs and adaptations for ELL students.

I. Foundations for Preservice Candidates

Candidates will be able to:

A. Language

1. Demonstrate knowledge of language systems, structures, functions, and variation.
2. Identify the process of acquiring multiple languages and literacy skills, including the general stages of language development.
3. Identify the differences between academic language and social language.

B. Culture

1. Identify sociocultural characteristics of ELLs including educational background and demographics.
2. Describe how ELLs' cultural communication styles and learning styles affect the learning process.
3. Describe how ELLs' cultural values affect their academic achievement and language development.
4. Identify bias in instruction, materials and assessments.
5. Demonstrate cross-cultural competence in interactions with colleagues, administrators, school and community specialists, students and their families.
6. Observe culturally and/or linguistically diverse instructional settings.

II. Applications for Pre-service Candidates

Candidates will be able to:

A. Standards-based Instruction

1. Apply research, concepts and theories of language acquisition to instruction.
2. Implement appropriate research-based instructional strategies to make content comprehensible for all ELLs.
3. Demonstrate effective instructional planning and assessment integrating the PA Language Proficiency Standards for English Language Learners PreK-12 (ELPS) (<http://www.able.state.pa.us/esl/cwp/view.asp?a=3&Q=110015&esINav=|6449|&esINavPage=|>) and PA academic standards.

B. Assessment specific to ELL

1. Use PA ELPS to design content assessment.
2. Identify issues related to standards-based formative and summative assessment for *all* ELLs.
3. Use assessment data to differentiate and modify instruction for optimal student learning.

C. Professionalism

1. Describe the legal responsibilities related to serving ELLs.
2. Demonstrate collaborative, co-teaching models for serving ELLs.
3. Define common terms associated with English Language Learners.
4. Identify professional resources and organizations related to serving ELLs.

A PROGRAM DESIGNED TO
THRILL, INSPIRE
AND CAPTURE THE
IMAGINATION
OF OUR STUDENTS

(b)(6)

CLASSROOMS *for the* FUTURE

2006-2010



pennsylvania
DEPARTMENT OF EDUCATION

(b)(6)

articipating schools of CLASSROOMS for the FUTURE

(b)(6)

- Abington SD
- Albert Gallatin Area SD
- Aliquippa SD
- Allegheny-Clarion Valley SD
- Allestown City SD
- Altoona Area SD
- Ambridge Area SD
- Anrville-Cleona SD
- Antietam SD
- Apollo-Ridge SD
- Armstrong SD
- Athens Area SD
- Austin Area SD
- Avella Area SD
- Avon Grove SD
- Avonworth SD
- Bald Eagle Area SD
- Baldwin-Whitehall SD
- Bangor Area SD
- Beaver Area SD
- Bedford Area SD
- Belle Vernon Area SD
- Bellefonte Area SD
- Bethwood-Antis SD
- Bensalem Township SD
- Benton Area SD
- Bentworth SD
- Berlin Brothersvalley SD
- Bermudian Springs SD
- Berwick Area SD
- Bethel Park SD
- Bethlehem Area SD
- Bethlehem-Center SD
- Big Beaver Falls Area SD
- Big Spring SD
- Blackhawk SD
- Blacklick Valley SD
- Blairsville-Saltsburg SD
- Bloomsburg Area SD
- Blue Mountain SD
- Blue Ridge SD
- Bradford Area SD
- Brandywine Heights Area SD
- Brenwood Borough SD
- Bristol Borough SD
- Bristol Township SD
- Brookway Area SD
- Brookville Area SD
- Brownsville Area SD
- Bucks County Technical High School
- Burgettstown Area SD
- Burrell SD
- Butler Area SD
- California Area SD
- Cambria Heights SD
- Cameron County SD
- Camp Hill SD
- Canon-McMillan SD
- Canton Area SD
- Carbondale Area SD
- Carlinton SD
- Carnochanville Area SD
- Catawauqua Area SD
- Centennial SD
- Central Bucks SD
- Central Cambria SD
- Central Columbia SD
- Central Dauphin SD
- Central Fulton SD
- Central Greene SD
- Central York SD
- Chambersburg Area SD
- Charleroi SD
- Chartiers-Houston SD
- Chartiers-Valley SD
- Cheltenham Township SD
- Chester-Upland SD
- Chestnut Ridge SD
- Chichester SD
- Clairton City SD
- Claysburg-Kimmel SD
- Clearfield Area SD
- Coatesville Area SD
- Cocalico SD
- Colonial SD
- Columbia Borough SD
- Columbia-Montour AV/TS
- Conemaugh Valley SD
- Conestoga Valley SD
- Conewago Valley SD
- Conneaut SD
- Connellsville Area SD
- Conrad Weiser Area SD
- Cornell SD
- Cornwall-Lebanon SD
- Corry Area SD
- Coudersport Area SD
- Council Rock SD
- Crawford Central SD
- Creshwood SD
- Cumberland Valley SD
- Curwensville Area SD
- Dallas SD
- Dallastown Area SD
- Danville Area SD
- Deer Lakes SD
- Delaware Valley SD
- Derry Area SD
- Derry Township SD
- Donegal SD
- Dover Area SD
- Downingtown Area SD
- Dubois Area SD
- Dunmore SD
- East Allegheny SD
- East Lycoming SD
- East Penn SD
- East Pennsboro Area SD
- East Stroudsburg Area SD
- Eastern Lancaster County SD
- Eastern Lebanon County SD
- Eastern York SD
- Easton Area SD
- Elizabeth Forward SD
- Elizabethtown Area SD
- Elkhart City Area SD
- Ephrata Area SD
- Erie City SD
- Everett Area SD
- Exeter Township SD
- Fairview SD
- Fannett-Metal SD
- Farell Area SD
- Femdale Area SD
- Fifehead Area SD
- Forbes Road SD
- Forest Area SD
- Forest City Regional SD
- Forest Hills SD
- Fort Cherry SD
- Fort LeBoeuf SD
- Fox Chapel Area SD
- Franklin Regional SD
- Frazier SD
- Freedom Area SD
- Freeport Area SD
- Galeton Area SD
- Garnet Valley SD
- Galeway SD
- General McLane SD
- Gettysburg Area SD
- Grard SD
- Glendale SD
- Great Latrobe SD
- Great Valley SD
- Greater Johnstown SD
- Greater Nanticoke Area SD
- Greencastle-Antrim SD
- Greensburg Salem SD
- Greenville Area SD
- Greenwood SD
- Grove City Area SD
- Halifax Area SD
- Hamburg Area SD
- Hampton Township SD
- Hanover Area SD
- Hanover Public SD
- Harbor Creek SD
- Harmony Area SD
- Harrisburg City SD
- Hatboro-Horsham SD
- Haverford Township SD
- Hazleton Area SD
- Hempfield SD
- Hempfield Area SD
- Hemitage SD
- Highlands SD
- Holidaysburg Area SD
- Homer-Center SD
- Hopewell Area SD
- Huntington Area SD
- Indiana Area SD
- Interboro SD
- Iroquois SD
- Jeannette City SD
- Jefferson-Morgan SD
- Jenkintown SD
- Jersey Shore Area SD
- Jim Thorpe Area SD
- Johnstown Area SD
- Juniata Valley SD
- Karns City Area SD
- Kennett Consolidated SD
- Keystone SD
- Keystone Central SD
- Keystone Oaks SD
- Kiskadee SD
- Kutztown Area SD
- Lackawanna Trail SD
- Lakeland SD
- Lake-Lehman SD
- Lakeview SD
- Lampeter-Strasburg SD
- Lancaster SD
- Laurel SD
- Laurel Highlands SD
- Lawrence County CTC
- Lebanon SD
- Leeburg Area SD
- Lehigh Career and Technical Institute
- Leighton Area SD
- Lenape AV/TS
- Lewisburg Area SD
- Ligonier Valley SD
- Line Mountain SD
- Lifftstown Area SD
- Lower Dauphin SD
- Lower Merion SD
- Lower Moreland Township SD
- Loyalsock Township SD
- Mahanoy Area SD
- Manheim Central SD
- Manheim Township SD
- Marion Center Area SD
- Marple Newtown SD
- Mars Area SD
- Mars Area SD
- McGuffey SD
- McKeessport Area SD
- Mercer Area SD
- Meyersdale Area SD
- Mid-Mountain SD
- Mid-West SD
- Millburg Area SD
- Millcreek Township SD
- Millville Area SD
- Milton Area SD
- Minersville Area SD
- Minark Area SD
- Monaca City SD
- Montgomery Area SD
- Montour SD
- Montoursville Area SD
- Montrose Area SD
- Moon Area SD
- Morrisville Borough SD
- Moshannon Valley SD
- Mount Camel Area SD
- Mount Pleasant Area SD
- Mount Union Area SD
- Mountain View SD
- Mt Lebanon SD
- Muhlenberg SD
- Muncy SD
- Nazareth Area SD
- Neshaminy SD
- Neshannock Township SD
- New Brighton Area SD
- New Castle Area SD
- New Hope-Solebury SD
- New Kensington-Arnold SD
- Newport SD
- Northampton Area SD
- North Allegheny SD
- North East SD
- North Hills SD
- North Penn SD
- North Pocono SD
- North Schuylkill SD
- Northampton Area SD
- Northwest Lehigh SD
- Northwestern SD
- Octorara Area SD
- Oil City Area SD
- Oley Valley SD
- Oswayo Valley SD
- Otto-Eldred SD
- Owen J Roberts SD
- Oxford Area SD
- Palisades SD
- Palmerston Area SD
- Palmira Area SD
- Panther Valley SD
- Parkland SD
- Pen Argyl Area SD
- Penn Cambria SD
- Penn Hills SD
- Penn Manor SD
- Penncrest SD
- Penn-Delco SD
- Penns Valley Area SD
- Pennsbury SD
- Penn-Trafford SD
- Pequea Valley SD
- Parkington Valley SD
- Peters Township SD
- Philadelphia City SD
- Philadelphia City SD
- Philadelphia City SD
- Phillipsburg-Osceola Area SD
- Phoenixville Area SD
- Pine Grove Area SD
- Pine-Richland SD
- Pittsburgh SD
- Pittston Area SD
- Pleasant Valley SD
- Plum Borough SD
- Pocono Mountain SD
- Port Allegany SD
- Pottsgrove SD
- Pottstown SD
- Pottsville Area SD
- Punxsutawney Area SD
- Purchase Line SD
- Quaker Valley SD
- Quakertown Community SD
- Radnor Township SD
- Reading SD
- Red Lion Area SD
- Reynolds SD
- Richland SD
- Ridgway Area SD
- Ridley SD
- Ringgold SD
- Riverside SD
- Riverside Beaver County SD
- Riverview SD
- Rochester Area SD
- Rockwood Area SD
- Rose Tree Media SD
- Saint Marys Area SD
- Salisbury Township SD
- Salisbury-Elk Lick SD
- Saucon Valley SD
- Sayre Area SD
- Schuylkill Haven Area SD
- Schuylkill Valley SD
- Scranton SD
- Selinsgrove Area SD
- Shade-Central City SD
- Shaler Area SD
- Shamokin Area SD
- Shanksville-Stoneycreek SD
- Sharon City SD
- Sharpville Area SD
- Shenandoah Valley SD
- Shikellamy SD
- Shippensburg Area SD
- Slippery Rock Area SD
- Smethport Area SD
- Solanco SD
- Somerset Area SD
- Souderton Area SD
- South Allegheny SD
- South Butler County SD
- South Eastern SD
- South Fayette Township SD
- South Middletown SD
- Southern Lehigh SD
- South Side Area SD
- South Western SD
- Southeast Delco SD
- Southeastern Greene SD (no 2007)
- Southern Columbia Area SD
- Southern Fulton SD
- Southern Huntingdon County SD
- Southern Lehigh SD
- Southern Tioga SD
- Southern York County SD
- Spring Cove SD
- Spring Grove Area SD
- Springfield SD
- Springfield Township SD
- Spring-Ford Area SD
- State College Area SD
- Steel Valley SD
- Steeltown-Highspire SD
- Sto-Rox SD
- Stroudsburg Area SD
- Sullivan County SD
- Susquehanna Community SD
- Susquehanna Township SD
- Susquehanna SD
- Tamaqua Area SD
- Titusville Area SD
- Towanda Area SD
- Trinity Area SD
- Tri-Valley SD
- Troy Area SD
- Tulpehocken Area SD
- Tunkhannock Area SD
- Turkeyfoot Valley Area SD
- Tussey Mountain SD
- Twin Valley SD
- Tyone Area SD
- Union Area SD
- Union City Area SD
- Uniontown Area SD
- Unionville-Chadds Ford SD
- United SD
- Upper Adams SD
- Upper Darby SD
- Upper Dublin SD
- Upper Merion Area SD
- Upper Moreland Township SD
- Upper Perkiomen SD
- Upper Sant Clair SD
- Valley View SD
- Wallenpaupack Area SD
- Wallingford-Swarthmore SD
- Warrior Run SD
- Warwick SD
- Washington SD
- Wattsburg Area SD
- Wayne Highlands SD
- Weatherly Area SD
- Wellsboro Area SD
- West Allegheny SD
- West Branch Area SD
- West Chester Area SD
- West Greene SD
- West Jefferson Hills SD
- West Mifflin Area SD
- West Perry SD
- West Shore SD
- West Side AV/TS
- Western Wayne SD
- Westmont Hilltop SD
- Whitehall-Coplay SD
- Wilkes-Barre Area SD
- Wilkesburg Borough SD
- William Penn SD
- Williams Valley SD
- Williamsburg Community SD
- Williamsport Area SD
- Wilmington Area SD
- Wilson SD
- Windsor Area SD
- Wissahickon SD
- Woodland Hills SD
- Wyoming Area SD
- Wyoming Valley West SD
- Wyomissing Area SD
- York City SD
- York County School of Technology
- York Suburban SD
- Yough SD



CLASSROOMS *for the* FUTURE

At the start of a new school year in the fall of 2006, the Pennsylvania Department of Education unveiled a list of more than 100 high schools selected to be part of a new education initiative: Classrooms for the Future (CFF). Those schools formed the vanguard of a movement within the Commonwealth to profoundly affect the way teachers teach—and students learn—by “re-tooling” the classroom environment.

In its first three school years, CFF met with amazing success. Statewide participation grew from those first 103 schools in just 79 school districts to 543 schools in more than 450 districts. Why? Because word spread that it, in fact, works.

This is my 34th year of teaching, and I have seen many initiatives throughout my career; however, I don't think that any one has ever made as profound an impact as that of the integration of technology into our classrooms.

—Teacher

(b)(6)



WOW! What an experience it was to teach (last week) with my laptop, the smart board, and the students on their own laptops! I'm teaching 39 years, and I have not had such a tremendous sense of accomplishment.

—Teacher

In a CLASSROOM *for* the FUTURE...

(b)(6)

Teachers are:

- ▶ Facilitators
- ▶ Guides
- ▶ Co-investigators

(b)(6)

Students are:

- ▶ Producers
- ▶ Apprentices
- ▶ Co-explorers



What is CLASSROOMS *for the* FUTURE



When I enter the classroom I get excited because I know that we can really learn everything about anything in this classroom. I feel that I make more progress about learning in this class than any other class.

Having the computer available to me has given me the chance to use what I already know about computers and helps me do better in class. I want to spend more time on projects and possibly bring up my grades.

—Students

Classrooms for the Future is a simple concept, really. It is built on the premise that education in the 21st Century should incorporate teaching strategies to engage students in new, more challenging ways—including the use of relevant computer-based technology.

State-of-the-art classroom tools, such as laptops, interactive whiteboards and video cameras, have been available for years. However, studies found that they were under-utilized in high school classrooms—primarily because teaching models and technology professional development were in short supply.

CFF was launched in 2006 as a three-year, \$200 million project. Since then, it has reached some 20,000 teachers and 500,000 students.

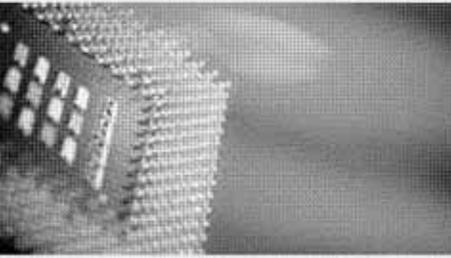
Through CFF, English, math, science and social studies classrooms receive Internet connected laptop computers for teachers and every student, along with interactive whiteboards, digital cameras, printers and scanners. Each school is encouraged to have a district leadership team to ensure effective implementation. An instructional technology coach is assigned to every participating school.

Most importantly, CFF provides teachers and administrators with new opportunities for professional development. With the help of instructional technology coaches—assigned to every participating school—they learn to use more effectively the technology available in the classroom. At the same time, they facilitate development of critical skills in their students, such as collaboration, problem solving, creativity and innovation.

INSTRUCTIONAL TECHNOLOGY COACH



Education Technology Innovation



[CFF] has engaged our faculty and students like nothing before. The professional development we have experienced is excellent. I have seen excitement return to many classrooms that were dull; teachers are learning alongside their students.

—School Superintendent

Why CLASSROOMS *for the* FUTURE

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In the 21st century, high school students live comfortably with technology. Cell phones enhance voice communications by adding image and data transfer applications. Personal computers employ high-definition graphics and high-speed Internet connectivity to facilitate social networking and online research—as well as casual browsing through an endlessly captivating virtual marketplace.

Today's youth spend as much or more time at a computer screen as they do watching television. They work fearlessly with interactive software and communication applications. While many young people adopt technology more easily than adults, they often do not know how to use the tools to think more deeply about a topic, to present effectively, or to solve problems.

Classrooms for the Future was created to help schools adapt instructional techniques to complement learning and prepare students to thrive in today's digital environment. Students who have grown up with technology are often more adept at finding a popular new recording online and downloading it to their iPod than they are at searching the racks of a retail mall store—and they can be frustratingly difficult to reach with "traditional" teaching methods.

CFF offers a practical approach to helping educators find and utilize research-based, technology-enabled instructional strategies that engage students in rigorous, authentic and student-centered activities. In short, teachers are creating new ways to thrill, to inspire and to capture the imagination of our students.

GOALS

Improve teaching and learning in English, math, science and social studies.

Change classroom practice.

Change student-teacher relationships.

Increase student engagement.

Increase student responsibility for learning.

Develop 21st century skills in students.

Increase academic achievement.



AN OPPORTUNITY AND A RESPONSIBILITY

High school students are poised to enter one of two paths: onward to the global marketplace or toward continuing their education at a higher level. Either path will lead them to highly competitive environments, increasingly served by technology.

We have the opportunity and the responsibility to prepare our students for the future. CFF is designed to help today's educators give our children 21st Century skills for success as they move forward with their lives.

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EXPECTATIONS

Classrooms for the Future is about giving students power to learn.

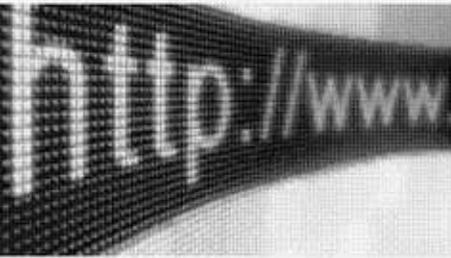
CFF equips core curricular classrooms with instructional technology and works with teachers to ensure they make the most effective use of the technology at hand—but that's not the best part. Ultimately, it's seeing students learn to take control of their learning in powerful ways.

Technology is simply a tool.

At first, the tool is the focus as teachers and students become accustomed to new equipment, unfamiliar software and intriguing Web-accessible tools. Once the novelty is gone, the challenge is to make sure that instructional technology is employed frequently and seamlessly integrated with teaching and learning.

CFF helps schools support the educational process with timely professional development for teachers and administrators. Instructional technology coaches work with teachers in each building, constantly demonstrating the wisdom of transforming teaching styles from lecturing to facilitating student-driven work. Ultimately, CFF teaches students that they can learn exciting new things outside of the classroom, throughout their lives

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Instead of promoting “experts” with little classroom experience to tell teachers how to teach, CFF embeds experienced teachers with their colleagues to work on constructing effective learning units. I cannot wait to get to school in the morning and work with the teachers. Classrooms for the Future is changing the dynamics of education in Pennsylvania.

—Instructional Technology Coach

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I can only say this about the CFF initiative: wow! WOW! and WOW! Our teachers agree that this initiative is important to the education of our students and wholeheartedly realize that it must not only continue but be expanded. These teachers have access to information that they could only have dreamed about previously. Classrooms for the Future IS the future of education.

—Teacher

I want my kids to enjoy learning! I want to learn with them, just as they learn with and from me. The 21st century is here—and the pressures and opportunities are boundless as we move forward.

—Teacher

CRITICAL ELEMENTS FOR SUCCESS

- ▶ Leadership involvement at both district and school level.
- ▶ A close relationship between curriculum and technology leadership.
- ▶ Policies and procedures in place in the school that allow teachers and students to maximize Web 2.0 tools.
- ▶ An energetic instructional technology coach, released during the day to work with teachers.



How is CLASSROOMS *for the* FUTURE Doing?

An in-depth evaluation by Penn State University, conducted each year of the program, indicates that there has been a positive impact. Specifically, there is preliminary evidence that participating schools have made desirable changes in some important areas:

CLASSROOM ORGANIZATION

Classrooms are transforming from the traditional rows of desks, designed to promote teacher-to-student information flow, to clusters of three to five desks. The result: more collaboration and group work.

TEACHER ACTIVITY

Teachers are spending more time interacting with individual students and significantly less time lecturing the whole class.

EDUCATIONAL GOALS

There are significant increases in the use of activities requiring higher-order thinking, such as project- and problem-based learning, authentic learning and peer teaching. At the same time, a greater focus on developing the identified 21st century skills was observed; skills including Visual Literacy, Collaboration, E-communication, Social or Personal Responsibility, and Planning, Prioritizing and Managing Work.

TEACHING ACTIVITY ASSOCIATED WITH STUDENT ACHIEVEMENT

Teachers are employing techniques that have been shown through prior research to increase student achievement.

STUDENT ACTIVITY AND LEVEL OF ENGAGEMENT

Students are spending less time in lectures. They spend more time working independently and in groups, working on reports, projects or presentations. Student engagement and interest is enhanced.

TECHNOLOGY USE

As expected, increasing numbers of students are using computers throughout their class time.

TEACHER ATTITUDES

More and more, teachers see the value of technology in the classroom. Most report feeling better prepared to teach, and that they're working harder and longer. They also report that the CFF coaches have been valuable, particularly for three services:

- Suggesting ways to incorporate technology into teaching content.
- Helping teachers learn to operate computers, networks and software programs.
- Providing professional development.

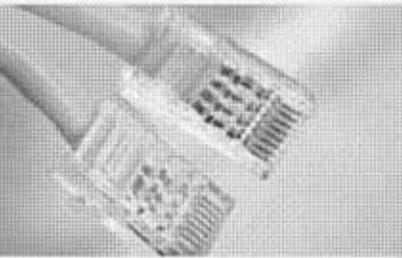
INSTRUCTIONAL COACH

Teachers and administrators indicated through interviews that the instructional coach was the key to success of the program. Too often new instructional strategies or technologies are provided for teacher use and they go unused unless there is sympathetic, knowledgeable support to assist them in getting started.

<http://cff.psu.edu/public/home.html>

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I was so proud of how they conducted themselves and how prepared they were for the event. They felt special, and it showed in their faces, their teachers' faces and their principal's face...Thank you again for all the support that allowed so many changes to take place inside our school and most of all for giving us this wonderful opportunity today.

—CFF Coach

CLASSROOMS *for the* FUTURE In Action...

STUDENT CAPITOL DAY

Now an annual event, this day provides selected CFF students with an opportunity to share their work and talk with legislators about what they are doing in their classrooms. Here are some examples of projects featured:

WINDMILLS FOR POWER?

Windmills for Power is an interdisciplinary (Math and English) project in which students first wrote about windmills, then gathered data from a local windmill farm and calculated the power output of the windmills. They then created persuasive video infomercials for and against windmills as an alternative source of power.

WORLD GENOCIDE AWARENESS

This social studies project involved students working collaboratively to research, write about and present what they found on a genocide in the world. Students used primary sources and first-hand accounts to write letters from the point of view of a genocide victim.

VIRTUAL CLASSES WITH THE GOVERNOR

During the 2007-08 and 2008-09 school years, the Governor made effective use of the Commonwealth's video conferencing network—PAIUnet—to conduct four virtual classes with CFF students. Each session involved 10 to 13 schools.

In preparation for their interactive video conference sessions, students researched the topic of discussion from a common wiki, prepared questions for the governor, then discussed the topic with him via video conferencing technology. This unprecedented opportunity for Pennsylvania students motivated many to become ~~552~~ involved in civic activities in their communities.

THE AGE OF THE UNIVERSE

Students combined physics and calculus skills to use data collected with a simulated telescope for calculating the movement of five separate galaxies. They used a computer spreadsheet to record their calculations and create graphs illustrating distance and velocity.

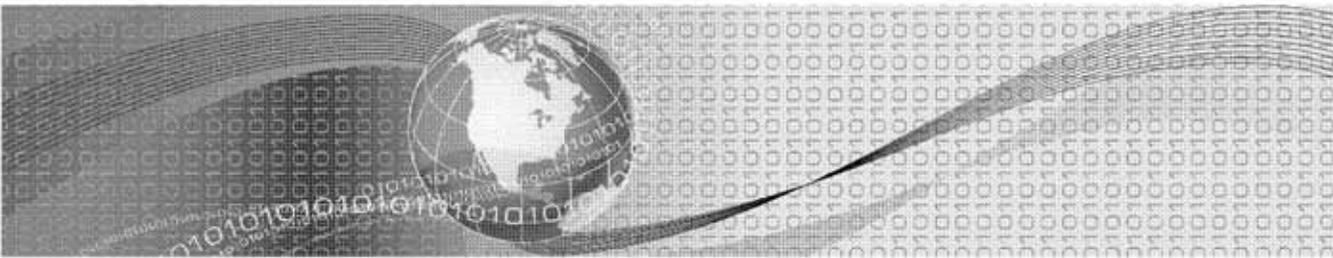
APPEALING TO YOUNGER STUDENTS

Sophomore chemistry students created story books about the elements of the Periodic Table, using cartoon characters in a fictional plot and weaving science facts into a story intended to appeal to fifth graders. Senior communication arts students edited the stories and offered suggestions. Printed copies were sent to the fifth graders who provided feedback via Google forms.

"FLIP THE SWITCH"

Annual open houses or "showcase days" are held by CFF schools to enable legislators, board members and other community members to visit classrooms and see how Classrooms for the Future is changing education practices. The events have been enormously successful, as community leaders learn about CFF and its impact on student motivation, teacher enthusiasm and student achievement.

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WHAT'S NEXT?

Classrooms for the Future transforms into 21st Century Teaching and Learning

To sustain the program, there must be:

- A clear, shared vision for 21st Century educational practices.
- Committed leadership at both district and school levels.
- Continuation of the Instructional Technology Coach position (PDE is launching a new Instructional Coach Endorsement credential).
- Utilization of the professional development courses provided free of charge through PDE's 21st Century Teaching and Learning Series.
- Ongoing technical support.
- Replenishment of appropriate instructional equipment through state-wide contracts to provide cost effective purchasing of equipment.
- Support from the Pennsylvania General Assembly and the public for 21st Century education to continue funding for coaches.
- Strong leadership from the Pennsylvania Department of Education for the use of technology in instructional practices.

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Professional development courses included in the 21st Century Teaching and Learning Series:

- The Need for Change
- Authentic Teaching
- Differentiated Teaching
- Inquiry Based Learning
- Project Based Learning

Courses are available, free of charge at:
<http://pa.professionaleducational.org>

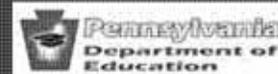
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FOR MORE INFORMATION:
21st Century Teaching and Learning with Technology
Pennsylvania Department of Education
333 Market Street
Harrisburg, PA 17126
717-214-9393

[HTTP://WWW.EDUCATION.STATE.PA.US](http://www.education.state.pa.us)

Science: It's Elementary

Transforming the Teaching and Learning
of Science In Pennsylvania



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Expanding the Impact of Hands-on, Inquiry-Based Science to More Schools, Teachers and Students Across Pennsylvania

Science: It's Elementary (SIE) proudly kicked off its third year, expanding its reach to help bring science to life for thousands more students across the state in the 2008-09 school year. To date, Governor Edward G. Rendell and the Pennsylvania Legislature have invested \$38 million in this landmark initiative, bringing *SIE* to 141 schools in 132 school districts and touching approximately 2,700 teachers and nearly 72,000 students across 52 Pennsylvania counties.

ASSET Inc. was selected in 2006 to design and coordinate *SIE* in partnership with the Pennsylvania Department of Education (PDE). This statewide initiative to improve elementary science education provides hands-on science materials supported by rigorous teacher professional development, with the goal of helping teachers and school districts implement inquiry-based science education programs. *SIE* expands upon ASSET's proven model of hands-on science materials and intensive teacher training to help Pennsylvania's students meet the state standards in science.

School districts are selected to participate by the PDE through an e-grant process, with priority given to schools that serve a significant number of students scoring below proficiency in reading and math.

Participating *SIE* schools receive the following services at no cost to the district:

- the opportunity to develop a three-year strategic plan for implementation of *SIE* in their schools;
- rigorous teacher professional development from highly trained and skilled ASSET Resource Teachers; and
- delivery of research-based, hands-on instructional materials for students to engage in a nine-week science curriculum unit aligned with state science standards.

"The professional development I received through SIE has made it possible for me to grow and change as a teacher, perhaps the greatest impact has been my personal growth as a teacher. I have witnessed the change in student interest and the eagerness to learn because of the new direction I have taken in my teaching."

Cindy Molinick
4th Grade Teacher
Blacklick Valley School District

Teacher Professional Development

Every new implementing K-6 teacher participates in a two-three day professional development session to learn how to use a module in the classroom as well as science concepts embedded in the hands-on materials. Teachers learn teaching strategies such as inquiry, questioning for higher level learning, how to use science notebooks and how to integrate literacy and science.

Teachers participating in their second year of *SIE* will engage in a one-two day professional development session on their second module.

Teachers participating in their third year of *SIE* will engage in two days of module enrichment on their first module.

Delivery of Classroom Science Materials

Teachers receive science modules with enough materials for a class of 30 students to engage in nine weeks of hands-on, inquiry-based science exploration and experiments. Second year teachers will receive the module they taught last year and a new module. Third year teachers receive both their first and second modules. All modules are delivered to the schools and are on loan from ASSET.

Teachers also receive 30 science notebooks, an effective tool that allows students to document their thinking and scientific process as well as reflect on their learning.

"Every dollar invested in today's children is a down-payment on a brighter future for the commonwealth."

— Governor Edward G. Rendell

Investing in What Works...

Analyses of Year One Science: It's Elementary (*SIE*) Student Achievement by an external evaluator provide evidence that the *SIE* program is having a positive effect on student learning in science.*

- On 4 of the 6 module assessments, students receiving instruction using the *SIE*-provided module from teachers who participated in *SIE* professional development scored significantly higher (**ranging from 16-44% higher**) than students not receiving instruction with that module.*
- Teachers' ratings of their understanding of the science content needed to teach their module rose dramatically (from **20% prior to 73%** after participating in *SIE* professional development.)*

**Information cited from SIE Student Achievement Study Summary of Results and Year One Report, Horizon Research, Inc., July 2007. A full report is available by contacting ASSET.*

"It's a wonderful program. I watched everything. I'm glad that we could come and witness it first hand. When school districts talk about programs like this, you have to see it first hand so you can understand what they're doing and what it means to the kids

Sean Logan
Senator, 45th District
Commonwealth of Pennsylvania

Pennsylvania Strategic Planning Institute

This initial event helps prepare and educate leaders to implement research-based science for all students within their district. The institute follows the model of science reform used by the National Science Resources Center. Each district creates a strategic plan to implement into their district as part of the *SIE* program.

Pennsylvania Vision Conference

Vision starts at the top and administrative/community involvement is a key component of implementing a standards-based science education program. School district and community leaders, such as curriculum coordinators, principals, lead teachers, board members or higher education partners, will participate in a one-day Vision Conference to create a long-term vision for science education for their school district.

Showcases of Student Learning

Thousands of elementary students in classrooms throughout more than 60 school districts across the Commonwealth are showcasing the hands-on science learning as part of the statewide *SIE* initiative. During the *SIE Showcases of Student Learning*, students facilitate and actively engage parents, legislators and community members through science investigations sparked by hands-on, inquiry-based teaching and learning.

Governor Rendell, along with both the Pennsylvania Senate and House of Rep-resentatives issued resolutions recognizing the month of May as *SIE Showcase of Student Learning Month*. Resolutions from Governor Rendell, Pennsylvania Senate and Pennsylvania House of Representatives can be seen below.

SIE/ASSET Leadership Conference

Developing leadership within schools is the next step toward firmly establishing exemplary elementary science education programs. This five-day conference helps build a cadre of lead teachers who can mentor and coach their peers as they learn to conduct ASSET module training for new participating teachers in future years.



"The Science Showcase validated what students are learning in science. The students were very excited to show off their acquired science knowledge to their parents, friends and family members. The Showcase brought together our families and community for an educational event."

Jean McCleary
Elementary Principal
Union School District

***SIE* Year Two Highlights**

Student Achievement Continues to Improve

- On 5 of the 6 module assessments, students receiving instruction using the *SIE*-provided module from teachers who participated in *SIE* professional development scored significantly higher (**ranging from 7-47% higher**) than students not receiving instruction with that module.**
- Post-test scores are significantly higher the second time teachers use the module. Depending on the module, students in Year Two gained about 1 to 4 points more from pre- to post-test scores than students in Year One.**

Module Enrichment Improves Teachers Content Knowledge

- Module Enrichment professional development sessions are designed to help teachers better understand science content and become more effective in implementing the module.**
- On assessments administered at the beginning and end of two-day module enrichment sessions, teacher post-test scores were significantly higher on three of four modules.**

***Information cited from *SIE Student Achievement Study Summary of Results and Year Two Report*, Horizon Research, Inc., May 2008. A full report is available by contacting ASSET.*

Achieving Student Success through Excellence in Teaching

For more information, contact ASSET Inc.
SIE Program Director, Cynthia Pulkowski
eMail: cpulkowski@assetinc.org
Phone: 412-481-7320
www.assetinc.org

Appendix E-1



January 27, 2010

Fernando A. Gallard
#111-10

SCHOOL DISTRICT OF PHILADELPHIA LAUNCHES MAJOR TURNAROUND SCHOOL INITIATIVE - RENAISSANCE SCHOOLS

*The Renaissance Schools Initiative, a Major Component of Imagine 2014, Looks to
Turn Around Chronically Underperforming Schools*

PHILADELPHIA – Today, The School District of Philadelphia announced the launch of the Renaissance Schools initiative, a major reform program that is designed to turn around low-performing schools. This initiative is a key component of the District’s five-year strategic plan, *Imagine 2014*. The Renaissance Schools initiative will transform the District’s lowest-performing schools by working with school communities to recruit and select individuals and organizations that have proven track records of operating and supporting high-achieving schools. The goal of the initiative is to turn underperforming schools into highly effective schools that provide exceptional opportunities for student academic achievement and preparedness for success in college and the workforce.

“With this initiative, we are taking a definitive step toward providing students in our lowest-performing schools with a new beginning,” said Arlene Ackerman, Superintendent of the School District of Philadelphia. “After years of failure, these schools must begin again, and all of us, teachers, parents and community members, must work together to provide our children with the greatest chance of success. I believe that the Renaissance Schools initiative is poised to do just that.”

With today’s announcement, the District kicks off the first year of the Renaissance Schools initiative and unveils a list of fourteen (14) schools, named *Renaissance Eligible Schools*, that are eligible for “turnaround” under the initiative for the 2010-2011 school year.

Also today, the District released a list of twenty-five (25) schools that have earned the designation of *Vanguard Schools* due to their high academic performance, and a list of twelve (12) chronically low-performing schools, labeled *Renaissance Alert Schools*, that will receive further academic supports.

These new designations, *Vanguard Schools*, *Renaissance Alert Schools*, and *Renaissance Eligible Schools*, are part of the District’s commitment to continue to monitor schools according

to their instructional gains and overall academic performance with the ultimate goal of Building a System of Great Schools.

The Renaissance Schools plan made public today is largely based on recommendations developed by the Renaissance School Advisory Board, which consisted of approximately 60 educators, business and community leaders, parents and District personnel from across Philadelphia. The Board's recommendations were presented to the School Reform Commission and Superintendent Arlene Ackerman on October 21, 2009. This initiative was further informed by community feedback the District collected through eight (8) community information sessions conducted in November 2009 throughout the City of Philadelphia.

There are three major components of the Renaissance Schools initiative: 1) identifying chronically low-performing District schools that are not likely to achieve dramatic improvements without transformative change, 2) identifying individuals and organizations that have a track a proven track record in demonstrating student achievement and prepared to turnaround around failing schools in Philadelphia, and 3) empowering school communities to play an active role in the turnaround and ongoing support of their school. The District believes that these components must be implemented with rigor and transparency in order to create an effective and lasting process for turning around failing schools in Philadelphia.

Year one of the Renaissance Schools initiative begins today with the release of the Request for Qualifications (RFQ) to recruit turnaround teams, and the announcement of the Renaissance Eligible Schools. The final selection of Renaissance Schools will be informed by the results of a school review to be conducted in February 2010. By May 2010, the District expects to finalize matches between schools and qualified turnaround teams with substantive input and support from school communities. This matching process will also determine if the new Renaissance School will be an externally operated school (Contract or Charter school), or a District-run school (Innovation or Promise Academy school).

A key player involved in matching the selected Renaissance Schools with the turnaround teams are the School Advisory Councils that will be created at each Renaissance Eligible School. Members of the Advisory Councils will review proposals from the turnaround teams and will have the opportunity to meet with turnaround team finalists. After reviewing the proposals, meeting with the prospective Turnaround Teams and holding community meetings, the Councils will develop match recommendations to the Superintendent. The Councils will also play a role in the transition, monitoring and ongoing support of Renaissance Schools.

Members of the Advisory Councils will be representative of the larger school community and will include parents, high school students (if applicable), area residents, school alumni, local businesses, representatives from faith-based/community-based organizations, members of the local university community, and representatives from offices of locally elected officials.

Specifically, School Advisory Councils will have the following responsibilities in the Renaissance School process:

- Meet regularly to discuss and determine the community's educational needs

- Review turnaround team proposals to identify potential matches to identify potential turnaround team finalists the larger community would like to meet and interview
- Host community meetings, public forums and community outreach activities to collect community input on potential turnaround teams
- Provide recommendations to the Superintendent on matches between their school and potential turnaround teams
- Assist in incubation and transition of Renaissance Schools
- Participate in periodic monitoring of Renaissance School progress, including an annual report on school progress against performance targets

Renaissance Schools will differ from traditional District schools by having greater degrees of autonomy in school management in exchange for a high degree of accountability for performance. Renaissance Schools must use these autonomies to implement a school design that provides a high-quality educational experience for students.

Renaissance Schools will continue to serve as neighborhood schools with a defined geographic boundary for assigning students. Student retention will be a key performance indicator for the Renaissance Schools, and the District expects that successful Renaissance Schools will achieve higher rates of student retention as a result of engaging curriculum, high-quality enrichment programs for students, and skilled and caring teachers and school staff.

How were Renaissance Eligible Schools Selected?

The process used to select the Renaissance Eligible Schools is consistent with the recommendations made by the Renaissance School Advisory Board. The District identified a pool of fourteen (14) eligible Renaissance School based on the following criteria:

- Designation as a Corrective Action II school, as defined by NCLB.
- Score on the District’s School Performance Index (SPI). The SPI includes outcome measures of academic progress, achievement, as well as parent and student satisfaction. The SPI score is a composite of key indicators that show how the school is performing relative to the District overall, and relative to similar schools. Any Corrective Action II school that is in the District's bottom 10% on the School Performance Index (score of "10") was identified as an eligible Renaissance school for 2010-11.

The School Performance Index was also used to identify Vanguard Schools and Alert Schools. A full description of how schools were evaluated with the use of the School Performance Index is included in the attachment entitled Overview of the Schools Performance Index.

What are the key implementation dates for the Renaissance Schools initiative?

In order to meet the goal of opening the first set of Renaissance Schools in September 2010, the following timeline has been adopted.

Summary of Renaissance Schools Implementation Timeline– Year 1	
Due Date	Activity
January 27, 2010	- Release SDP Renaissance Implementation Plan - Announce initial pool of 14 Renaissance Eligible Schools - Issue RFQ to solicit Turnaround Teams
February 1 - 9	Conduct school-based community meetings at Renaissance

Eligible Schools	
February 8 - March 1	Conduct School Reviews in Renaissance Eligible Schools
February 1 - March 12	Recruiting and Formation of School Advisory Councils
March 5	Announce RFQ Turnaround Teams finalists Release RFP to solicit detailed Turnaround Teams proposals
March 12	Announce Final list of Renaissance Schools Announce Superintendent Promise Schools
March 15 - April 9	Training and development of School Advisory Councils
April 13	Announce RFP Turnaround Teams finalists
April 14 - April 30	School Advisory Councils evaluate Turnaround Team finalists and submit matching recommendations to the Superintendent
May 5	Superintendent Finalizes provider-school matches; makes recommendation to SRC
May 19	SRC vote on Renaissance School provider contracts, agreements or charters

A full detailed implementation timeline can be found in the Renaissance Schools Implementation Plan at www.philasd.org/renschoools.

Throughout the Renaissance Schools initiative the District is committed to keeping parents informed and involved. Today, as part of this commitment, the District distributed letters from the Superintendent to parents whose children attend Renaissance Eligible Schools to inform them of their schools new designation and to invite them to an information meeting to be held at each Renaissance Eligible School starting on February 1, 2010. This will be the start of a community involvement process that will last throughout the entire initiative.

Similarly, letters from the Superintendent were delivered today to teachers and staff members at each Renaissance Eligible Schools. Teachers and school staff are also invited to information meetings that will be held at each school and also start this Monday, February 1.

With both sets of letters, a list of Frequently Asked Questions are included which are design to provide further information about the initiative. Copies of all letters, Frequently Asked Questions, and the schedule of meetings at the Renaissance Eligible Schools are available in the Renaissance Schools web site located at www.philasd.org/renschoools.

Attached to this press release are an overview of the Renaissance Schools initiative, a detailed description of the District's School Performance Index, a copy of Renaissance Schools Frequently Asked Questions and a schedule of Renaissance Eligible Schools' information meetings.

###

Overview of the Renaissance Schools Initiative

Renaissance Schools Process Overview

There are three major components of the Renaissance Schools initiative: 1) identifying chronically low-performing District schools that are not likely to achieve dramatic improvements without transformative change, 2) identifying individuals and organizations that are capable and prepared to turnaround around failing schools in Philadelphia, and 3) empowering school communities to play an active role in the turnaround and ongoing support of their school. The District believes that these components must be implemented with rigor and transparency in order to create an effective and lasting process for turning around failing schools in Philadelphia.

Renaissance Schools Implementation Timeline

The process begins in January 2010 with the public release of the initiative, the release of the Request for Qualifications (RFQ) to recruit turnaround teams, and the announcement of Renaissance Eligible Schools. The final selection of Renaissance Schools will be informed by the results of a school review to be conducted in February 2010. By May 2010, the District expects to finalize matches between schools and qualified turnaround teams with substantive input and support from school communities. This matching process will also determine if the new Renaissance School will be an externally operated school (Contract or Charter school), or a District-run school (Innovation or Promise Academy school).

Renaissance Schools Definition, Governance, and Autonomies

Renaissance Schools will serve students in a neighborhood catchment area but will differ from traditional District schools by having greater degrees of autonomy in school management in exchange for a high degree of accountability for performance. Renaissance Schools must use these autonomies to implement a school design that provides a high-quality educational experience for students.

Within the Renaissance Schools initiative, four school models exist: Innovation, Promise Academy, Contract, and Charter. All of the options are alike in offering a change for the selected schools but differ in their structure, governance, and level of autonomy from the District.

Renaissance Schools Accountability

Renaissance schools will be granted increased operating autonomies in exchange for increased accountability for producing dramatic gains in student achievement. Each form of school (Innovation, Promise Academy, Contract, and Charter) will be held to a Performance Agreement, contract, or charter that clearly states performance and growth targets for each school in several areas. The District will monitor performance targets and intervene if schools do not meet targets.

Student Admission and Retention

Renaissance Schools will continue to serve as neighborhood schools with a defined geographic boundary for assigning students. Student transfers in and out of the Renaissance School catchment area will be managed in a manner consistent with School District policies and procedures. Student retention will be a key performance indicator for the Renaissance Schools,

and the District expects that successful Renaissance Schools will achieve higher rates of student retention as a result of engaging curriculum, high quality enrichment programs for students, and skilled and caring teachers and school staff.

Renaissance School Selection Process

The District will implement a multi-step process for selecting Renaissance Schools. Today the District took the first step in this process by selecting a pool of 14 Renaissance Eligible Schools based on a comprehensive review of school performance data. In February, the District will conduct multi-day school evaluation of each eligible school. The school review will help assess the school's capacity to achieve dramatic improvements in student learning without the need for transformative Renaissance school intervention. The review will be led by an independent third-party organization with expertise in school quality reviews. The school review will also help assess the capacity and willingness of the community to support the transformation of the school.

The final list of Renaissance Schools for the 2010-11 school year will be announced on or around March 12, and will be based on findings from the school reviews, and by the number and types of Turnaround Team proposals that are qualified through Phase I of the RFQ process.

Recruiting and Selecting Renaissance Turnaround Teams

The District will utilize a public Request for Qualifications (RFQ) and Request for Proposal (RFP) to solicit responses from highly qualified individuals or teams who are capable of turning around and managing schools in Philadelphia. The two-phased RFQ and RFP process will solicit responses from internal District candidates (i.e. SDP principals, teachers and administrators), as well as external individual and organizations. In Phase I, the District will evaluate applicants' qualifications to manage and/or start-up schools in urban settings, including their success in turning around low performing schools. Phase II will require successful applicants to submit more detailed plans for turning around specific schools and will include detailed elements of the school design. Based on a comprehensive review of the Phase II RFP responses, the District will identify Turnaround Team finalists that will participate in the school matching process.

Renaissance Schools that are formed as Promise Academies will not be developed through a RFQ/RFP process, but will be designed and implemented by the District Superintendent and administrative staff. These schools will otherwise function as Innovation Schools.

The District will also commence a Request for Information (RFI) process to identify Renaissance Support Applicants who have demonstrated the ability to address specific areas of the turnaround such as providing professional development, after-school programming, mental and behavioral support services, etc. Information collected through the RFI will be made available to Lead Applicants who respond to the RFQ. Lead Applicants are required to partner with at least one or more Support Applicants to participate in the Phase II RFP process.

Formation of School Advisory Councils

The District will facilitate the formation of School Advisory Councils for each Renaissance School in order to ensure active parent and community involvement. School Advisory Councils are made up of a majority of parents who have children at the school. The Council members will

serve as liaisons between the School District, communities, and potential turnaround teams to ensure that Renaissance Schools offer high quality educational options that match the community's needs and interests.

The Councils will review RFP proposals and solicit input from the broader community in order to submit recommendations to the Superintendent on which turnaround team proposals best meet the needs of the school community. The Councils will also play an active role in the transition, monitoring and ongoing support of Renaissance Schools. The District will provide technical assistance and training to ensure that each Council member is prepared to play this critical role in the Renaissance Schools process.

Matching Process for School Communities and Turnaround Teams

Renaissance Turnaround Teams and Renaissance Schools will be matched based upon how the Turnaround Team's proposed school design meets the needs of the respective schools. The matching process will allow communities, Turnaround Teams, and the School District to identify optimal matches. School Advisory Councils will present recommendations to the Superintendent, who will incorporate their findings into her final recommendation to the School Reform Commission. In Promise Academies, the Advisory Council will provide support in designing and implementing the turnaround school design, but not in the selection of a Turnaround Team. A vote by the SRC (expected for May 2010) will finalize the match between Renaissance Schools and Turnaround Teams.

Renaissance School Transition and School Opening

After the SRC finalizes matches between Turnaround Teams and Renaissance Schools, the District will work with Turnaround Teams to quickly implement the new Renaissance School design. The School District will provide funds and resources to facilitate the planning and preparation for school transition, and Councils will play an important role by providing regular feedback to the Turnaround Team.

The District believes that the most critical factor in school success is the quality of a school's leadership, teachers and support staff. The District recognizes the importance of implementing a smooth process for transitioning staff in and out of Renaissance schools. The objectives of the transition process is to be respectful of the professionals that currently work in a Renaissance School, and to facilitate the formation of a high quality, cohesive faculty and staff that are committed to the new mission and design of the Renaissance School.

The School District looks forward to successful openings for each Renaissance School in September 2010 as neighborhood schools with new configurations of management, curriculum, and programs.

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Overview of the School Performance Index

Evaluating schools' performance requires examining many outcomes of academic progress and achievement as well as parent, student, and teacher satisfaction. Since at least 1996, the School District of Philadelphia has periodically implemented methods of combining school performance data into a single index. The index used as a school accountability measure from 1996 through 1999, and slightly modified in 2000, was phased out of use with the advent of the NCLB accountability framework. A revised index was used for research purposes only in 2005-2006. Building on those precedents and informed by work at other large urban school districts, the 2009 School Performance Index (SPI) is a newly-defined composite of key indicators of school success. The 2009 SPI will help school leaders and communities evaluate the performance of each school relative to the District overall as well as compared to similar schools.

There are two versions of the 2009 SPI, a High School version and an Elementary-Middle version. Both versions include measures of individual student progress, school-wide student academic achievement, and the satisfaction of students, parents and teachers. The High School version additionally includes a section on post-secondary readiness. The indicators and their relative weights are given in the following table:

SPI Components	High School	Elementary-Middle
Student Progress (Growth on PSSA)	40%	50%
Student Achievement (PSSA)	30%	40%
Percent Proficient or Advanced	18%	20%
Percent Below Basic	6%	10%
Achievement Gap	6%	10%
Post-Secondary Readiness	20%	N/A
On-Time Graduation Rate	10%	
Ninth-Grade On-Track	4%	
SAT Participation	4%	
College Enrollment	2%	
Satisfaction & Engagement	10%	10%
Student Attendance Rate	4%	4%
Student Satisfaction	2%	2%
Parent Satisfaction	2%	2%
Parent Survey Response Rate	1%	1%
Teacher Satisfaction	1%	1%

After the indicators are weighted and combined, schools are ranked by the resulting index and divided into ten groups. The top ten percent of schools are rated "1" in the overall rating, the next ten percent are rated "2", and so on down to the lowest-performing ten percent, which receive a "10".

Although the overall rating is useful for comparing schools district-wide, SPD schools face distinct challenges related to their diverse demographics. When evaluating school performance, it is often desirable to compare schools with similar student populations. Therefore, every school is also assigned a *similar schools rank*, which is based on comparing its SPI to the nine schools most similar to it demographically. Strawberry Mansion High School, for example, received an overall rating of "2",

meaning its SPI ranks in the top twenty percent of high schools, but not in the top ten percent. However, Strawberry Mansion's similar schools rank is "1", which means it had the highest SPI among demographically similar schools.

The components and relative weights used to determine demographic similarity are given in the following table:

Demographic-Similarity Components	High School	Elementary-Middle
Percent African American/Latino	30%	32.5%
Percent Poverty	30%	32.5%
Percent Special Ed	15%	17.5%
Percent English Language Learners	15%	17.5%
Selectivity (8 th grade Reading PSSA)	10%	N/A

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Pittsburgh Public Schools Accelerated Learning Academies

Frequently Asked Questions

What is the definition of an Accelerated Learning Academy?

An Accelerated Learning Academy is designed to improve achievement of all children, regardless of where they start, through an innovative enhanced school model that has a proven record of success.

The Accelerated Learning Academy model includes:

- high expectations, structured routines and standards for all students;
- increased instructional time;
- high quality leadership;
- strong social support systems;
- continuous monitoring of student performance; and
- commitment from and support for parents.

What makes Accelerated Learning Academies unique?

- A partnership with a school design model like America's Choice;
- Performance-based accountability for principals and our school design partners;
- Ongoing intensive professional development for staff;
- Increased instructional time;
- A recommended 40-hour work week for teachers; and
- A 12-month work schedule for principals.

Describe the extended school day and extended school year.

- Right now, students in elementary schools spend 32 hours and middle school students spend 33 hours in school each week. The Accelerated Learning Academy schedule will add approximately four hours per week.
- The Accelerated Learning Academy schedule stretches the school day by 45 minutes of additional instructional time.
 - The elementary school day is extended from 6 hours and 25 minutes to 7 hours and 10 minutes.
 - The middle school day is extended from 6 hours, 36 minutes to 7 hours, 21 minutes.
- The school year will be stretched to include 10 additional school days.
- Benefit to students: Students who attend an Accelerated Learning Academy from Kindergarten through Grade 5 gain 1.21 school years.

How will staff be chosen?

- Applicants for principal positions will be interviewed through the Office of Human Resources.
- All other school staff will be interviewed by the principal and the site-based interview team.

-more-

Accelerated Learning Academies—Frequently Asked Questions

Will after-school activities be offered at Accelerated Learning Academies?

- Enrichment activities, clubs, intramural and middle-grade interscholastic sports will be offered at the end of the school day.

Are Accelerated Learning Academies remedial programs?

- Accelerated Learning Academies are not remedial.
- Remediation often means doing the same thing over again in the same way. Accelerated learning uses new teaching strategies to help students approach learning in a different way.
- The America's Choice School Design Model provides rituals, routines and expectations designed to meet all students where they are and move them to even higher levels of performance.
- Students who are two or more years behind will participate in "ramp-up" programs to bring them up to grade level.

How will student achievement be measured?

- Students in Accelerated Learning Academies will take all District standards-based assessments and State assessments.
- In addition, the America's Choice School Design Model includes frequent monitoring of individual student performance so that instruction may be planned to meet specific needs.

How can parents be assured that Accelerated Learning Academies provide a safe, caring, challenging learning environment?

- We are partnering with a model that has conducted research nationally as well as internationally to determine what helps children learn. Our students will benefit from the inclusion of those global best practices in the Accelerated Learning Academies instructional approach.
- Each school's leadership team will work together to assess student needs to determine the best use of space, inside building traffic flow, student schedules and routines to create the optimal learning environment.
- The America's Choice comprehensive approach brings organization, discipline and rigor to all areas of learning.

How will students get to school?

- The District transportation guidelines will be followed for all schools. Students who live 1.5 miles or more from their assigned school or qualify based on hazardous routes (vehicular danger) or medical reasons will be transported to school.

Will Accelerated Learning Academies establish partnerships with businesses and community-based organizations?

- Each school will collaborate with community partners to meet their students' needs and interests.

How can parents support their children's learning in the new Accelerated Learning Academies?

- A Parent Engagement Specialist will serve as a liaison between home, school and community and will help to develop strategies to support parental involvement in their children's educational success.

Appendix F-1

Commonwealth of Pennsylvania State Board of Education Summary of Costing-Out Study

In March 2006, the State Board began to explore with the Governor's Office and the General Assembly the idea of conducting a costing-out study. In July of 2006, by votes of 185-13 and 43-6, the House of Representatives and Senate passed, and Governor Rendell signed, Act 114, which assigned to the State Board responsibility for conducting such a study. Act 114 requires the study to address two issues – adequacy and equity. The study of adequacy grows out of a desire among state officials, educators, and others to understand what it costs for all of our students – no matter where they live – to attain state academic standards. The study of equity grows out of their concern about the growing gap between high- and low-spending districts and the implications (1) for the quality of education received by students in our lowest spending districts and (2) for local taxpayers.

Last fall, after consultation with the leadership of the General Assembly, the State Board issued a request for proposals to select a contractor to conduct the costing-out study. In December, after reviewing proposals, the Board selected the firm of Augenblick, Palaich and Associates (APA), and they began work in January, gathering and analyzing data, assembling and meeting with Pennsylvania educators and others, and working with a team of researchers from throughout the nation. They presented their report to the State Board on November 14, 2007, and a revised version in December 2007.

Adequacy Findings

The study was designed to determine the cost of meeting this **standard: 100 percent of Pennsylvania students mastering the state standards in 12 academic areas and demonstrating proficiency on state reading and math tests by 2014**. APA used three primary methodologies in the study and combined results from all three and several other statistical analyses to reach their conclusions. The primary methods were **professional judgment** (empanelling educators to determine the resources needed to achieve the standards in different sized schools and districts); **successful schools** (determining actual costs in districts on track to meet the standard); and **evidence-based** (determining the costs of implementing research-based reforms shown to improve student performance). Supporting analyses included a cost function analysis of district spending, geographic cost of living differences, wage and salary issues, enrollment changes, and student transportation. The report is based upon 2005-06 data (the last year for which all necessary data are available) and excludes food service, capital costs and debt service, transportation (studied separately), community services, and adult education. Act 114 did not request the design of a new funding formula.

- ◆ The statewide cost of meeting the standard (in 2005-06) is \$21.63 billion, compared with actual comparable spending of \$17.25 billion. Achieving this adequacy level would require an additional \$4.38 billion or 25.4 percent. On a per pupil basis, the adequacy level averages \$11,926 (compared with current spending of \$9,512), including:
 - A base cost of \$8,003 for all students, assuming they have no special needs.
 - A modification of enrollment to recognize growth and decline over five years.
 - An additional weight for students with disabilities (1.30 or \$10,404).
 - An additional weight for children in poverty (0.43 or \$3,441).
 - An additional weight for English language learners (highest weights for the smallest districts, with a minimum of 1.48 and a maximum of 2.43).
 - An additional weight for gifted students (highest weights for the smallest districts, with a minimum of 0.20 and a maximum of 0.66).
 - A district size modification that recognizes higher per pupil costs in small districts.
 - A geographic cost of living adjustment.
- ◆ The report calculates adequacy levels for each district, based upon its own student and community characteristics.
- ◆ 471 districts (94 percent) are spending less than their adequacy levels; the other 30 are spending a total of \$188.8 million more than their adequacy levels.

- ◆ 1.67 million students (92 percent) attend districts spending less than their adequacy levels.
- ◆ The least wealthy districts are furthest from meeting their resource needs; they would need an additional 37.5 percent (compared to the average of 26.8 percent). The wealthiest districts would need only an additional 6.6 percent.
- ◆ Current transportation spending appears to be reasonable.

Equity Findings

Act 114 also required the study to consider the equity of the current school finance system for **students** (variations in spending across districts) and for **taxpayers** (variations in tax effort across districts).

- ◆ Wealth (personal income and property value) per pupil varies widely across the state – from \$33,691 per weighted pupil (using the weights from the adequacy analysis) to \$2,354,028; the latter district has 70 times the wealth of the former.
- ◆ State aid is distributed so that poorer districts receive more funding per pupil than wealthy districts.
- ◆ However, the effect of this aid is overwhelmed by local wealth discrepancies, since local revenues account for about twice as much as state aid.
- ◆ Districts with the greatest student need generate the least local revenue per pupil.
- ◆ Districts with the lowest wealth make a greater tax effort than districts with more wealth.
- ◆ Districts with higher wealth and lower needs spend more than lower wealth districts that are making a higher tax effort.
- ◆ State and local taxes are comparable to those nationally but are considerably lower than the average of the six states that border us (Delaware, Maryland, New Jersey, New York, Ohio, and West Virginia). If Pennsylvania's state and local tax revenues matched the six-state average of revenues per capita, we would generate an additional \$6.02 billion. If our tax revenues matched the six-state average of revenues per \$1,000 of personal income, we would generate an additional \$3.17 billion.

Next Steps

APA's report is posted on the State Board's website at www.pde.state.pa.us/stateboard_ed. It will be transmitted, as required by Act 114, to the Governor and members of the General Assembly. The statute also requires the House and Senate Education Committees to "promptly review and consider the recommendations of the study and develop legislation as deemed appropriate."

Oversight of the Study

The costing-out study was conducted under the direction of a special committee of the State Board, chaired by Dr. James E. Barker. Other members were Karl R. Girton, Mollie O'Connell Phillips, and Larry A. Wittig. The committee was staffed by Jim Buckheit, State Board Executive Director, and Dr. Robert E. Feir, Project Manager.

Although the Board was directed to conduct the study and present its findings to the General Assembly and Governor, it has no direct role in addressing school funding or tax issues. These are matters for the consideration of the General Assembly and Governor.

Updated December 2007

Appendix F-2

2010-2011 PA-PACT Application Guidelines

A Consolidated Application for the Basic Education Hold Harmless Funding (Federal Portion), Basic Education Funding Increase (Federal and State), Accountability Block Grant (State), and Educational Assistance Program (State)

Funding allocations and planning requirements are based on Governor Rendell's proposed Education Budget. Final allocations and requirements are pending the General Assembly's approval of the Governor's proposed budget.

Preface

With the proposed enactment of the 2010-11 budget, the Pennsylvania Department of Education is requesting that districts prepare their PA-PACT plan to include the following:

Basic Education Funding (BEF)

A portion of the state BEF subsidy is being funded this year by State Fiscal Stabilization Funds (SFSF). As part of the American Recovery and Reinvestment Act (ARRA), expenditure of SFSF dollars is subject to the reporting requirements of Section 1512 of ARRA. SFSF dollars are being used to support three areas within the BEF – 1) the “Hold Harmless” allocation amount; 2) the BEF increase “up to and including 2.9%” and; 3) the “above 2.9%” increase. Expenditures of SFSF dollars in each of these three areas of the BEF will be subject to ARRA Section 1512 reporting on a quarterly basis.

The sections of the application for the Hold Harmless and the BEF up to and including 2.9% are combined. The suggested uses for both of these allocations can be found in the guidelines Appendix A.

Federal and State funds must be accounted for separately from a budgetary standpoint, but we still encourage you to plan in the Narrative Section, as you did in previous year, with the student, classroom, and school as the center of the planning.

Accountability Block Grant (ABG)

The Accountability Block Grant provides Pennsylvania school districts with financial assistance to implement effective educational practices and initiatives to improve student achievement. The legislation identifies the 16 proven practices as acceptable expenditures of Accountability Block Grant funds. The proposed budget allocation is \$271.4 million.

Educational Assistance Program (EAP)

Districts that have received EAP funds in the past will continue to receive these funds for the express purpose of providing increased instructional time to students who struggle academically. The proposed budget allocation is \$55.342 million.

Summary

In summary, each LEA must prepare its Narrative and Budget information by funding source as follows:

- Hold Harmless (Federal portion) and increase in BEF up to and including 2.9% (federal and state)
- Increase in BEF above 2.9% (federal and state)
- Accountability Block Grant (state)
- Educational Assistance Program (state)

LEA Planning Overview

Each year, LEAs undergo planning processes in which student performance data is analyzed, educational needs are identified and solutions are chosen to meet the needs of the students served. LEAs should use the results of the planning process to ensure all federal, state and local funding is aligned to the overall educational and instructional objectives of the LEA.

As LEAs build their district plans, or, if required school improvement plans, LEAs are encouraged to commit to the four areas of reform recently identified by the U.S. Department of Education and endorsed by the Pennsylvania Department of Education:

- Make improvements in teacher effectiveness and ensure that all schools within the district have highly qualified teachers;
- Make progress toward college and career-ready standards and rigorous assessments that will improve both teaching and learning;
- Improve achievement in low-performing schools, by **providing intensive support and effective interventions** in schools that need the most support;
- Gather information to improve student learning, teacher performance, and college and career-readiness through enhanced data systems that track progress.

Assurances

An LEA submitting a PA-PACT application must answer the assurance questions throughout the document. Affirmative answers are required for an approvable application.

By submitting a PA-PACT application and accepting allocations, LEAs agree to meet all required reporting requirements.

LEA Needs Assessment

LEAs should begin the PA-PACT application process by reviewing their schools' Getting Results Improvement Plan. Reviewing those plans will ensure districts build their PA-PACT application by targeting funds to the High Impact Strategies detailed in Appendix A of these guidelines.

Process for LEAs that have not yet completed the Getting Results

1.) Review of Data

There are at least four types of data that should be reviewed:

- a. *Formative Assessments*
- b. *Benchmark Assessments*
- c. *Summative Assessments*
- d. *Other Locally Relevant data* – indicators may include absenteeism, PSSA participation rates, student/teacher surveys, focus groups, etc.

It is essential that LEAs first examine key data sources for information on student achievement at the school and LEA levels, as described above. To ensure reliability, at least three state-level data sources should be reviewed:

- 1) PAAYP Data – Located at: <http://paayp.emetric.net/>
 - Locate the Data Tables for both schools and the LEA
- 2) eMetric Data – Located at: <http://pssa.emetric.net>
 - Provide the secure username and password for the LEA (for help, please call 717-705-2343).
- 3) PVAAS Data – Located at: <https://pvaas.sas.com/evaas/signin.faces>
 - For help, please call 717-606-1911 or email: pdepvaas@iu13.org.

2.) Analyzing the Data and Discovering Root Cause

Using the data collected in Step #1, analyze and describe the student achievement challenges in the LEA and the schools it serves. Please be specific about which grade level(s), subject areas and student subgroups may be underperforming.

Based on this analysis, identify the potential root cause(s) of the achievement challenges described above. This section of the application includes Foundational Guiding Questions from the Getting Results Framework and the Root Cause Analysis Guiding Questions.

All LEAs MUST complete the Foundational Guiding Questions and should use them to assist in their planning and timeline for implementation.

Districts identified for School Improvement and Corrective Action MUST verify and document that all requirements are being met. At the completion of this section, LEAs identified for improvement must download and submit an **Assurance for Additional NCLB Requirements for Title I District Improvement Signature Page**. <http://www.pasip.org/grdip.asp> .

3.) Planning for a Solution with proposed research/evidenced-based strategies or promising practices to address the identified root cause(s).

Below are some resources to assist as you develop your Program Goals and Budget Details.

www.bestevidence.org

<http://ies.ed.gov/ncee/wwc> What Works Clearinghouse

http://www.education.state.pa.us/portal/server.pt/community/child_development_early_learning/7200 Early Childhood Research posted on PDE Website
[http://nieer.org/National Institute for Early Education Research](http://nieer.org/National_Institute_for_Early_Education_Research)

4.) Program Goals

After the district has performed the planning process outlined above, program goals should be developed that reflect the focus and priorities for school improvement and student achievement. These goals must be specific to the needs of the individual schools within the district, as well as possible district-level needs, that have been identified through the process.

Using the goals and the district plan identified in the Needs Assessment Section of this grant application, districts should identify the High Impact Strategies that will result in maximum student achievement and align those goals with available funds. The chart in Appendix A of these guidelines provides categories, detailed strategies and the corresponding funding sources available to address those strategies.

5.) Funding Options

After identifying program goals based on the LEAs needs and planning document, the following are the various funding options that can be used to support these goals:

Basic Education Funding Hold Harmless (Federal Portion) and BEF increase up to and including 2.9% (Federal and State) -All Districts

Basic Education Funding Hold Harmless (Federal portion) and any BEF increase that an LEA receives up to the rate of inflation for the 2010-11 school year can be used as a cost-of-living adjustment for the general operating costs and salaries and benefits that LEAs face, and can be allocated for any allowable activity under:

- **Elementary and Secondary Education Act (ESEA)**
- **No Child Left Behind Act (NCLB),**
- **Individuals with Disabilities Education Act (IDEA)**
- **Carl Perkins Act**
- **Adult and Family Literacy Act**

and for School Modernization & Construction

Basic Education Funding increase above 2.9% (Federal and State) – 329 Districts

If a district receives an increase above the 2.9% index in their Basic Education Funding, 80% of the amount must be used to establish or expand programs and services to students using the High Impact Strategies identified in Appendix A of these guidelines.

The remaining 20% of the increase in BEF funds above the 2.9% index may be allocated as follows:

- No more than 10% of the increase in BEF above the 2.9% index may be used to maintain eligible programs that are already in existence in the LEA, and/or for one-time costs necessary to the delivery of instruction.

- No more than 10% of the increase in BEF above the 2.9% index can be used for programs or activities essential to achieving or maintaining academic performance targets, and research-based or one-time costs necessary to the delivery of instruction.

Note: Once the LEA is notified that its PA-PACT plan is approved, it will be necessary for the LEA to complete, sign and mail the Rider Agreement in order to obtain Federal funds.

Waiver Option for the use of the 80% of BEF increase above 2.9% (Federal and State)

LEAs may apply for a waiver for the use of 80% of the BEF increase. This waiver option provides the opportunity for districts to use up to 25% of the 80% to maintain High Impact Strategies currently being successfully implemented in the district if the district can show that the program:

1. Would otherwise be eliminated due to budget shortfalls; or
2. Cannot be funded through alternative funding opportunities; or
3. Meets an essential need for increasing student achievement

Thus, two options exist for the allocation of the BEF increase (above 2.9%) as set forth in the chart below. Note that the waiver based on the criteria set forth above applies to the second option.

Allowable use of BEF (above 2.9%)	Option 1: Standard Rule	Option #2: With Approved Waiver
Expand programs and services	80%	60%
Maintain programs	10%	30%
Researched-Based/One time Cost	10%	10%

Districts that wish to request such a waiver are required to submit a 25% Waiver Request Form. http://www.portal.state.pa.us/portal/server.pt/gateway/PTARGS_0_123568_814336_0_0_18/25pctWaiverForm.doc **This form will be available in the application as well.** On the application, districts must indicate how all conditions for the waiver have been satisfied.

Accountability Block Grant (ABG) – (State) All Districts

Based on the proposed state budget, districts will receive the same amount in ABG funding in 2010-11 as they received in 2009-10. Funds should continue to be allocated as described in Section 25-2599.2 of the School Code. The strategies approved for ABG funding are outlined in Appendix A. Additional guidance on ABG can be found in Appendix C.

The General Assembly requires that school districts report data on the uses of the ABG funds for accountability and transparency. These reporting requirements are the same as in 2009-10.

Educational Assistance Program (EAP) – (State) 175 Districts including Career Technical Centers

Districts that have received EAP funds in the past will continue to receive these funds for the express purpose of providing increased instructional time to students who struggle academically in reading

and math. Additional guidance on the Educational Assistance Program is available in Appendix D of these guidelines.

The General Assembly requires that school districts report data on the uses of the EAP funds for accountability and transparency. These reporting requirements are the same as in 2009-10.

Where multiple funding sources are being used to support one activity, please report the estimated number of students and staff impacted for each funding source.

6.) Completing the Application Narrative

Parts A and B of the application will serve as the district's narrative and should describe how the district plans to allocate funding to meet the goals established in the Needs Assessment section. Districts should review plans submitted for other funding streams under (ex: Supplemental Title I and IDEA funds) to ensure that the district is maximizing the use of all resources.

The plan for the use of Title I funds is located on the eGrants system and can be accessed by clicking on "Division of Federal Programs" on the left hand side of the login screen. If you cannot access this application, call 717-783-2193 at the Division of Federal Programs for assistance.

Please note: IDEA funding has been addressed outside of the eGrants application process. LEAs should contact their IU for information about these funds.

Thorough and detailed descriptions are needed for each of the strategies. As an example: In previous years it may have been acceptable to indicate that a specific amount of money would be used to expand the number of teachers in grades K through 3; this year, districts are required to indicate exactly how many more teachers they plan to hire. This additional level of detail should be included in the "Projected number of students and staff" in the indicated columns of the table.

Narrative Part A (All Districts) – Basic Education Funding Hold Harmless (Federal Portion) and increase in Basic Education Funding up to and including 2.9% (Federal and State):

This section describes the allowable use of funds for the Basic Education Hold Harmless and increase in Basic Education Funds (Federal Portion). These funds can be used with the same flexibility as traditional basic education funding, as well as for construction, and renovation/repair to facilities. However, certain restrictions apply to the expenditure of SFSF dollars.

Describe the activities, programs, projects, cost of living adjustments and/or general operating costs provided with these funds.

The LEA must assure that funds used under this section, the source of which is SFSF, will NOT be used for:

- Payment of maintenance costs;
- Stadiums or other facilities primarily used for athletic contests or exhibitions or other events for which admission is charged to the general public;
- Purchase or upgrade of vehicles;
- Improvement of stand-alone facilities whose purpose is not the education of children, including central office administration, operations or logistical support facilities;

- Aquariums, zoos, golf courses or swimming pools;
- School modernization, renovation, or repair that is inconsistent with State law or;
- Financial assistance to students to attend private elementary and secondary schools, unless the funds are used to provide special education and related services to children with disabilities as authorized by IDEA.

The LEA assures that:

- E-Rate funding is maximized before using any State Fiscal Stimulus Funding on internet wiring or other covered items and that Title II-D funds will be used wherever possible in applicable buildings.
- Consideration will be given to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating Systems standards or the Green Building Initiative's Green Globes Building Rating System.
- When possible and feasible energy Star-rated products, materials and equipment will be used in their projects.

Narrative Part B (All Districts) – Increase in Basic Education Funding above the 2.9% (Federal and State), ABG, EAP:

This section will be used to describe the High Impact Strategies funded through:

- Increase in Basic Education Funding above the 2.9% index (Federal and State)
- ABG
- EAP

Describe the programs and activities the LEA will implement using the funding and information provided above. Include a description of the programs to be implemented to support each category and the method by which the district will evaluate the effectiveness of the programs.

Answer the question and complete the items in the table pertaining to Early Childhood Education if the LEA chooses to use a portion of the allocation for Pre-Kindergarten, Full-Day Kindergarten and/or Class Size Reduction Grades K-3. Please see Appendix E of these guidelines for more information.

7.) Completing the Application Budgets

Complete the budget page for each funding source for which the LEA receives an allocation. Every LEA will complete the budget page for the Hold Harmless and BEF increase up to and including 2.9% and the Accountability Block Grant. Only LEAs that will receive an allocation for the BEF increase above 2.9% and the Educational Assistance Program will complete those budget pages.

Proposed LEA allocations can be found on the Department website:

http://www.portal.state.pa.us/portal/server.pt/community/grants_and_subsidies/7207/new_guidelines_and_application_process_for_abg%2c_eap_and_act/507147

It is imperative that the information in the budget pages is aligned with the information in the Program Goals and the Program Design and Narrative sections of the PA-PACT Narrative. Any discrepancies will result in the return of the application to the LEA.

Appendix A

FUNDING SOURCES AND ELGIBLE HIGH IMPACT STRATEGIES

**BASIC EDUCATION HOLD HARMLESS FUNDING (FEDERAL)
AND BASIC EDUCATION FUNDING UP TO 2.9% (FEDERAL/STATE)**

School Construction and Modernization
Elementary and Secondary Education Act (ESEA)
No Child Left Behind (NCLB)
Individuals with Disabilities Education Act (IDEA)
Carl Perkins Act
Adult and Family Literacy
General Operating Expenses, Salaries, Benefits
And for School Modernization & Construction

BASIC EDUCATION FUNDING INCREASE ABOVE 2.9%

Increased Instructional Time
 Tutoring Before/After School
 Tutoring During School
 Tutoring Extended School Year
 Intensive support for ELLs Students
New Curriculum & Course Offerings
School Libraries Services
 Employment of School Librarians & Staff
 Purchasing Materials
Pre-Kindergarten
Full-Day Kindergarten
Class Size Reduction K-3
Professional Development
 Increase number of students graduating prepared for college/career success
 Addressing learning needs for students at-risk of academic failure or needing remediation
 Ensure high school completion with successful transition to and post-secondary education or enrollment in the workforce
Incentives to Highly Qualified Teachers and Principals to work in schools identified for improvement or corrective action
Research-Based Improvement (Limited to 10%)
Evidence Based One Time Cost (Limited to 10%)

FUNDING FOR ACCOUNTABILITY BLOCK GRANT (ABG)

Increased Instructional Time

- Tutoring Before/After School**
- Tutoring During School**
- Tutoring During Extended School Year**

High School Reform

Elementary Science Education

World Languages in the Elementary Grades

Improving Academic Performance in Student Subgroups

Science & Applied Knowledge Skills

Career Awareness Education

School Libraries Services

Pre-Kindergarten

Full-Day Kindergarten

Class Size Reduction Grades K-3

Professional Development

- Teacher Training**
- Other Professional Development**
- Technology Coaching and Other Technology Resources**

Literacy and Math Coaching

Social & Health Services

Research-based Improvement

Incentives for Highly Qualified Teachers to work in schools identified for improvement or corrective action

FUNDING FOR EDUCATIONAL ASSISTANCE PROGRAM (EAP)

Increased Instructional Time

- Tutoring Before/After School**
- Tutoring During School**
- Tutoring During Extended School Year**

Appendix B

President Barack Obama and US Secretary of Education Arne Duncan have identified four key areas of reform to guide the investment of all education spending provided under the American Recovery and Reinvestment Act (ARRA). These four commitments appear and reappear across all of the different categories through which ARRA provides education funds. In particular, the governors of each state were required to make specific assurances with regard to each of these areas in order to receive ARRA State Fiscal Stabilization Funds (SFSF). The four essential areas of reform are:

1. **Effective teachers and school leaders:** making improvements in teacher effectiveness and ensuring that all schools have highly qualified teachers.
2. **Standards and Assessments:** making progress toward college and career-ready standards and rigorous assessments that will improve both teaching and learning.
3. **Support for Struggling Schools:** Improving achievement in low-performing schools, by providing intensive support and effective interventions in schools that need them the most.
4. **Collection and Use of Data:** gathering information to improve student learning, teacher performance, and college and career-readiness through enhanced data systems that track progress.

In order to track each state's commitment to reform in these essential areas, the proposed guidelines for each state's Phase 2 SFSF application indicates that states will have to provide the following information:

1. **Effective teachers and school leaders** – A state would report on the extent to which all students have access to qualified and effective teachers and whether or not teachers are evaluated based on how well their students perform. This will include collecting information on all LEAs teacher and principal evaluation systems.
2. **Standards and Assessments** – A state would report the extent to which public information is available regarding student performance compared to other states, the extent to which all students are fully included in state assessment and accountability systems and are provided high-quality assessments, and how many high school seniors continue on to pursue a college education or technical training.
3. **Support for Struggling Schools** – A state would identify schools most in need of academic intervention, and report on the progress of those schools in implementing reforms to improve student academic achievement.
4. **Collection and Use of Data** - A state would report on the extent to which it has implemented a system to provide greater clarity to parents about the quality of their child's education. This system will enable educators to use real time information about the individual needs of students, move away from a one-size-fits-all approach to education, and improve the performance of all students.

For more information see: <http://www.ed.gov/legislation/FedRegister/proprule/2009-3/072909e.pdf>

Appendix C

Additional ABG Guidance

General Guidance:

The following provides additional ABG information and guidance for all districts as they complete their 2010-11 PA-PACT applications:

- **“Establish, Expand, or Maintain 1st, 2nd, 3rd, 4th, 5th, 6th and 7th year ABG funding.”**
As stipulated in the legislation, the Accountability Block Grant shall be used by school districts to attain or maintain academic performance targets by establishing, expanding or maintaining one or more of the designated strategies. When districts report the status of the strategies funded by the Accountability Block Grant, they must report, by area, whether they are “establishing, expanding or maintaining” an initiative or effort. If a district has any questions about which of these three categories is most applicable to its strategy, it should refer to the definitions below for guidance.

Because this is the 7th year for the Accountability Block Grant funding, districts need to be clear about their approach for 2010-11 strategies. Depending on the year, a strategy was established, expanded, or maintained, please use the label indicated in the table below.

Year Strategy was Established/Expanded	Year – Maintain Label
2004-05	7th Year Block Grant Maintain
2005-06	6th Year Block Grant Maintain
2006-07	5th Year Block Grant Maintain
2007-08	4th Year Block Grant Maintain
2008-09	3rd Year Block Grant Maintain
2009-10	2nd Year Block Grant Maintain
2010-11	1st Year Block Grant Maintain
2010-11	Establish or Expand

This will help the Department understand the district’s specific use of the funding. In addition, please note below that there are two reasons to indicate “establish/expand” on your application.

Establish: To set up or bring into existence a new ABG initiative or strategy within the district. Therefore, the district did not have this ABG funded strategy prior to the 2010-11 ABG funding. (Example: Establishing full-day kindergarten in 2010-11 when the district only provided half-day kindergarten in the past.)

Expand: To increase the number, extent, impact or scope of a strategy or initiative that has already existed within the district. (Example: Expanding full-day kindergarten from one school to three schools.) This definition would also apply if a district either established or maintained a strategy with the previous ABG funding, and now wishes to *expand* its existing initiative.

1st Year Block Grant - Maintain: To preserve and support a pre-existing strategy or initiative not previously funded by ABG that has, and is resulting in, documented student achievement. (Example: The district plans to continue an already existing student assistance program by using Accountability Block Grant funds in place of other funding that had been used to support the program.)

2nd Year Block Grant – Maintain: This category represents the second consecutive year of Accountability Block Grant funding and is an option for the district to choose that helps to identify when a district established or expanded a strategy initially. (Example: The district initially “established” or “expanded” the strategy with 2009-10 Accountability Block Grant funding and now wishes to continue it for 2010-11.)

3rd Year Block Grant – Maintain: This category represents the third consecutive year of Accountability Block Grant funding and is an option for the district to choose that helps to identify when a district established or expanded a strategy initially with 2008-09 Accountability Block Grant funding and now wishes to continue it for 2010-11.

4th Year Block Grant – Maintain: This category represents the fourth consecutive year of Accountability Block Grant funding and is an option for the district to choose that helps to identify when a district established or expanded a strategy initially with 2007-08 Accountability Block Grant funding and now wishes to continue it for 2010-11.

5th Year Block Grant – Maintain: This category represents the fifth consecutive year of Accountability Block Grant funding and is an option for the district to choose that helps to identify when a district established or expanded a strategy initially with 2005-06 Accountability Block Grant funding and now wishes to continue it for 2010-11.

6th Year Block Grant – Maintain: This category represents the sixth consecutive year of Accountability Block Grant funding and is an option for the district to choose that helps to identify when a district established or expanded a strategy initially with 2006-07 Accountability Block Grant funding and now wishes to continue it for 2010-11.

7th Year Block Grant- Establish or Maintain: This category represents the seventh consecutive year of Accountability Block Grant funding and is a **new option** for the district to choose that helps to identify when a district established or expanded a strategy initially with 2004-05 Accountability Block Grant funding and now wishes to continue it for 2010—11.

➤ **ABG Allowable Uses**

ABG funds can be allocated for the same strategies as in 2009-10. These strategies are:

- Increased Instructional Time
- High School Reform
- Elementary Science Education
- World Languages in the Elementary Grades
- Improving Academic Performance in Student Subgroups
- Science and Applied Knowledge Skills
- Career Awareness Education
- School Library Services
- Pre-Kindergarten

- Full-Day Kindergarten
- Class Size Reduction K-3
- Professional Development
- Literacy and Math Coaching
- Social and Health Services
- Research-based Improvement
- Teacher Incentive

The ABG funding should be allocated for expenditures directly related to improving student achievement, including but not limited to: learning materials and resources; instruction (including salaries and benefits, where permitted) consistent with the limitations in sections 2599.2(b) and (e) of the ABG legislation; professional development (including coaching); technical assistance; strategic partnerships with community organizations, universities and parents and direct services to students.

Intensive Instructional Time

It is highly recommended that the following guidelines be adhered to for Intensive Instructional Time funded by ABG funds:

- **A minimum of 45 hours of instruction per content area** for each tutoring program;
- **A minimum of one teacher to every ten students** during the school year and a **one to fifteen ratio** during summer programs;
- Alignment with classroom instruction
 - Aligned with PA Standards and assessment anchors
 - Use of guidance around evidenced-based models that meet PA rigorous evaluation standards
 - Incorporates strategies for learning
 - Ongoing feedback to the student, tutor, teacher and parent;
- Rigorous selection and intensive, ongoing training of tutors and;
- Intensive monitoring and evaluation of student progress
 - Baseline (pre-test), mid-year and end of year assessment data and demographic data to be entered in mid-year and end of year ABG reports.

Equipment Purchase: Equipment expenditures must be justified in terms of the item's direct relationship to the program or activity for which it will be used. Equipment is defined as wholly non-disposable items with a unit value of more than \$1,500. Any items with a unit value less than \$1,500 are considered supplies. ABG funds may not be used to pay for office equipment and furniture, construction or renovations.

Reserve Accounts: Districts also may not place Accountability Block Grant funds in a reserve account. And, districts may not use the funds to increase salaries, except in the case of Accountability Block Grant Program (Incentives for Certified Teachers) in which districts may offer financial incentives to teachers working in the most academically challenged schools in a district.

Administrative Cost: The Accountability Block Grant is **not** available to cover administrative costs because the authorizing legislation prohibits this practice. Districts are advised that, as a general matter, administrative costs are defined by the Department as those that refer to such items as salaries for principals, central office or clerical staff; utilities and phones; indirect costs; or other like expenditures associated with central, administrative or other logistical supports. If

districts have specific questions about whether expenses they are charging are administrative in nature, please consult Marlene Kanuck, the ABG coordinator at mkanuck@state.pa.us .

Appendix D

Additional EAP Guidance

Assessment and Evaluation: Districts should implement a specific system for evaluating the success of their tutoring strategies and the effect on student learning. Students participating in the tutoring initiative should have individual assessments on an ongoing basis throughout the tutoring program.

Districts can use program effectiveness data to make programmatic adjustments and refinements, as well as provide important data to the community.

The districts shall use an approved assessment that is aligned with state standards to fulfill the requirements of measuring student progress. The Pennsylvania Department of Education has approved assessment tools for collecting and reporting data. Those benchmark assessments include:

- Reading: Grades K-2 – DIBELS
- Reading: Grades K-12 – GRADE
- Reading: Grades 3-11 – 4 Sight
- Math: Grades K-12 – G-MADE
- Math: Grades 3-11 – 4 Sight
- Reading and Math: Grades 3-8 – Acuity
- Reading and Math - Study Island

Should you need additional information about these assessments or other benchmark assessments please contact Ray Young in the Bureau of Assessment and Accountability at ryoung@state.pa.us .

Assessments to measure progress during the course of the tutoring:

- District-wide assessments for evaluation purposes.
- Clear and specific performance targets
 - For progress against academic standards
 - For release from the tutoring program
- Regular feedback on progress
 - Students – Teachers – Parents
 - Ongoing feedback to and from student

School districts will show the following:

- 80 percent of tutored students will show progress as per Value Added data in order for the Pennsylvania Department of Education to determine growth. It is the responsibility of the school district to ensure that the PA Secure ID is used with all data for the tutored students.

Program Budget:

- Budgets are expected to primarily reflect expenditures for instructors and any necessary tutoring instructional materials.
- Budgets that contain excessive administrative expenditures will not be approved.
- **Requests for a waiver of the 5% restriction for administrative expenditures (including transportation, salary and benefits for a tutoring or data coordinator, snacks and incentives) must be made in writing to the Department.**

Additional recommendations to districts regarding their proposed plans:

- Instruction should be individually tailored to districts and personalized for students;
- Sessions should be at least weekly with an emphasis on regular attendance;
- **A minimum of 45 hours of instruction per content area** for each tutoring program.
- A minimum of **one teacher to every ten students** during the school year and a **one to fifteen ratio** during summer programs;
- Alignment with classroom instruction:
 - Aligned with PA Standards and Assessment anchors
 - Use of guidance around evidenced-based models that meet PA rigorous evaluation standards
 - Incorporates strategies for learning
 - Ongoing feedback to the student, tutor, teacher and parent;
- Rigorous selection and intensive, ongoing training of tutors;
- Intensive monitoring and evaluation of student progress
 - Baseline (pre-test), mid-year and end of year assessment data and demographic data to be entered in mid-year and end of year EAP reports and;
- Building a culture for tutoring connected authentically with community partners.

If districts have specific questions whether expenses charging are administrative in nature, consult Teresa Shakespeare, EAP Lead Coordinator at tshakespea@state.pa.us .

Appendix E

Additional Early Childhood Education Guidance

Pre-Kindergarten

The ABG and BEF funding above the inflation rate supports districts in establishing, maintaining or expanding pre-kindergarten aligned with the current academic standards. Pre-kindergarten should meet the needs of the district students, families and communities by incorporating evidence-based and proven early childhood practices. To apply for ABG or BEF funding above the inflation rate for pre-kindergarten, districts must be prepared to provide the Department the following information:

- Data on the district, the students to be served and the pre-kindergarten strategy to be supported with ABG or BEF funding above the inflation rate;
- A concise description of the core components of the proposed pre-kindergarten strategy and how those components meet, at a minimum, Pennsylvania’s regulations for pre-kindergarten that were passed in December, 2006, and a plan that includes goals, activities and evaluation methods.

Pre-kindergarten Framework

Extensive research on pre-kindergarten programs demonstrates that quality pre-kindergarten not only prepares children for school, but also has a lasting positive effect on student achievement well beyond kindergarten. The challenge for many communities, however, is two-fold: 1) to ensure all children, particularly those who are considered “at risk,” have access to such programs and; 2) to ensure that the programs are of “high quality.” To help Pennsylvania communities meet this challenge, the Commonwealth’s PA-PACT funding may be allocated by districts to establish, maintain or expand pre-kindergarten. All districts that utilize ABG funds for pre-kindergarten, directly or through contract with a community partner, must meet the regulations for pre-kindergarten as specified in 22 PA Code, Chapters 2, 11 and 12.

The following information provides a framework for effective pre-kindergarten:

- 1. *Age of Child.*** Pre-kindergarten should serve 3 and 4-year-old students for up to two years prior to the kindergarten entrance age for the district.
- 2. *Length of Day.*** Effective pre-kindergarten shall consist of at least five hours of instructional time per day –full-day pre-kindergarten; or 2.5 hours of instructional time (half-day is the minimum).

Instructional activities include the following:

- Classroom instruction;
- Orientation;
- Meals and snack-time, as long as they are integral parts of the curriculum, supervised by the teacher and used for student learning experiences;
- Play time, as long as they are integral parts of the curriculum, supervised by the teacher and used for student learning experiences;

- Time spent at the library and in art, music or physical education also constitutes “instructional time” if provided by area specialists;
- Opening exercises;
- School, group, or class educational trips to which admission is not charged to students or parents and a teacher accompanies the students;
- Student services, such as guidance and counseling services, psychological services, speech pathology or audiology services, and student health services;
- Civil defense, fire, bus evacuation and similar drills and;
- Early dismissal and delayed opening due to inclement weather. An early dismissal so that part of the day is spent in parent/teacher conferences does not count as a full day of instruction. Time spent in transportation, professional development, and parent/teacher conferences does not count as “instructional time”. A program that includes an on-going schedule of home visitations may include these hours as part of the instructional day upon advance approval of the Department. The frequency, duration, purpose and activities included in these visits must be described in the application.

3. Days Offered. Pre-kindergarten should be offered, at the least, on the same days as elementary school classes for a minimum of 180 days.

4. Curriculum and Effective Practices. Consistent with regulations of the State Board of Education, the curriculum used in any ABG pre-kindergarten classroom must be aligned with Early Learning Standards established by PDE. The curriculum and instruction must be standards-based and should reflect current scientific research and understandings in all related areas of early development to address the individual needs of a diverse population of children. Copies of the revised 2009 Early Learning Standards can be downloaded from the Early Learning Standards page on the PDE website. http://www.pakeys.org/pages/get.aspx?page=Career_Standards The Early Learning Standards have been “cross-walked” and developed with close alignment to several nationally respected, commercially available curricula for Pre-K. The review is available on-line in the Curriculum section of the Standards web pages.

5. Reporting Guidelines:

a. Assessing Student Progress. The purpose of student assessments is to guide instructional practice, to guide professional development and technical assistance, and to report overall progress of children participating. Frequent and on-going assessment is advisable to provide feedback to teachers and other staff so that they can adjust their practices and activities with students to meet their needs and fill in any learning gaps.

The Department recommends that pre-kindergarten programs or providers adopt the assessment principles on both curriculum and assessment that are outlined in Pennsylvania’s report, “Early Childhood Assessment for Children, Birth through Age 8.” This report states that early learning education utilizes a connected system of curriculum and assessment providing teachers with a model that supports optimal learning through the intentional structure of individualized, developmentally appropriate classroom activities. The quality pre- kindergarten should complete child-level assessments a minimum of three times over the course of a school year.

All Accountability Block Grant funded pre-kindergarten programs will use the Checklist and Guidelines portion of the Work Sampling System (WSS) for the reporting of child outcomes. The distribution of complementary WSS materials for ABG pre-kindergarten classrooms accompanies

professional development events that outline the WSS Checklist and Guidelines. Registration for these sessions, held regionally, may be completed at the Online Calendar section of the PA Keys website: <http://www.pakeys.org/docs/PDCalendarForPractitioners.pdf>

Children's outcomes will be reported electronically through the Office of Child Development and Early Learning's (OCDEL) Early Learning Network (ELN) which will enable access to Work Sampling Online where the outcome information will be entered. Additional training for ELN will be announced through OCDEL's Announcement system.

b. *Assessing Classroom Environments.* The learning environment plays a pivotal role in pre-kindergarten children's successful opportunities to acquire knowledge through meaningful play, active exploration and thoughtfully planned activities. Learning environments should be well designed and equipped with materials that stimulate and engage children while supporting teachers' strategies for classroom management and intentional instruction.

A well designed learning environment must facilitate effective implementation of all aspects of instruction that would occur on a typical day. Each day's activities should include teacher-directed and meaningful child-initiated activities, including both active and quiet time, independent and guided activities, large and small-group, and individual activities, and reading to children.

The Early Childhood Environment Rating Scale - A reliable assessment of the learning environment requires the application of a classroom assessment tool that permits a review of the environment, itself, and the teacher-child interaction within the environment. The Department has identified the Early Childhood Environment Rating Scale – Revised (ECERS-R) as the tool that should be used to assess the learning environment in Accountability Block Grant classrooms.

http://www.pakeys.org/pages/get.aspx?page=Programs_STARS_ERS

It is anticipated that high-quality classrooms attain a score of 5.50 on the following five subscales:

- Space and Furnishings,
- Language-Reasoning,
- Activities,
- Interactions,
- Program Structure.

Professional Development on the ECERS-R is available through OCDEL's Regional Keys via the PA Keys online professional calendar- www.pakeys.org. Districts should participate in the ECERS-R training and identify strategies to self-assess Pre-K classrooms and identify changes or improvements that would further support high quality Pre-K implementation.

6. Class Size and Teacher/Student Ratio. Pre-kindergarten classrooms must have a student /teacher ratio of no more than 20 students for one teacher and one teacher aide, that is, 2 adults in a classroom for every 20 students. Programs of high quality ordinarily have a student /teachers ratio of no more than 17 students for one teacher and one teacher aide in a classroom or 2 adults for every 17 students. This requirement is consistent with State Board of Education regulations. (22 Pa. Code §4.20 (6)).

7. Teacher Qualifications. Teachers in school-based pre-kindergarten classrooms must be certified in early childhood education. Community-based pre-kindergarten programs that use ABG funding should seek to hire teachers with certificates in early childhood education; by December 2012 all lead teachers in all ABG classrooms must possess a bachelor's degree and early childhood certification.

These requirements are consistent with regulations of the Pennsylvania State Board of Education. (Title 22 PA Code, Part 1, Chapter 4 Academic Standards and Assessment and Chapter 49 Certification of Professional Personnel)

8. Teacher Aide Qualifications. Beginning in 2009-10, teacher aides in all PA-PACT pre-kindergarten classrooms must meet one of the following criteria:

- a. Completion of at least two (2) years of postsecondary study, or
- b. Possession of an associate's degree or higher, or
- c. Ability to meet a rigorous standard of quality and demonstration of knowledge and the ability to assist a teacher in instructing reading, writing, and mathematics. This rigorous standard of quality includes a demonstration of competence in basic literacy skills, the ability to speak and write Standard English, and the ability to provide instruction of pre-kindergarten students in the acquisition of the knowledge, skills and abilities described in the Early Learning Standards. Demonstration of this knowledge and ability can be accomplished through a formal State or local academic assessment, or possession by the teacher aide of a Child Development Associate's (CDA) certificate.

9. Professional Development. Pre-kindergarten teachers should be provided with ongoing professional development opportunities that are grounded in research and reflect practices aligned with the Early Learning Standards, and are specific to the needs of teachers and children participating in the program. The professional development experiences should, at a minimum, meet the requirements outlined in Act 48 and utilize instructors who are certified through the Pennsylvania Quality Assurance System (PQAS). Click here for details and a list of frequently asked questions about **Act 48**. PQAS- Certified instructors have undergone a rigorous review of their qualifications and provide research-based professional development that has been created to meet the specific needs of early childhood professional.

It is recommended that teaching staff attain 24 hours of PQAS-certified training annually.

Information about PQAS is located at the PA Key website:

http://www.pakeys.org/pages/get.aspx?page=Career_Requirements , along with the Calendar of Professional Development events: <http://www.pakeys.org/docs/PDCalendarForPractitioners.pdf> where low-cost early childhood specific training events can be found that are offered regionally.

Community partners that host pre-kindergarten should meet the level of professional development required by Act 48 within three years of the start of the Accountability Block Grant pre-kindergarten program. School districts are encouraged to include the pre-kindergarten staff of all community pre-kindergarten programs in their professional development activities. Opening these opportunities to community providers creates connections among programs and supports the consistent delivery of pre-kindergarten services to all pre-kindergarten children in the district. At a minimum, the community partners of the ABG must be included.

10. Comprehensive Services. Effective pre-kindergarten programs facilitate connections between students and families and social and health services, and address the food and nutritional needs of children while they are attending pre-kindergarten. The Head Start standards provide a model of comprehensive services for school districts and community partners, and include the provision of referrals for developmental and health screenings, parent involvement, nutritional services and information and referrals to social service agencies.

11. Transportation Services. The decision to provide transportation should be given careful consideration based on the needs of the families and community, and whenever possible, transportation should not be a barrier to a child's enrollment and attendance. However, only a modest portion of ABG funds may be used for transportation costs. Transportation requirements differ for school districts, Head Start and child care. When transportation is provided, programs must assure that they have met the specific requirements that pertain to their provider.

12. Coordination with Child Care. Pre-kindergarten programs should coordinate with local child care programs to ensure that families have access to quality before and after school child care. Additionally, child care providers can offer pre-kindergarten programs at their site and can serve as implementation partners for the pre-kindergarten program as described below.

13. Inclusion of Community Providers. The Pennsylvania Department of Education encourages school districts to identify existing community-based high quality pre-kindergarten programs, such as Head Start, early intervention, Keystone STARS 3 or 4 child care sites or licensed private academic nursery schools, in order to collaboratively establish new pre-kindergarten programs. Experience from across the nation suggests that community providers should deliver at least 30-40% of the pre-kindergarten services on a statewide basis. Districts should use at least 10-20% of their pre-kindergarten funds to facilitate these partnerships and may contract with community providers to offer pre-kindergarten programs. Indicators of high-quality early childhood services include:

- Head Start: fully compliant with the Triennial PRISM Review Process and completion of an annual Program Self Assessment with appropriate quality improvement.
- Child Care: Participation in Keystone STARS at a STAR 3 and 4 are indicative of high-quality programming.

14. Transition. Transitions for young children from one setting and type of activity to another are very critical times in their lives. How these transitions are managed has the potential to impact a child's success for many years into their future. The planning and development of relationships with the individuals, programs and organizations that may be involved in a child's life as that child moves from one setting to another takes time, but is time well spent. This planning and developing of relationships needs to be conducted with care and sensitivity to the child, the family and the programs and agencies involved. PA-PACT pre-kindergarten programs must plan for two types of transitions:

- Transition to Pre-K. Providing a smooth transition of pre-kindergarten children from the home setting or any early childhood care or education setting the child attends to the pre-kindergarten program is an important part of the Pre-K program and must be cultivated.
- Transition to Kindergarten. Transition into Kindergarten is an important time in children's lives, and influences their later school careers. Robert Pianta's research demonstrates that children face discontinuities between preschool and Kindergarten as they enter elementary school for the first time. These discontinuities underscore the importance of this transition period. Smooth transitions are even more critical for children in high risk categories. Transition activities, developed across community Pre-K providers and school districts, such as pen pals, school visits, and jointly-created lists of student expectations may all be helpful parts of the transition curriculum. Community Engagement Groups can be looked to as a resource in the development of community transition plans and local contacts can be found at the following website: http://www.pakeys.org/pages/Community_Groups.aspx. Over the past several years these groups have worked in their communities to develop relationships between school districts and early learning programs to work on transition issues for those children moving from an early learning experience to a school setting. This

has resulted in the formation of transition teams to formalize these efforts. Their work has been supported through a best practices conference bringing together community engagement team members and school district personnel to work with nationally recognized experts to identify next steps for their communities. At the foundation of these efforts is the best practices framework described in *Successful Kindergarten Transition: Your Guide to Connecting Children, Families, & Schools* by Robert Pianta. OCDEL has created a transition toolkit to support and enhance current transition practices. The materials and examples are intended to be adapted to meet each community's context. To access this toolkit, go to www.pakeys.org/pages/get.aspx?page=TransitionToolkit

15. Parent Involvement. Parent engagement in pre-kindergarten is another important element to the success of the program and the children receiving its services. Parent involvement doesn't happen by accident or automatically, but requires planning and understanding of the diverse situations and needs of families and their children. PA-PACT pre-kindergarten should develop a parent involvement plan that includes the following:

- Joint staff and parent planning for the promotion of social, emotional and overall healthy development
- Establishment of policies for development and support of reciprocal relationships with parents that acknowledge the parent role as the child's first teacher and integral to the education of the child
- Establishment of a role for parents in developing and evaluating program success
- A regular system of reporting to parents on the progress of their children and provision of opportunities for parents to contribute their ideas and thoughts about progress, using language and a communication vehicle that is understood and readily accessible to them
- Activities that involve parents, such as informational and training workshops that help parents support positive outcomes for their children, field trips, and other child/parent events
- Parent education activities that help them support and reinforce the learning experiences that the pre-kindergarten program provides to their children
- A resource library for parents
- Home visitations
- Toy and book lending programs

Planning and Implementation

Districts should work with program administrators, teachers, parents, early childhood experts and community partners (e.g., civic leaders, early childhood community providers) to develop a pre-kindergarten program that meets the needs of local children. They should consider the types of services children and families need, such as before- and after-school care; summer programming; transportation; referrals to health and social services; healthy meals and snacks; English acquisition education for students and translation services for families who do not speak English. An effective pre-kindergarten program will take these needs into account in designing the program and linking it to appropriate supports. Additionally, districts should consider:

- *The Needs of the Most At-Risk Students.* If there are a limited number of slots for students, pre-kindergarten learning opportunities should first be offered to students at the highest risk of future academic failure. Local Head Start programs often have information available about pre-school age children who are at-risk and OCDEL has developed a Risk & Reach

Survey that can provide additional information for consideration. This survey can be found at: www.pakeys.org/pages/get.aspx?page=EarlyLearning_Reach

- *Programs Combined Across Districts.* In order to leverage resources and efforts, school districts may partner in order to offer pre-kindergarten programs across district boundaries.
- *Reporting Enrollment:* Every student who is experiencing pre-kindergarten in a school district environment should be counted when reporting enrollment to the Pennsylvania Department of Education. Those students who are in school district Head Start programs, child care classrooms or pre-kindergarten (but not K-4) should be included in the enrollment reports, but NOT on reimbursement reports. Coordination should occur with partners to ensure that all children are counted in state pre-kindergarten reports, but not counted twice.

Budget Guidance for Pre-Kindergarten

Pre-kindergarten quality programming relies on the inclusion of comprehensive services. In addition to instruction, materials, equipment and professional development, school districts may include support services that address young children's unique learning needs in their program costs. National research notes that partnerships with community providers assure the quality delivery of these comprehensive pre-kindergarten services. *Districts should use approximately 10-20 percent of their pre-kindergarten funds to facilitate these partnerships.*

The following are the numerical coded categories of allowable costs:

1000 – Instruction

Instruction includes all those activities that deal directly with the interaction between teachers and students. This could include salaries, contracted services, equipment and supplies and maintenance costs that are directly attributable to instruction. Expenditures to renovate space to make age-appropriate classrooms for pre-kindergarten children may be included here, including purchase or rental of modular classrooms.

2100 – Pupil Personnel Services

Activities that assess and improve the well-being of students are addressed in this cost function and may include counseling and psychological services, student assessment, activities around student attendance, speech pathology and audiology services and social work.

2400 – Health Support Services

This cost function is related to physical and mental health services that are not direct instruction and includes activities that provide students with appropriate medical, dental and nurse services.

2700 – Student Transportation

Proven pre-kindergarten practice is to ensure that transportation is available. It is, however, advisable to avoid excessive expenditures for transportation to ensure that the quality of the program itself is not diminished. A modest portion of grant funds may be allocated for transportation costs.

3100 – Food Services

Quality pre-kindergarten programs should address young children's food and nutritional needs and include the provision of healthy meals and snacks according to the length of the program day. USDA-approved breakfast, lunch or snack items are acceptable program costs and should be included under this cost function. Food preparation and delivery may also be charged to this function.

3300 – Community Services

Activities that provide community services to students, such as childcare, are included in this function. Services that facilitate connections between students and families and child care and social services may be included here.

Support for Program and Budget Development

The Pennsylvania Department of Education welcomes requests from districts for support in planning and implementing pre-kindergarten programs. All requests and/or questions regarding the implementation or expansion of pre-kindergarten programs, early childhood effective practices or the PA-PACT application for pre-kindergarten programs may be directed to:

**Sue Mitchell, Chief, Division of Standards
Office of Child Development and Early Learning
333 Market Street, 6th Floor
Harrisburg, PA 17126-0333
Phone: (717) 787-7489
FAX: (717) 783-8230
E-mail: susmitchel@state.pa.us**

Full-day Kindergarten

The PA-PACT supports districts in establishing, maintaining or expanding quality full-day Kindergartens that are aligned with current academic standards. Such programs must have a minimum of five hours of instructional time per day and be open for the full school year, 180 days, for a total of 900 instructional hours. To apply for ABG or BEF funding above the inflation index for full-day Kindergarten, districts must be prepared to provide the Department the following information:

- Data on the district, the students to be served by full-day Kindergarten supported with ABG or BEF funding above the inflation index;
- A concise description of the core components of the proposed full-day kindergarten and;
- A plan that includes goals, program activities and evaluation methods.

Full-day Kindergarten Framework

Extensive research indicates that full-day Kindergarten positively impacts student learning and also emphasizes that full-day Kindergarten's potential for increased student success is at high levels during these critical years. More often than not, Kindergarten and primary school expectations and practices fall short of what research and data from effective full-day Kindergarten programs show children to be capable of achieving. In effect, implementing a full-day Kindergarten program demonstrates a shift in thinking of Kindergarten as an "introduction to formal schooling" to regarding Kindergarten as the "social, emotional and academic foundation for future learning and success in school".

Successful full-day kindergarten programs have crucial elements that must be included in order for districts to maximize learning opportunities for students. The following information provides a framework to help districts leverage the opportunity that full-day Kindergarten presents for improving student achievement:

Quality Teaching and Support for Teaching

Districts should commit to hiring or appointing only certified and highly qualified teachers to teaching positions for full-day Kindergarten. For optimal instructional experiences for students, teachers should be certified in early childhood, pre-k to 3rd grade. Elementary certification is an acceptable alternative. Please note: by 2012 all newly hired pre-k to 3rd grade teachers must be certified in early childhood, pre-k-3rd grade.

Full-day Kindergarten increases the effect of quality teaching for students, but cannot compensate for poor teaching. Full-day Kindergarten teachers should be provided with ongoing professional development opportunities that are grounded in research and are specific to the needs of the teachers and children participating in the program. The professional development experiences should, at a minimum, meet the requirements outlined in Act 48. Please check the Pennsylvania Department of Education's website under "Teaching in PA," "Act 48, Continuing Professional Development" for details.

To assist districts with their implementation of full-day Kindergarten, the Department offers ongoing and summer professional development that focuses on full-day Kindergarten. To view current opportunities, go to the Early Childhood pages of the Department's website.

The Department is currently working with Pennsylvania's Intermediate Units to develop year-round professional development opportunities that focus on full-day kindergarten. Future plans will be posted on this webpage.

Class Size and Student/Teacher Ratio

In order to ensure that programs are of high quality, districts should maintain a teacher/student ratio of 1:17. Teacher/student ratios should remain under 1:20 and be 1:25, at a maximum.

Standards-based, Effective Practice

Full-day Kindergarten programs should be evidence-based, reflecting both the extensive research on full-day Kindergarten and promising practices in the field, in order to maximize the opportunity for learning presented during a child's early years. ABG full-day Kindergarten programs must utilize Pennsylvania's Revised 2009 Early Learning Standards. They may be ordered from fulfill@wavelinedirect.com. Or downloaded from: http://www.pakeys.org/pages/get.aspx?page=Career_Standards.

These comprehensive standards provide information across key curricular areas including arts and humanities, personal and social, health and physical education, science, social studies, reading, writing, speaking and listening, mathematics and partnerships. Programs should note the linkage to

both the pre-kindergarten standards and the third grade standards as Pennsylvania strives to create a connected set of standards from birth through grade 12.

Kindergarten teachers' and administrators' ongoing collaborative work with community pre-kindergarten practitioners will ensure children's successful entry into a formalized Kindergarten setting. Teachers of both grade levels should work together to connect their students' curriculum and assessment strategies while linking them to both sets of Learning Standards, pre-kindergarten and Kindergarten.

Additional standards that may be helpful in planning a full-day Kindergarten program include:

- Best Practice Rubric, produced by the Office of Child Development and Early Learning provides an overview of best practices for full day Kindergarten, including environment, curriculum instruction, assessment and parent and community engagement. This document can be obtained by contacting Dr. Jane Daschbach at Pennsylvania Department of Education. jdaschbach@state.pa.us
- The National Association for the Education of Young Children Accreditation Standards (NAEYC), which can be previewed and, for a fee, ordered by going to www.naeyc.org and clicking on "Accreditation, General Information, Accreditation Criteria".

To ensure students meet the above-mentioned standards, effective full-day Kindergarten should:

- Be deliberate and purposeful in their teachers' use of standards to guide classroom lessons.
- Utilize a comprehensive curriculum that has a rigorous literacy and curriculum at its core.
- Exhibit teachers' instructional practices that are explicit in their instructional language and include a variety of configurations (whole group, small group, partner, and individual activities).
- Actively engage Kindergartners in meaningful learning.
- Support and expect high quality work from all students.
- Be differentiated to meet the needs of all learners.
- Include deliberate efforts to expand Kindergartners' vocabulary and expressive language.
- Have clear expectations for children's behavior that respect the age and development of the Kindergartener.
- Provide many opportunities for kindergarteners to acquire and practice important learning behaviors: listening; participating; task persistence; self-regulating; making choices; exhibiting self-control; being organized; motivating self to do one's best; working with others; respecting the rights, feelings and property of others, etc.
- Be attractive and stimulating to foster and stimulate the Kindergartner's curiosity, initiative and inquiry.
- Incorporate literacy, be literacy- rich and include numerical learning throughout the day.
- Design environments that are organized and structured to support all areas of development through a range of instructional techniques and strategies.
- Foster many opportunities throughout the day for children and adults to talk, listen and respond to one another for a variety of purposes. In effect, full-day Kindergarten should provide students with a rich learning experience that helps to ensure their future success in school.

Curriculum, Assessment and Program Evaluation

Effective early childhood practices include a system of linked curriculum, lesson planning and ongoing assessment that is:

- Valid and reliable
- Comprehensive
- Developmentally appropriate
- Linguistically responsive

The Department recommends that Kindergarten programs adopt the principles on curriculum and assessment that are outlined in Pennsylvania’s report, “Early Childhood Assessment for Children, Birth through Age Eight.” Kindergarten classrooms that utilize a connected system for curriculum and assessment provide teachers with a model that supports optimal learning through the intentional structure of individualized, developmentally appropriate classroom activities. The quality full-day Kindergarten should complete child-level assessments a minimum of three times over the course of the school year.

To guide programs in the selection of curriculum and assessment materials, “Early Childhood Assessment for Children Birth Through Age Eight” also outlines specific measures that align with the Kindergarten Standards. The full report can be accessed at the Department’s early childhood website.

Program-level evaluation and assessment is another component of a quality full-day Kindergarten program. In addition to the use of a classroom rating scale, full-day Kindergarten classrooms should develop self-assessment strategies that evaluate program goals and objectives and program delivery in relation to identified student and familial needs. For additional information on curriculum and assessment, NAEYC has a published position statement on Curriculum, Assessment and Evaluation that can be viewed at:

<http://www.naeyc.org/positionstatements/cape>

Transition into Public School

School districts that work with community-based pre-Kindergarten programs to ensure successful transitions into public school maximize students’ early experiences and support positive school attitudes and successful learning opportunities. Pennsylvania’s 2009 Revised Early Learning Standards provide the framework that can be used to support consistent expectations, as well as the use of consistent curriculum/assessment materials across program settings and grade levels. In addition, shared student experiences throughout the pre-Kindergarten and Kindergarten year create better prepared students as they move in and out of Kindergarten. Activities such as pen pals across grades, classroom visits, joint parent orientations or meetings and picture books written by Kindergarten or first grade students and sent to lower grades’ classrooms support children’s transitions and families’ familiarity with the school setting. These activities should be available throughout the school year since parents may enroll their child in Kindergarten anytime during the year.

Districts and community-based practitioners who join together to develop transition activities such as pen pals, school visits, jointly-created lists of student expectations, etc., help students move into the formalized school setting more easily. For more information on transition activities and strategies,

see: *Successful Kindergarten Transition: Your Guide to Connecting Children, Families, & Schools* by Robert Pianta and Marcia Kraft-Sayre. OCDEL has created a transition toolkit to support and enhance current transition practices. The materials and examples are intended to be adapted to meet each community's context. To access this toolkit, go to www.pakeys.org/pages/get.aspx?page=TransitionToolkit.

Transportation

Some school districts that are currently operating full-day Kindergarten identify transportation as a barrier to effective implementation for all students. It is recommended that districts consider the use of Accountability Block Grant funds to offset the high cost of transportation of Kindergarten students.

Working with Parents

Research shows that many districts that offer full-day Kindergarten develop richer and more rewarding relationships with parents. Additional time for communication, additional volunteer and classroom opportunities and fewer students overall support increased parent teacher partnerships. Including parents in children's assessment and development of learning goals further promotes collaborative relationships and supports students' learning and development.

Program Planning and Implementation

Districts should work with school leaders, teachers, parents, and community partners, such as civic leaders, early childhood experts and early childhood programs, to develop a full-day Kindergarten program that meets the needs of local children. The school-community collaboration should identify the most crucial pieces of this effort for their specific community, including identifying and serving the students who are most "at risk" of not succeeding in school and analyzing classroom space and configurations to identify potential necessary changes.

When districts move from half-day to full-day Kindergarten, some parents express reluctance to enroll students because of the length of the school day. In response, many districts have been successful in creating a choice for parents as they transition into full-day Kindergarten classrooms. Experience shows that parents who originally opt for half-day quickly see the benefits of the full-day experience and enroll their children in the full-day option soon after the school year begins. Districts may also want to refer to the Northwest Regional Educational Laboratory, www.nwrel.org which provides information on full-day Kindergarten, including an overview of the research, characteristics of high quality full-day Kindergarten and tips for success.

Budget Guidance for Full-Day Kindergarten

The crucial elements of a successful full-day Kindergarten program such as quality teaching and support, class size and student-teacher ratio, standards-based effective practice and assessment and program evaluation may be included in the following categories as allowable program costs:

1000 – Instruction

Instruction includes all those activities that deal directly with the interaction between teachers and students. This could include salaries, contracted services, equipment and supplies and maintenance

costs that are directly attributable to instruction. Expenditures to renovate space to make age-appropriate, full-day Kindergarten classrooms may be included in this category, including purchase or rental of modular classrooms.

1692 – Tutor Training

Costs that are directly involved with training volunteer tutors, materials used by tutors, equipment and facility rental necessary to conduct tutor training, as well as ongoing evaluation of tutors, are included in this cost function.

2100 –Pupil Personnel Services

Activities that assess and improve the well-being of students are addressed in this cost function and may include counseling and psychological services, student assessment, activities around student attendance, speech pathology and audiology services and social work.

2400 – Health Support Services

This cost function is related to physical and mental health services that are not direct instruction and includes activities that provide students with appropriate medical, dental and nurse services.

2700 – Student Transportation

Proven Kindergarten best practice is to ensure that transportation is available. Even if the program is targeted to certain students and is not offered district-wide, districts should count students in full-day Kindergarten programs for purposes of their regular transportation reimbursement from the Pennsylvania Department of Education. If necessary, districts may use a limited portion of their Accountability Block Grant funds for the remaining costs that would otherwise be paid for with local funds.

3300 – Community Services

Activities that provide community services to students, such as childcare, are included in this function. This can include services that are not directly related to the instructional program and where children's attendance is not included in LEA attendance figures. Services that facilitate connections between students and families and social services and childcare may be included here.

Support for Program and Budget Development

The Pennsylvania Department of Education welcomes requests from districts for support in planning and implementing their full-day Kindergarten programs. All requests and/or questions regarding full-day Kindergarten, effective Kindergarten practices or the PA-PACT application for full-day Kindergarten may be directed to:

Dr. Jane Daschbach
Early Childhood Specialist
Office of Child Development and Early Learning
Pennsylvania Department of Education
333 Market Street, 6th Floor
Harrisburg, PA 17126
Phone: 717-783-9807
jdaschbach@state.pa.us

K-3rd Grade Class Size Reduction

The PA-PACT supports districts in reducing class size to one teacher for every 17 students, or two teachers for every 35 students, in Kindergarten through 3rd grade. To apply for ABG or BEF funding above the inflation rate for K-3rd grade class-size reduction, districts must be prepared to provide the Department the following information:

- Data on the district, the students to be served and the K-3rd grade class size reduction strategies to be supported with ABG or BEF funding above the inflation rate;
- A concise description of the core components of the proposed class size reduction initiative and;
- A plan that includes goals, program activities and evaluation methods. Districts must provide assurance to the Department that they will not meet the requirements of class size reduction by making a reduction in, and subsequent increase to, current teacher complement.

K-3rd Grade Class-Size Reduction Framework

Research shows that reducing K-3rd grade class size effectively improves student achievement at those grade levels. The research also emphasizes, however, that the context in which class-size reduction occurs is critical to its success. The following information provides a framework to help districts leverage the opportunity that K-3rd grade reduced class size presents for improving student performance:

Quality Teaching and Support for Teaching

It is important that districts commit to hiring or appointing only certified and highly qualified teachers to K-3rd grade positions associated with reducing class. Smaller class size exponentially increases the effect of quality teaching for students in grades K-3, but cannot compensate for poor teaching.

Teachers should also be involved in ongoing, quality professional development that facilitates their growth as professionals and supports their continuous development of skills and knowledge that meet the learning needs of students. Kindergarten through third grade teachers who are working in reduced class size environments should be provided ongoing professional development opportunities that are grounded in research and are specific to the needs of the teachers and children participating. The professional development experiences should, at a minimum, meet the requirements outlined in Act 48. Please check the Pennsylvania Department of Education website under “Teaching in PA,” “Act 48 of 2000, Continuing Professional Development,” 24 p.s. §1205.1 et seq.,” for details. To assist districts with their implementation of early childhood initiatives, the Department offers summer professional development.

Sufficient Classroom Space

According to research, sufficient classroom space is a key factor to the success of reducing class size. Districts should closely analyze the capacity within their elementary schools to plan for additional classrooms or space that may be necessitated by reducing class size. However, districts should note that adding classes is only one option for reducing class size and will not necessarily meet the needs of students and teachers. The Department encourages districts to be innovative and

creative in how they reduce class size. For instance, some districts are choosing a ratio of two teachers to 35 students in one classroom by using a team teaching structure that facilitates grouping and regrouping students in a variety of ways to meet students' learning needs. Other districts are choosing to stagger teacher schedules or reduce class size only for their literacy and math blocks.

High quality, focused curriculum that is aligned with PA Standards and Assessments

Districts should ensure that their K-3rd grades:

- Focus on student learning in math and literacy;
- Implement a math and literacy curricula that is aligned with standards and is documented to be effective in developing students' skills and knowledge and;
- Have the necessary learning materials and resources to support learning at those grade levels.

Program Assessment and Evaluation

Districts should implement a specific system for evaluating their class-size reduction initiative and its effect on student learning. Students participating in the reduced class-size initiative should have individual assessments three times during the year. Information on the program effectiveness can be used by districts to make programmatic adjustments and refinements in the future, as well as provide important data to the community.

The Department will be collecting information in the mid-year and year-end reports on the academic outcomes for the students in classes no larger than 1:17 or 2:35. The district's assessment and evaluation plan will need to determine how to obtain the data necessary to show how well these particular students have progressed using whatever assessment and evaluation measures the district decides to employ.

Planning and Implementation

The Department encourages districts to work closely with school leaders, teachers, facilities experts and community partners (e.g., businesses) to identify the challenges to reducing K-3rd grade class size and to leverage resources to meet those challenges. The team should analyze the educational needs of their K-3rd grade students and the logistical needs of the schools and community.

Districts that are implementing reduced class size initiatives under these provisions are advised to have contingency plans that allow them to maintain the required 1:17 or 2:35 ratios at all times throughout the year.

The Department also plans to investigate the effects of the K-3 Class Size Reduction program on those students who are in classrooms where the teacher-pupil ratio is higher than 1:17, but for whom the ratio would be much higher except for the use of the PAPACT funding to reduce the ratio to 1:17 (or less) in one or more other classrooms in the district.

You will be asked to supply similar information for this category of students, i.e., those who may be indirectly benefiting from the Class Size Reduction Program because they are in classrooms with a lower than usual student-teacher ratio (although they do not meet the program's standard ratio of 1:17). Please read all instructions in this section carefully to separately consider and address students benefiting directly and indirectly from this strategy.

Budget Guidance for Reduced Class Size Programs

Reduced class size for K-3rd grade has been proven to positively impact student achievement. Four areas of consideration--quality teaching and support, sufficient classroom space, high quality curricula, program assessment and evaluation--provide the framework for effective class size reduction. The following budget lines may be included in the following categories as allowable program costs, but the expected focus is on instruction:

1000 – Instruction

Instruction includes all those activities that deal directly with the interaction between teachers and students. This could include salaries, contracted services, equipment and supplies and maintenance costs that are directly attributable to instruction. Expenditures to renovate space to make age-appropriate classrooms may be included in this category, including purchase or rental of modular classrooms.

1692 – Tutor Training

Costs that are directly involved with training volunteer tutors, materials used by tutors, equipment and facility rental necessary to conduct tutor training, as well as ongoing evaluation of tutors, are included in this cost function.

2100 – Pupil Personnel Services

Activities that assess and improve the well-being of students are addressed in this cost function and may include counseling and psychological services, student assessment, activities around student attendance, speech pathology and audio logy services and social work.

2400 – Health Support Services

This cost function is related to physical and mental health services that are not direct instruction and includes activities that provide students with appropriate medical, dental and nurse services.

3300 – Community Services

Activities that provide community services to students, such as childcare, are included in this function. This can include childcare services that are not directly related to the instructional program and where children's attendance is not included in LEA attendance figures. Services that facilitate connections between students and families and social services may be included here.

Support for Program and Budget Development

The Department welcomes requests from districts for support in reducing K-3rd grade class sizes. All requests and/or questions regarding reducing class size, effective practices in class-size reduction or the PA-PACT application for K-3rd Grade class-size reduction may be directed to:

Dr. Jane Daschbach
Early Childhood Specialist
Office of Child Development and Early Learning
Pennsylvania Department of Education
333 Market Street, 6th Floor

Harrisburg, PA 17126
Phone: 717-783-9807
jdaschbach@state.pa.us

Appendix F

Links to Useful Reference Materials and Resources

1. To help you in your school/district improvement planning process, please go to www.pasip.org

2. Useful websites

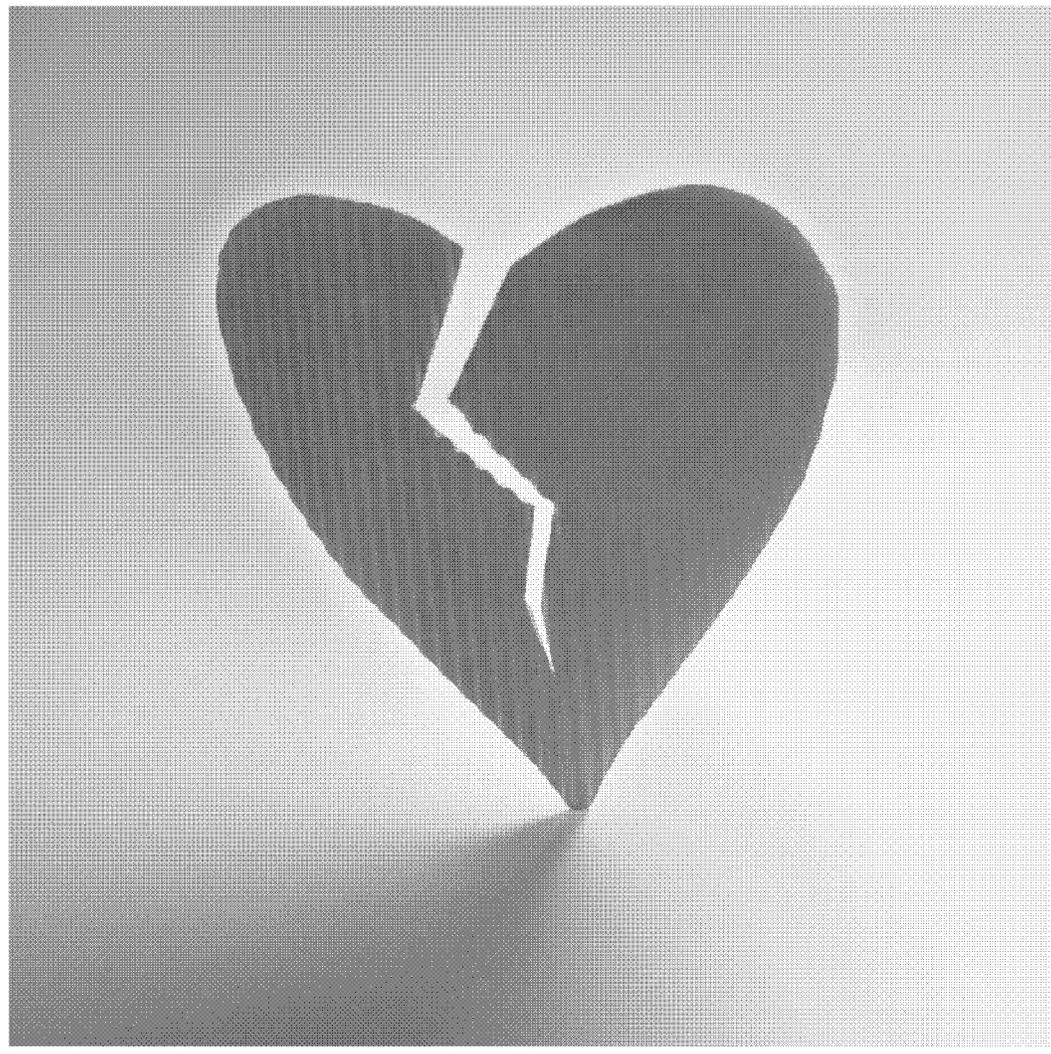
<http://paayp.emetric.net>

<http://pvaas.sas.com/evaas/login.jsp>

www.education.state.pa.us

www.cddre.org (4Sight link)

CHARTER SCHOOL AUTONOMY: A HALF-BROKEN PROMISE



By Dana Brinson and Jacob Rosch

Foreword by Chester E. Finn, Jr. and Amber M. Winkler

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The Thomas B. Fordham Institute is a nonprofit organization that conducts research, issues publications, and directs action projects in elementary and secondary education reform at the national level and in Ohio, with special emphasis on our hometown of Dayton. It is affiliated with the Thomas B. Fordham Foundation, and this publication is a joint project of the Foundation and the Institute. For further information, please visit our website at www.edexcellence.net or write to the Institute at 1016 16th St. NW, 8th Floor, Washington, DC 20036. This report is available in full on the Institute's website. The Institute is neither connected with nor sponsored by Fordham University.

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FOREWORD

Chester E. Finn, Jr. and Amber M. Winkler

America's charter schools resemble an artist who is expected to paint masterpieces while forced to wear thick mittens. Our policy makers and school authorizers, by and large, have not fulfilled their part of the grand "bargain" that undergirds the charter school concept: that these new and independent schools will deliver solid academic results for needy kids *in return for the freedom to do it their own way*.

There's been plenty of attention in recent years to the results side of that bargain, but precious little to the freedom side. As this study makes plain, though the situation varies greatly by state and by authorizer, charter schools as a whole do not have the autonomy they need to succeed. That represents a major policy failure in American education reform, one that needs to be understood by those who are closely inspecting charter school results, and by policy makers who want this bold experiment to have a fair chance to show what it can do.

The larger policy failure, of course, extends far beyond charters. Recently, the *Wall Street Journal* ran a gutsy and perceptive op-ed by Philip Howard, founder of the non-profit legal reform group Common Good, who observed that "a steady accretion of law since the 1960s has smothered personality and individual responsibility in schools" such that "[t]here's no oxygen left for educators to build healthy school cultures."¹ Howard's antidote for these sickly schools is both obvious and sensible: Give teachers and principals the authority to run their classrooms and schools and hold them accountable for their results.

Autonomy for district-operated schools may strike you as a contradiction in terms, and it must be said that few district-led efforts to confer authority on individual schools and principals have amounted to much. The district model of schooling is still, for the most part, a top-down, bureaucratic, even authoritarian model, and we have ample evidence that it doesn't "empower" principals.² One could argue that it isn't really meant to.

But charter schools are supposed to present a completely different profile. Operational freedom is at the core of the essential concept. It's part of the very definition of a charter school:

Charter schools are created through a formal agreement between a group of individuals and a sponsor (e.g., a local school board, state department, or an independent governing board). . . . [They] either receive blanket exemptions from most state codes and district rules regarding curriculum, instruction, budget, and personnel, or they may apply to waive requirements one by one. In return, most charter schools are expected to meet certain accountability requirements, such as demonstrating student achievement and participating in state testing programs.³

Promoting "smart regulation" for charter (and district) schools is a topic that Fordham has been interested in for nearly a decade. In 2001, for instance, we published *Personnel Policy in Charter Schools* by Mike Podgursky and Dale Ballou. The study found that, freed from procedural red tape but held accountable for results, charter schools tended to pursue innovative hiring and compensation policies. Five years later, we published *Turning the Corner to Quality*, which issued guidelines for strengthening Ohio's charter schools (Ohio is Fordham's "home state")—one of which was to "keep the accountability/autonomy promise." We followed that report with *Trends in Charter School Authorizing* that laid out five elements for successful authorizing, including "adequate resources and autonomy." And in 2007, we published *The Autonomy Gap*, which found, among other things, that charter principals felt they had greater autonomy regarding key school functions than did district-operated public school principals.

Now we return with this examination of the autonomy granted by state charter law and authorizer contracts. As our analytic partner, we engaged Public Impact, one of the nation's most respected charter research shops and one with which we have a long and fruitful working relationship. For example, *Charter School Funding: Inequity's Next Frontier*, done in league with Public Impact, remains one of our most requested (and quoted) publications—five years after its release. It found that charter schools receive about 22 percent less in per-pupil funding than the district schools that surround them—a crucial and worrying discovery, considering that charters need adequate financing *as well as* autonomy if they're to deliver the goods.

You could boil that down to a three-word quid pro quo: autonomy for results. It's *not* autonomy for autonomy's sake. Though freedom is generally a virtue in American society, the point of charter schooling is autonomy as an enabling condition for greater educational effectiveness. Results are what matters in the end, but the essential theory of charter schooling is that results are apt to be better if those running and working in the schools are at liberty to produce them in the ways that they think best—and in ways that may differ widely from school to school. Because these are schools of choice, families will select those with methods that they favor and results of which they approve.

Yes, results matter. And charter schools that don't produce them have no right to continue in operation. (We would apply that same precept to district-operated schools as well.) But what about the autonomy side of the bargain? To deny charters that freedom is akin to tying one arm behind the back of a prize fighter. Or forcing Monet to paint in mittens.

We set out to investigate empirically whether charter schools have the autonomy they need. Analysts examined charter laws in twenty-six states that are home to more than 90 percent of the nation's charter schools. They also inspected charter contracts for 100 schools associated with the country's most active authorizers. (These authorizers, fifty of them, oversee nearly half of the nation's charter schools.) Finally, they interviewed insiders (authorizers, school principals, state charter association leaders) associated with the most and least autonomous schools in the sample.

In the end, individual schools (which are named, and which include two authorized by Fordham in Ohio) were scored on a scale from zero (least freedom) to 100 (most freedom); points were then turned into traditional letter grades. Note, though, that we're not grading the schools themselves. The grades reflect how much autonomy they're granted by their states and authorizers.

Key Findings

The typical charter school in America today lacks the autonomy it needs to succeed—a degree of freedom we equate with a grade *no better* than a C+—once federal, state, and authorizer impositions are considered. For some schools, the picture is brighter but for many it's much grimmer, with far too many charters in the F range. Moreover:

- *Huge variation exists among states.* Though the average state earns an encouraging B+, state grades for charter autonomy range from A to F. Arizona, California, Texas, and the District of Columbia, for example, provide much-needed autonomy, while states like Maryland, New Mexico, Wisconsin, and Tennessee—in the words of our analysts—“tie the hands of charters with their overly restrictive statutes.”
- *The states that scored high on the autonomy index also tend to be the ones with lots of charter schools.* The analysts note that this relationship is scarcely a surprise. After all, “states extending high levels of autonomy to schools also tend to be freer with charter caps and enable organizations other than districts to authorize schools, both of which encourage more charter schools to form.”
- *Authorizer contracts add another layer of restrictions.* On average, they drop schools' grades to B-. (Federal policy and other state and local statutes likely push it down further.) School district authorizers are especially burdensome, placing added restrictions on charter autonomy in six areas—more than any other category of authorizer. Examples include forcing schools to adopt the district's discipline policies, follow a particular curriculum, or abide by standard practice when allocating budget dollars.
- *Teacher certification rules are most burdensome.* Almost all charter schools (95 percent) report facing restrictions relative to teacher certification, very likely a consequence of states' interpretations of the federal “Highly Qualified Teachers” mandate. Roughly 70 percent of charters also deal with restrictions around “contract revisions,” a measure of how much flexibility schools have to make mid-course corrections in noncritical areas (e.g., minor curricular changes). About half of them face restrictions when it comes to participating (or not) in the state retirement system; providing special education services; and decision making relative to their governing boards—including freedom to choose its members.
- *In some key areas, however, most charter schools were relatively free to set their own policies.* Research has repeatedly shown that two areas of autonomy matter most to building leaders: control over staffing and instruction. Without the right

FOREWORD

teaching staff to implement the curriculum, principals report, instructional autonomy is meaningless. State certification aside, most charters enjoy considerable freedom in staff dismissal and curricular matters. Most are also free to establish teacher work rules and school schedules.

What to make of all this? To be sure, charter schools in some places enjoy substantial freedom to do their best without having to wear mittens. But too many—especially in states like Maryland and Wisconsin and those authorized by school districts everywhere—are still shackled with the rules and regulations that have left so many traditional public schools dispirited and ineffectual. To put it simply, for many charters, the promise of autonomy has not been kept. Sometimes this is deliberate—plenty of districts don't want their charters to succeed. Sometimes it's accidental—district bureaucrats might be so accustomed to their own regulatory regimen that they can't conceive of an education world with true autonomy. And sometimes it's misguided, as responsible authorizers seek to enshrine myriad “lessons learned” from every hiccup,

EARLY VISIONARIES

University of Massachusetts education professor Ray Budde first coined the term “charter school” in the late 1970s. He had in mind a fundamental reorganization of school districts designed to support the work of innovative teachers within the public school system. His 1988 book, *Education by Charter: Restructuring School Districts*, articulated a vision whereby school charters would operate in much the same way as traditional charters had. He used the example of the charter granted to Henry Hudson by the East India Company in 1609. Budde aptly applied that same concept to education. He said that school charters, like their original namesakes, should support “exploration into unknown territory and involv[e] a degree of risk to the persons undertaking the exploration.”⁴

Albert Shanker, longtime president of the American Federation of Teachers, shared Budde's vision and discussed it publicly in a 1988 speech. He proposed creating schools-within-schools that would be publicly funded, but would allow greater agility to test out new ways of educating students. These small, teacher-led initiatives would be “totally autonomous,” as long as they provided “a better, alternative way of accomplishing the same purpose [as traditional schools].”⁵

setback, and yes, sometimes, scandal into their charter contracts going forward “to make sure that this can never happen again.” But whatever the reason, insufficient autonomy is holding back the charter movement from reaching its potential and producing the results we seek from it.

Many people and organizations help make this study possible. Our thanks go to the Walton Family Foundation for its support of our work relating to charter schools and school choice, and to the Doris & Donald Fisher Fund and the Koret Foundation for their support of this project in particular. This study was also supported in part by our sister organization, the Thomas B. Fordham Foundation. It benefited as well from the expertise of an advisory panel that included former and current school operators, authorizers, and experts on charter legislation. They are Greg Richmond, President & CEO, National Association of Charter School Authorizers; Erin Dillon, Policy Analyst, Education Sector; Deborah McGriff, Partner, NewSchools Venture Fund; James Merriman, Chief Executive Officer, New York City Charter School Center; Paul O'Neill, Senior Fellow, Edison Learning; Nelson Smith, President & CEO, National Alliance for Public Charter Schools; and Perry White, Founder and Executive Director, Citizens' Academy. Of course, not every suggestion made by every expert could be fitted into the final draft, so any critiques should be addressed to Fordham and the authors, not to the reviewers. (After all, they gave us plenty of autonomy, for better or worse!)

Special thanks to Dana Brinson and Jacob Rosch at Public Impact who conducted the study and wrote the report. Their thorough research was matched by their attention to accuracy and commitment to a first-rate product. Public Impact Co-Director Bryan Hassel also provided valuable insight.

We also appreciate the hard work of Fordham's own team, especially research assistant Janie Scull, policy analyst Stafford Palmieri, public affairs director Amy Fagan, new media manager Laura Pohl, and Vice President for National Programs and Policy Michael Petrilli, as well as copyeditor Erin Montgomery and designer Bill Buttaggi.

EXECUTIVE SUMMARY

For nearly two decades, charter founders have opened schools across the land on the basis of a distinctive education bargain: operational autonomy—freedom from restrictions typically placed on public schools—in exchange for strong results-based accountability. During that time, many have studied the “results” and “accountability” side of this arrangement, yet to our knowledge there has never before been a systematic national appraisal of the autonomy side. Despite the importance of autonomy to the charter concept—and notwithstanding innumerable anecdotes about various infringements on these freedoms—amazingly little is known about how free (or hamstrung) charter schools really are. Yet such information is fundamental to examining the state of the charter school movement in America and to appraising its value and its potential to advance American education. It is well known that charter schools in most states operate with substantially less money per pupil than do district schools. If they also lack essential freedom in such key areas as budget, curriculum, staffing, etc., it would be naïve to expect them to produce strong results.

This study begins to fill that vexing information gap via a national review of charter school autonomy. In the fall of 2009, The Thomas B. Fordham Institute teamed up with Public Impact to grade the autonomy extended by charter laws in **twenty-six states that are home to more than 90 percent of America’s charter schools**. Analysts also examined 100 individual charter contracts in those states to uncover further restrictions imposed by fifty of the country’s most active charter authorizers, entities that **collectively oversee nearly half of the country’s current crop of charter schools**.⁶

In appraising state charter laws, we measured school autonomy across fourteen areas, resulting in an overall state score ranging from 0 percent (least freedom) to 100 percent (most freedom). We then determined whether each of the 100 charter contracts further restricted freedoms in these areas, yielding a final autonomy score for each school. Finally, we converted these scores into letter grades on a conventional A to F scale. Schools with As experienced the most autonomy and schools with Fs the least. This analysis intentionally omitted those restrictions on school autonomy that are commonly deemed appropriate, such as academic assessment and accountability provisions and protections for student safety and civil rights.

To supplement the document review, Public Impact conducted over fifty phone interviews with charter school leaders, authorizers, and state charter association representatives linked to some of the most and least autonomous schools in the sample.

Nationwide Findings

- *State laws were the primary sources of constraint on charter school autonomy*, accounting for nearly three-quarters of the infringement that these schools experience.
- *Still, they average a B+ in terms of how much autonomy they provide to schools*. The restrictions state laws place on school autonomy, while significant, are not—in the average case—egregious.
- *Charter contracts drop the national average autonomy grade to B-*. The additional restrictions imposed on schools via authorizing reduced the school autonomy average by about half a letter grade.
- *The ultimate autonomy experienced by the average charter school is likely no better than a C+*. Restrictions from sources we did not examine—such as federal legislation and regulation, state and local statutes, or other policies and practices—surely lower school autonomy even further.
- *Most common restrictions*. Charter schools were most likely to face restrictions on teacher hiring (95 percent). Seventy percent of schools faced some limitations in their ability to renegotiate components of their charter contracts, potentially hindering their ability to make mid-course changes to their programs. About half of schools faced restrictions when establishing their governance boards, choosing a provider of special education services, or determining whether or not to participate in state retirement systems.
- *Most common freedoms*. Schools enjoyed the greatest autonomy over curricula, school calendars, teacher work rules, procurement policies, and staff dismissals.

State-Level Findings

- *The extent of state-level constraint on school autonomy varied widely. Although nearly half of the twenty-six states examined earned “autonomy grades” in the B range, five states earned As, seven earned Cs, and two states each earned a D or an F.*
- *State-imposed restrictions were most acute in the realms of teacher certification, teacher compensation, and revisions to charter contracts.*

Authorizer-Level Findings

- *Authorizers added constraints.* While a less significant source of restriction on schools than state laws, charter contracts reduced average charter autonomy from a B+ under state law to a B-. About 60 percent of charter contracts imposed restrictions beyond state requirements.
- *Authorizers varied significantly in the extent of constraint they imposed.* Thirty percent of those in the study reduced autonomy by more than a letter grade, while nearly 40 percent left the state’s letter grade intact or enhanced school autonomy.
- *Authorizers’ impact on school autonomy varied by authorizer type.* School districts and institutions of higher education typically imposed the most additional constraint while nonprofit organizations and state boards of education imposed the least.

Implications for Policy and Practice

Each encroachment on charter autonomy may stem from a rational and well-intended purpose, such as solving a problem or reducing the likelihood that a bad situation will recur. Yet the cumulative result is what one high-autonomy charter leader termed “death by a thousand paper cuts.” “None are insurmountable,” she admitted, “but together they divert serious time, money, and energy toward compliance and away from our mission of educating our students.”

To keep the autonomy side of the charter bargain, many changes to current practice are needed:

State policy makers should:

- Expand charter autonomy across multiple areas by revising state laws to provide automatic charter school waivers from most laws and regulations that apply to typical public schools;
- Amend state laws to expand staffing (hiring, work rules, compensation, and dismissal) autonomies for charter schools, an area interviews revealed as one of the most important areas of autonomy to school leaders; and
- Expand autonomy by changing laws or policies to (1) foster multiple authorizers, (2) support authorizers in conferring upon charters the full measure of autonomy afforded by state law, and/or (3) restrict authorizer ability to impose additional constraints on key areas of charter operations.

Authorizers should:

- Think twice before codifying well-intentioned impulses into blanket policies or standard practices that restrict autonomy; and
- Consider the informal influence that blanket policies have over the schools they charter (and the applicants who petition them), and the potential for these influences to quash common-sense or path-breaking approaches by the next generation of charter schools.

Charter operators should:

- Know in advance what areas of autonomy must be negotiated, and negotiate aggressively;
- Shop around for an authorizer with a demonstrated history of providing charters with broad autonomies in exchange for results-based accountability; and
- Choose state policy environments, if possible, that extend broad autonomies to charter schools.

Charter advocates at the state, authorizer, and school level should:

- Remain vigilant to protect charter autonomy from creeping regulations; and
- Foster a cadre of school leaders who can advocate for strong autonomy and capitalize on available freedoms.

INTRODUCTION

For nearly two decades, charter founders have opened schools across the land on the basis of a distinctive education bargain: operational autonomy—freedom from laws and regulations which typically apply to public schools—in exchange for strong, results-based accountability. The bargain first allowed potential school operators the opportunity to design and run schools in ways that deviated from traditional district norms, norms which in many districts had produced poor results for decades. Charter sector founders argued that it was these very restrictions—on curriculum, staffing rules, school-level governance, and budgets, for example—that limited schools’ abilities to improve student learning. They argued that, given freedom from these restrictions, charter schools could better educate students.

Nearly twenty years later, charter schools have had mixed results. Some charters have achieved stellar student achievement—taking full advantage of freedoms to extend the school day and year, develop innovative curricula, hire nontraditionally trained teachers, or establish innovative discipline policies to achieve their visions. Other charters over the years have failed to achieve outstanding results. As researchers undertake studies to measure charter achievement, and policy makers turn significant attention toward holding low-performing charters accountable, the question remains, “Are charter schools enjoying the freedoms they were promised in exchange for this level of accountability?”

Despite the importance of autonomy to the charter concept—and notwithstanding innumerable anecdotes about various infringements on these freedoms—amazingly little is known about how free (or hamstrung) charter schools really are. Yet such information is fundamental to examining the state of the charter school movement in America and to appraising its value and its potential to advance American education. It is well known that charter schools in most states operate with substantially less money per pupil than do district schools. If they also lack essential freedom in key areas such as budget, curriculum, or staffing, it would be naïve to expect them to produce strong results.

This report aims to fill this gap through a national study of charter school autonomy. The Thomas B. Fordham Institute joined with Public Impact in examining twenty-six state charter laws and 100 charter school contracts associated with fifty of the country’s most active authorizers. We investigated whether, and how, autonomy varies across states and authorizers. We also interviewed charter school leaders, authorizers, and state charter association representatives linked to some of the most and least autonomous schools in the study. These interviews deepened our understanding of how charter autonomy works—or does not work—in practice.

Autonomy was never meant to be absolute. Since charters are public schools, some limits on their freedom are appropriate (see *Appropriate Limitations on Charter Autonomy*). Policy makers rightly want charter schools to administer state assessments, be accountable for their academic results, be accessible to students, adhere to civil rights laws, and protect their students’ health and safety; we set such restrictions aside as givens.

Beyond those legitimate requirements, however, is potential trouble. Limiting the charter freedoms initially promised by educational reformers thwarts charter school operators from developing independent, innovative, and efficient schools that meet the academic needs of their students. Further, the American education system urgently needs such models to flourish, inform other school approaches, and help scale up what works. States and charter authorizers are in a position to foster an environment in which successful school models can emerge, grow, and spread. Yet they also serve as the greatest potential obstacles to charter autonomy:

- **State laws:** Each state with charter schools has a law governing their operation, as well as many other laws that apply to charter schools. These laws set the stage for school-level autonomy.
- **Charter contracts:** Each charter school enters into an agreement or contract with an “authorizer,” an entity designated by state law to oversee charter schools. This contract may impose additional restrictions on charter school operations beyond those envisioned by state law.⁷

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Because these two sources have the largest and most direct impact on charter autonomy, they are the focus of this study. Other potential sources of restriction—federal laws and regulations, state board and department of education policies, local ordinances, and strings attached to funding—may also be important, but are not addressed in this analysis.

Our analysis extends earlier efforts of other organizations to rate state charter laws on related dimensions. The most recent of these efforts is the development of a model charter law by the National Alliance for Public Charter Schools and its comparison of each state charter law against the model.⁸ The Alliance report explores twenty aspects of charter laws, including some that relate to school-level autonomy.⁹ The report devotes significant attention to the accountability side of the charter equation by heavily weighting four specific areas of charter law: charter applications, reviews, and renewals; performance-based contract development; charter monitoring and data collection; and charter renewal, nonrenewal, and revocation decisions. The Center for Education Reform (CER) has also graded state charter laws on a number of accountability and autonomy components.¹⁰ Our report builds on these efforts in two ways: (1) by focusing in-depth on the components of state laws that influence charter autonomy and (2) by examining charter contracts to measure the level of autonomy experienced at the school level, an important new lens through which to view charter school autonomy.

APPROPRIATE LIMITATIONS ON CHARTER AUTONOMY

It is widely recognized that school autonomy was never intended to free charter operators from the following fundamental obligations, which serve to promote both students' wellbeing and societal interests:

- State assessments of student achievement and consequences for poor performance;
- Health and safety regulations;
- Teacher background checks;
- Open enrollment policies;
- Zero tuition policies;
- Civil rights protections;
- Open meeting laws;
- Anti-nepotism rules for governing boards; and
- Financial accountability rules.

METHODOLOGY

Defining autonomy. To focus our analysis on areas where school-level autonomy is most important, we began with a literature review on school autonomy, successful charter schools, and other high-performing schools. We also convened an advisory panel of charter experts who, building off of the findings from the literature review, helped us identify four broad areas in which charter schools need autonomy to succeed: defining and implementing a vision and culture,¹¹ choosing and implementing an instructional program,¹² making staffing decisions,¹³ and controlling finance and governance.¹⁴

Developing a measurement tool. We developed a metric that spanned fourteen types of charter autonomy within these four broad areas (for more detail, see *Areas of Autonomy*). For each of the fourteen areas, we defined what constituted low, moderate, and high levels of autonomy (see Appendix B).

Gathering data. We examined the charter law and other relevant laws in the twenty-six states covered by this study, as well as sample charter contracts.¹⁵ The National Association of Charter School Authorizers (NACSA) provided a list of the most active authorizers in the U.S.—those that had chartered more than ten schools—for a total of sixty-six authorizers. We contacted these sixty-six, requesting two charter contracts from each. We asked that if the authorizer chartered different types of schools—such as start-ups and conversions—that the two contracts reflect this diversity.¹⁶

We gained the participation of fifty authorizers from twenty-six states (including the District of Columbia) for a total of 100 charter school contracts. To further frame our understanding of charter autonomy at the school level, we conducted fifty-one phone interviews with charter principals, authorizers, and state charter association leaders associated with a subsample of ten high- and ten low-autonomy schools.

AREAS OF AUTONOMY

VISION AND CULTURE

- *Waivers:* Are charter schools provided an automatic waiver from state and local policies that typically apply to non-charter schools (excluding non-negotiables like safety and civil rights)?
- *Discipline Policies:* Can charter schools establish their own discipline policies?
- *Contract Revisions:* Can charter schools revise or amend their charter contracts before the end of their initial charter? Is authorizer approval only necessary for major changes in direction?

STAFFING

- *Teacher Certification:* Are state certification requirements waived for charter school teachers?
- *Staff Compensation:* Can charter schools determine salary scale and participation in a retirement system?
- *Work Rules:* Are charter schools and employees exempt from existing collective bargaining agreements (CBAs) or established work rules?
- *Dismissals:* Can charter schools develop teacher dismissal policies?

INSTRUCTIONAL PROGRAM

- *Curriculum:* Can charter schools design their own curriculum?
- *Special Education:* Can charter schools determine who provides their special education services?
- *School Scheduling:* Can charter schools establish school schedules and calendar?

FINANCE/GOVERNANCE

- *Board Composition:* Can charter schools determine the composition of their own governing boards?
- *Budget:* Do charter schools possess substantial budgetary discretion?
- *Management Contracting:* Can charter schools contract with a charter or education management organization (CMO or EMO)?
- *Procurement:* Can charter schools develop their own procurement procedures?

See Appendix B for the complete metric.

METHODOLOGY

While our sample is not random, its wide national coverage does allow us to draw reasonable conclusions about the condition of charter school autonomy in the U.S., differences across states, and the practices of different authorizer types. Collectively, the twenty-six states are home to more than 90 percent of the nation's charter schools.¹⁷ In addition, the fifty authorizers that provided us with contracts have chartered over 2,000 schools, nearly half of those operating in the United States.¹⁸

Analyzing the data. We used our metric to assess charter freedoms granted by state law on a scale from 0 percent (least freedom) to 100 percent (most freedom). This is the *state charter-law score*. We then determined whether each of the 100 charter contracts altered the degree of autonomy experienced by the school across any of the fourteen indicators. Adjusting the state law score to account for these additional restrictions, we produced a final school autonomy score for every school. This *school autonomy score* is not only a grade for the charter contract, but represents the impact of the state charter law *and* the additional restrictions placed on charter schools by authorizers.

Finally, we converted these scores into letter grades on a conventional A to F scale. Schools with As experienced the highest levels of autonomy and schools with Fs, the least. With grades in hand for each state and contract, we looked for differences among states, authorizer types, and school types. Because we analyzed fourteen different areas of autonomy, our data also enabled us to examine which areas of autonomy were most and least likely to be restricted by state laws or charter contracts.

Limitations. Our method supports analysis and discussion only about the levels of autonomy extended to schools through laws and contracts. It does not address school effectiveness or student performance in relationship to levels of autonomy. For further discussion of the methodology employed, its limitations, and our efforts to counter them, please see Appendix C.

FINDINGS

Nationwide Findings

Overall grades. The average state charter law earned a score of 87 percent, resulting in an average grade of B+.¹⁹ But grades ranged from A to F across our twenty-six-state sample. Adding in the restrictions imposed by charter contracts reduced the autonomy average by 5 percentage points to 82, or about half a letter grade. Given that this review did not explore all known sources of restrictions on autonomy (e.g., federal legislation, state laws and policies, etc.), it is likely that charter schools in 2009 experienced an autonomy level of no better than a C+. Further, our sample excluded schools chartered by authorizers that oversee only a handful of charters—the vast majority of which are district authorizers. This analysis found districts to be the most restrictive authorizer type, suggesting a further dampening effect on average charter autonomy across the nation.

Most and least common restrictions. Figure 1 details the percentage of schools facing a restriction—either from

state law or charter contract—in each of fourteen key areas of autonomy (These are further explained in *Areas of Autonomy*, pg. 11 and in Appendix B). The brown portion of each bar represents schools facing high restrictions, while the blue portion indicates moderate restrictions on charter schools. For example, in the area of teacher certification, the levels of restrictions are as follows:

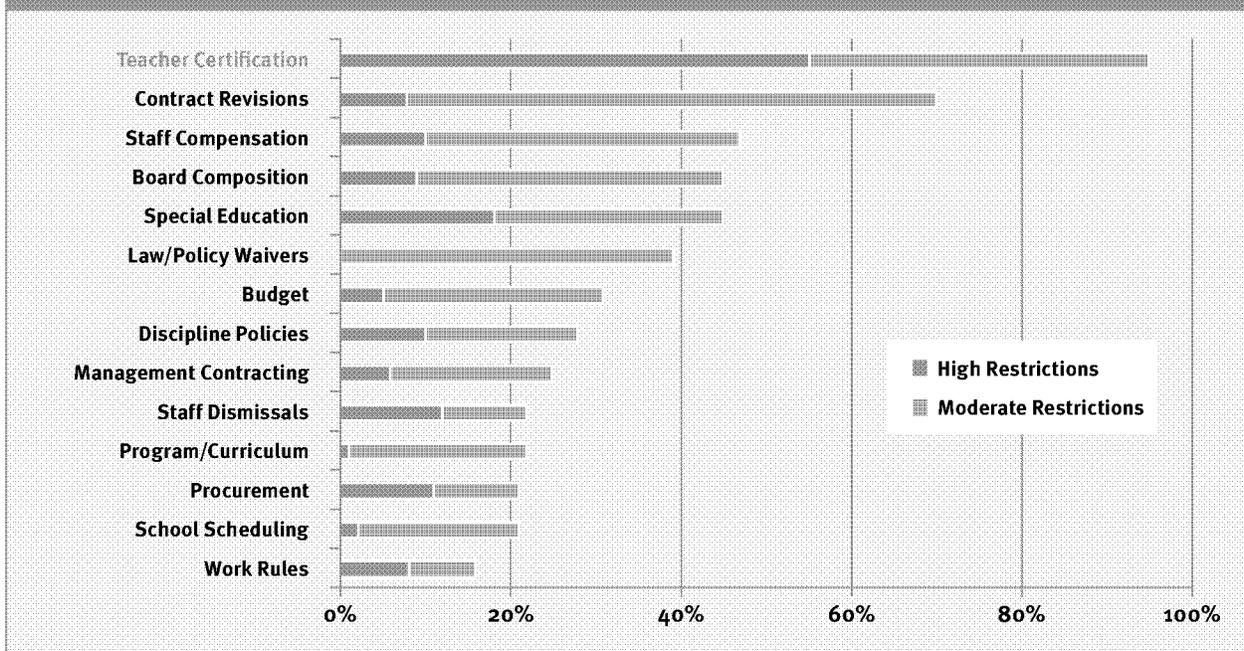
High restriction: All charter school instructional personnel must be certified according to state regulation

Moderate restriction: Some instructional staff must be certified (e.g., only staff in core subjects, or a specific percentage of staff) or school may seek a waiver of certification requirements

No restriction: State certification requirements waived for charter school teachers

Charter schools were most likely to face restrictions related to teacher certification (95 percent) and “contract

Figure 1: Percentage of Schools Facing High and Moderate Restrictions by Area of Autonomy



Note: This figure shows the percentage of schools that were restricted in each of the fourteen areas in the metric.

How to read this figure: Ninety-five percent of schools faced a restriction related to teacher certification, 55 percent faced a high restriction, while 40 percent faced a moderate restriction.

FINDINGS

revisions” (70 percent), the latter meaning the flexibility a school is granted to make mid-course changes (i.e., changing instructional materials or adding a grade level). About half the schools also faced restrictions regarding mandatory participation in or exclusion from state retirement systems, the composition of their governance boards, or who may (or may not) provide special education services.

Charter schools were most likely to enjoy freedom in establishing their own teacher work rules, school schedules, procurement policies, curricula, and staff dismissal policies—with about 80 percent of schools experiencing broad autonomy in each of these areas.

Interviewees identified two freedoms—control over staffing and instruction—as most important to school success. Principals spoke of staffing issues—hiring, evaluating, developing, and dismissing teachers—as equally important parts of a whole. Uniformly, interviewees stated that control over the school’s instructional approach and curriculum was necessary, but that without the right teaching staff, instructional autonomy alone was insufficient in driving achievement.

Interviewees also identified two more domains of school autonomy they deemed necessary for charter success: control over the school budget and freedom with respect to composition of the school’s board and the span of its authority. Yet, state charter laws and charter contracts restricted these two areas for nearly a third and nearly half of schools, respectively.

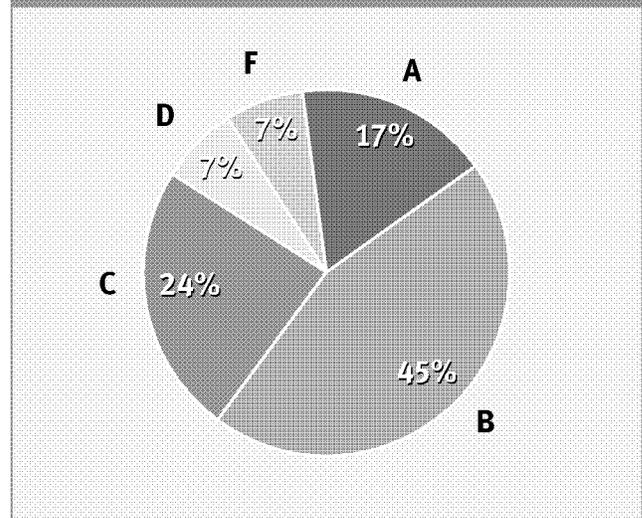
State-Level Findings

As Figure 2 displays, 17 percent of the states provided broad autonomy to charter schools—earning an autonomy grade in the A range—and nearly half of the states earned a grade in the B range. About a quarter of states earned an autonomy grade in the C range, and 14 percent earned a D or an F.

Charter school autonomy varies significantly by state.

Although state laws earn an average grade of B+, this obscures considerable variation in the amount of autonomy that different states extend and the areas of autonomy that they restrict. State autonomy grades range from A to F, with some jurisdictions, such as Arizona, California, Texas, and the District of Columbia, providing for truly autonomous schools while others (including Maryland,

Figure 2: State Charter-Law Grades



How to read this figure: Seventeen percent of the state laws in our sample earned an autonomy grade of A+, A, or A-.

New Mexico, and Tennessee) tie charters’ hands with overly restrictive statutes.

Table 1 shows autonomy scores for the twenty-six states examined here and highlights the range of school autonomy grades *within* each state, which demonstrates the range of additional limitations (or occasional expansions) of autonomy at the charter contract level, a topic discussed below. We should note that we did not review all types of charter schools operating in the twenty-six states reviewed. For more detail on the charter types included from each state, see Appendix D.

States with high autonomy also tend to be states with lots of charter schools. Of the ten states with the most charter schools, eight are included in our top ten for autonomy.²⁰ One might reasonably expect this relationship, considering that states extending high levels of autonomy to schools also tend to be freer with charter caps and enable organizations other than districts to authorize schools, both of which encourage more charter schools to form. Prospective charter operators are arguably more eager to step up and start charter schools if they know they will enjoy significant freedom once operating.

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Table 1: State and School Autonomy Grades

State (Number of Charter Contracts Reviewed)	State Charter-Law Autonomy Grade	School Autonomy Grade Ranges
Arizona (2)	A	A-
California (10)	A-	A- to B+
D.C. (2)	A-	A-
Pennsylvania (virtual) (2)	A-	B+
Texas (2)	A-	A- to B+
Illinois (2)	B+	B-
Massachusetts (2)	B+	B+
North Carolina (2)	B+	B+
Florida (10)	B	C to F
Indiana (4)	B	B to C
Louisiana—Type 5 (1)	B	D
Michigan (8)	B	C to D+
Minnesota (6)	B	B to C+
Ohio (10)	B	B to B-
Idaho (2)	B-	B to D-
Louisiana—Type 2 (1)	B-	B-
New Hampshire (2)	B-	B- to C+
New York (6)	B-	C+ to C
Connecticut (2)	C+	C+ to C
Delaware (2)	C+	C+ to C
Georgia (start-up) (2)	C+	C+ to D
Utah (2)	C+	C+
Colorado (4)	C	C- to D+
Georgia (conversion) (2)	C	F
Wisconsin (non-instrumentality) (1)	C	F
Tennessee (2)	D+	D+
New Mexico (4)	D-	D-
Wisconsin (instrumentality) (3)	F	F
Maryland (2)	F	F

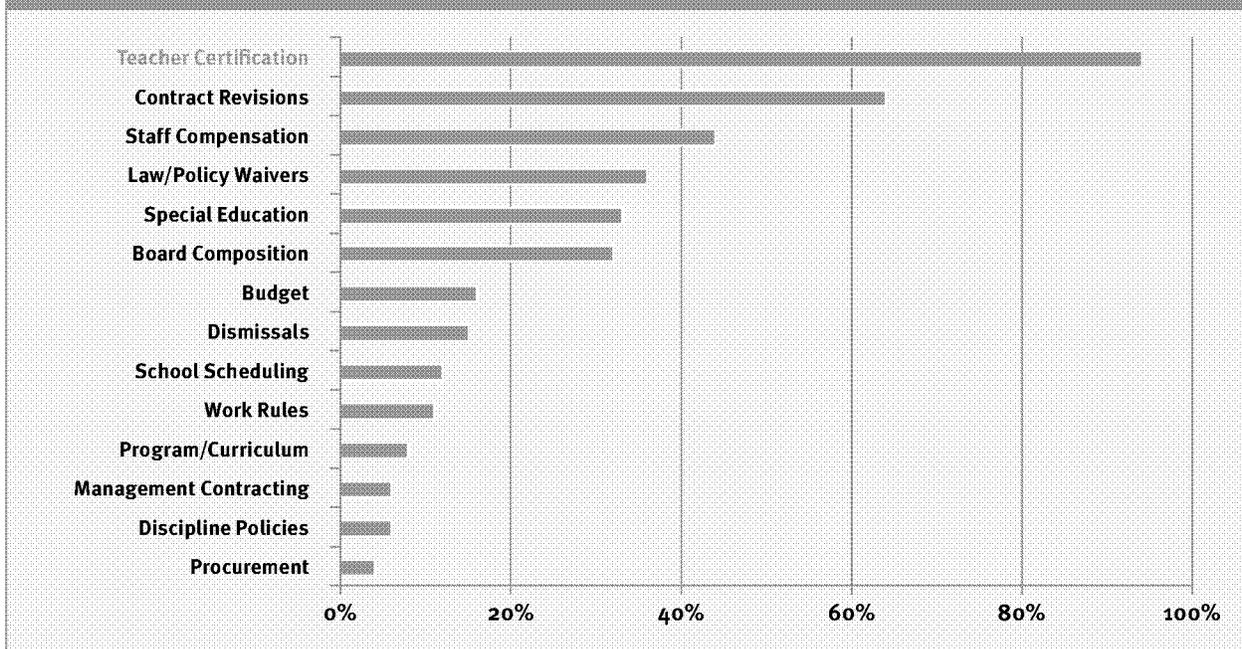
How to read this table: The California State charter law earned an A- for the autonomy it extended to charter schools; however, the amount of autonomy experienced by schools in the state ranged from A- to B+, because of additional restrictions imposed by the ten charter contracts we reviewed. See Appendix D for discussion of charter types (such as virtual, start-up, conversion, etc.).

FINDINGS

State laws focus their restrictions on certain areas of charter operation. As Figure 3 illustrates, states most commonly restricted:

- **Teacher certification.** Nearly every school (94 percent)²¹ in our sample experienced some amount of state-imposed control over teacher certification requirements.
- **Revising the charter contract.** Eight schools in our sample were unable to make any changes to their charters until the charter was up for renewal. Most (sixty-two), however, could amend their charters, but it required renegotiation with their authorizers—a process that is more or less onerous depending on the authorizer.
- **Teacher compensation.** Nearly half of the charters faced state-imposed restrictions on staff compensation. Restrictions mandated (or sometimes prohibited) participation in state retirement programs. Ten schools faced the double restriction of mandated participation in the state retirement program and mandatory use of state-established salary schedules.
- **Other areas of restriction.** Nearly one-third of the schools faced state-imposed limitations on determining who provides special education services or who sits on the governance board. About a third of states did not provide charter schools with an automatic waiver from certain regulations that typically apply to traditional schools and districts.

Figure 3: Percentage of Schools Facing Restrictions from State Charter Laws



Note: This figure shows the percentage of schools in our sample that faced restrictions from state charter laws in each of the fourteen areas in the metric.

How to read this figure: Ninety-four percent of schools faced a restriction under state charter laws on teacher certification.

Authorizer-Level Findings

Operating within disparate state policy environments, authorizers also influenced charter freedoms through their own policies, oversight practices, and accountability requirements. Though state laws created the most constraints, charter contracts added to the burden of restriction on school freedoms.

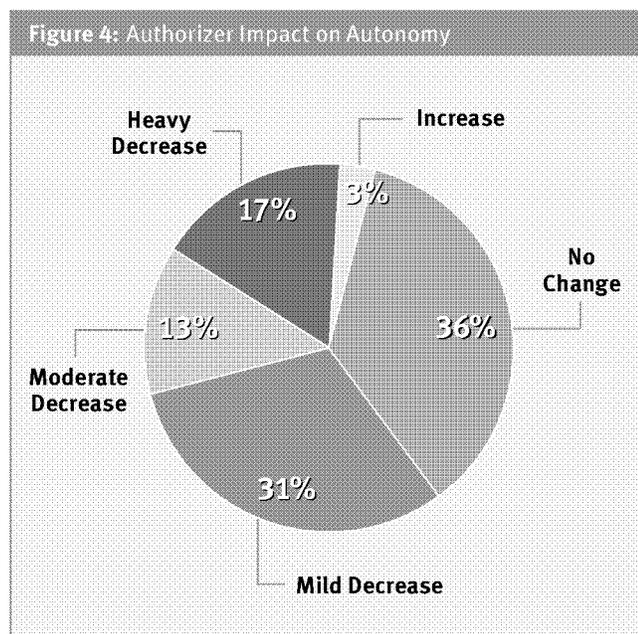
Authorizers' impact varies nationally. Overall, authorizers tended to reduce charter schools' autonomy by about half a grade, or 5 percentage points. However, this average obscures a broad range of *authorizer* impacts on charter autonomy (see Figure 4). For 36 percent of the schools in our sample, authorizers did not further reduce autonomy beyond state restrictions. Further, for three schools, authorizers *enhanced* autonomy beyond the state's autonomy grade. Thirty percent of the schools, however, experienced a moderate or heavy decrease in autonomy—at least one full letter grade—based on authorizer-added limitations.

Although only three authorizers increased the overall autonomy score for schools beyond that allowed by state charter law, authorizers of twenty-one schools actually extended autonomy beyond the state law in at least one

domain. Authorizers who increased charter autonomy typically did so in relation to governance and contract revisions. For example, authorizers increased ten schools' autonomy over who could sit on their governance board (e.g., in California, several authorizers chose not to act upon their state-granted right to place an individual on their charters' governing boards). Second, authorizers of seven schools expanded charter freedom over the contract revision process.

Autonomy restrictions vary by authorizer and charter type. States have empowered several types of organizations to serve as authorizers, including state boards of education, school districts, nonprofit organizations, higher education institutions, mayoral offices, and special-purpose charter boards or commissions. Of these authorizer types, nonprofits and state boards of education were the least likely to place additional restrictions on schools, while districts and higher education institutions were most apt to do so—lowering their schools' autonomy scores by an average of 10 to 11 points, or more than one full letter grade. Table 2 (pg. 18) shows average state scores, additional authorizer restrictions, and final school scores by authorizer type.

District-imposed limitations may stem from the fact that, in many cases, district-authorized schools legally remain part of the district, much like any other public school. If these charters fail to develop legally sound discipline policies or fail to provide special education services in accordance with the law, responsibility ultimately rests with the district. Interviews revealed that district authorizers may choose to protect themselves by reducing charter freedoms in specific areas as a preemptive means of avoiding legal problems later. The other types of authorizers—whose schools are typically legally independent—may not feel as directly responsible for charter failures, and therefore may be in a position to grant greater autonomy to schools.²²



Note: This graph shows the degree to which authorizers further restricted charter autonomy beyond limitations established by state charter laws. A “mild” decrease reduced autonomy by half a letter grade, a “moderate” decrease reduced autonomy by up to one-and-a-half letter grades, and a “heavy” decrease reduced autonomy by about two full letter grades or more. Each reduction increased the regulatory burden charter schools faced.

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Our data also suggest that authorizers with the most schools in their portfolios add fewer restrictions than those with more mid-sized portfolios, on average. (As a reminder: Authorizers with very small portfolios were not included in the study.) Of the ten authorizers with the most schools, eight lowered their schools' autonomy scores by fewer than 5 percentage points. Nine of these ten larger authorizers, however, are non-district authorizers—as such, they already tend to impose fewer restrictions overall than district authorizers. As a result, our data do not allow strong conclusions about the link between authorizer size and school autonomy.

The type of charter school authorized also affects autonomy. Virtual charter schools in our sample operated with the greatest autonomy while conversion charters (traditional district schools converted to charter status) enjoyed the least freedom. Table 3 (pg. 19) shows average state scores, additional authorizer restrictions, and final school scores by school type.

Authorizers' restrictions vary by state law context.

No authorizer in the eight high-autonomy states (those with a B+ or better) further reduced school autonomy by more than half a letter grade. In states with moderate or

low autonomy scores, however, authorizers ranged from placing no further restrictions on schools to reducing autonomy by a staggering three letter grades.

States and authorizers focus their restrictions on different areas of school operations. Figure 5 (pg. 20) shows authorizer restrictions by area of autonomy. Authorizers tend to focus more on some of the finer details of school operations, such as discipline policies, contracting with management organizations, and electing a governance board. We see that no more than a quarter of the authorizers in our sample restricted any single measure we reviewed. For nearly half of these measures, fewer than 10 percent of schools faced authorizer restrictions at all.

Figure 6 (pg. 20) provides a comparison between the areas (and frequency) of autonomy restriction rendered by state laws and charter contracts.

Areas of restriction varied by authorizer type. Table 4 (pg. 19) highlights the areas in which different authorizers chose to restrict autonomy. District authorizers, the most prevalent authorizer in our sample and in the country, placed additional restrictions on charter autonomy in six areas of operation, the most of any authorizer type.²³

Table 2: Degree of Additional Authorizer Restriction by Authorizer Type

Authorizer Type	Average Autonomy Scores		Average Authorizer Restriction ^A
	State	School	
District ^B (n=21)	80%	69%	-11%
Mayor (n=1)	86%	75%	-11%
Higher Education Institution (n=6)	85%	74%	-10%
State Charter Commission (n=4)	87%	82%	-4%
Department of Education (n=11)	84%	82%	-2%
Nonprofit (n=7)	86%	84%	-2%

How to read this table: On average, district authorizers operated in states with an autonomy score of 80 percent. After taking into account additional restrictions imposed by charter contracts, the average autonomy score for schools authorized by districts was 69 percent. Therefore, district authorizers further reduced school autonomy, on average, by 11 percentage points.

^A Values may not sum due to rounding.

^B N is the number of each type of authorizer for which we reviewed contracts.

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Table 3: Degree of Additional Authorizer Restriction by School Type

Charter School Type	Average Autonomy Scores		Average Authorizer Restriction
	State	School	
Conversion ^A (n=12)	74%	58%	-16%
Start-up ^B (n=85)	84%	78%	-6%
Virtual (n=3)	89%	87%	-2%

Note: See Appendix D for discussion of charter types.

How to read this table: On average, conversion charter schools operated in states with an autonomy score of 74 percent. After taking into account additional restrictions imposed by charter contracts, the average conversion charter school autonomy score was 58 percent. Therefore, authorizers of conversion charters further reduced school autonomy, on average, by 16 percentage points.

^A Conversion schools include Louisiana Type 5 charters and the remaining Wisconsin charters.

^B Start-up schools include Louisiana Type 2 charters and one Wisconsin Instrumentality charter (Odyssey-Magellan).

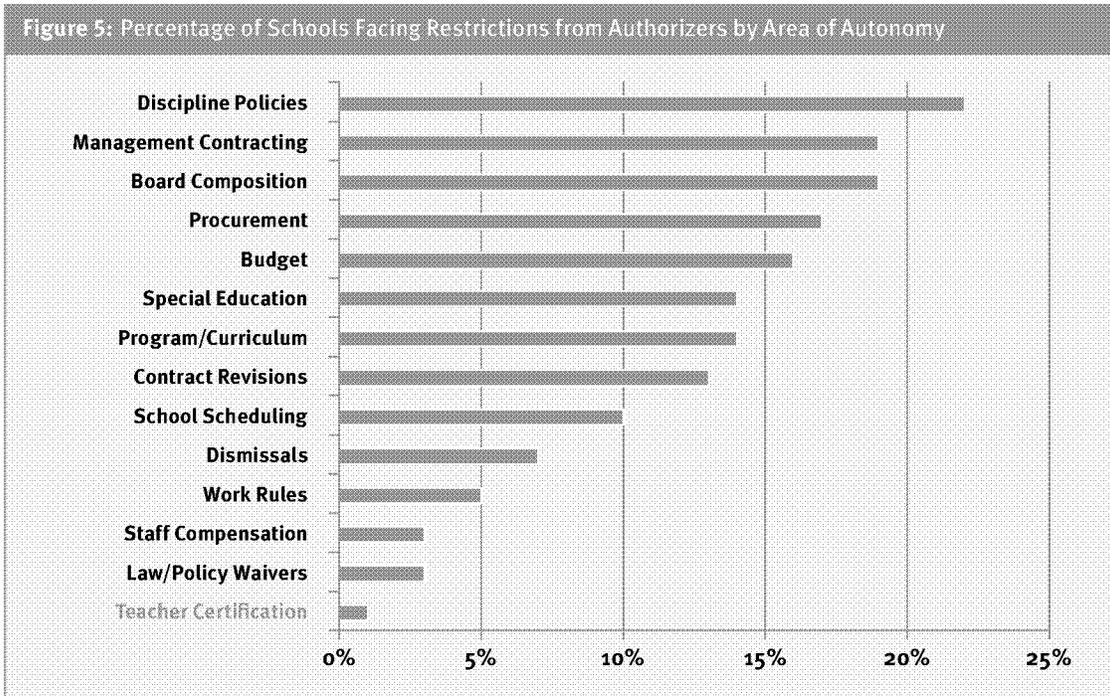
Table 4: Most Restricted Areas of Autonomy by Authorizer Type

Authorizer Type	Commonly Restricted Areas
District (n=21)	Discipline Policies, Budget, Procurement, Charter Revisions, Curriculum, Board Composition
Department of Education (n=11)	Curriculum, Management Contracting
Nonprofit (n=7)	Charter Revisions, Special Education
Higher Education Institution (n=6)	Special Education, Board Composition, Management Contracting
State Charter Commission (n=4)	Special Education, Procurement
Mayor (n=1)	Curriculum, Special Education, Budget

Note: This table shows the areas where specific types of authorizers were most apt to impose restrictions.

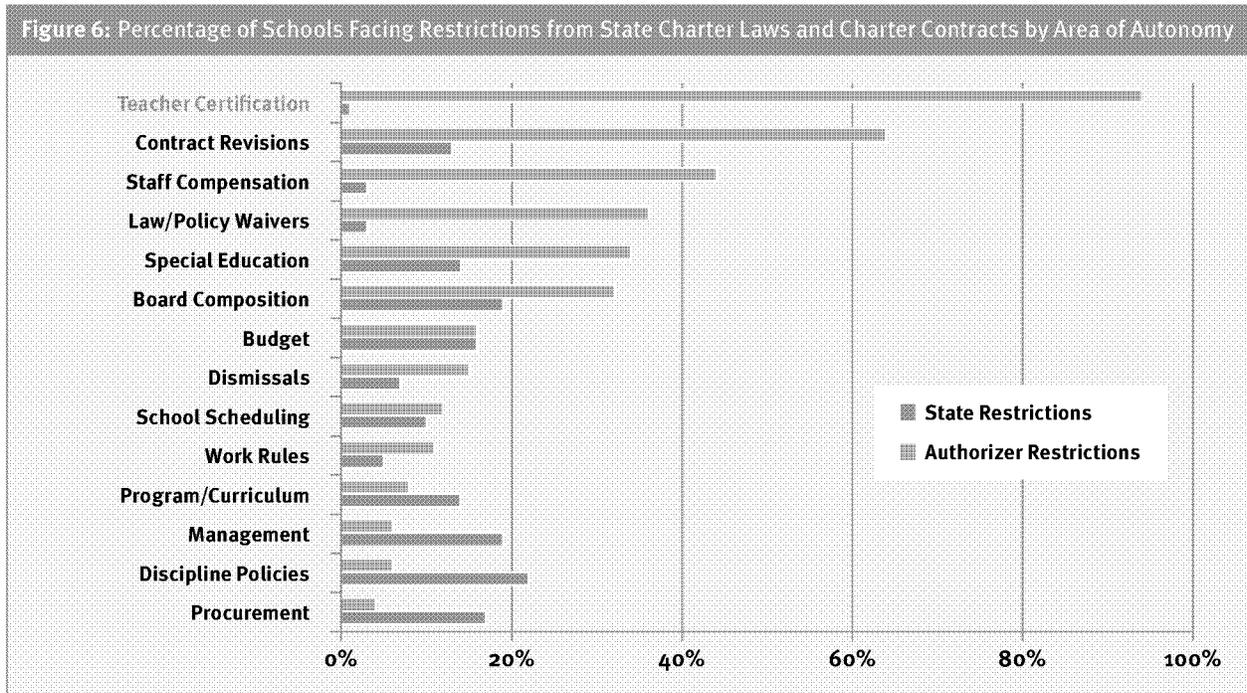
How to read this table: Departments of Education that authorized charters were most likely to restrict charter autonomy in designing a curriculum and contracting with a management organization.

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Note: This figure shows the percentage of charter contracts that restricted school autonomy in each of the fourteen areas in the metric.

How to read this figure: Twenty-two percent of charter contracts imposed a restriction related to discipline policies.



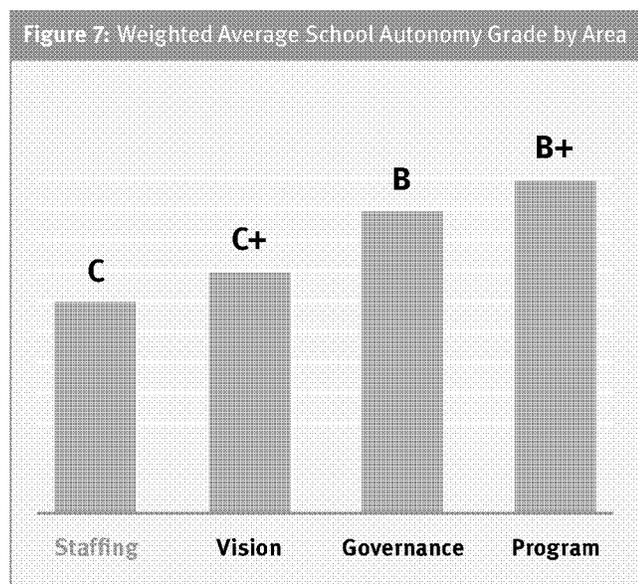
Note: This figure shows the percentage of schools in our sample that faced restrictions from either the state charter law or the charter contract in each of the fourteen areas in the metric.

How to read this figure: In the area of teacher certification, for example, 94 percent of schools faced a restriction written into the state charter law, while just 1 percent of schools faced a similar restriction from their authorizer.

Findings by Area of Operation

The autonomy metric enabled us to assign overall letter grades—taking into account both state law and authorizer impacts on autonomy—to each of the four key areas of charter autonomy that we studied: vision and culture, instructional program, staffing, and budget and governance (see Figure 7). On average, charter schools experienced the highest level of freedom in the area of instructional programming (B+), followed by budgetary and governance freedoms (B). Charter schools experienced the lowest levels of autonomy, on average, in the areas of staffing (C) and implementing a vision and culture (C+).

The next sections explore each of these four main areas of autonomy, from most to least restricted. Within each area, we identify the specific components measured, such as discipline policies, and provide the percentage of schools facing restrictions in those areas from either state laws or charter contracts. We use our interview data to enrich the findings and shed light on how autonomy functions in reality. In discussing interview results, we sometimes differentiate between the responses of those associated with “high-autonomy” schools (an overall autonomy grade of B+ or higher) and “low-autonomy” schools (D+ or lower) (see *Levels of Autonomy*).



Note: This figure shows the average grade state laws and charter contracts earned for the autonomy they extended in each of the four autonomy areas in the metric.

LEVELS OF AUTONOMY:

We classified schools in this study as experiencing high, moderate, or low autonomy.

- **High-autonomy school**—Schools in this study with autonomy grades of a B+ or higher (twenty-one in sample).
- **Moderate-autonomy school**—Schools in this study with autonomy grades of a B- to a C+ (sixty in sample).
- **Low-autonomy school**—Schools in this study with autonomy grades of a D+ or lower (nineteen in sample).

Staffing (Average Autonomy Grade: C)

Research on charter schools identifies the ability to hire like-minded staff as a key to success.²⁴ Our findings reveal that states and authorizers largely extend freedom to charters in the areas of establishing work rules, teacher salaries, and dismissal policies, but place greater restrictions in the area of teacher certification and some components of teacher compensation (such as participation in state retirement programs).

Teacher Certification (95 percent face some limitation)

Teacher certification was the most common area of restriction across all fourteen measures in our metric. Ninety-five of the 100 schools in our sample experienced some limitation regarding whom it could hire to teach. In all but one school, the restriction came from the state charter law. The most common restriction, affecting fifty-five schools, required charters to hire only state-certified teachers. The remaining forty schools had to seek a waiver from some certification requirements, had to hire certified staff in core subjects, or were allowed only a small percentage of uncertified teachers—and these typically had to be on track toward earning certification within a few years.

These restrictions are likely in response to federal requirements for every student to have a “highly qualified teacher.” States have some leeway under federal law to fashion different policies for charter schools, enabling them to employ teachers who are “highly qualified” but not necessarily certified through normal state channels. More than half of the schools in our sample, however, operated in states that bluntly applied blanket state certification requirements on charter schools.

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“It’s always a challenge to figure out what ‘Highly Qualified’ means. I have one teacher who is a ten-year veteran with a degree from Brown University and the state people tell me she doesn’t meet the HQ standards. They admit it doesn’t make sense, but they have to enforce it anyway.”

—Principal from a high-autonomy school

Compensation (47 percent face some limitation)

Our compensation metric examined two issues: restrictions related to participation in state retirement systems and restrictions on establishing teacher salaries. On **retirement**, about half of the schools in our sample (forty-six) experienced some constraint—many were required to participate in the state retirement system; others were excluded. Most principals interviewed did not discuss mandatory participation in a state retirement system as a burden. Some believed that participation helped charters compete with the district for experienced teachers. The freedom to opt out, however, allowed some charters to provide different benefits packages that may appeal to those not interested in retiring from a state system. Further, as one state charter representative noted, “There’s an ongoing battle . . . to make charters pay a portion of their per-pupil funds toward helping districts make good on the promises they made to teachers who have already retired from the system, or to provide health insurance to current district teachers. No one wants to talk about the impact that diverting these dollars would have on students.”

On **salary**, few charter schools (eleven) experienced constraints. Interviewees noted they used this freedom both to develop a pay scale competitive with the local district and to retain high performers and remain competitive with jobs outside the teaching profession. Several principals appreciated the freedom to pay professionals who were new to teaching based on their work experience elsewhere. A second principal from a high-autonomy school noted, “In every other industry I know, you can pay people better who do a better job, and that’s a freedom I have and appreciate as a charter school leader.”

Low-autonomy schools, by contrast, had overall limited control over salaries. A district authorizer of one of these schools noted, “Technically the charter is not required to

use the district pay scale, but we do require the school to have some type of scale they apply equally to all staff. We want it to be clear to staff, the parents, and the community what is going on. We can’t have the school deciding how each individual will be paid.”

Teacher Dismissal (22 percent face some limitation)

About one in five schools experienced limitations on teacher dismissal. These restrictions do not include authorizer efforts to prevent discriminatory practices. In fact, an authorizer from a state that scored high on autonomy noted, “Charter schools establish their own dismissal policies, but we require as part of our application process a review of the policies to make sure they are lawful and do not allow for discrimination.” Beyond these basic protections, some low-autonomy schools—particularly those that remain part of their districts—experienced hiring freedom while having to follow standard dismissal procedures. Some principals of low-autonomy schools expressed the desire for greater control over teacher dismissal because lack of that autonomy often resulted in a costly and prolonged process to dismiss an ineffective teacher.

Work Rules (16 percent face some limitation)

Most schools in our sample established their own teacher employment terms. Even some charter schools that did operate under existing collective bargaining agreements had developed memoranda of understanding (MOUs) with unions allowing waivers from the district’s standard work rules. In other places, however, the union sought to enforce the district-wide collective bargaining agreement, regardless of charter school teachers’ wishes. One authorizer said the local union demanded that charters cease providing a longer school day even though teachers agreed to work those hours for an added stipend. “Our charters are only as free as the union will let them be,” the authorizer noted, “but I think that charter schools are schools of choice for students *and for staff*. If the school has an extended day, and teachers sign up for that, they know what is expected of them.”

Vision and Culture (Average Autonomy Grade: C+)

To develop an intentional school culture guided by a charter vision, school leaders need autonomy from many of the rules that govern traditional school districts and the flexibility to amend charter contracts to meet evolving needs. In our sample, the large majority of schools (seventy) had to negotiate with their authorizer to change any component of their charter contract, and more than a

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third (thirty-nine) did not receive a blanket waiver from state regulations.

Revisions to Charters (70 percent face some limitation)

For charter leaders to respond to the changing student needs or amend approaches when original plans are not working, they need the flexibility to make mid-course corrections to their programs. For some schools, this may require amending their original charter. Eight schools in our sample were unable to make any changes to their charters until the charter was up for renewal. Most (sixty-two), however, could amend their charters, but it required renegotiation with their authorizers—a process that would vary in level of difficulty depending on the authorizer.

Because a charter is essentially a performance contract between a school and authorizer, it makes sense that schools cannot change the components of that charter without negotiating with the authorizer. States and authorizers of thirty schools in our sample, however, provided for broader charter autonomy by requiring only that major changes in direction—sometimes referred to as “material changes”—be approved by authorizers before taking effect (i.e., changing the student population served). Schools with this high level of autonomy could make other amendments to their programs without having to first obtain approval from authorizers. Some authorizers protected charter schools’ freedom to make mid-course corrections by developing contracts that gave wide latitude in several areas so changes did not constitute a revision. One authorizer, for example, required each of its schools to develop and follow a discipline policy, but explicitly allowed a school to amend that policy as needed (as long as it complied with the law) without it constituting a change to the charter.

Most of the charter leaders interviewed had not sought amendments or revisions to their charters, but interviews revealed some confusion about how to initiate the process and what constituted a “material” change. This confusion

may explain why most authorizers require across-the-board approval for all changes. While this resolves the question of what constitutes a material change, it also adds another layer of potentially unnecessary restriction.

Waivers from State and District Policies (39 percent face some limitation)

Nearly two-thirds of the schools in our sample received an automatic waiver or were otherwise freed from a wide range of state or district regulations that typically apply to public schools, such as certification requirements, teacher work rules, or the length of a school day or year. The remaining thirty-nine could receive waivers from individual regulations, but only if a higher authority (usually the state board of education) approved. The willingness of states to approve individual waivers varied widely according to interviewees. While one state authorizer admitted that no individual waivers were ever approved (and that charters did not routinely request them), a charter association leader in another state noted that individual waivers were “almost always approved, so much so that it’s nearly automatic.”

Interviews with high- and low-autonomy schools revealed much confusion over the existence of state waivers, what a waiver was, and whether it applied to their schools. One charter association leader in a state that scored low on autonomy admitted, “We have individual schools that don’t have a deep understanding of the flexibility and autonomy that they could advocate for, legally.”

Discipline Policies (28 percent face some limitation)

Most of the restrictions on student discipline policies originated from district authorizer contracts. Over half of the schools with district authorizers experienced limitations in this area. Districts may place greater restrictions on charter discipline policy because they remain legally responsible for charter schools that remain part of the district.

In addition, district authorizers deal most directly with results of strict charter discipline policies: Students who opt out of (or are *pushed* out of) strict charter schools must enroll in other district schools. To avoid these disruptions, some district authorizers encourage or require charter schools to adopt the district’s standard discipline code. One principal conceded, “We made a political decision to follow the district’s code of conduct because we knew from others’ experiences it would improve our chances of gaining a charter.”

“If I hadn’t had control over our discipline policy, I probably would not have applied for a charter—it’s that important to the vision of our school.”

—School principal

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Budget and Governance (Average Autonomy Grade: B)

Autonomy to develop an instructional program and manage staff at liberty can only occur when a school enjoys the flexibility to manage its resources and make dynamic decisions. In the areas of governance and finance, nearly half of charters faced a limitation on who could not—or had to—sit on the charter governance board. In addition, about a third of charter school leaders had to negotiate budgetary decisions with authorizers while most enjoyed autonomy in developing procurement policies and contracting with management organizations.

Governing Board Composition (45 percent face some limitation)

The members who sit on a charter school's governance board can impact a school's success. States and authorizers may require a certain number of individuals on a board or forbid individuals who may have conflicts of interest from serving on a board (neither of which decreased the autonomy scores in this study). However, forty-five schools in our sample faced restrictions over the composition of their governing boards that extended beyond these commonly accepted limitations. Two-thirds of these restrictions came from state laws and typically allowed authorizers, if they chose, to place an individual on the charter board (a heavy restriction that would earn the law or contract a zero). Nearly as common were less-restrictive requirements for a specific type of person—such as a parent or school employee—to be represented on the board.

Michigan charter schools faced the highest degree of authorizer control over board composition. In fact, some Michigan authorizers design and run the entire charter school board member selection process—even during the middle of the charter term. This wide control allows the authorizer to remove an entire charter board for failing to produce results and replace them.²⁵ Of course, such control may be used judiciously by an experienced, deft authorizer. It could also, in the hands of others, severely restrain the independent operation of a charter school.

Budgetary Control (31 percent face some limitation)

Five schools, all of which remained fiscally part of their local district, had extremely limited control over their budgets. Twenty-six others experienced moderate restriction in this realm, such as a requirement to submit a budget to the authorizer for official approval. This approval process provided authorizers with the ability to demand changes to a proposed budget. As with other restrictions,

this level of control may only have a negative impact on charter schools if the authorizer imposes certain types of spending or unduly restricts charter flexibility while responding to changing budgetary needs.

Contracting with Management Organizations (25 percent face some limitation)

In our sample, six schools were not allowed to contract with a management company even if they wanted to. Nineteen others needed authorizer approval to enter into a management contract. Still, because the decision to contract with a management organization typically occurs during the initial application process—and/or would constitute a “material change” to an existing charter contract—authorizers have significant control over most avenues for a school to engage an outside management organization, even without explicit legal or contractual language stating so.

Procurement Policies (21 percent face some limitation)

Only eleven schools faced heavy restrictions regarding procurement, meaning they were required to follow the existing procurement policies of the district or state. Interviewed schools did not regard procurement regulations as particularly cumbersome. One principal revealed, however, that her school had to participate in the same procurement training that the state mandated for districts: “Like any other district, I have to pay five hundred dollars every year to send someone from my school to get trained on procurement best practices—every single year.”

“Many charter applicants think they want autonomy in the area of special education, but they may not yet be aware of what they are taking on.”

—State association leader

Instructional Program (Average Autonomy Grade: B+)

For a charter school, the freedom to develop its own instructional program and then implement that program is central to achieving its academic mission. This study revealed that most charter schools—about 80 percent—have such freedom in regards to curriculum and school calendar. Almost half of them, however, had to negotiate

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with the district or use district-provided special education services.

Special Education Provision (45 percent face some limitation)

Most special education restrictions are federally mandated and apply to all public schools, including charter schools. For this review, we did not examine various federal requirements related to special education. Rather, we simply asked who held the power to decide who provides special education services. Nearly half of our sample of schools did not have control over who would provide special education. State law or charter contracts required eighteen schools to obtain all of their special education and related services from the local district and did not allow the school to procure or provide special education services on their own. With no room for negotiation or modification, district provision of special education services can result in a mismatch between the charter model and district services.

More than half of the restricted schools (twenty-seven) could negotiate with the district over who would provide special education services, but interviews revealed that negotiations did not always result in services that the charter operators believed were effective or worked well with their overall school program. Interviews revealed mixed views among charter leaders regarding district involvement in special education: Some wanted more assistance from districts and authorizers while others sought greater freedom to design services that worked well with their instructional models. The quality of district-provided services greatly influenced these reactions.

Curriculum (22 percent face some limitation)

Freedom to establish a curriculum was often a protected area of autonomy, even in low-autonomy schools. For

“We theoretically have wide curricular autonomy, but the state’s recent reauthorization of instructional materials resulted in charters now having to buy texts off of a state-approved list. This can limit curricular freedom even though it is not a direct limitation imposed by the law or authorizer.”

—Charter management organization representative

example, only one school in our sample was required to adhere in full to an existing curriculum. Even among schools with the worse autonomy grades (Ds and Fs), two-thirds still held freedom to design and implement their own curriculum. Authorizers at low-autonomy schools typically stated that curricular autonomy was important to allow the school to fulfill its role of supplementing the district’s portfolio of educational options.

Interviewees pointed to more subtle constraints on curricular autonomy. Some authorizers, for example, may narrow schools’ instructional choices at the application phase—perhaps as a result of past experience. As one high-autonomy district authorizer noted, “In recent years, we have definitely moved away from taking ‘leaps of faith’ on charter applications. In the past, we have seen too many of those leaps [result] in harm to students. There are too many proven approaches out there; [we can’t] justify that level of uncalculated experimentation on students.” Conversely, authorizer limitations may stem less from experience and more from other biases that unnecessarily limit approved curricula to those with which the authorizer is familiar or comfortable.

Establishment of a School Calendar (21 percent face some limitation)

About one in five charter schools faced moderate restriction in establishing the length of the school day or year. Even for those schools with nominal autonomy in this area, several limitations influenced them to follow the district calendar—difficulty accessing district services (e.g., pupil transportation) outside the district school year, lack of additional funding for additional school days, and parental demands for a standard calendar.

Summary Findings

Table 5 provides autonomy scores for each of the 100 schools in our sample ordered from most to least autonomous. For each school, the table shows the state law score and grade, the additional impact of the charter contract on each school’s autonomy, and the school’s overall autonomy score and grade.

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Table 5: School Autonomy Grades

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
Gertz-Ressler High School	Los Angeles Unified School District	CA	93%	A-	+4%	96%	A
Civicorps Middle School	Oakland Unified School District	CA	93%	A-	+4%	96%	A
Charter for Excellence	Arizona State Board for Charter Schools	AZ	96%	A	-4%	93%	A-
Salt River Pima-Maricopa Indian Community School	Arizona State Board for Charter Schools	AZ	96%	A	-4%	93%	A-
High Tech High Statewide Benefit	California Department of Education	CA	93%	A-	0%	93%	A-
Aspire: ERES Academy	Oakland Unified School District	CA	93%	A-	0%	93%	A-
Aspire Capital Heights Academy	Sacramento City Unified School District	CA	93%	A-	0%	93%	A-
The Language Academy of Sacramento	Sacramento City Unified School District	CA	93%	A-	0%	93%	A-
High Tech High	San Diego Unified School District	CA	93%	A-	0%	93%	A-
National Collegiate Prep PCS High	D.C. Public Charter School Board	DC	93%	A-	0%	93%	A-
Hope Academy PCS	D.C. Public Charter School Board	DC	93%	A-	0%	93%	A-
Stephen F. Austen State University Charter	Texas Education Agency	TX	93%	A-	0%	93%	A-
Everest Charter School	California Department of Education	CA	93%	A-	-4%	89%	B+
Granada Hills Charter School	Los Angeles Unified School District	CA	93%	A-	-4%	89%	B+
Phoenix Charter Academy	Massachusetts Department of Education	MA	89%	B+	0%	89%	B+
Pioneer Charter School	Massachusetts Department of Education	MA	89%	B+	0%	89%	B+
Evergreen Community Charter	North Carolina Department of Education	NC	89%	B+	0%	89%	B+
Thomas Jefferson Classical Academy	North Carolina Department of Education	NC	89%	B+	0%	89%	B+

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Table 5: School Autonomy Grades — *continued*

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
Agora Cyber Charter	Pennsylvania Department of Education	PA	93%	A-	-4%	89%	B+
Achievement House Cyber Charter	Pennsylvania Department of Education	PA	93%	A-	-4%	89%	B+
George Gervin Academy	Texas Education Agency	TX	93%	A-	-4%	89%	B+
Gompers Area Middle Charter School	San Diego Unified School District	CA	93%	A-	-7%	86%	B
Nampa Classical Academy	Idaho Public Charter School Commission	ID	82%	B-	+4%	86%	B
International School of Columbus	Ball State University	IN	86%	B	0%	86%	B
The Bloomington Project School	Ball State University	IN	86%	B	0%	86%	B
Spectrum High School	Volunteers of America-Minnesota	MN	86%	B	0%	86%	B
Academy of Business and Technology	Ashe Cultural Center	OH	86%	B	0%	86%	B
The Academy of Cleveland	Ashe Cultural Center	OH	86%	B	0%	86%	B
Phoenix Community Learning Center	Thomas B. Fordham Foundation	OH	86%	B	0%	86%	B
Columbus Collegiate Academy	Thomas B. Fordham Foundation	OH	86%	B	0%	86%	B
Menlo Park Academy	Lucas County Education Services Center	OH	86%	B	0%	86%	B
New Choices Community School	St. Aloysius of Cincinnati	OH	86%	B	0%	86%	B
Bella Academy of Excellence	St. Aloysius of Cincinnati	OH	86%	B	0%	86%	B
Octavio Paz Charter School	Chicago Public Schools	IL	89%	B+	-7%	82%	B-
Legacy Charter School	Chicago Public Schools	IL	89%	B+	-7%	82%	B-
International School of Louisiana	Louisiana Board of Elementary and Secondary Education	LA	82%	B-	0%	82%	B-

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Table 5: School Autonomy Grades — *continued*

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
KIPP Minnesota	Volunteers of America-Minnesota	MN	86%	B	-4%	82%	B-
Virtual Learning Academy	New Hampshire Department of Education	NH	82%	B-	0%	82%	B-
Capitol City Academy	Education Resource Consultants of Ohio	OH	86%	B	-4%	82%	B-
Legacy Academy	Education Resource Consultants of Ohio	OH	86%	B	-4%	82%	B-
Westpark Community School	Lucas County Education Services Center	OH	86%	B	-4%	82%	B-
Achievement First Hartford Academy	Connecticut Department of Education	CT	79%	C+	0%	79%	C+
Maurice J. Moyer Academy	Delaware State Board of Education	DE	79%	C+	0%	79%	C+
Fulton Science Academy	Fulton County School Board	GA	79%	C+	0%	79%	C+
Eagle Ridge Academy	Friends of Education	MN	86%	B	-7%	79%	C+
Nova Classical Academy	Friends of Education	MN	86%	B	-7%	79%	C+
Learning for Leadership	Pillsbury United Communities	MN	86%	B	-7%	79%	C+
Richard Alan Math and Science Academy	Pillsbury United Communities	MN	86%	B	-7%	79%	C+
Academy for Science and Design	New Hampshire Department of Education	NH	82%	B-	-4%	79%	C+
East New York Collegiate Charter School	State University of New York	NY	82%	B-	-4%	79%	C+
New Roots Charter School	State University of New York	NY	82%	B-	-4%	79%	C+
City Academy	Utah State Office of Education	UT	79%	C+	0%	79%	C+
Summit Academy	Utah State Office of Education	UT	79%	C+	0%	79%	C+
The School for Young Children	Connecticut Department of Education	CT	79%	C+	-4%	75%	C

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Table 5: School Autonomy Grades — continued

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
The Charter School of Wilmington	Red Clay Consolidated School District	DE	79%	C+	-4%	75%	C
Tampa Advantage Academy	Hillsboro County Public Schools	FL	86%	B	-11%	75%	C
Andrew J. Brown Charter	Indianapolis Mayor's Office	IN	86%	B	-11%	75%	C
Indianapolis Lighthouse	Indianapolis Mayor's Office	IN	86%	B	-11%	75%	C
State Landmark Academy	Saginaw Valley State University	MI	86%	B	-11%	75%	C
Detroit Community School	Saginaw Valley State University	MI	86%	B	-11%	75%	C
St. HOPE Leadership Academy	New York City Department of Education	NY	82%	B-	-7%	75%	C
Renaissance Charter School	New York City Department of Education	NY	82%	B-	-7%	75%	C
Girls Preparatory Charter	State University of New York	NY	82%	B-	-7%	75%	C
Hellenic Classic Charter School	New York City Department of Education	NY	82%	B-	-7%	75%	C
Provist Academy Charter	Colorado Charter School Institute	CO	75%	C	-4%	71%	C-
Newpoint High of Tampa	Hillsboro County Public Schools	FL	86%	B	-14%	71%	C-
Ridgeview Global Studies Academy	School Board of Polk County	FL	86%	B	-14%	71%	C-
Chain of Lakes Collegiate High School	School Board of Polk County	FL	86%	B	-14%	71%	C-
Capital Area Academy	Central Michigan University	MI	86%	B	-14%	71%	C-
Cross Creek Charter Academy	Central Michigan University	MI	86%	B	-14%	71%	C-
Thomas McLaren State Charter School	Colorado Charter School Institute	CO	75%	C	-7%	68%	D+
Envision Leadership Prep	Denver Public School District	CO	75%	C	-7%	68%	D+

FINDINGS

Table 5: School Autonomy Grades — continued

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
West Denver Prep	Denver Public School District	CO	75%	C	-7%	68%	D+
Integrated Science and Asian Culture Academy	School Board of Miami-Dade County	FL	86%	B	-18%	68%	D+
South Tech Academy	School District of Palm Beach County	FL	86%	B	-18%	68%	D+
Keystone Academy	Bay Mills Community College	MI	86%	B	-18%	68%	D+
Ojibway Charter School	Bay Mills Community College	MI	86%	B	-18%	68%	D+
New Bedford Academy	Ferris State University	MI	86%	B	-18%	68%	D+
Francis Reh Academy	Ferris State University	MI	86%	B	-18%	68%	D+
Circles of Success Learning Academy	Memphis City Schools	TN	68%	D+	0%	68%	D+
Memphis Business Academy	Memphis City Schools	TN	68%	D+	0%	68%	D+
Hialeah Educational Academy	School Board of Miami-Dade County	FL	86%	B	-21%	64%	D
DeKalb Path Academy	DeKalb County School District	GA	79%	C+	-14%	64%	D
William J. Fischer Elementary	Louisiana Board of Elementary and Secondary Education	LA	86%	B	-21%	64%	D
Sweetwater Branch Academy	School Board of Alachua County	FL	86%	B	-25%	61%	D-
North Valley Academy	Idaho Public Charter School Commission	ID	82%	B-	-21%	61%	D-
The Learning Community Center	Albuquerque Public Schools	NM	61%	D-	0%	61%	D-
Twenty-First Century Public Academy	Albuquerque Public Schools	NM	61%	D-	0%	61%	D-
Cien Aguas International School	New Mexico Department of Education	NM	61%	D-	0%	61%	D-
Horizon Academy West	New Mexico Department of Education	NM	61%	D-	0%	61%	D-

FINDINGS

Table 5: School Autonomy Grades — continued

School Name	Authorizer Name	State	State Law Score	State Law Grade	Authorizer Impact on Score	School Autonomy Score	School Autonomy Grade
Florida School for Integrated Academics and Technology	School Board of Alachua County	FL	86%	B	-29%	57%	F
Stephen Foster Elementary	Appleton Area School District	WI	57%	F	0%	57%	F
Peachtree Middle School	DeKalb County School District	GA	75%	C	-21%	54%	F
Life Skills Center	School District of Palm Beach County	FL	86%	B	-36%	50%	F
Ridgeview Charter School	Fulton County School Board	GA	75%	C	-25%	50%	F
Highland Community School	Milwaukee Public Schools	WI	75%	C	-29%	46%	F
Odyssey-Magellan	Appleton Area School District	WI	57%	F	-14%	43%	F
Baltimore Civitas No. 343	Baltimore City Public Schools	MD	54%	F	-14%	39%	F
Wolfe Street Academy	Baltimore City Public Schools	MD	54%	F	-18%	36%	F
Fritsche Middle School	Milwaukee Public Schools	WI	57%	F	-36%	21%	F

Note: Individual state scores broken down by area of operation, as well as all state/school scores across authorizer type (school district, mayor, non-profit, etc.) and charter type (start-up, conversion, etc.), are available online at http://www.edexcellence.net/index.cfm/news_charter-school-autonomy-a-half-broken-promise. Individual school scores are available by request; email info@edexcellence.net.

How to read this figure: The (Arizona) state charter law governing the Charter for Excellence school received a grade of 96 percent or an A for the autonomy it extended to the school. The charter contract for the Charter for Excellence school, issued by the Arizona State Board for Charter Schools, reduced that grade by 4 percentage points to an A- or 93 percent.

IMPLICATIONS FOR POLICY AND PRACTICE

Formal laws or contracts and subtle influence both constrain charter autonomy. Each new encroachment—a new reporting requirement, pressure to adhere to common practice, or efforts to micromanage the enrollment composition of a school—may stem from a well-intentioned goal. The result, however, is what one high-autonomy charter leader termed “death by a thousand paper cuts,” a phenomenon that pushes charters inexorably toward existing bureaucratic norms. “None [of these challenges] are insurmountable,” she admitted, “but together they divert serious time, money, and energy toward compliance and away from our mission of educating our students.” To counter this encroachment and uphold the autonomy side of the charter bargain, changes in policy and practice must occur at the state, authorizer, and school levels.

Implications for State Policy Makers

State policy makers committed to extending autonomy to charter schools should begin with revising their charter laws—the greatest source of restriction for many charter schools—by targeting the areas in which they have not yet extended autonomy. Most state laws and rules were not designed with single-campus charter schools in mind. Regulations that may make sense for a typical district—such as an enrollment requirement to qualify for funding, or the development of comprehensive policies for relatively rare situations—can wreak havoc when applied to a 200-student school versus a district of 15,000.

The goal of state policy makers should not be autonomy for autonomy’s sake. Rather, the goal should be educational effectiveness. Autonomy is simply the means to provide charter schools with a fair chance to demonstrate that they can improve student achievement. The areas of state law that should receive immediate attention include:

- *Providing automatic waivers* for charter schools from most laws and regulations that typically apply to districts and traditional public schools. This is a catch-all way for states to provide a broad range of autonomy as a default.

- *Extending staffing autonomy* for charter schools, including freedoms from teacher certification requirements and mandatory participation in retirement programs, which are common areas to restrict, and autonomy from existing salary schedules, established work rules, and staff dismissal policies, which are less-commonly restricted, but centrally important to charter school success, according to staff from both high- and low-autonomy schools.

In addition, since authorizers also play a role in determining charter school autonomy, state policy makers could enhance school autonomy via policies that foster better authorizing, including:

- *Allow for multiple types of authorizers.* Non-district authorizers appear more willing to maintain or extend school autonomy. Their existence may also produce powerful incentives for districts, either to enhance the freedoms of the schools they authorize or to cease authorizing low-autonomy schools altogether.
- *Foster a skilled corps of authorizing agencies.* Authorizers committed to the charter ideal of autonomy for accountability are more apt to use restrictions carefully in pursuit of school quality while maintaining wide latitude for charter schools. States should provide guidance and support to help authorizers use restrictions judiciously and hold authorizers accountable to living up to this ideal.
- *Override authorizers’ ability to impose additional constraints.* For example, state policy makers could not only allow charter schools to deviate from conventional salary schedules but also forbid authorizers from reimposing these requirements.

Implications for Authorizers

Although authorizers place fewer formal restrictions on autonomy than do state laws, they may negatively impact charter autonomy through authorizing practices and informal influence. To protect charter freedoms, authorizers should:

- *Understand that blanket policies and mandatory standard practices may quash both common-sense and path-breaking approaches by the next generation of charter schools.* As authorizers gain chartering experience, they are bound to develop

viewpoints about what practices schools should and should not adopt. In well-meaning attempts to foster school quality, they may be tempted to codify these “lessons learned” into contract restrictions or other constraints on charter autonomy. Ironically, the charter sector was founded in an effort to escape the traditional bureaucratic restrictions that arose from exactly this kind of experience accumulation in the district sector. Though such constraints may well be justified, authorizers should weigh them carefully against a general bias to maintain school autonomy in the charter sector.

- **Recognize that authorizers can wield strong, informal influence over their charter schools, especially those that remain part of the district.** Authorizers committed to charter autonomy should examine not just their formal policies, practices, and contracts, but also the informal communication and indirect requirements that may induce applicants or schools to self-restrict. One principal of a low-autonomy school said, “Our autonomy should be measured not necessarily by what we can finally do, but by the fact that we always have Big Brother watching us. We’re constantly saying, ‘Is that OK? Is that OK?’ I think for most charters like us, it can become easier to play the district’s game than do what we need to do.” This informal influence can be powerful at the application stage, when petitioners eager to obtain charters may compromise their own vision and approach dramatically to meet real or perceived authorizer expectations. These schools’ formal autonomy may remain intact, but they will have narrowed their focus in ways that limit the dynamism of the sector.

Implications for Charter School Operators

- **Know in advance what areas of autonomy must be negotiated.** Charter operators should not hesitate to advocate for the full measure of autonomy provided by law and lobby for broader freedoms in policy and practice.
- **Choose an authorizer with care.** If possible, charter operators should choose an authorizer with a demonstrated history of providing charters with broad autonomies in exchange for high accountability.

- **Choose a state wisely.** For those operators that operate across multiple states, choosing to petition for charters in states that grant high autonomy will provide charter schools with the greatest opportunity to develop innovative and effective institutions.

Implications for the Charter Sector

Beyond state policy makers and authorizers, charter advocates can take steps to support and expand school autonomies. They should:

- **Remain vigilant in protecting charters from creeping regulations.** Even when charter advocates believed that charters enjoyed appropriate autonomy, many noted that it was a constant battle to protect autonomy from bureaucratic creep. As one charter association leader said of district authorizers, “A district is inherently always working toward uniformity—bureaucracy works better that way—so districts try to reduce exceptions, like charters.”
- **Build a pipeline of well-informed, energetic charter school leaders.** Our interviews revealed that whether a charter school had a high or low autonomy grade, its level of actual autonomy hinged in part on the willingness and capacity of its leader to understand her rights, negotiate with authorizers aggressively, and, in some cases, know when it was better to seek forgiveness than permission. Charter proponents should: (1) Undertake efforts to draw these types of leaders into the sector and (2) provide relevant, timely, and comprehensive information or training to leaders. Autonomy is only as good an opportunity as a school leader makes it. Building the supply and skill of charter leaders could serve as a means of protecting autonomy at the school level, even in the midst of a policy environment that is antagonistic to it.

CLOSING

The charter bargain consists of two equally essential components—broad operational autonomy coupled with strong accountability for results. As national and state-level focus turns more intently toward ensuring charters are rightly held accountable for student performance, policy makers and authorizers must also ensure that charter schools are given a fair chance to improve student performance. They can do this by protecting existing autonomies and lifting restrictions in the areas reviewed here. This study has shown that, in many places, states and authorizers fall far short of upholding the promise of autonomy even while strengthening accountability.

For charters to fulfill their promise of creating high-quality programs that better meet students' needs, they need both components of the bargain. Leaders at all levels—state, authorizer, and school—can play a role in making good on this dual promise.

ACKNOWLEDGMENTS

The national advisory panel members (listed in Appendix A) deserve many thanks for sharing their time and expertise in the design and draft phases of this project. Their guidance helped us to focus tightly on school-level freedoms and identify relevant proxies for broad areas of autonomy.

We also thank the National Association of Charter School Authorizers for providing an authorizer database that enabled us to identify the most active authorizers in the country.

The authorizers (listed in Table 5) shared examples of typical charter school contracts and, in some cases, agreed to speak with us to provide deeper insights into their authorizing practice. We appreciate as well the leaders of the state charter associations in the states covered by this study; they provided welcome feedback on our state charter-law scoring, pointed us to additional resources, and helped us improve the accuracy of our work. In addition, some of them also shared their insights into the challenges and opportunities that their members experience.

We are especially grateful to the charter principals who took time to share their stories and thoughts about how autonomy, or its absence, has influenced their schools and their work.

Finally, we would like to thank Lauren Morando Rhim for her initial work and guidance on this project, Bryan Hassel and Julie Kowal of Public Impact for their thoughtful editing, Michael Petrilli and Chester E. Finn, Jr. of the Thomas B. Fordham Institute for their comments and suggestions, and Fordham's Amber Winkler for her overall direction and support of the project.

ENDNOTES

- 1 Howard, “Why freer schools are better schools.”
- 2 See, for example, Adamowski, Therriault, and Cavanna’s *The autonomy gap: Barriers to effective school leadership*.
- 3 Yamashiro and Carlos, *More on charter schools*.
- 4 Budde, *Education by charter*.
- 5 Shanker, 1988 speech.
- 6 The Thomas B. Fordham Foundation opted to be a part of this study, even though it is not one of the fifty biggest authorizers (it charters only six schools). As sister organization to the publisher of the report (Thomas B. Fordham Institute), the Foundation welcomed the opportunity to have a sampling of its schools examined. Additionally, due to a sampling error, one school authorized by the Red Clay Consolidated School District in Wilmington, Delaware was included in the study. As of May 2010, Red Clay Consolidated School District had authorized four charter schools; we defined our “biggest” authorizers as those who charter more than ten schools.
- 7 Not every charter school has an actual “contract” with its authorizer. For some, the charter application or petition becomes the document under which the school operates. Other authorizers issue a boiler-plate contract to each school. In this report, we refer to all documents agreed upon by authorizers and charter operators as the guiding document for the charter as “charter contracts” or “contracts” for short.
- 8 The Alliance’s work examines many aspects of state charter laws, including some areas of autonomy included in this study. See: <http://www.publiccharters.org/charterlaws> for the Alliance’s interactive state charter-law rankings database.
- 9 Ziebarth, *How state charter laws rank*.
- 10 Center for Education Reform, Charter school law ranking and scorecard 2010.
- 11 Hess and Higgins, *Learning to succeed at scale*; Merseth et al., *Inside urban charter schools*; U.S. Department of Education, *Innovations in education*; Luyten et al., *School factors related to quality and equity*. We chose three proxies to measure autonomy in the area of “vision/culture,” by which we mean establishing and implementing a vision and school culture. The first proxy, waivers from state and district policies, provides flexibility for a school to implement a unique vision by freeing its leaders from restrictions placed on typical district schools. Freedom to establish a school’s own discipline policy, the second proxy, clearly affects cultivation of a specific school culture. Finally, the freedom to revise a charter contract allows a charter leader to change an instructional program, curriculum, or other component of the charter contract that may stand in the way of the school pursuing its vision or shaping its culture.
- 12 Davies and Hentschke, “School autonomy.”
- 13 U.S. Department of Education, *Innovations in education*; Merseth et al., *Inside urban charter schools*; Johnson and Landman, “Sometimes bureaucracy has its charms.”
- 14 Davies and Hentschke, “School autonomy”; Wohlstetter, Wenning, and Briggs, “Charter schools in the United States”; Finnigan, “Charter school autonomy.”
- 15 In some cases, we reviewed additional state laws if the charter law pointed to other statutes or regulations that applied to charters and were relevant to the fourteen areas measured by our metric. We did not conduct a full analysis of all state laws that may apply to charter schools.
- 16 Because the design and scope of the project called for two contracts per authorizer, we did not request examples of all types of charter contracts an authorizer had negotiated. To see the types of authorizer contracts we reviewed in each state, see Appendix D.

ENDNOTES

- 17 We did not review the state charter laws for fourteen states: Alaska, Arkansas, Hawaii, Iowa, Kansas, Missouri, Nevada, New Jersey, Oklahoma, Oregon, Rhode Island, South Carolina, Virginia, and Wyoming. Collectively, these states had 419 charter schools in 2009, only 8 percent of all charter schools. Source: Center for Education Reform, *National Charter School & Enrollment Statistics 2009*. Available at: http://www.edreform.com/_upload/CER_charter_numbers.pdf.
- 18 The fifty authorizers in our sample had authorized 2,026 schools by the 2007-08 school year, at which time there were 4,220 charter schools operating across the nation.
- 19 This is a weighted average. The simple average autonomy score for our 100 schools was a 76 percent, or a C. Alternate weighting schemes, such as weighting state grades by charter enrollment in the states, return similar grades to what we report here. See Appendix C for more detail on sample weighting.
- 20 There are fourteen schools in our “autonomy top ten” because six states (FL, IN, LA, MI, MN, OH) tied with an 86 percent for ninth and tenth places. Only two of the ten biggest charter states (those with the most charter schools) are not in our top ten: CO (C autonomy grade) and WI (C/F autonomy grade). Source for charter numbers: Center for Education Reform, *National Charter School & Enrollment Statistics 2009*. Available at: http://www.edreform.com/_upload/CER_charter_numbers.pdf.
- 21 When contractor restrictions are factored in, this rises to 95 percent.
- 22 “Legally independent” refers to charters that are fully responsible for their own actions and do not remain under the legal umbrella of another entity such as a school district. Authorizers of legally independent schools typically state in charter contracts that they, as authorizers, are not legally liable for charter school actions and cannot be sued for actions taken by the charter schools.
- 23 In 2008, the National Association of Charter School Authorizers reported 819 active authorizers in the country, of which 726 were local districts. Only 10 percent (seventy-three) of these districts had authorized more than five schools. See: http://www.qualitycharters.org/files/public/Authorizing_Report_2008_FINrev_web.pdf.
- 24 U.S. Department of Education, *Innovations in education*; Merseth et al., *Inside urban charter schools*; Johnson and Landman, “Sometimes bureaucracy has its charms.”
- 25 Our metric coded these Michigan-specific restrictions on charter board composition as authorizer-based rather than state-law-based. Michigan’s state law does require authorizers to “adopt a resolution establishing the method of selection, length of term, and number of members of the board of directors of each public school academy subject to its jurisdictions,” but does not require authorizers to deviate from schools’ proposals on these issues. Michigan authorizers may argue, however, that they effectively must impose these restrictions in order to fulfill their broader responsibilities as overseers of public schools.
- 26 See the National Alliance for Public Charter Schools’ 2010 charter dashboard. Available at: <http://www.publiccharters.org/dashboard/schools/page/overview/year/2010/>.
- 27 O’Neill and Ziebarth, *Charter School Law Deskbook*.
- 28 Education Commission of the States, “State Profiles—Charter Schools.” Available at: <http://mb2.ecs.org/reports/Report.aspx?id=65>. Accessed: September 2009.
- 29 For a more in-depth view of these various system-level autonomies across all states with charter laws, see the National Alliance for Public Charter Schools’ *How State Charter Laws Rank Against the New Model Public Charter School Law*. Available at: http://www.publiccharters.org/files/publications/DB-ModelLaw_Report_01-12-10.pdf.

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APPENDICES

Appendix A: Advisory Panel

The national advisory panel included former and current school operators, charter authorizers, and experts on charter legislation. They met in the summer of 2009 to help craft the study design and metrics and also provided feedback on the draft report.

Erin Dillon, Policy Analyst, Education Sector

Deborah McGriff, Partner, NewSchools Venture Fund

James Merriman, Chief Executive Officer, New York City Charter School Center

Paul O'Neill, Senior Fellow, Edison Learning

Greg Richmond, President, National Association of Charter School Authorizers

Nelson Smith, President and CEO, National Alliance for Public Charter Schools

Perry White, Founder and Executive Director, Citizens' Academy

Appendix B: Autonomy Metric and Scoring Procedures

VISION AND CULTURE		
Measure	Indicator	Score
Waivers From State/ District Policy	School is not eligible for waivers of law and policy	0
	School is not granted blanket waivers, but may apply for specific waivers	5
	School granted automatic waiver of all state and local policies (excluding health, safety, civil rights, academic and fiscal accountability, etc.)	10
Discipline Policies	School must use district discipline policy	0
	School may seek waiver from district discipline policies	5
	School may establish its own discipline policy	10
Charter Revisions	School is prohibited from making revisions to charter agreement outside of formal renewal process	0
	School may make revisions but all revisions subject to negotiations with authorizer	5
	School may make revisions, but only major changes in direction (e.g., student population served, overall education program, use of EMO) require authorizer pre-approval	10
TOTAL POSSIBLE POINTS		30

PROGRAM		
Measure	Indicator	Score
Instructional Program	School must follow established curriculum, including sequencing and pacing, in all subjects	0
	School may design some but not all elements of its curriculum, or must seek a waiver from instructional program requirements	5
	School may design its own curriculum (e.g., select curriculum materials, develop pacing guides, graduation requirements)	10
Special Education Provisions	School is required to obtain all special education and related services from the district	0
	School negotiates with local district to determine how special education services will be provided	5
	School is wholly responsible for determining how to provide or obtain special education services	10
School Time	School must follow established school schedule and calendar (e.g., length of day, school calendar)	0
	School must follow either established school schedule or calendar or must seek a waiver to alter school schedule or calendar	5
	School may establish individual school schedules and calendar	10
TOTAL POSSIBLE POINTS		30

APPENDICES

Appendix B: Autonomy Metric and Scoring Procedures *(continued)*

STAFFING		
Measure	Indicator	Score
Teacher Employment Terms	School employees are automatically covered by existing district CBA or established work rules	0
	School employees must abide by select terms of CBA or established work rules	5
	School employees are employees of the charter school and are exempt from existing district CBA or established work rules	10
Dismissal	School must follow staff dismissal procedures prescribed by state or district	0
	School may seek waiver of staff dismissal procedures	5
	School may dismiss staff without restrictions beyond basic civil rights and anti-discrimination protections	10
Certification	All charter school instructional personnel must be certified according to state regulation	0
	Some instructional staff must be certified (e.g., only staff in core subjects, or a specific percentage of staff) or school may seek a waiver of certification requirements	5
	State certification requirements waived for charter school teachers	10
Compensation	Salary schedule and retirement plan dictated to charter school	0
	Specific aspects of salary schedule or retirement plan or both are dictated to charter school.	5
	School is granted full discretion related to determining salary scale and retirement system	10
TOTAL POSSIBLE POINTS		40

FINANCIAL AND GOVERNANCE		
Measure	Indicator	Score
Board Governance Structure	Composition of school board is prescriptive (i.e. law prescribes membership)	0
	Composition of school board is somewhat prescriptive (e.g., some members of board are prescribed)	5
	Composition of school board is not prescriptive (e.g., no limits beyond language related to nepotism and/or basic conflicts of interest)	10
Budgetary Fungibility	School must follow established state guidelines for the allocation of all funding	0
	School can negotiate level of budgetary discretion	5
	School has substantial budgetary discretion	10
Management Organizations	School is prohibited from contracting with a management organization	0
	School is prohibited from contracting with a for profit management organization or the contract is subject to authorizer approval	5
	School may enter into a partnership with a management organization	10
Procurement	School must follow standard procurement procedures used by district or state	0
	School may seek waiver of standard procurement procedures used by district or state	5
	School may develop own procurement procedure reflecting standard best practices (e.g., seek multiple bids for large contracts)	10
TOTAL POSSIBLE POINTS		40

Appendix C: Procedures

Defining Autonomy

We based our definition of autonomy on the premise that charter schools should be accountable for outputs and have autonomy over inputs. Based on meetings with our advisory panel and on our literature review (which covered school autonomy, successful charter schools, and high-performing schools), we identified four main areas where charter schools need freedom: vision and culture, instructional program, staffing, and finance and governance.

Developing a Measurement Tool

To quantify autonomy, we sought a measurement tool that was comprehensive but practical enough to employ across many schools in multiple states. The final metric spanned fourteen distinct charter freedoms that fell within the four main areas of autonomy identified above. For the full metric, see Appendix B.

Components not included in our metric

First, our definition recognizes some basic requirements—those related to academic results and accountability, fiscal responsibility, health and safety, and civil rights protections—as necessary restrictions on autonomy.

Additionally, our definition does not consider the individual autonomy of staff within a school (e.g., a teacher's autonomy to decide how to teach certain material). Our focus is on the school's autonomy relative to oversight entities such as authorizers, districts, and states.

Finally, we do not consider deliberate decisions by a charter school to limit its own autonomy to be an infringement on autonomy. Schools choosing to delegate day-to-day operations to a management organization, for example, do not earn lower autonomy grades in our metric.

Creating a National Charter School Sample

We enlisted the help of the National Association of Charter School Authorizers (NACSA) to help gather our sample of charter contracts. NACSA provided us with a list of the nation's most active authorizers—sixty-six of them who have each authorized more than ten charter schools. We contacted these sixty-six authorizers and asked them to share two charter contracts that reflected “common”

agreements the authorizer developed with its charter schools. If the authorizer chartered multiple types of schools, we requested that they share two contracts that reflected a sample of the diversity of schools they had approved. Fifty authorizers from twenty-six states (including the District of Columbia) participated in the study and, as a group, provided us with the 100 charter school contracts reviewed in this study. The schools spanned the range of charter types and authorizers in the country. Twelve percent were charter conversions; nationally, that figure dips to 10.5 percent.²⁶ We also included virtual schools and both independent start-ups and those affiliated with a management organization. Every authorizer type—higher education institution, state board of education, state charter commission, district, nonprofit, and mayor—was represented.

While our sample is not random, the fifty authorizers included have chartered over 2,026 schools, nearly half of the charter schools in the country. Further, the twenty-six state charter laws cover 92 percent of charter schools operating in the country.

Gathering Data

We reviewed state charter laws and other relevant laws and graded each state against our metric. To the extent that the charter laws referenced other articles or statutes, we reviewed them; however, our primary focus was on restrictions contained within each state's charter law. We used the 2008-09 *Charter School Law Desk Book*²⁷ as our source for state charter-law text. We used the Education Commission of the States “State Charter Law Reports” to access information on state retirement systems.

In some cases, state laws granted different levels of autonomy to different charter schools. For example, in Wisconsin, state law allows for two distinct degrees of freedom to be granted to charter schools; these two classifications, “instrumentalities” and “non-instrumentalities,” each encompass varying types of charters (start-up, conversion, etc.), but differ in the amount of freedom that each enjoys at the state level. Although both of these charter types are authorized by and remain part of a district, Wisconsin extends greater autonomy to non-instrumentalities, particularly in the areas of teacher work rules, dismissal policies, and compensation. We reviewed and scored laws governing each charter school classifica-

APPENDICES

tion separately. For Wisconsin as well as for Georgia and Louisiana, we produced two state law grades to reflect the various autonomies granted to different charter types.

After grading each state law, we reviewed the charter contracts from each state and generated a school autonomy grade for each school. Within each of the twenty-six states for which we reviewed the charter law, we did not review contracts for every charter school type available. Where relevant, we noted if the final autonomy score would differ for other charter types in the state.

We also reviewed—when they were provided by authorizers—charter applications, memoranda of understanding, application revision requests, and other materials.

Grading Procedures

Our grading metric allowed for nuance, but also reflected the scope of our work. We measured each of the fourteen areas of autonomy and assigned one of three scores: high (ten points), moderate (five points), and low autonomy (zero points). In general, a high-autonomy score of ten corresponded with broad freedom for a school (within the necessary boundaries discussed earlier). A low-autonomy score of zero corresponded with very little or no freedom for a school—meaning the school’s choices were severely restricted or a particular “choice” was imposed in that area. A moderate autonomy score of five was assigned when schools received complete autonomy in one way, but not another (e.g., for the “compensation” metric, a school with a five score may have freedom over developing a salary schedule but not over participation in the state retirement plan). Moderate autonomy scores also included instances when full autonomy was possible but not guaranteed (e.g., a charter school could not institute its own school calendar without approval by the surrounding district, or a school could hire uncertified teachers after receiving a waiver—but that waiver was not guaranteed by law).

If the state law was silent on an issue addressed in our metric, we assigned a score of ten; if a charter contract was silent on an issue, we carried over its state law score. We tallied scores for each state and contract and divided by the maximum number of points (140). We assigned grades on a standard A through F scale, as outlined in Table C-1.

In addition to the rubric, we also developed six rules for measuring specific components of charter laws (the applicable metric appears in parentheses):

Table C-1: Letter Grade Ranges

Grade	Score Range
A+	100% – 97%
A	96% – 94%
A-	93% – 90%
B+	89% – 87%
B	86% – 84%
B-	83% – 80%
C+	79% – 77%
C	76% – 74%
C-	73% – 70%
D+	69% – 67%
D	66% – 64%
D-	63% – 60%
F	<60%

1. High school graduation requirements contained within state laws were not an infringement on autonomy, unless those restrictions specifically established sequence and instruction for schools—which would earn a zero (Instructional Program).
2. All course theme requirements, such as “teaching of the Constitution” or “informing students about the tenants of national socialism,” were a “moderate” infringement on autonomy and earned a five (Instructional Program).
3. The prescription of any member of a school’s governing board was an infringement on autonomy that earned a zero, unless the member or members prescribed were nonvoting (Governance). Requirement for a specific “type” of person—a teacher or a parent—was considered a moderate infringement and earned a five.
4. The ability of an authorizer to revise a school’s budget—either through a formal process or through comment-and-review procedures—was a moderate infringement on autonomy (earning a five), unless the scope of the revisions was explicitly restricted to due

APPENDICES

diligence and the prevention of fraud (Budgeting).

5. Any language establishing authorizer decision-making control over a school's ability to contract with a management organization was a moderate infringement on autonomy, unless that control was explicitly restricted to due diligence and the prevention of fraud (Management Organizations).
6. Restrictions on large purchases were not considered restrictions on autonomy; however, restrictions on small purchases (earning a five) or blanket restrictions on purchasing (a zero) were considered infringements (Procurement).

Confirming Metric Scores for State Charter Laws

We received 100 percent response from the twenty-six state charter associations representing the states from which we drew the charter contracts reviewed in this analysis. Three associations accepted our initial scoring. Eight provided additional information about general practices that did not impact our scoring, and sixteen provided additional information or interpretation about statute language that allowed us to change the scores. In all, we increased eleven state scores by an average of nine points and decreased four state scores by an average of six points based on state charter association feedback.

We used the following decision-making rubric for accepting proposed changes to our state charter-law scores:

1. If the reviewer provided verifiable, specific examples of how the law provided limits or extensions of autonomy and our score was based on an absence of information in the main charter law (i.e., we didn't find the relevant law in other statutes), we chose to accept the reviewer's suggestion for scoring.
2. If the reviewer noted that a law functioned differently in practice than on paper, we chose to maintain our original score based on the law's language, because "practices" can change without changing the law.
3. In some cases, reviewers supplied us with relevant statutory language that helped us to remedy oversights or variant interpretations, and we altered our scores.

Weighted Averages

Rather than using simple averages of the 100 schools in our sample, we used a weighted average to reflect the

number of schools that authorizers chartered in the country. For example, the fifty authorizers in our sample, collectively, chartered 2,026 schools. If one authorizer chartered 10 percent of those schools, then the grades for that authorizer's schools would account for 10 percent of the total average.

Subsample Interviews

We conducted fifty-one phone interviews with key personnel (sixteen charter school leaders, twenty authorizers, and fifteen state charter association leaders) associated with a subsample of ten high-autonomy (B+ or higher) and ten low-autonomy (D+ or lower) schools. The average autonomy score for our "high-autonomy" subsample was 91 percent, or an A-. The average autonomy score for the "low-autonomy" schools was 57 percent, or an F.

Our interview selection process was not random since we sought maximum variation in the sub-sample. We initially contacted twenty schools with the highest scores and twenty schools with the lowest scores, recognizing that some would choose not to participate. Mindful not to oversample from one or two states, our final interview pool included individuals associated with:

- Three schools with different authorizers from one state,
- Two schools with different authorizers from a second state, and
- Fifteen schools from fifteen different states.

Respondents were guaranteed anonymity. All interviews were conducted over the phone following a standard protocol (see Appendix E).

Limitations

While we believe our study provides the most comprehensive picture to date of charter school-level autonomy, there are, nonetheless, several limitations:

- Our sampling method introduced some self-selection bias because authorizer participation was voluntary and authorizers chose the charter contracts reviewed in this study.
- Our contracts are products of the country's most active charter authorizers. We do not capture the policy or practice of less-experienced authorizers.

- Our review focuses on state charter laws and does not include administrative rulings, court cases, or other state statutes that may have infringed on autonomy.
- Our study focused on school-level autonomy as experienced by present-day charter schools. There are important system-level factors—such as limitations on which groups or individuals can petition for charters or which entities can act as authorizers—that might restrict charter autonomy by shutting out potential school leaders or severely restricting the scope of authorizer practice.²⁹
- Our review assumed autonomy if there was no evidence of an explicit limitation on it. When reviewing contracts, this bias might have obscured authorizer-imposed restrictions that were presented in the contract as applicant decisions. For example, we assumed autonomy if a charter school chose to operate on the local district schedule and was not required by law to do so. It is possible, however, the charter applicant capitulated to pressure by the authorizer to make this choice.
- We treated all restrictions of the same type (e.g., governance board membership or budgetary limitations) as equal across states and schools, though this may have obscured state-specific nuances in policy or practice.

Our review of state laws and charter contracts was conducted during the fall of 2009 and confirmed by charter association representatives in January 2010. Given the recent flurry of charter legislation and policy activity in response to the federal “Race to the Top” competition and other United States Department of Education initiatives, states may have changed some portions of the laws we reviewed.

Appendix D: Charter School Types

This report does not explore the autonomy of all types of charter schools operating in the twenty-six states reviewed. Rather, it explores the autonomy of the types of charters for which we secured charter contracts (see Table D-1). In four of the states we examined as part of our sample (Pennsylvania, Louisiana, Georgia, and Wisconsin), state laws grant different levels of autonomy to different classifications of charter schools (such as start-ups versus conversion schools, or virtual versus brick-and-mortar schools). In these states, we provide a score for the unique classification of charter school included in our sample.

A few other things to note:

- The Pennsylvania grade reflects the autonomy of state-authorized virtual schools only. District-authorized schools, which make up the majority of charters in Pennsylvania, were not covered in our review.
- The Michigan grade reflects the autonomy experienced by University-authorized schools only which constitute over half of the charter schools in Michigan. The autonomy of district-authorized schools would likely differ, due to additional restrictions imposed by the state’s charter law on schools authorized by districts.
- The Wisconsin grades only reflect the autonomy of district-authorized charter schools, which include “instrumentality” and “non-instrumentality” schools. District-authorized schools make up the vast majority of Wisconsin’s charters.

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Table D-1: Charter School Types in State and in Study

State	Types of Charter Schools in State	Types of Charter Schools Examined
Arizona	Conversion, new start-up, and virtual schools	Conversion, new start-up
California	Countywide-schools – Conversion and new start-up schools Statewide-schools – Conversion and new start-up schools District-schools – Conversion and new start-up schools	Statewide new start-up, district conversion, district new start-up
Colorado	Conversion, new start-up, and virtual schools	New start-up
Connecticut	Conversion, new start-up, and virtual schools	Conversion, new start-up
D.C.	Conversion and new start-up schools	New start-up
Delaware	Conversion and new start-up schools	New start-up
Florida	Conversion and new start-up schools	Conversion, new start-up
Georgia	Conversion, new start-up, and virtual schools	Conversion, new start-up
Idaho	Conversion, new start-up, and virtual schools	New start-up
Illinois	Conversion, new start-up, and virtual schools	New start-up
Indiana	Conversion and new start-up schools	New start-up
Louisiana	Type 1 – District authorized start-ups Type 2 – State authorized start-ups or conversions Type 3 – District authorized conversions Type 4 – District authorized start-ups or conversions Type 5 – State authorized conversions under Recovery School District jurisdiction	Type 2 new start-up, Type 5
Maryland	Conversion and new start-up schools	Conversion
Massachusetts	Commonwealth charter – State authorized start-up Horace Mann charter – District authorized start-up or conversion	State-authorized start-up
Michigan	University Authorized - Start-ups enrolling students statewide District Authorized – Start-ups enrolling district students Community College Authorized – Start-ups enrolling students within its district	University- and community college-authorized start-ups
Minnesota	Conversion, new start-up, and virtual schools	New start-up
New Hampshire	Conversion, new start-up, and virtual schools	New start-up, virtual
New Mexico	Start-ups & conversions (moratorium on new conversions since 2006)	New start-up
New York	Conversion and new start-up schools	New start-up
North Carolina	Conversion and new start-up schools	New start-up
Ohio	Conversion, new start-up, and virtual schools	New start-up
Pennsylvania	Conversion, new start-up, and virtual schools	Virtual
Tennessee	Conversion, new start-up, and virtual schools	New start-up
Texas	Conversion and new start-up schools	New start-up
Utah	Conversion and new start-up schools	New start-up
Wisconsin	Instrumentality – Conversion, new start-up, and virtual schools closely affiliated with the authorizing district Non-instrumentality – Independent conversion, new start-up, and virtual schools	Instrumentality conversion, Instrumentality new start-up, Non-instrumentality conversion

Sources: *Watson et al. Keeping Pace With K-12 Online Learning: An Annual Review of State-Level Policy and Practice 2009;* *O'Neill and Ziebarth. Charter School Law Deskbook.*

Appendix E: Interview Protocol

The protocol below was used for interviews with school leaders. We modified it as needed for authorizers and state charter association leaders.

INTRODUCTORY QUESTIONS:

Question 1a: What are the key areas where you feel autonomy is required in order to operate your charter school program successfully? In other words, what types of things do you (or your school) need control over in order to be effective?

Question 1b: In these areas, do you have the autonomy you need?

If yes: Can you give me an example of how you've used that autonomy to implement and/or improve your school's program?

If no: What are the barriers to obtaining autonomy in these key areas? (If an authorizer, what are the barriers to extending autonomy in these areas?)

Question 1c: Are there any areas where you believed, initially, that you would have autonomy, but in reality, you didn't?

NOTE TO INTERVIEWER:

Use the questions in the next section to confirm our understanding based on the school's score on the metric. If the answer confirms our analysis, then move to the next question. If an answer from the interviewee does not match our scoring sheet, probe with one of the following questions to find the reason:

- My understanding of the law/your contract was that you had greater autonomy or more flexibility in this area. What is restricting your autonomy in this area? Why?
- My understanding of the law/your contract was that you did not have autonomy or as much flexibility in this area. Is that not the case? Why?

AUTONOMY METRIC QUESTIONS:

SCHOOL VISION AND CULTURE

Question 2: Has your school received any waivers exempting it from specific state or district laws or policies that typically apply to public schools? If yes, were those waivers all automatic, or did you have to petition for them individually? If no, is your charter school eligible to petition for waivers?

Question 3: Are you required to follow the district discipline policy or were you able to design your own?

Question 4: If you wish to make a revision to your charter contract, what is the process for that? Have you made any substantive revisions of your charter contract?

SCHOOL PROGRAM, CURRICULUM, AND CALENDAR

Question 5: Are you required to follow state- or district-established curriculum sequencing and pacing, or to use state- or district-established curriculum materials or textbooks, in some or all subjects? Or are you free to design your own curriculum and select your own curriculum materials?

Question 6: Who decides how special education services are provided to your students with disabilities? (If they're unsure, clarify if the school is solely responsible, if the school contracts with an outside provider, or if the school must access/use district special education and related services.)

Question 7: Are you required to follow a state- or district-established school calendar or daily schedule, or are you free to establish your own?

SCHOOL STAFFING, COMPENSATION, AND DISMISSAL

Question 8: Are your employees covered by existing district collective bargaining agreements or established work rules, or do you set your own work rules and policies?

Question 9: Is your school required to follow state or district staff dismissal procedures, or did you establish your own?

Question 10: Are your instructional personnel required to be certified according to state regulations or are such requirements waived for your school?

Question 11: Is your school required to abide by the state or district salary schedule?

Question 12: Is your school required to use the state retirement system?

SCHOOL FINANCE AND GOVERNANCE

Question 13: Does your school have control over the composition of its board or does your authorizer have some degree of control over who sits on the board?

Question 14: Is your school required to follow established state guidelines for the allocation of funding? What is the role of authorizers, if any, in your budgetary and spending decisions? In what ways do you have budgetary and spending discretion?

Question 15: Does your school have a contract with a charter/education management organization? If not, does your state law allow you to hire a charter or education management organization?

Question 16: Is your school required to abide by standard state or district procurement procedures, or are you allowed to develop your own procurement procedures?

FINAL QUESTION:

Question 17: Are there any aspects of school governance, operations, or instruction we have not covered in which you wish you had more autonomy?

Errata

After the initial publication of this report in April 2010, we found that, due to a sampling error, the authorizers of three schools were misnamed. Girls Preparatory Charter is authorized by the State University of New York, Hellenic Classic Charter is authorized by the New York City Department of Education, and The Charter School of Wilmington is authorized by Red Clay Consolidated School District. Additionally, the two schools attributed to Albuquerque Public Schools were misnamed.

This edition of the report corrects these errors. The total number of schools chartered by the fifty authorizers in this report is now 2,026 schools (down from 2,044 as originally reported in April). This number still represents nearly half of the charter schools in the country. A change to the weight associated with each school grade has a small impact on Figure 7. The average grade associated with the staffing area is now a C (from a C+). In addition, our sample now includes one fewer Department of Education authorizer and one additional District authorizer. The results in Tables 2 and 4 have been updated to reflect this.

While these changes affect the names of three authorizers and two schools, they have no impact on our analysis of the autonomy experienced in the schools or in the states where the schools are located. The conclusions drawn from these findings remain unchanged.

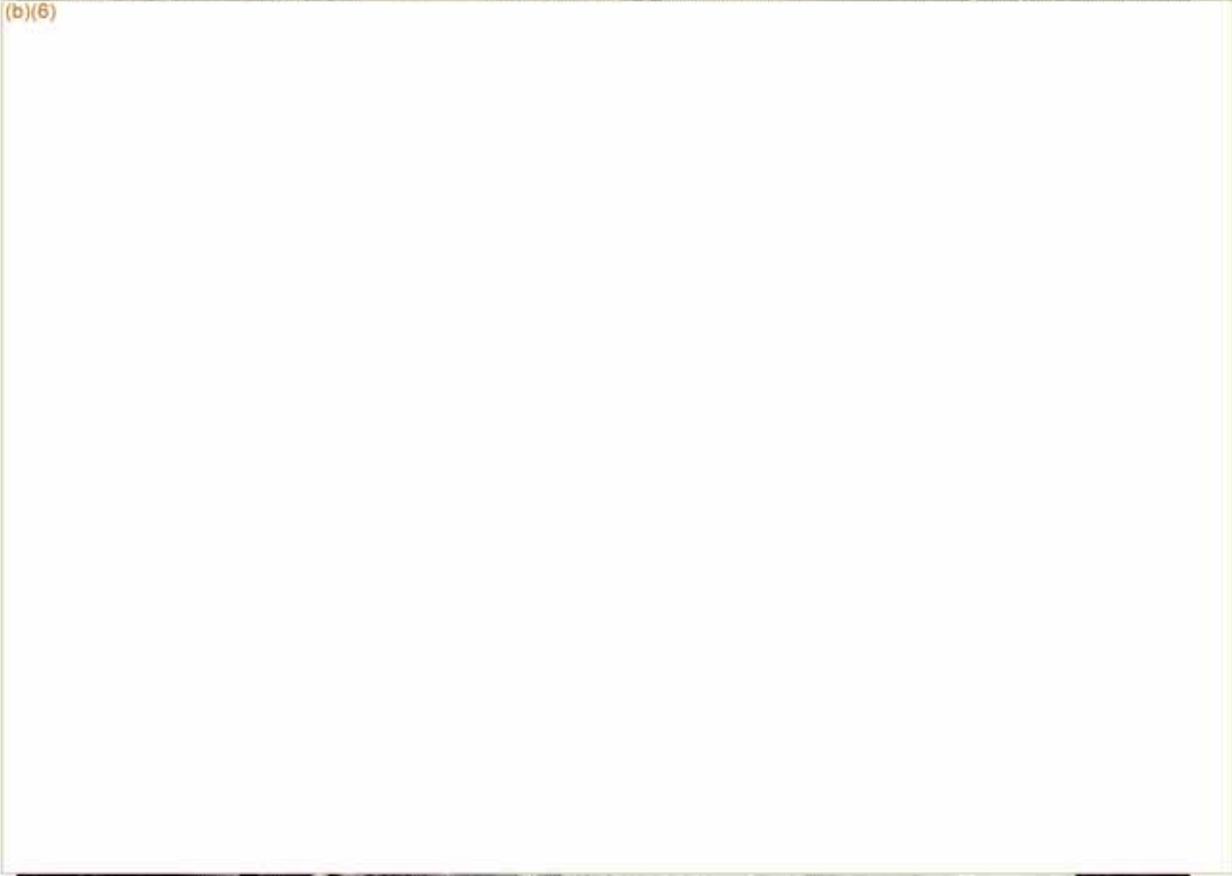


CHESTER COUNTY

Technical College

HIGH SCHOOL

(b)(6)



A partnership of the



Chester County Intermediate Unit

and



Delaware County Community College

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Project Description

In Spring 2002, the Chester County Intermediate Unit (CCIU) and Delaware County Community College (DCCC) completed a feasibility study and determined the need to construct a career training and educational facility in southern Chester County. The new dual-enrollment school, now known as the Chester County Technical College High School, included comprehensive, shared educational space for the high school and college students.

The Technical College High School will relieve overcrowding at the Center for Arts & Technology Brandywine Campus, give better access to southern Chester County school districts, and provide space saving efficiencies for secondary and post-secondary utilization within the facility. It will house high school students in grades 10-12 and post-secondary students. Classrooms are approximately 850 square feet, and science labs 1,200 square feet. A greenhouse and wellness center are also included. Dedicated spaces for CCIU programs (Head Start, Even Start, preschool and child care services) are planned. Additional building capacity is available for regular education classes for other IU programs.

High school career and technical programs include: horticulture; agriculture, cosmetology, child care, security, automotive service technology, drafting, business, health care, carpentry, computer maintenance, computer information systems, heating/air conditioning/refrigeration, food preparation, automotive body repair, and vehicle and mobile equipment repair.

Statement of Need

Over the past decade, Chester County has experienced unprecedented growth, especially in the southern portion of the county. Unfortunately, due to the rural character of southern Chester County, career and technical training, and work force development have not kept pace with the region's rapidly expanding population. For example, over 300 high school students were denied admission to the Center for Arts & Technology Brandywine Campus due to lack of space. The Brandywine Campus provides career and technical training to high school students living in southern and central Chester County, and is at maximum capacity with nearly 900 students.

In addition, southern Chester County has a large migrant, predominately Hispanic population that has relocated to the area to seek employment in the mushroom industry. The Technical College High School will greatly expand educational and career training options for the region's under-served Hispanic community.

Local Support

Business and educational leaders recognize the need for a facility that provides career training for the growing school-age population and the adult work force. These communities have come together to support the construction of a career, technical and educational training facility to serve secondary and post-secondary students in southern Chester County.

The construction of the Technical College High School has been overwhelmingly endorsed by educators and business leaders throughout Chester County, including:

- The unanimous endorsement of Chester County's 12 school district superintendents
- The overwhelming endorsement of Chester County's school directors: 104 yea; only 1 nay
- The endorsement of the Chester County Economic Development Council
- The endorsement of many area businesses

Financial Stability

The Chester County Intermediate Unit (CCIU) is fiscally sound. During 2005-06, the CCIU operated on a total revised budget of \$134.6 million.

In September 2005, the Chester County School Authority received an "A" rating from Standard and Poor's Rating Services. The rating was supported by:

- CCIU's being the single, largest provider of special education services in Chester County, Pennsylvania
- A stable customer base in a wealthy county, with strong underlying townships and growing enrollments, and
- CCIU's modest lease burden

Project Benefits

Educational Benefits

- Expand educational services to special needs and other under-served student populations, including: Hispanic, migrant, economically disadvantaged and at-risk students.
- Provide career and technical training to a minimum of 600 secondary students.
- Provide associate degree programs to a minimum of 300 post-secondary students during its first year of operation. The post-secondary enrollment is projected to grow by several hundred students annually through 2012.
- Strengthen existing articulation agreements and lay the foundation for new ones to be developed between the Center for Arts & Technology and Delaware County Community College; thereby allowing secondary students to earn credit toward their associate's degree while in high school.
- Create opportunities for expanding 2 + 2 + 2 opportunities for high school students by aligning Center for Arts & Technology curriculum with college and university transfer programs, including: education, computer information systems, business administration, science for health care professionals, and engineering.
- Permit the expansion of the Chester County Middle College High School to serve students in southern Chester County. The Chester County Middle College High School allows high school students to achieve academic success, explore career aspirations, and to attend college classes while they are in their junior and senior years of high school.
- Allow for shared instructional space for high school and college students, including: career and technical training programs, credit-bearing classes, science and computer labs, and a library/media center.

Economic Benefits

- Save taxpayers \$16.5 million in duplicate development and construction costs through the shared use of the facility by the Chester County Intermediate Unit and Delaware County Community College.
- Expand job training opportunities for the region's large migrant population.
- Strengthen the commonwealth's tax base by producing a technically-trained, high-wage work force.

Educational Opportunities

The Chester County Technical College High School will feature three distinct yet interrelated educational programs – traditional high school career and technical programs, traditional college courses, and new dual-enrollment initiatives that blend high school and for-credit college courses. Each is described below.

Career & Technical Programs (Secondary)

The Technical College High School will provide traditional career and technical training to 600 high school students. In keeping with the Pennsylvania Department of Education’s focus on high-priority occupations for workforce development, the following career and technology clusters will be offered to secondary students:

- Engineering & Industrial Technologies
 - HVAC/Refrigeration Academy
 - Electronics Technology
- Information and Communication Services
 - Business Academy
 - Computer Information Systems
- Life Sciences
 - Allied Health Academy
 - Animal Science and Technology
 - Health Occupations
- Logistics and Transportation
 - Automotive Service Technology
 - Automotive Collision Technology
- Lumber, Wood and Paper
 - Carpentry & Cabinetmaking
- Natural Resources
 - Horticulture and Landscaping
- Personal Services
 - Cosmetology
 - Culinary Arts
- Education Industry
 - Teacher Academy
 - Early Childhood Care & Education

Delaware County Community College

Adult students will be able to take a wide variety of for-credit and non-credit courses offered by Delaware County Community College, including:

- Associate Degree Programs
 - Core subject and elective courses
- Personal Skills
 - Photography
 - Foreign language
 - Creative writing
 - Floral design
 - And more
- Computer Training
- Adult Education
 - General education development
 - English as a second language
- Technical and Trade
 - Automotive Technology
 - AutoCAD
 - Industrial Systems
 - Electrical
 - Carpentry
 - And more
- Corporate Training
 - Customized job training programs for employees
- Career Skills
 - Food manager certification
 - Child care provider certification
 - Real estate license program
 - And more

Educational Opportunities (continued from page 3)

Dual-Enrollment Program Clusters (Hybrid Secondary/Post-Secondary Programs)

In addition to the traditional secondary and post-secondary options at Technical College High School, qualifying high school students will be able to enroll in hybrid high school/college courses that offer credit towards an associate's degree for college-level work completed in high school. High school students will be dually enrolled in high school and Delaware County Community College; thereby, working towards a high school diploma and an associate's degree at the same time.

Proposed dual-enrollment clusters include:

- Applied Engineering Technology
- Automotive Technology Academy
 - Automotive Service Technology
 - Automotive Collision Technology
- Construction Technology Academy
 - Carpentry
- Health Care Academy
- HVAC/Refrigeration Academy
- Industrial Systems

At-Risk Educational Services and Early Childhood Education Center

In addition, the new facility will serve as an at-risk educational service and early education center providing services to school-age and preschool children who are at-risk, and their families.

Proposed programs include:

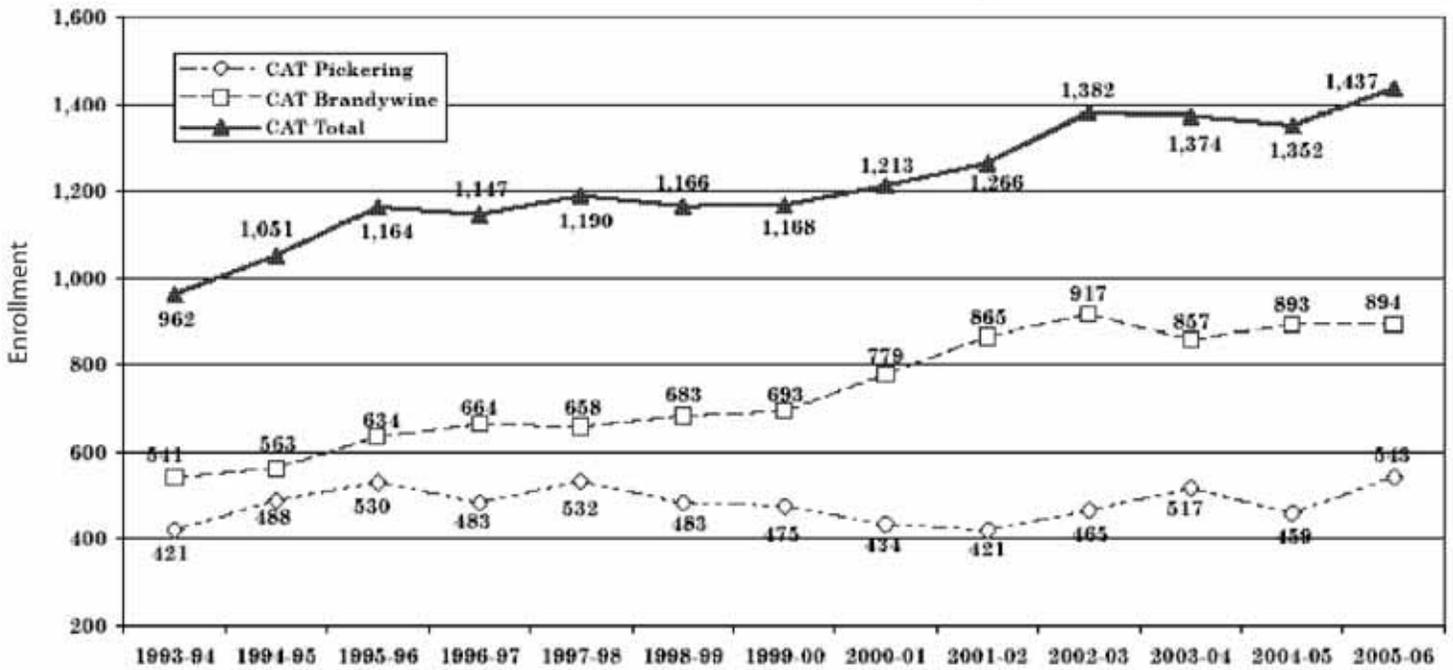
- Even Start (federally-funded family literacy services to families with children from birth through seven years of age)
- Head Start (federally-funded preschool for children aged three to five years old from low-income families)
- Migrant Education (educational and support services to the children of migrant workers and their families)
- Special Education Preschool Early Intervention – (federally- and state-funded preschool program for children with developmental delays aged three to five years old)

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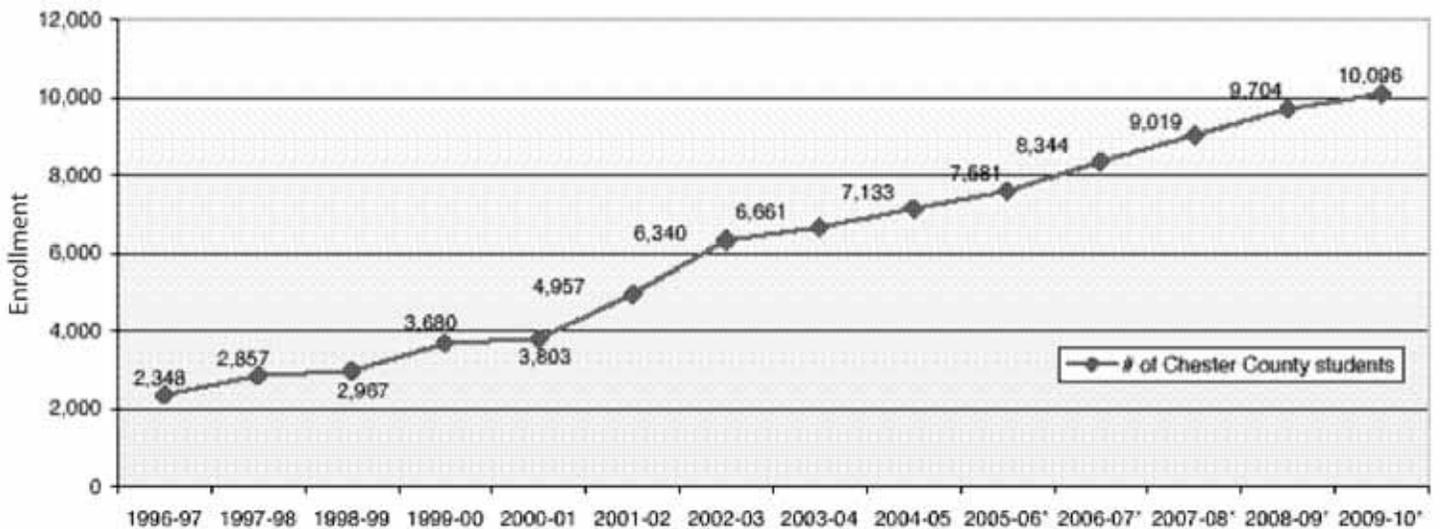
Completed (✓)	Project Time Line	
✓	2002	Presented recommendations for career training and workforce development improvements
✓	2003	Restructured the Articles of Agreement to support construction of a southern site
✓		Partnered with Delaware County Community College
✓	2004	Completed feasibility study regarding construction of southern site
✓		Developed instructional program specifications
✓		Evaluated possible campus sites
✓	2005	Finalize construction financing plan
✓		Complete land acquisition for site
✓	2006	Complete design development and construction plans
✓		Award construction bids
✓		Obtain municipal and Pennsylvania Department of Education approvals
✓		Break ground for new campus
✓	2007	Start construction
		Develop curriculum
	2008	Open southern campus in September 2008

Estimated Project Costs	
Site acquisition	\$2,100,000
Design and construction	\$28,980,000
Furniture, equipment and technology	\$4,000,000
Financing	\$970,000
Other costs and contingency	\$4,600,000
Total projected costs	\$41,250,000

Center for Arts & Technology Ten-Year Enrollment History

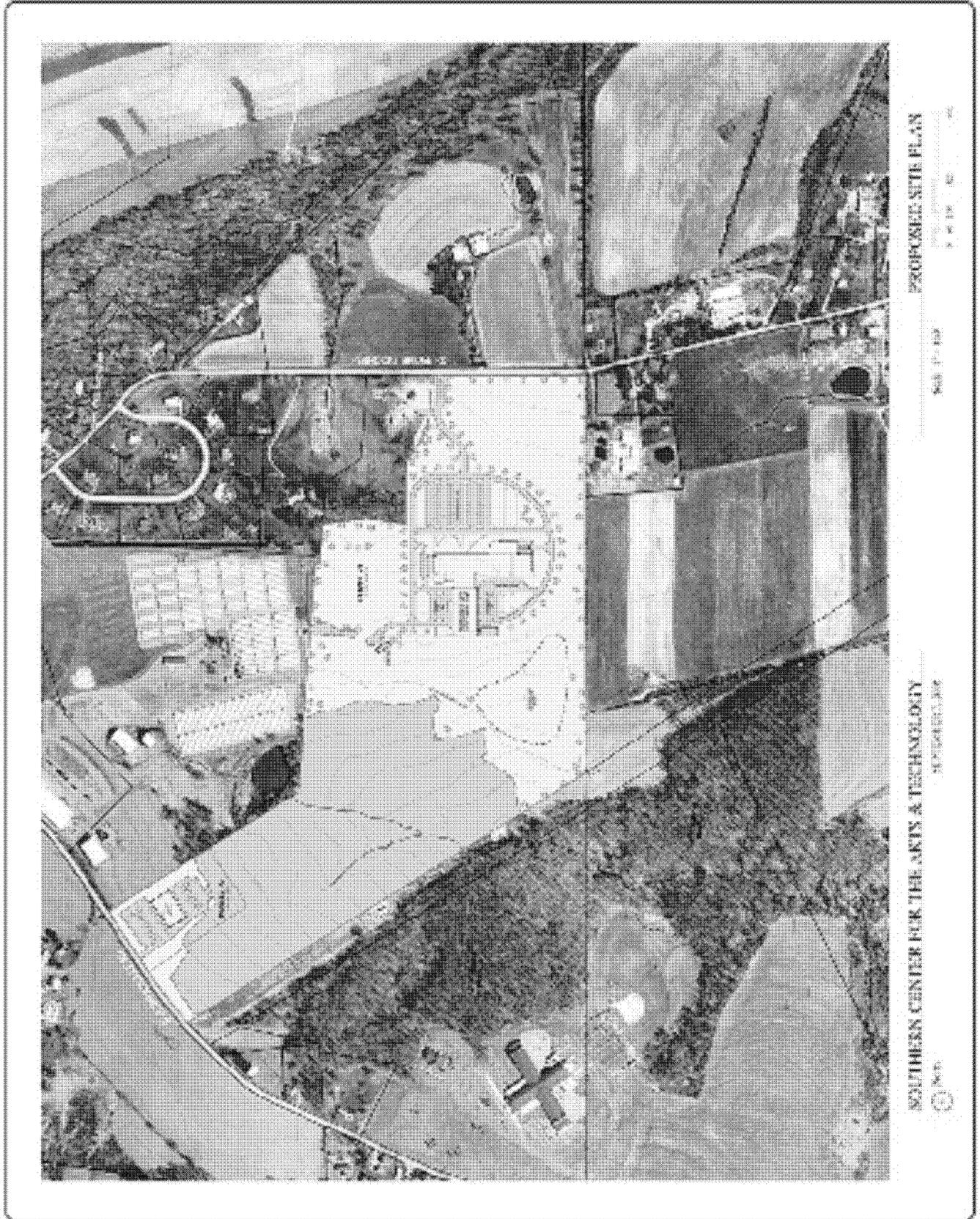


Delaware County Community College Actual & Projected Enrollment

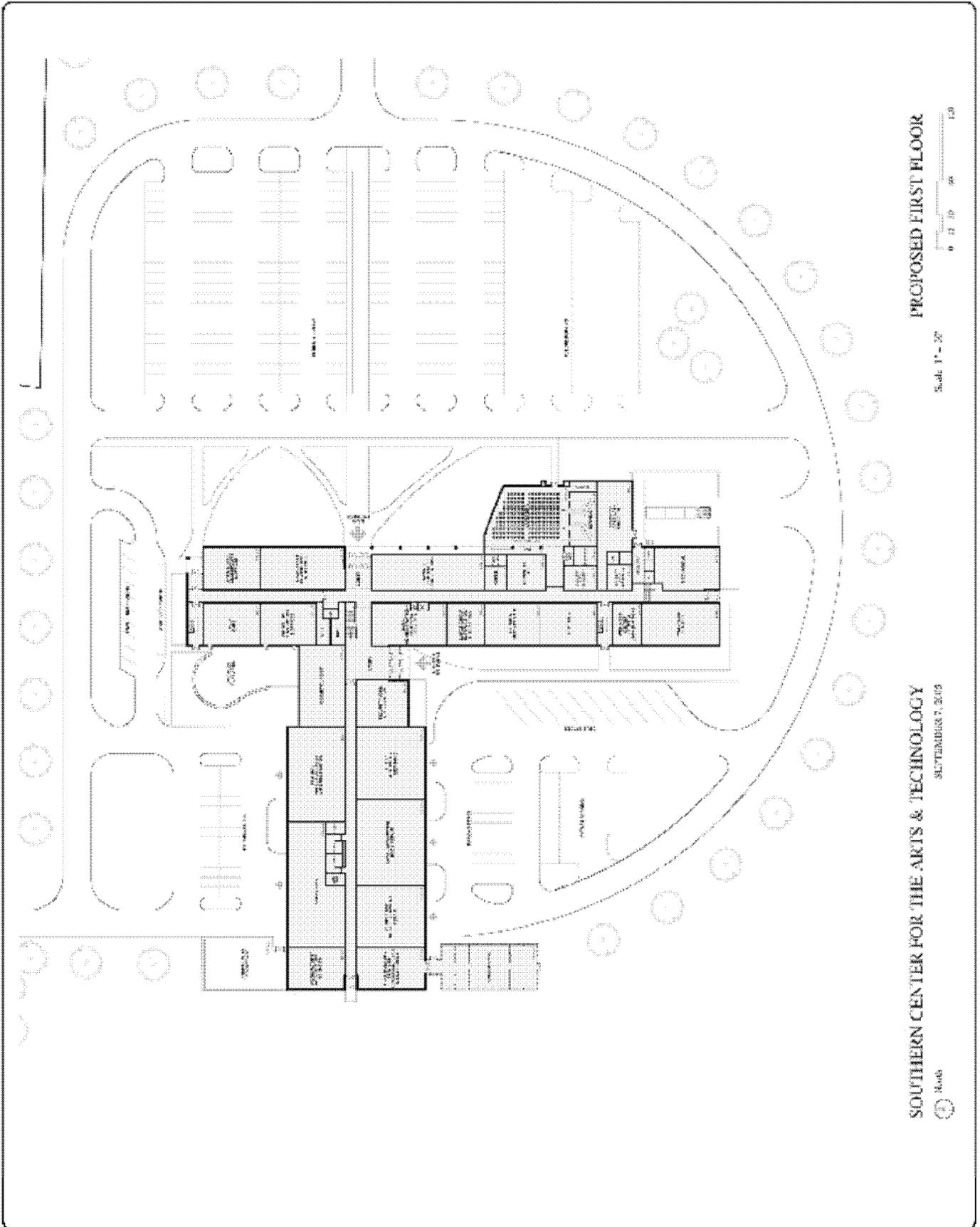


*Please note: Enrollment figures for these years are estimated based on current enrollment trends.

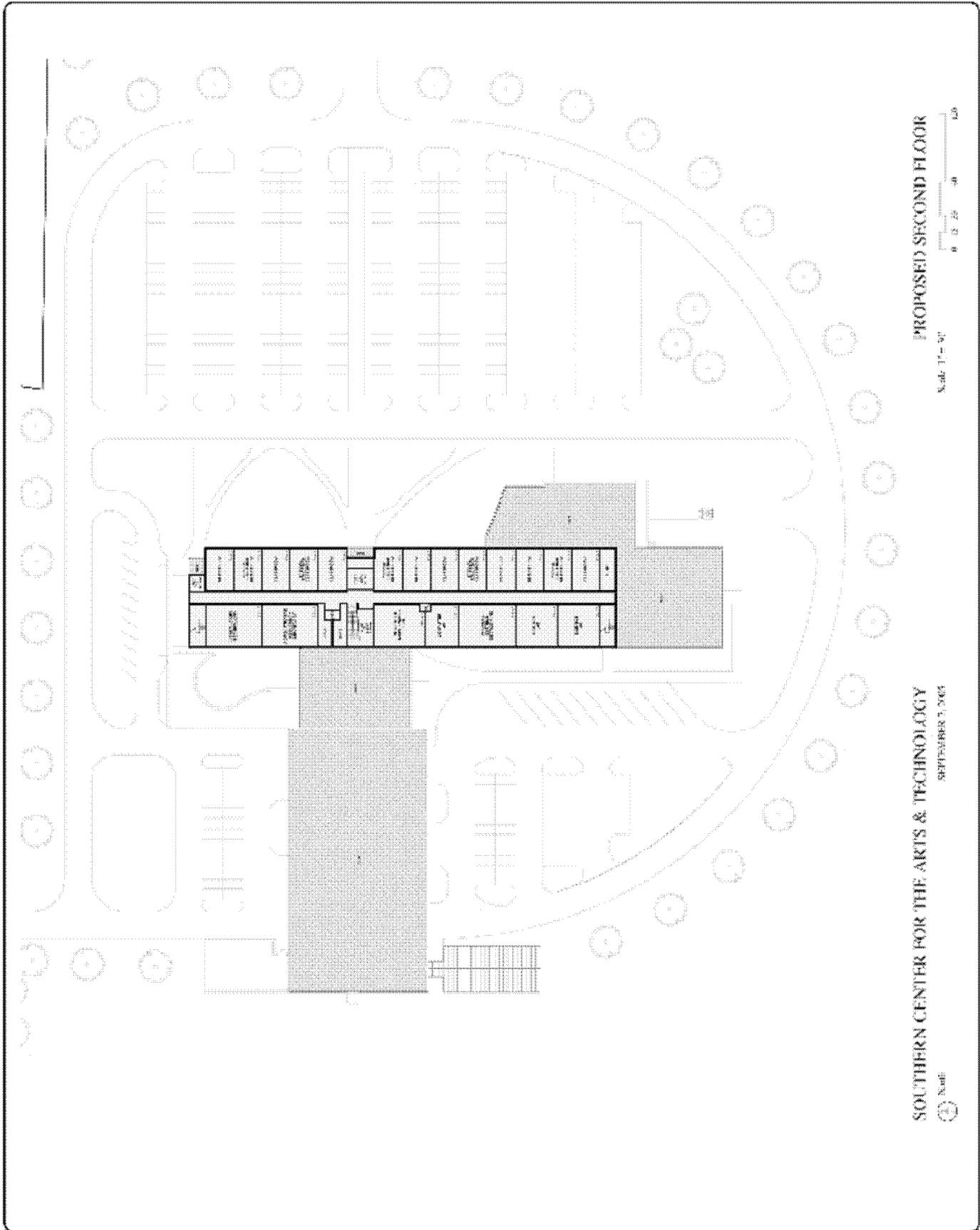
Chester County Technical College High School
Pennock's Bridge Campus
Site Schematic



Chester County Technical College High School Proposed First Floor Plan



Chester County Technical College High School Proposed Second Floor Plan



Employer Endorsements and Testimonials

“The southern part of our county is growing rapidly. We believe it is important to proactively manage that growth. We’ve made southern Chester County a primary focus of our smart growth strategy and are currently working to create outreach offices in Kennett Square and Oxford. A technical education center in southern Chester County is another critical piece to that smart growth strategy.”

- *Michael Grigalonis, Chester County Economic Development Council*

“As a former president of a large manufacturing facility, I am keenly aware of the demand for skilled trades people. Facilities such as ours, which operate continuously, cannot afford unplanned interruptions or failures that create serious safety risks.

“The demand for constantly improving quality in both metallurgy and dimensional tolerance is challenging. To produce steel plate at temperatures of 2,000 degrees with weights up to 40 tons and tolerances measured in thousands requires sophisticated control systems.

“When something fails at 3 a.m., a competent technical staff is a must. Without such sophistication, our industry (and others like us) will not be able to compete. There is not an adequate supply of trained personnel. The proposed technology campus will be a very positive addition for our long-term business health.”

- *A. W. Eastburn, Lukens Steel Company*

“The mushroom industry is Pennsylvania’s largest cash crop, with the majority of the production taking place in southern Chester County. The Modern Mushroom Company employs approximately 500 people in various aspects of the industry, including: product research and development, specialty agriculture and transportation. The development of a vocational education and workforce development facility by the Delaware County Community College and the Chester County Intermediate Unit would be a tremendous benefit for our industry and for the retention and training of future employees for our organization and others like us.”

- *M. James Hoffman, Jr., Modern Mushroom Company*

“During the twenty years that I have served as director of Longwood Gardens, I have witnessed the explosive growth in Chester County and, in particular, the Route 1 corridor in our immediate area. At Longwood, we have indulged in a serious program of physical plant restoration, along with enhancement of our displays and programming. I expect that our attention to physical plant restoration will remain intense for the next 25 to 30 years. We have been fortunate to find great employees. However, it is increasingly more difficult to find the kind of talent at any price that will be required for the near term, and certainly for the future. The development of a southern campus for the Center of Arts & Technology would help significantly to fill this void, as well as to strengthen the cultural development of the region.

“I believe that the proposed center is only a first step in what should be a long-term development plan for a technical education center in this region. Having people well trained in crafts and technology is essential to our future.”

- *Frederick E. Roberts, Director, Longwood Gardens*



Chester County Intermediate Unit

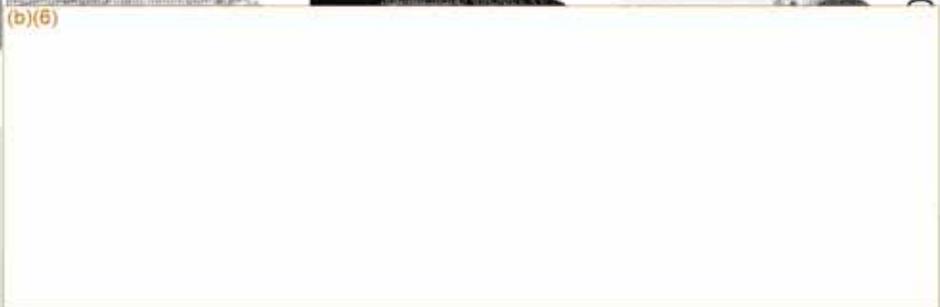
455 Boot Road, Downingtown PA 19335

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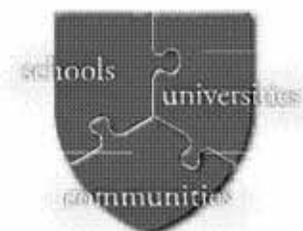
The Chester County Intermediate Unit will not discriminate in employment, educational programs or activities based on race, color, religion, national origin, age, sex, disability, marital status or because a person is a disabled veteran or a veteran of the Vietnam era. Reasonable accommodations will be provided for employees and program participants who are disabled. For information regarding civil rights or grievance procedures, contact Patricia McLaughlin, Title IX coordinator, at (484) 237-5088/TDD: (484) 237-5528; or in writing at the Chester County Intermediate Unit, 455 Boot Road, Downingtown, PA 19335.

(b)(6)



engage, empower, educate

pathways to the *future*



**The Barbara and Edward Netter
Center for Community Partnerships**
University of Pennsylvania

(b)(6)

“The Netter Center’s model for university-assisted community schools continues to make great strides. Its proven success is now being widely recognized. This year, for example, establishment of the first regional training center in Tulsa has elevated the model to a new level.

We believe that if the 674 higher eds in large cities were to engage with their local public schools, these higher eds could reach nearly one million children and youth, representing 20% of all students attending moderate-to-high poverty schools in their cities. We must continue to strengthen the educational pipeline for our students, because our nation’s young people are the key to a vibrant, democratic future.”

—Barbara and Edward Netter

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message from the president

(b)(6)

When the University of Pennsylvania was placed at the top of a new "Saviors of Our Cities" list this fall, we were cited for our work with local public schools through the Barbara and Edward Netter Center for Community Partnerships. Although this public recognition is a source of pride and gratification, it is no surprise.

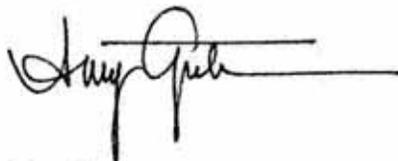
Penn's Netter Center is a *model* of community engagement. I use the word model advisedly because it was the desire of Barbara and Edward Netter that the Netter Center's programs be replicated in other institutions around the country. I am delighted that the Netter Center's first regional training center on university-assisted community schools opened this year at the University of Oklahoma-Tulsa. The model will now have the potential for impact on many more young people and communities across the southwestern United States.

Closer to home, our model of university-assisted community schools is the subject of a new grant from the American Federation of Teachers Innovation Fund to the Philadelphia Federation of Teachers, in partnership with the Netter Center, our Graduate School of Education, and the School District of Philadelphia. Again we are receiving important recognition since the AFT Innovation Program is designed to highlight and expand models of educational reform of national significance.

University-assisted community schools are, of course, only one example of the pioneering programs of the Netter Center. From nutrition, to college access and career readiness, to volunteer training, to academically based service-learning, the Center truly leads the way for Penn and the world.

At the 2008 ServiceNation Summit, I pledged to support an additional 400 community service opportunities for Penn students. I am delighted that the Netter Center will host 120 academic internship positions over the next four years as part of this commitment. This type of work will continue not only to make a meaningful impact in West Philadelphia but also to enhance the intellectual, social, and civic development of the many students involved.

I know you will enjoy reading this report, which highlights some of the Netter Center's recent achievements. I also know that there are many more achievements to come in the months and years ahead. This is a model for the ages.



Amy Gutmann
President, University of Pennsylvania

message from the director

(b)(6)

Throughout his campaign and first year of office, President Obama called for a "New Era of Service." The President's inspiring challenge to serve applies not only to individuals, but to institutions as well. Over the last 20 years, colleges and universities across the nation have been building mutually beneficial partnerships with their local communities through service-learning, volunteer community service, and community development projects.

While much is happening, more can and should be done to capitalize on the idealism and energy of college students and the skills and assets of school and community leaders. Moreover, higher education institutions as institutions can and should do a great deal more to galvanize their extraordinary resources to benefit their local communities and society. The mission and societal role of colleges and universities are well suited to help fulfill the democratic promise of America for all Americans. At Penn, we have found that university-assisted community schools are the most promising approach for improving education and schooling and contributing to the public good.

In 2008-2009, we continued to strengthen and develop our university-assisted community school efforts in West Philadelphia. Thanks to the generous gift from Edward and Barbara Netter in 2007, we launched our first comprehensive evaluation of this model. We are also pleased that the Philadelphia Federation of Teachers (PFT) has recently been selected as one of seven recipients for the American Federation of Teachers Innovation Fund, from an applicant pool of 125. The PFT applied in collaboration with the School District of Philadelphia, the Netter Center and Penn's Graduate School of Education to improve and bring to scale the Penn model of university-assisted community schools. Specifically, the project will focus on teacher leadership in the creation of university-assisted community schools across the entire feeder school patterns of Sayre and West Philadelphia High Schools.

This year also marked a milestone in the Netter Center's national replication efforts when we selected the University of Oklahoma-Tulsa to host the first regional training center on university-assisted community schools. OU-Tulsa has already made significant contributions to the development of community school partnerships in the Tulsa area. We look forward to working with our Tulsa colleagues to strengthen their local efforts, as well as the efforts of higher education institutions throughout the southwest. Tulsa is particularly interested in replication of Penn's Pipeline Program, which is featured in this report as a model of engaged learning and mentorship for students across all levels of schooling. We are honored to be working with Penn's Schools of Medicine and Nursing on this critical program, which strengthens the educational pipeline for minority youth and prepares young people for careers in health-related fields.

I want to thank the Netter Center staff and our many partners for their dedication and ongoing efforts to make a genuine difference in the community and society in general. We hope you enjoy this report. Please do share your suggestions and comments with us.



Ira Harkavy

671 Associate Vice President and Director,
The Netter Center for Community Partnerships

our mission

Founded in 1992, the Barbara and Edward Netter Center for Community Partnerships is Penn's primary vehicle for bringing to bear the broad range of human knowledge needed to solve the complex, comprehensive, and interconnected problems of the American city so that West Philadelphia (Penn's local geographic community), Philadelphia, the University itself, and society benefit. The Netter Center is based on **three core propositions**:

1. Penn's future and the future of West Philadelphia/Philadelphia are intertwined.
2. Penn can make a significant contribution to improving the quality of life in West Philadelphia/Philadelphia.
3. Penn can enhance its overall mission of advancing and transmitting knowledge by helping to improve the quality of life in West Philadelphia/Philadelphia.

The Netter Center, which is housed in the Office of Government and Community Affairs, works to achieve the following objectives:

1. Improve the internal coordination and collaboration of all university-wide community service programs
2. Create new and effective partnerships between the University and the community
3. Create and strengthen local, national and international networks of institutions of higher education committed to engagement with their local communities.

The Netter Center's 2008-09 Annual Report focuses on the local and national development of the Netter Center's work, particularly its university-assisted community school model that is building pathways to the future for America's children and youth. University-assisted community schools continue to gain visibility across the nation, indeed around the world, for their innovative approach to education reform and significant leveraging of resources.

executive summary

This year's report particularly highlights the Netter Center's collaboration with Penn's Health Sciences Educational Pipeline—a model program of mentorship, teaching and learning that helps realize the Netter Center's three core objectives.

1. Pipeline is improving internal coordination and collaboration of university-wide service programs.

The Pipeline is implemented at Sayre High School, a university-assisted community school partner for over 12 years. Students and faculty from multiple Penn Schools are involved, including Medicine, Nursing, and Arts & Sciences. The program also collaborates with the Center's Moelis Access Science Program, which implements hands-on and inquiry-based learning activities linked to the core math and science curricula.

2. Pipeline is creating new and effective partnerships between the University and the community, strengthening the university-assisted community school model.

Each of Pipeline's four components involves a theme, specific grade level, teacher partners, undergraduate and professional students, and Penn faculty liaison. Hands-on labs, real world problem solving, and small group lessons engage high school students as part of their core curriculum. Penn students play multiple roles in the classroom while they learn through teaching. After-school lessons and internships tie into school-day learning. Young people receive mentoring support, college and career preparation, as well as exposure to healthcare students, residents, faculty, and professionals.

3. Pipeline is strengthening national networks of higher educational institutions.

The directors of Pipeline have been advising and collaborating with other institutions on the development of similar programs. They have worked particularly with the University of Oklahoma-Tulsa, which was selected as the Netter Center's first regional training center on university-assisted community schools in September 2008. OU-Tulsa, through its new Community Engagement Center, is deepening its local work with Tulsa area public schools and engaging higher eds in the region and throughout the southwest. The Pipeline program is one of the first efforts Tulsa partners are planning to adapt in their local high schools.

Finally, this report describes the evaluation process now underway by the Netter Center. While Netter Center staff have used several basic data collection methods for many years (e.g., surveys, focus groups, etc.), assessment has primarily focused on individual programs or activities. New resources enabled the Center to hire a full-time director of evaluation in 2008. The Netter Center has embarked upon a comprehensive, longitudinal evaluation of its university-assisted community school programs, as well as the impact of Academically Based Community Service on teaching,

673 research, and learning at Penn.

Academically Based Community Service

Academically Based Community Service (ABCS) is at the core of the Center's work. ABCS courses advance beyond traditional service-learning since they aim to bring about structural community improvement, including effective public schools, neighborhood economic development, and strong community organizations. The most critical component of this model is that the work is integrated into both the public schools' and the University's curricula, creating a collaborative problem solving approach through multiple levels of schooling—K-12 and higher education. This academic link fosters sustainable partnerships. Since the Center's beginning in 1992, 160 ABCS courses have been developed at Penn from a wide range of disciplines and schools. In 2008-09, 55 such courses were offered.

University-Assisted Community Schools

A collaboration between the University of Pennsylvania, led by the Netter Center, and West Philadelphia school and community partners, has helped to transform existing public schools into university-assisted community schools throughout local neighborhoods. University-assisted community schools help educate, engage, empower, and serve all members of the community in which the school is located. At the same time, working with community members to create and sustain university-assisted community schools provides a powerful means for universities to advance teaching, research, learning and service, as well as the civic development of their students.

The university-assisted community school strategy is based upon the following principles:

- The strategy assumes that, like universities, public schools can function as environment-changing institutions and can become the strategic centers of broadly based partnerships that genuinely engage a wide variety of community organizations and institutions.
- Therefore, more than any other institution, public schools are particularly well suited to function as neighborhood "hubs" or "centers," around which local partnerships can be generated and developed.
- When they play that innovative role, schools function as community institutions par excellence. They then provide a decentralized, democratic, community-based response to rapidly changing community problems. In the process, they help young people learn better, at increasingly higher levels, through action-oriented, collaborative, real-world problem solving.
- Working to solve complex, real-world problems is the best way to advance knowledge and learning, as well as the general capacity of individuals and institutions to advance knowledge and learning.
- Moreover, if the neighborhood school is to function as a genuine community center, it needs additional human resources and support.
- University-assisted is emphasized because universities constitute the strategic sources of broadly based, comprehensive, sustained support for community schools.

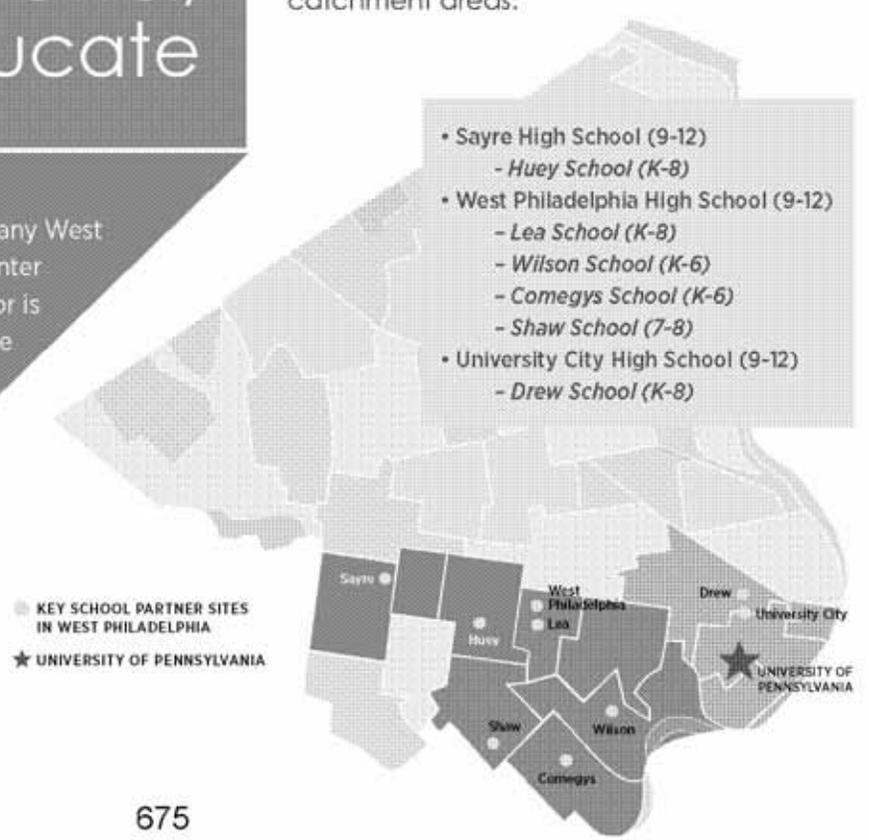
pathways to the future:
the netter
center model

pathways to the future: programs to engage, empower, and educate

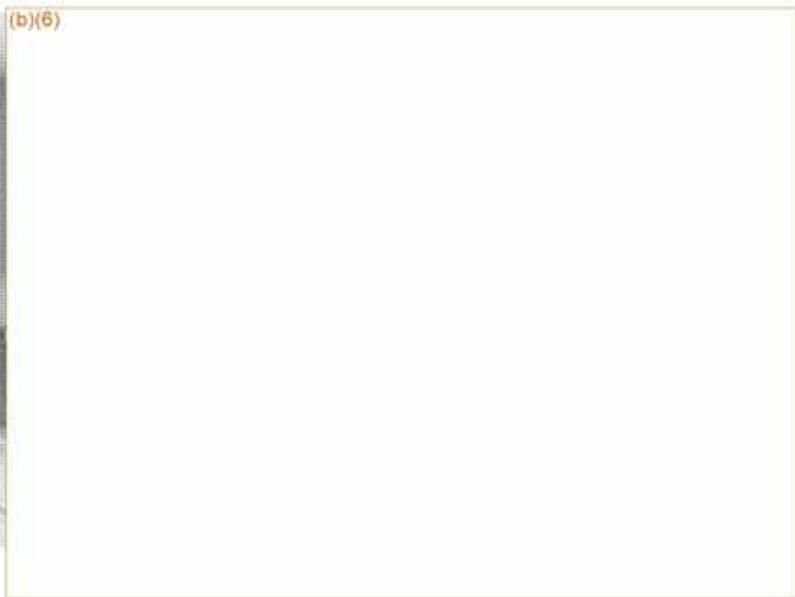
Once skeptical of working with universities, many West Philadelphia teachers now embrace Netter Center programs and Penn partnerships. One indicator is the Philadelphia Federation of Teachers' choice of the university-assisted community school (UACS) model in its application to the AFT Innovation Fund. This project will focus on teacher leadership in creating UACS across the feeder patterns of Sayre and West Philadelphia High Schools.

The Netter Center's university-assisted community schools in West Philadelphia serve nearly 5,000 children and youth from a set of schools within three high school catchment areas:

- Sayre High School (9-12)
 - Huey School (K-8)
- West Philadelphia High School (9-12)
 - Lea School (K-8)
 - Wilson School (K-8)
 - Comegys School (K-6)
 - Shaw School (7-8)
- University City High School (9-12)
 - Drew School (K-8)



2008-09 numbers at a glance*

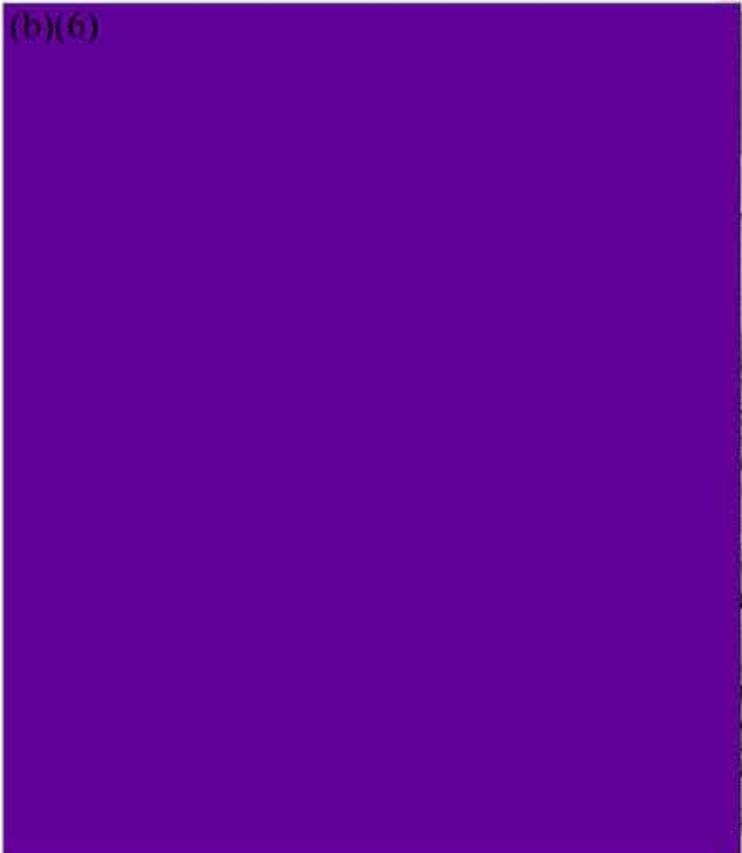


K-12 Students in School Day Programming	1,669
K-12 Students in After School Programming**	2,106
K-12 Students in 2008 Summer Programming	876
Academically Based Community Service Courses	55
ABCS Faculty & Instructors	42
ABCS Students	1,331
Additional Penn Student Volunteers at Community Schools	232
Work-Study Students	177
Undergraduate & Graduate Paid Interns	65

* Data refer to activities from July 1, 2008 through June 30, 2009. Statistics are based on actual numbers where available and best approximations where exact numbers could not be determined.

** Includes all children and youth, ages 6-21, who attended various after school programs at UACS sites. All possible efforts were made to eliminate duplicates.

Several key school day, after school, and summer programs support the university-assisted community school approach in West Philadelphia. Each school site has at minimum one coordinator from the Netter Center who works closely with the school and the community to determine activities that best serve the specific needs of that area. Penn students taking ABCS courses, work-study students, and student volunteers provide vital support for these programs. Programs include:



Agatston Urban Nutrition Initiative (AUNI)

AUNI supports university-assisted community schools (UACS) so that schools become effective centers for improving nutrition and wellness and reducing the burden of obesity, for the students and the entire community. AUNI activities include food and nutrition lessons integrated within the school day curriculum; healthy cooking classes; after school fruit and vegetable stands; job training and youth leadership; school-based gardens; farmers' markets; and community fitness and health programs. In 2006, AUNI activities expanded to 20 Philadelphia public schools, serving more than 10,000 students every month.



America Reads/America Counts (AR/AC)

AR/AC is a federal work-study program that employs university students as tutors to work with children in grades K-8 to improve literacy and math skills. Undergraduates provide one-on-one and small group tutoring, support classroom teachers during the school day, and coordinate and staff after school tutoring programs.

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(programs continued)

College Access and Career Readiness (CACR)

CACR strives to provide high school students at Sayre, West Philadelphia and University City High Schools with a comprehensive combination of college access, career readiness, and academic support activities across grades 9-12. During the 2008-2009 academic school year, over 120 students enrolled and 69 paid internships were offered across the three schools.

Community Arts Partnership (CAP)

Through initiatives ranging from artists in residence in public school classrooms to arts-based community service courses at the University level, from teacher professional development to community arts and cultural events, CAP works with West Philadelphia residents, particularly school partners, to enhance academic learning and increase community engagement. Penn faculty and students from Fine Arts, Music, and other disciplines in the humanities work with CAP.

K-12 After School and Summer Programs

K-12 After School Programs provide a safe space until 6 p.m. for more than 2,000 children and youth from the community. Children in grades K-8 participate in tutoring and homework help, project-based learning, and extracurricular activities. High School programming combines elements of academic support, college and career mentoring, real-world job experiences, and extracurricular activities. Monthly field trips, parent meetings, and student showcases regularly engage parents. After school programs are largely supported through Community School Student Partnerships (CSSP), a Penn student-run organization that recruits, trains and coordinates over 150 undergraduate tutors and mentors each year. During the summer, Freedom School provides an intensive literacy and service-learning curriculum for K-8 students, and high school students work as Junior Servant Leaders alongside college-aged Servant Leaders.

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Moelis Access Science (MAS)

Moelis Access Science works to improve Science, Technology, Engineering and Mathematics (STEM) education in K-12 classrooms, as well as to improve undergraduate and graduate STEM education at Penn. MAS Fellows work with public school teachers to make the best use of their standardized science and math materials while also helping teachers take advantage of a variety of supplemental resources to support inquiry-based learning. MAS also provides teacher professional development and has supported the redesign of the School District of Philadelphia's core STEM curriculum.

In a spring 2009 survey to 154 after school students in grades 4-12:

93% agreed or strongly agreed that there is at least one thing they are really good at

93% agreed or strongly agreed that the program has helped them be more active and learn to live a healthy life

92% agreed or strongly agreed that they feel safe after school; **72%** feel safe during school

88% agreed or strongly agreed that the after school program helps them learn new things and do better in school.

The Health Sciences Educational Pipeline Program is a partnership between Penn's Medical and Nursing Schools, the Netter Center, and Sayre High School. This program is working towards a comprehensive 9th-12th grade educational pipeline that creates engaged learning and mentorship opportunities at many levels. For example, in the Neuroscience Pipeline, high school students are taught by undergraduates, who learn from medical students, who are guided by neurology residents and fellows. There are currently three components of the Health Sciences Pipeline, and a fourth in development, each with its own theme that is integrated with the science curriculum of that particular grade level.

pathways to the future:
health sciences
educational
pipeline

In summer 2009, the Neuroscience Pipeline Program earned a Provost Diversity grant for \$23,000 over three years to enhance its operation.

I. Neuroscience Pipeline

Neuroscience Pipeline is the oldest and most developed component. Each year, 40 Penn undergraduates and a dozen 1st and 4th year Medical students design and implement neuroscience curriculum at Sayre and on Penn's campus.

In the fall semester, Penn students teach basic anatomy and brain function, once a week for 12 weeks, in each of Sayre's five 10th grade Biology classes. Penn undergraduates lead small group lessons, enabling the core science curriculum to have hands-on, inquiry-based and small group learning. In the spring, a cohort of 25 Sayre students from the 10th grade are selected to travel weekly after school to Penn's School of Medicine to continue their exploration of neuroscience through work in university classrooms and labs. Neurology residents create clinical vignettes from which the lessons are structured. Teams of medical students teach the material with the help of undergraduate teaching assistants. The program culminates with team-based student presentations to peers and family members.

II. Cardiology Pipeline

In spring 2008, Penn Nursing and the Netter Center expanded the program by adding a Cardiology Pipeline. Modeled after the Neuroscience Pipeline, all 11th grade Chemistry students at Sayre participate in an eight-week intensive introduction to Chemistry through the lens of cardiology. In spring 2009, 40 Medical and undergraduate students worked with 100 Chemistry students at Sayre. Later that semester, a cohort of 20 students were selected to work with Nursing, Medical, and undergraduate students for six weeks on Penn's campus.

2008-09 high school participant surveys

55% of students rated their level of knowledge about health issues that can affect them and their families "high" or "very high" compared to 37% at the beginning of the course.

88% of students rated their degree of interest in pursuing medicine as "high" or "very high" compared to 42% at the beginning of the course.

77% of students rated their level of knowledge regarding the educational pathway to becoming a physician as "high" or "very high" compared to 56% at the beginning of the course.

100% of students rated their degree of interest in science as "high" or "very high" compared to 68% at the beginning of the course.

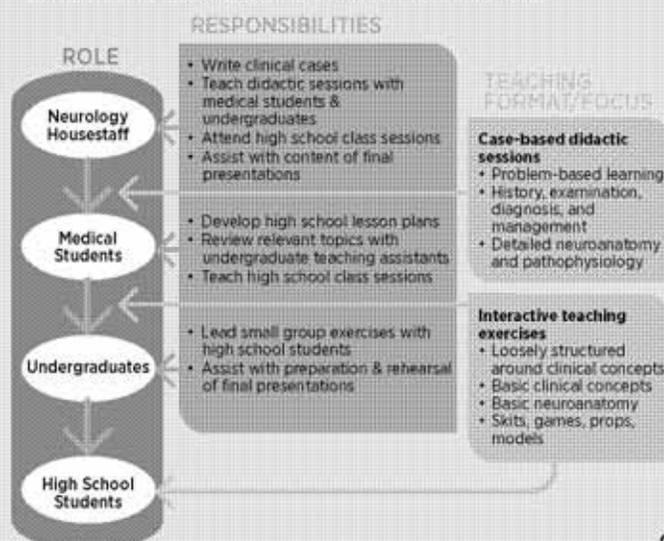
III. Infectious Diseases Pipeline

The Infectious Diseases (ID) Pipeline for 9th graders was piloted in spring 2009. In its first semester, ten 9th grade students taking Physical Science worked after school for seven weeks with a Medical School faculty member and three Medical students. In 2009-10, a school day component will be added to make a direct connection with the physical science curriculum. This will be followed by seven trips to Penn Medical School to further students' learning in the field.

IV. Endocrine Pipeline

The Endocrine Pipeline will be piloted in spring 2010. It will engage Sayre students both during the school day, as well as after school at Penn's School of Nursing. Graduate Nursing students and faculty are currently developing the curriculum, which will be built upon general knowledge of the endocrine system, growth and diabetes.

Multi-tiered Engagement in Neuroscience Pipeline



advancing through the pipeline: 3 success stories

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Tamara Bockow

College '07, Medicine '12

Tamara Bockow exemplifies the powerful and ongoing impact of Netter Center programs on Penn students. Her passion for biology, learning, and teaching have shaped not only her personal career path, but also the aspirations of many young people with whom she has worked.

"Tamara is changing minority youth's perceptions about careers and what it takes to go to college, and helping them set realistic goals to get there." -Dr. Karen Hamilton

Tamara first got involved with the Netter Center her freshman year as a Moelis Access Science Fellow, teaching Biology lessons at Sayre High School. Because of this experience, she was intrigued when she found out about the Pipeline Program. She soon became an undergraduate teaching assistant for the Neuroscience Pipeline. "As an undergrad, teaching neuroscience to high school students helped me gain better mastery of the material," Tamara reflects.

At the same time as she served as a mentor and teacher to high school students every week, Tamara formed meaningful mentoring relationships with Penn medical students and physicians who helped guide her on her own career path.

"I became particularly close with two twin girls [at Sayre]," says Tamara. "We exchanged emails long after I graduated from Penn. Both girls initially told me that they wanted to be either supermodels or actresses. However, I sensed their excitement about the brain, and I explained to them that they

Participants in Neuroscience Pipeline from 1998-2009:

24 Neurology Residents,
206 Medical Students,
137 Penn Undergraduate Students,
136 Sayre Students (2003-09)

demonstrated a real aptitude for neuroscience. I received an email from one of them a year later saying that they both

got internships working at the hospital over the summer and were now considering nursing school."

Now in her second year as a Penn Medical student, Tamara has continued working with the Pipeline Program, leading classes with undergraduate students and helping design program curriculum. "I love teaching and allowing students to explore their interest in science. Pipeline has solidified my interest in academic medicine, and I know that teaching is something I want to incorporate in my future career."

Princess Carter

Sayre '08; Xavier U. of Louisiana '12

Born and raised in West Philadelphia, Princess Carter is one of Sayre High School's star graduates. She was introduced to biology in the 10th grade through hands-on lessons with brains. "At Sayre, we did worksheets and reading assignments because there weren't any functional labs. The Pipeline Program opened up a curiosity for the sciences that I didn't even know I had."

Princess expressed her growing interest in medicine to then Sayre-Penn coordinator Scott Baier. "Mr. Baier made sure that I had every opportunity possible to expose myself to different fields within healthcare." She attended the National Youth Leadership Forum on Medicine and the Future Healers and Scholars of Tomorrow Program hosted by Penn's School of Medicine.

Through a Medical Intake course at Sayre, Princess worked with Dr. Terri Lipman and Penn Nurse Practitioner students, with whom she presented at the 22nd, 23rd, and 24th Annual Pediatric Nursing Conferences in Dallas, Philadelphia, and Las Vegas. "These were some of the most amazing experiences of my life," reflects Princess. "Aside from the fact that it was my first time flying, it was also my first time doing a poster presentation. My classmate and I were the only high school students at the conference, let alone participating in it." The Penn-Sayre team twice won first prize in the research poster category.

Princess is now in her sophomore year at Xavier University in Louisiana, and her future in medicine looks bright. Last summer, Pipeline leaders helped arrange for Princess to shadow Dr. Joan Von Feldt in the Rheumatology Department at Penn's Hospital. "Pipeline exposed me to undergraduates, medical students, residents, as well as physicians, who I was able to speak with firsthand about what they did at each stage in their education to be successful." Regarding Medical School, Princess notes, "Of course Penn is my first choice because that is the place where it all began for me; having the opportunity to complete my medical degree there would feel like everything came full circle."

(b)(6)

Roy Hamilton, MD

Dr. Roy Hamilton was born in Long Beach, California to a recently immigrated mother from Japan and an African-American father. He was raised in a working class environment where few of his peers considered higher education as an option. He attended a large

public high school that was 25% White, 25% African-American, 25% Hispanic, 10-15% Asian, and 10-15% Pacific Islanders or other. "I'm certain my early experiences shaped my belief that diversity is an important element of any endeavor, whether it be education, medicine, or academia."

Fortunately, Dr. Hamilton's parents encouraged his pursuit of education. He completed residency in Neurology at Penn in 2005 after having graduated from Harvard and MIT with degrees in Medicine and Health Sciences Technology. During his residency, Dr. Hamilton was introduced to Pipeline and eagerly got involved. He assumed the role of Curriculum Director for the program in 2004 and subsequently became Faculty Program Director in 2009 when appointed to his current position as Assistant Professor of Neurology.

"At the end of the day, it isn't really that important that these [high school] students have advanced knowledge about neuroscience. What is important is that they feel that they have their foot in the door in the world of academia and that they have mentors who will help them out in the years to come." -Roy Hamilton, MD

Dr. Hamilton believes Pipeline fills a critical niche in medical education: "Most medical students don't have a lot of experience as teachers. This program makes them take the complicated concepts that they are learning about in medical school and boil them down to their most fundamental essence to teach them to a class of bright but medically inexperienced high school students."

Aside from his role as teacher and program director, Dr. Hamilton studies the characteristics and limits of how the adult human brain reorganizes itself in response to injury. "As a tenure track physician-scientist working primarily in the field of noninvasive brain stimulation, I don't have a lot of opportunities to give back to the community directly. Participating in Pipeline allows me to achieve a balance in my life between the goals I set for myself as an academic and those I set for myself as a humanitarian committed to diversity."

Footnote: Dr. Karen Hamilton, Assistant Dean for the Office for Diversity and Community Outreach in Undergraduate Medical Education, founded the Neuroscience Educational Pipeline Program at Penn in 1998. This was part of the Association of American Medical Colleges' Division of Community and Minority Programs' "Project 3000 by 2000" to promote recruitment of pre-college underrepresented minority students to medical careers. According to Dr. Hamilton, bringing the program to Penn was an easy fit: Penn's Medical School hosts the first minority affairs office in the country. The program has continued to grow in popularity among Penn Med students. <http://www.med.upenn.edu/pipeline>

The Netter Center hired Dr. Gretchen Suess as a full-time director of evaluation in August 2008 to deepen, extend, and improve its work through comprehensive, longitudinal evaluation.

Although several university-assisted community school (UACS) programs have had grant-specific evaluations conducted to assess goals and objectives, the Netter Center has not until now had the organizational capacity to carry out an in depth evaluation of a UACS partnership. The Director of Evaluation is initially focusing on evaluation of the Center's UACS partnership at Sayre High School.

evaluation planning process

In September 2009, the Netter Center invited nine faculty members from across the University of Pennsylvania to join an external Evaluation Oversight Committee (EOC). Faculty were recommended as candidates by their colleagues based on substantial and sustained contributions to research at Penn and democratic scholarship. The EOC is comprised of the following colleagues from across the university:

Fran Barg
*Family Medicine &
Community Health
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Evaluation Goals & Methods

1. Model:

Create an "ideal" approach to evaluating Netter Center programs at a university-assisted community school. The overall goals are to assess the impact and improve the Center's efforts, strengthen UACS partnerships, and contribute to broader social learning. This requires the use of both formative and summative evaluation, with consideration of both process and outcomes.

2. "Non-Cookie Cutter":

Develop an evaluation framework that is adaptable, flexible, and can be applied to each unique UACS (locally, nationally, and globally) while also allowing for cross-site analyses.

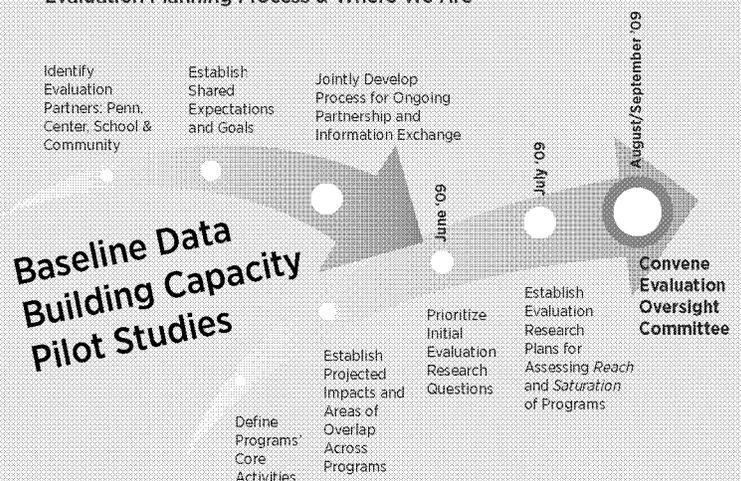
3. Collaboration:

Maintain a process that is participatory and collaborative. Collaborative partners include K-12 students, teachers and administration; undergraduate and graduate students; faculty; Netter Center Board members; program staff; parent and community leaders; and school district officials.

4. Theoretical Framework & Data:

The approach will be multi-disciplinary and will embrace mixed-method approaches (using qualitative, ethnographic, quantitative, and/or visual/spatial data).

Evaluation Planning Process & Where We Are



In September 2008, the Netter Center selected the University of Oklahoma-Tulsa to host its first regional training center on university-assisted community schools in the southwest region, including Oklahoma, Colorado, New Mexico, Texas and Arizona. The project builds on the significant work of the Tulsa Area Community Schools Initiative (TACSI), in which OU-Tulsa is a major contributor. Three focus areas have guided the work of the regional training center in its first year. Key 2008-09 accomplishments include:

1. Deepen OU-Tulsa's engagement with community schools in the Tulsa area

- Creation of the OU-Community Engagement Center (OUCEC) helped institutionalize community engagement on campus.
- OUCEC piloted the E3 Model (Engage, Empower, Educate)—a mentoring outreach program that is designed for at-risk female youth—at McLain High School. Replication is planned for University of Tulsa and Tulsa Community College, starting September 2009.
- OUCEC served on the task force that created Tulsa iJobs, a paid internship program for over 200 high school students. Out of the E3 program, 50% applied and received iJobs. OU-Tulsa employed over 30 students working in various departments.
- OUCEC organized the replication of Penn's Pipeline Program to start Fall 2009, as well as a new community school at Rogers High School modeled on the Netter Center's high school programs. An initial group of 50-70 Rogers students will be selected with the long-term goal of serving 500 or more Tulsa Public Schools (TPS) high school students each year.

2. Involve other higher eds in the Tulsa region

- OUCEC created the Higher Education Forum that includes nine area institutions. The aim is to create Career Access Pipelines coordinated through OUCEC and Tulsa Public Schools' Office of High School Re-Design to serve the high schools in TPS (9) and Union Public Schools (1) and eventually all Tulsa County School Districts. Rogers High School will be the initial flagship school and serve as a model for the region.

“Community engagement is a core component of our mission, and we engage in that mission every day through graduate programs in medicine, social work, education and more. This opportunity will allow us to expand that commitment, working in other collaborations to build better schools, stronger families, and healthier communities.”

-Gerard Clancy, MD, President, OU-Tulsa

Through its replication and training activities, the Netter Center is seeking to help raise the visibility of university-assisted community schools. A primary strategy is to help develop regional training centers for the model, as well as to continue to host trainings and conferences at Penn.

pathways to the future:
national replication



ADVISORS:



3. Provide training and technical assistance to the southwest region

- OUCEC hosted its first annual Regional Conference November 9-10, 2009. <http://tulsa.ou.edu/oucec/>



the reality

7.7 million students in the nation's largest cities (urbanized area with population >250,000)

66% of these students attend moderate-to-high poverty schools (schools with 50% or higher qualifying for free or reduced lunch)

674 public and private not-for-profit higher education institutions in the nation's largest cities

- 70 of these institutions with enrollment >20,000
- 82 institutions with enrollment of 10,000-19,999
- 77 institutions with enrollment of 5,000-9,999
- 176 institutions with enrollment of 1,000-4,999
- 267 institutions with enrollment <1,000

5,000 K-12 students reached annually by Penn

4 million dollars expended to serve nearly 5,000 students

imagine the impact...

70 institutions working with 5,000 students each

82 institutions working with 3,750 students each

77 institutions working with 1,875 students each

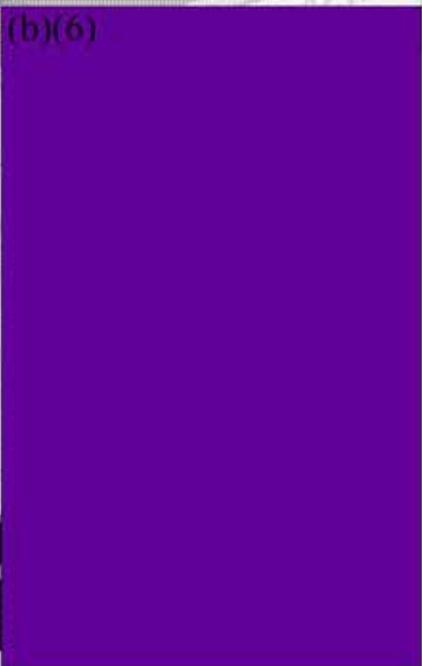
176 institutions working with 750 students each

267 institutions working with 250 students each

...967,250 K-12 students could be reached each year for **3/4** billion dollars! This represents **12.5%** of the total number of public school students in large cities.

If each university focused on moderate-to-high poverty schools, they could reach **19%** of these students.

Source: National Center for Education Statistics, www.nces.ed.gov



National Conference on University-Assisted Community Schools as an Effective Strategy for Education Reform, K-16+, June 3, 2009

- More than 200 people from 16 states, DC and Australia attended this national conference sponsored by the Netter Center, which focused on models of university-assisted community schools, School District partnerships, and the roles of teachers unions.

- Keynote speakers included Nancy Cantor, Chancellor and President of Syracuse University, and Jerry Jordan, President of the Philadelphia Federation of Teachers.

Technical Assistance

The Netter Center continues to host colleagues from across the country who visit Penn to better understand the university-assisted community school model. Visitors to the Netter Center, often with their school and community partners, included colleagues from the University of Minnesota, University of Delaware, the University of Oklahoma-Tulsa, the Harvard Family Research Project, and the Association for Community Organization and Social Administration (ACOSA). Colleagues also came from abroad, including Edith Cowan University (Australia) and Concordia University in Quebec. Of particular note this year was the Netter Center's work with Richard Stockton College of NJ as it developed a partnership with Atlantic City Public Schools. Stockton's partnership with local high schools has been formalized by School District resolution, and numerous departments at the College are engaged in the work.



2008-2009

highlights and developments benefiting penn, philadelphia, and the nation

(b)(6)

University of Pennsylvania

The University of Pennsylvania was placed on the Corporation for National and Community Service's 2009 Presidential Honor Roll with Distinction. (This was the highest award Penn was eligible for after being selected in 2008 as one of three recipients of the Corporation's highest honor, the Presidential Award for General Community Service.)

- The 2008 ServiceNation Summit engaged over 500 national leaders to build a consensus for service and civic engagement, ultimately leading to the creation of comprehensive national service legislation. At the Summit, President Gutmann announced the creation of 400 new academic community service internships. This Penn program will enable the Netter Center to provide 120 undergraduate internships that connect Penn and West Philadelphia from 2009-2012.
- The Tarnopol Program in Community Service and Urban Social Entrepreneurship is a new collaboration between the Wharton School and the Netter Center. Funding secured for the Tarnopol Program will support the following:
 1. Creation, design and implementation of new undergraduate academically based community service courses at the Wharton School, including in finance and micro-finance, venture capital, real estate, and retail;
 2. Academic year or summer stipend support for Wharton undergraduate or graduate students or those in dual degree programs serving as interns in the Netter Center's many programs; and
 3. Operating funds for program activities developed through Wharton-partnered academically based community service courses or internships, as described above.

Tarnopol Program activities are initially focused on three thematic areas:

1. Improving local food systems, in partnership with the Agatston Urban Nutrition Initiative and Wharton's Management 100 class, an experiential learning course required of all Wharton undergraduates that focuses on leadership, teamwork and communication;
2. Supporting small businesses and strategic community and economic development through interns placed at the West Philadelphia Enterprise Center CDC, a local community organization; and
3. Youth entrepreneurship and financial literacy education at West Philadelphia High School taught by Wharton undergraduates.

West Philadelphia/Philadelphia

- Out of the 19 seniors who participated in the Netter Center's College Access and Career Readiness (CACR) Program in 2009-2009: 89.5% submitted college applications to a minimum of one 2-year institution and two 4-year institutions; 84% were accepted to at least one college for the 2009-10 academic school year.
- The CACR Program won the 2009 WorkReady Philadelphia Second Place Award for Summer Education and Mentoring. In each of the last four years, the Netter Center team has been recognized for awards from WorkReady—a program of the Philadelphia Youth Network that provides design, administration and oversight support for youth workforce development. These efforts are helping to achieve Mayor Nutter's goals to reduce high school dropouts and increase college-going rates.
- In April 2009, AT&T Pennsylvania awarded a grant of \$300,000 over three years to the CACR Program, allowing the program to continue to expand and reach more freshman students at Sayre.
- The school-based Sayre Health Center now has over 300 users per month. A second full-time physician was funded to begin work on July 1, 2009. The Health Center hosts high school students as Medical Assistant Interns during the school year and summer.

- The Nonprofit Institute, a Netter Center program, held two professional development workshops in 2008-09.

The Institute provided six consecutive days of high-impact training to help individuals involved with local nonprofits and communities of faith to build organizational and program capacity.

Thanks to a capacity building grant from United Way, the Fall 2008 Institute was able to host 45 individuals. The Spring 2009 Institute hosted 25 individuals.

National Policy

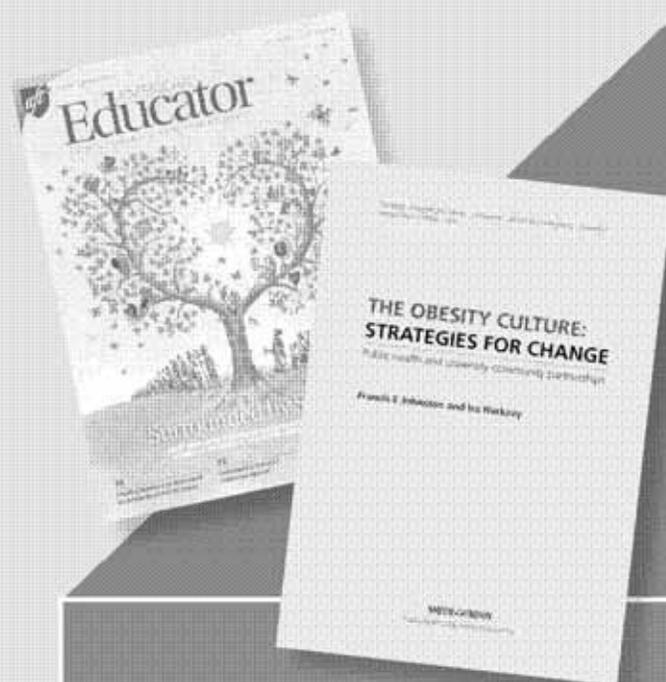
- In early 2009, the Netter Center Director chaired a national Anchor Institutions Task Force to advise the Secretary of the U.S. Department of Housing and Urban Development (HUD). This Task Force produced a report, "Anchor Institutions as Partners in Building Successful Communities and Local Economies," as part of *Retooling HUD for a Catalytic Federal Government: A Report to Secretary Shaun Donovan*. A Congressional Urban Caucus Briefing followed the Anchor Institutions Task Force report on June 9, 2009, which was organized by the Coalition of Urban Serving Universities and Penn. This Task Force is continuing, functioning as an ongoing think tank, developing long-term strategies, and making the case for the crucial role of anchor institutions in economic and community development.

- With support from the Annie E. Casey Foundation, the Netter Center also developed "Anchor Institutions Toolkit: A Guide to Neighborhood Revitalization." The Toolkit draws on Penn's experience in working to revitalize its West Philadelphia community in collaboration with a range of key stakeholders. The Toolkit is available to the public online at the Netter Center website as a PDF. An interactive version of the Toolkit is being completed that will also be available online.

• The Coalition for Community Schools National Forum held April 7-9, 2010 in Philadelphia.

Co-hosted by the Netter Center, this Forum includes plenary sessions, affinity groups, and workshops, led by community school advocates from around the country.

Visit www.communityschools.org.

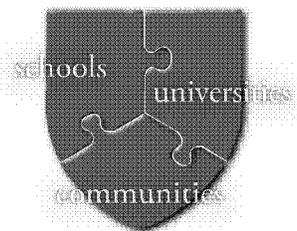


Selected Publications by the Netter Center Director

- *The Obesity Culture: Strategies for Change. Public Health and University-Community Partnerships* (with Francis E. Johnston), (Cambridgeshire, Smith-Gordon, 2009).
- Issue editor, "Universities in Partnership: Strategies for Education, Youth Development, and Community Renewal" (with Matt Hartley), *New Directions in Youth Development* (Summer 2009).
- "The Enduring Appeal of Community Schools" (with Lee Benson, Michael Johaneck, and John Puckett), essay in special issue on Community Schools in *American Educator*, (Summer 2009); 22-29, 47.

financial report

June 30, 2009 and 2008



<i>Statement of Activities</i>	FY 2009 Actual Year End	FY 2008 Actual Year End
REVENUE		
University Support	1,057,685	949,809
Grants	3,071,256	3,052,057
Term Gifts (Annual and Multi-year)	1,013,922	939,606
Net Endowment Income*	178,835	110,569
TOTAL REVENUE	\$5,321,698	\$5,052,040
EXPENSES		
Total Compensation	3,646,961	3,331,853
Program and Operations	1,292,857	1,572,299
TOTAL EXPENSES**	\$4,939,818	\$4,904,151
Annual Revenue less Expenses	381,880	147,889
Net Carryover/(Deficit) Previous Year***	747,753	599,864
TOTAL NET ASSETS****	\$1,129,633	\$747,753

*Net Endowment Income: Includes current year's investment income earned on endowment less any overhead charged on specific endowments.

**Total Expenses: Several factors contributed to the decrease in Program and Operation Expenses and the increase in Total Compensation from FY08 to FY09, particularly a decrease in travel and conference expenses, and an increase in the total number of staff, interns and work-study students hired to work with Center programs, which resulted in greater capacity to deliver more comprehensive services.

***Net Carryover/(Deficit) Previous Year: Includes funds from diverse sources (program income, multi-year grants and gifts) that were recognized in prior fiscal years but were designated by the donor or granting agencies for use in future fiscal years.

****Total Net Assets: Includes the Annual Revenue less Expenses plus the Net Carryover/(Deficit) Previous Year, which will be utilized in future fiscal years.

Starting in 2004, and continuing through *Making History: The Campaign for Penn*, the Netter Center for Community Partnerships has received more than \$17 million in commitments from alumni, families and friends of the University. Support from these generous individuals is critical both to the Center's current programming and to extend its reach to more young people and communities.

acknowledgements

Thank You to Our Individual Sponsors

The Netter Center gratefully acknowledges those who have contributed \$25,000 or more (July 2004 - June 2009).

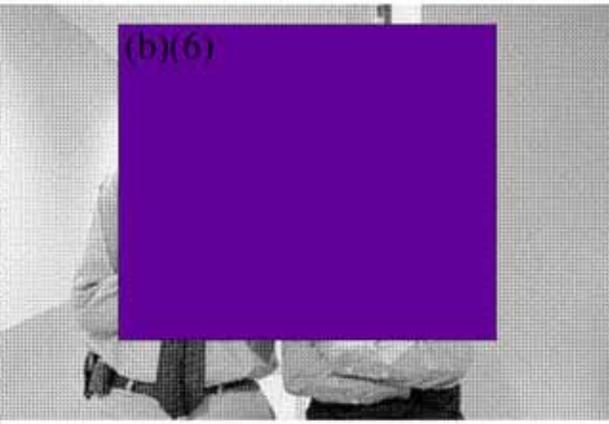


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History

(b)(6)

In Memoriam

Our dear friend and colleague, Dr. Bennett "Bernie" Johnson Jr., passed away in April 2009. He served as the Hospital of the University of Pennsylvania's senior medical officer and a professor of dermatology in the School of Medicine. For more than 20 years, he taught Penn medical students not only the vital importance of clinical knowledge but also of being involved in one's community. As the School's Senior Associate Dean for Diversity and Community Outreach and Co-Chair of the Netter Center's Faculty Advisory Board, Dr. Johnson shepherded the growing relationship between Penn and Sayre High School, which resulted in the school-based Sayre Health Center. His extraordinary humanity, practical idealism, and wise leadership have shaped, and will continue to shape, the Netter Center's work.

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“Academically based community service at Penn was eye-opening. It taught me the power of pedagogy to simultaneously and dramatically improve two different communities—students and the community members they were serving. That lesson has been important in my career and in the work I do. When I founded the national service corps program City Hall Fellows 3 years ago, I made it a point to integrate service-learning principles into my corps members’ training.”

-Bethany Rubin Henderson, Penn C'98, Harvard Law '02

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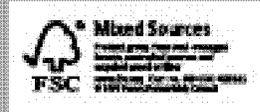
Eleanor Sharpe

Associate Director

Joann Weeks

Associate Director

(b)(6)



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The 2008-09 Annual Report was produced by
the Netter Center for Community Partnerships.

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Joann Weeks, Co-Editor

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Photographs: Tommy Leonardi, Jamie Tomczuk,
as well as other Penn staff
members and students

For an electronic version of this report, with links to more
information, articles and videos, please visit our website.

Comments and questions on the report are welcome.

For further information contact:
Rita Axelroth at ritaax@sas.upenn.edu
Joann Weeks at weeks@pobox.upenn.edu

December 2009



March 2009: Pennsylvania Pre-K Counts: Showing Results for Pennsylvania's Children



For A Brighter Future

Pennsylvania Pre-K Counts provides high quality pre-kindergarten services to 11,800 3 & 4 year olds in the commonwealth so that they can enter school ready to learn and succeed in school and in life. Children's progress and parent engagement is already resulting in academic achievement for our students and savings in special education costs for our school districts.

Pennsylvania Pre-K Counts is preparing our children for kindergarten

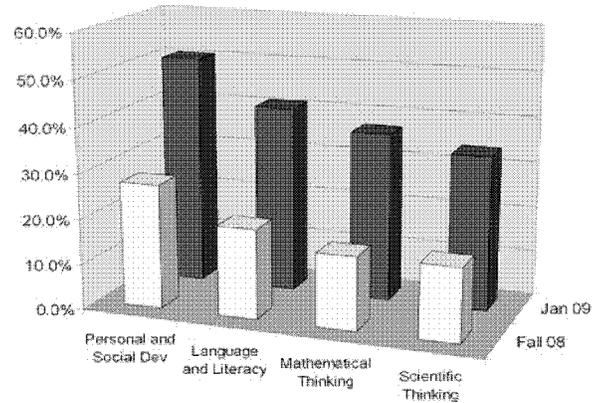
In 2007-2008

- Ninety-four percent of PA Pre-K Counts children finished the school year with age-appropriate skills and behavior or emerging age-appropriate skills and behavior – a stunning success rate.

In 2008-2009

- Twice as many three-year olds in PA Pre-K Counts classrooms demonstrated proficiency in personal social development and scientific thinking at mid-year than at the beginning of the 2008-2009 school year.
- Twice as many four year-olds demonstrated proficiency in language & literacy and mathematical thinking at mid-year than at the beginning of the school year. Nearly 80 percent are showing age-appropriate skill development in these areas.

Percentage of PA Pre-K Counts children proficient in Fall 2008 and January 2009



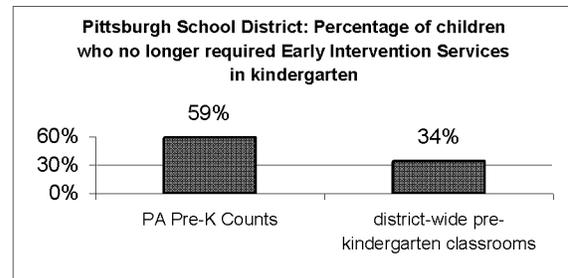
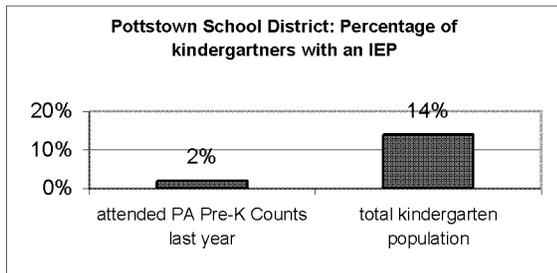
Children from PA Pre-K Counts classrooms in 2007-08 are demonstrating excellent results on kindergarten assessments in 2008-2009. School Districts report that PA Pre-K Counts children entered kindergarten with age-appropriate skills, were more prepared for kindergarten than their peers, and are meeting development expectations throughout kindergarten. For example:

- Nearly every PA Pre-K Counts graduate (95%) entering kindergarten in the Turkeyfoot Valley Area School District showed age-appropriate skills per the DIBELS screening assessment.¹
- Erie and Corry School District's kindergarten teachers reported that 85.7% of the children who participated in PA Pre-K Counts classrooms were doing better in math, literacy and social skills compared to peers who had not attended PA Pre-K Counts; 100% were doing better in motor skills; and 57% were better able to follow rules and be self-regulated.

Pennsylvania Pre-K Counts is reducing the need for special education services

Children with developmental delays who participated in PA Pre-K Counts in 2007-2008 were able to make significant developmental progress to enter kindergarten on par with the national norm.

- Many children who entered PA Pre-K Counts in 2007-2008 with Individualized Education Plans (IEPs) requiring Early Intervention services no longer required services when they entered kindergarten this year.
- Of those children who participated in PA Pre-K Counts last year, a smaller percentage is requiring Early Intervention services in kindergarten than the total kindergarten population.



¹ The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) are a set of standardized, individually administered measures of early literacy development. The DIBELS assessment is widely used in kindergarten and first grade to regularly **696** for the development of students' early literacy skills.

PA Pre-K Counts is getting parents involved in their children's early learning

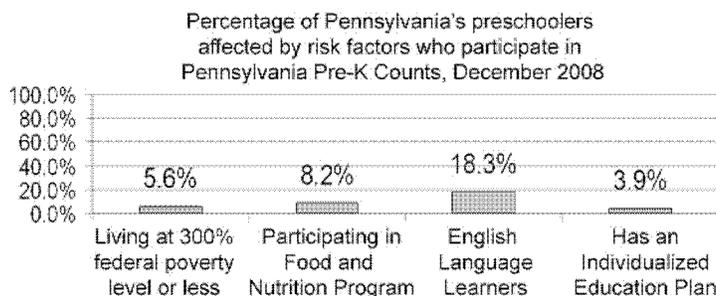
Parents are remarking on the progress in their children's learning and social skills since entering Pennsylvania Pre-K Counts. After seeing their child's progress and receiving encouragement and support from teachers, parents are continuing their child's early learning at home, volunteering in the classrooms and attending parent workshops.

After losing my job earlier this year, I wasn't sure if I would be able to put my daughter in preschool. I heard about Pennsylvania Pre-K Counts from someone at my church and called right away. My daughter's growth has been wonderful. She is excited about meeting new children, and her learning so far has far exceeded my expectations. Thank you for this awesome program. Parent, Child Advocates, Blair County

Less than 5% of Pennsylvania's preschoolers participate in PA Pre-K Counts

Pennsylvania Pre-K Counts is still only reaching a fraction of eligible children. In 2008-2009, less than four percent of Pennsylvania's 3 and 4 year olds are participating in Pennsylvania Pre-K Counts. Participation rates are slightly higher (approximately six percent) in counties that are at moderate-high to high risk of school failure².

According to grantee reports, nearly 95% of children participating in Pennsylvania Pre-K Counts are affected by at least one risk factor for school failure, with 75% affected by more than one risk factor. Often children affected by risk factors, such as living in low income families or English language learners, enter school without all the academic and social skills they need to succeed. This readiness gap can widen into an "achievement gap" as the child goes through school. Although all children benefit from quality pre-kindergarten, research has shown that at-risk children benefit the most, and can often catch up with their peers developmentally by the end of the pre-kindergarten year. Pennsylvania Pre-K Counts is reaching only a fraction of at-risk children who can benefit from high quality pre-kindergarten.



As a kindergarten teacher, I have found that students who have gone through a PA Pre-K Counts program come to school with more advanced skills, experiences and enthusiasm. I believe that PA Pre-K Counts is an excellent way to jump-start a child's knowledge and help prepare a child for kindergarten.

Quality program design and accountability is providing positive results for children

Pennsylvania Pre-K Counts meets or exceeds nearly every quality benchmark established by the National Institute for Early Education Research (NIEER). Comprehensive accountability includes a system of reporting, site monitoring and classroom environment ratings. Grantees submit monthly and quarterly reports which are monitored and reviewed by OCDEL staff. Preschool Program Specialists conduct site visits and, using a comprehensive review, evaluate each grantee on how it has met program requirements for reporting, communications/interactions, meeting and training attendance, continuous quality improvement, teacher qualifications, funds management, classroom environment, enrollment and attendance of the children, and program review. Independent assessors also evaluate individual classrooms using the nationally recognized Early Childhood Environment Rating Scales-Revised (ECERS-R). Grantees also submit periodic reports of each child's progress.

Providing a quality early education continuum

Pennsylvania Pre-K Counts is part of a quality early education continuum that serves children from birth to age five and their families to give Pennsylvania's children a strong foundation for future success in school and in life. It is the combination of programs such as Keystone STARS, Child Care Works, Head Start, Early Intervention, Full Day Kindergarten and Nurse Family Partnership that provides the most effective results. For more information, visit www.pde.state.pa.us/early_childhood/.

² Risk level refers to what extent children are at risk of school failure in that county, based on OCDEL's Program Reach and County Risk Assessment, FY 2007-2008.

(b)(6)



pennsylvania

OFFICE OF CHILD DEVELOPMENT
AND EARLY LEARNING

(b)(6)

Annual Report
2008 - 2009

Pennsylvania Departments of Education
and Public Welfare
Office of Child Development and Early Learning

(b)(6)

Keystone STARS moves from a pilot program to statewide implementation 6/03	Work begins to change the scope of the teaching certificates for early childhood education, elementary education, and special education and to strengthen the teacher preparation program approval guidelines 8/04	Task Force recommends reformed Special Education Guidelines for institutions of higher education 5/05	PA Early Learning Keys to Quality, a regional approach that combines practitioner professional development and the Keystone STARS quality improvement programs, is created 7/05
Pennsylvania becomes a BUILD Initiative state partner 8/03	More than 2,000 early learning practitioners participate in early childhood-specific summer professional development 8/04	State-wide Infant-Toddler Strategy created 5/05	Pennsylvania awards first MAWA Performance Grants for Inclusive Practices, a competitive grant, for Preschool Early Intervention Programs to increase the number of children with developmental delays/disabilities included in typical early childhood programs 7/05
PA legislature approves two new funding streams for early childhood education: Head Start Supplemental Assistance to serve 2,484 children in 04-05; and Accountability Block Grant to fund programs that will enhance students' academic achievement and school readiness in school districts and includes three early childhood options: pre-kindergarten, full-day kindergarten, and reduced class size in grades K-3, serve over 54,000 children in ABG-funded full day kindergarten and 3,000 children in ABG-funded pre-kindergarten 7/04	Office of Child Development established 9/04	Pre K Counts Public-Private Partnership for Educational Success, a public-private initiative, begins funding districts, Head Start, child care and Early Intervention teams to create high quality pre-kindergarten programs. Lead funding provided by Heinz Endowments, the Grable Foundation and the William Penn Foundation 6/05	Early Childhood Capital Investment Fund, in cooperation with the Pennsylvania State Public School Building Authority, launched a \$5 million revolving low-interest loan fund to help school districts invest more fully in early childhood education 7/05
PA legislature approves funding for 04-05 to serve: Over 100,000 children (monthly average) through Child Care Works Over 63,000 children through Early Intervention (birth-5) Over 62,000 children through school-funded Full Day Kindergarten Over 132,000 children through Keystone STARS Nearly 3,700 children through Nurse-Family Partnership 1,400 children through Parent-Child Home Program 7/04	Children's Trust Fund awards \$1,795,976 in grants to 13 community-based agencies to implement child abuse and neglect prevention programs. 11/04	PA legislature approves funding for 05-06 to serve approximately: Over 118,000 children (monthly average) through Child Care Works; Over 66,000 children through Early Intervention (birth-5); Over 54,000 children through ABG-funded full day kindergarten; Over 68,000 children through school-funded full day kindergarten; Nearly 4,800 children through Head Start State Supplemental; Nearly 154,000 children through Keystone STARS; Nearly 3,800 children through Nurse-Family Partnership; Over 1,000 children through Parent-Child Home Program; Nearly 3,700 children through ABG-funded pre-kindergarten; Over 8,000 children through school-funded pre-k and K4 7/05	Child Care Works eligibility regulations revised and new rules remove barriers and increase access for low-income families 7/05
Two Governor's Institutes are offered for early childhood practitioners focusing on literacy 7/04	Pennsylvania facilitates Mind in the Making institutes to enhance the teaching practices of early childhood teachers to improve quality early education 12/04		Work begins on developing a single, unified subsidy system to serve all families eligible for subsidized child care 7/05
Keystone STARS is opened to family child care providers 7/04	Task Force recommends reformed Early Childhood Education Guidelines for institutions of higher education 12/04		Child outcomes reporting is piloted among select Early Intervention programs 7/05
	Director Credential created for early childhood and school-age program directors and administrators 12/04		Early Childhood Education Partnership Conference held with US Department of Health and Human Services, Region III 9/05
	Task Force recommends reformed Elementary Education Guidelines for institutions of higher education 3/05		

Department of Welfare and Department of Education hold joint Annual Early Childhood Education conference 10/05	Pennsylvania initiates statewide annual "One Book, Every Young Child" campaign 4/06	New pre-certification orientation video introduced for prospective child care centers and group child care homes 7/06	Pennsylvania OCDEL is created in the Departments of Education and Public Welfare which includes the programs of Infant/Toddler and Preschool Early Intervention 1/07
Support received from The Heinz Endowments for the Color Me Healthy (child nutrition) program and for a pilot infant/toddler mental health consultation program in western Pennsylvania 11/05	Parents are provided information on Keystone STARS as part of their parent Resource & Referral services at CCIS agencies 5/06	Keystone STARS is open to Head Start programs 9/06	First "Program Reach and County Risk Assessment" report is published 1/07
Infant/Toddler Mental Health Initiative Consultation implemented in three Regional Keys 1/06	Early Childhood Career Lattice is released 5/06	Director Credential and Portfolio Policies and Procedures, and Portfolio Submission Option created 11/06	"Friends of Children's Trust Fund" nonprofit organization created to accept/solicit private and federal investments in the Children's Trust Fund program 3/07
PA Department of Education launches the campaign for career and technical education facilities, promoting student preparation for CDA certification 2/06	"Partnering for Success: Pre-kindergarten Programs in Pennsylvania" a guide book to promote pre-kindergarten partnerships is published 6/06	"Evaluation of Pennsylvania's Keystone STARS Quality Rating System in Child Care Settings" published - finds Keystone STARS is improving quality of child care and reversing the negative trend of declining quality over the past decade 12/06	Pennsylvania's Promise for Children campaign launched 4/07
Development of a common set of child outcomes assessments for all early care and education programs in Pennsylvania begins 2/06	Pennsylvania School-Age Professional Credential is created 6/06	TANF child care regulations revised to allow for the creation of a single, unified child care subsidy system 12/06	Pre K Counts Public-Private Partnership for Educational Success holds inaugural Executive Leadership Council meeting, co-chaired by PNC CEO Jim Rohr and Governor Ed Rendell 4/07
First-ever pre-kindergarten regulations for public schools established by the State Board of Education 3/06	PA legislature approves funding for 06-07 to serve: Over 122,000 children (monthly average) through Child Care Works; Nearly 70,000 children through Early Intervention (birth-5); Over 55,000 children through ABG-funded full day kindergarten; Nearly 70,000 children through school-funded full day kindergarten; Nearly 6,000 children through Head Start State Supplemental; Over 138,000 children through Keystone STARS; Nearly 4,000 children through Nurse-FamilyPartnership; Over 4,000 children through ABG-funded pre-kindergarten; Over 10,000 children through school-funded pre-k and K4 7/06	State Board of Education regulations regarding pre-kindergarten programs (Title 22, Ch 4, 11, 12) go into effect 12/06	Planning phase for the Early Learning Network begins 5/07
Parent Handbook developed for all Child Care Works families that are eligible for child care subsidy 3/06		Pennsylvania convenes early childhood and K-12 communities to facilitate the development of kindergarten transition planning based on the nationally-recognized framework by Dr Robert Pianta 12/06	Unification of Child Care Works subsidy program for all parents under Child Care Information Services agencies completed 6/07
"Kindergarten, Here I Come", an activity guide for families, is published, which provides monthly parenting information and at-home experiences that are linked to Pennsylvania's Learning Standards for Pre-Kindergarten 4/06		OCDEL receives grant from US Office of Special Education Programs (OSEP) to develop a common system of measuring child progress across state early childhood programs including Early Intervention 12/06	PA Learning Standards for Infants and Toddlers are published 5/07



COMMONWEALTH OF PENNSYLVANIA

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December 14, 2009

With the economic downturn, the past year was a difficult one for Pennsylvania and its citizens. We were all forced to closely examine and prioritize our investments. As we weather this storm, quality early education continues to shine as a beacon of hope for a brighter economic future.

We are pleased to present the Office of Child Development and Early Learning's annual report for 2008-2009. As you will read, Pennsylvania has made some impressive progress over the course of this year. For example:

- Quality design was improved through initiatives such as the revision of child care regulations for the first time in 16 years; the first comprehensive evaluation of Learning Standards for Early Childhood to ensure alignment from birth through third grade; and the creation of the new credential in Early Intervention Language Special Instruction.
- Accountability and documentation of positive outcomes was deepened with the development of the Keystone STARS Technical Assistance Quality Assurance and Accountability System and continued development of the PELICAN (Pennsylvania's Enterprise to Link Information for Children Across Networks) and Early Learning Network systems.
- Leadership to champion quality early education as a priority for Pennsylvania grew through the new Early Learning Council and Early Learning Investment Commission.

Pennsylvania has become a leader in early education, achieving many firsts among states and the nation. This progress sets the stage for a new chapter in state governance to deepen our investment to serve more children well, complete our work to support effective accountability and documentation, and increase access for infants and toddlers to quality early education.

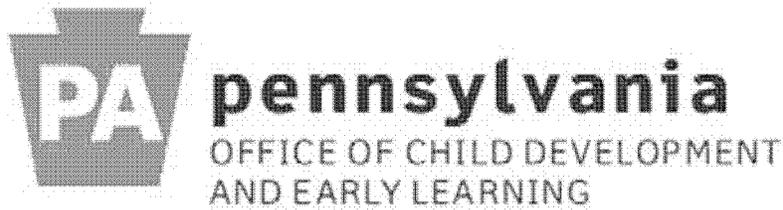
When our young children reach their promise through quality early education, we all benefit. I invite you to join in celebrating our achievements over the past year and supporting our future success for our young children.

Sincerely,

Estelle B. Richman
Secretary of Public Welfare

Gerald L. Zahorchak, D.Ed.
Secretary of Education

Enclosure



2008-2009 Annual Report

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I. Executive Summary

Not in recent history has our nation's economy been in such distress as it was in 2008-2009. The economic crisis has forced policymakers and citizens to examine funding at every level. Investing in early education is one strategy that should rise to the top when looking to support today's economy and build a stronger future.

A recent Cornell University study showed that Pennsylvania's early childhood education sector has a higher multiplier effect on our economy than any other sector. For every dollar Pennsylvania invests in early childhood programs, more than two dollars is circulated throughout our local economies through employment and purchasing of goods and services.¹ In addition, today's working parents—and their employers—rely on access to early education programs to continue to work, be more productive at work and have less absenteeism.

My grandson started in Sonrise Christian Day School when he was 18 months old. From the beginning it was a great experience for him as well as us. The school is part of the Keystone STARS system and Pennsylvania Pre-K Counts. My grandson is now four years old and will be attending kindergarten next fall. I am confident he will do very well in school because of the strong foundation he received from Sonrise. The staff is highly trained and compassionate. He enjoys going to school and is learning by leaps and bounds. My daughter receives help from the state for his tuition and it has been a true blessing.

Wendy VanCleve, Grandmother, Delaware County

These immediate benefits pale in comparison to the long-term economic benefits of providing quality early education. Quality early education saves tax dollars on special education, remediation, prisons, and public assistance. It also provides kids who would otherwise struggle or fail in school the strong start they need to graduate high school, attend college, get good jobs, own homes, and pay taxes.

Since 2003, Pennsylvania has worked to build a quality early education continuum that serves the diverse needs of families with children from birth to age five through school-age. To build this system, Pennsylvania continues to:

- **Strive for higher quality and reach all children and families that can benefit:** Quality standards and programs that produce the positive child outcomes documented by 40 years of research and align well with each other.
- **Refine accountability and document positive outcomes for children:** Systems to monitor performance of local programs and provide technical assistance to address concerns and continue to improve quality. By documenting how children are doing, Pennsylvania can refine the system to better serve future generations.
- **Build leadership in our communities and among state decisionmakers to champion quality early education as a priority for Pennsylvania:** Promoting early learning in young children involves all Pennsylvanians. Community involvement is vital to reaching vulnerable children and making effective local investments.

The work of the Office of Child Development and Early Learning (OCDEL) and its partners throughout the commonwealth has created a culture of continuous quality improvement among early learning programs, greater participation among school districts in early education, and more quality early learning opportunities for young children.

For example, since 2003:

- the percentage of child care centers participating in Keystone STARS has more than doubled (from 32% in 2002-2003 to 75% in 2008-2009);
- the percentage of school districts offering pre-kindergarten programs has quadrupled (from 6% in 2003-2004 to 26% in 2008-2009); and
- the percentage of Pennsylvania's three and four year olds participating in high quality early education programs has doubled (from 18% in 2002-2003 to 35% in 2008-2009).

Highlights from 2008-2009

In 2008-2009 OCDEL focused on creating more quality early learning opportunities for children, assuring strong implementation and coordination among programs, building accountability into the system, and beginning development of a system to document positive outcomes for children. Here are some highlights from the year:

Strive for higher quality and reach all children and families that can benefit

- Pennsylvania revised its child care regulations for the first time in 16 years.
- OCDEL completed a nine-part series of training videos on the Learning Standards for Early Childhood to help early learning directors, teachers and staff make the most of this resource. New parent companion guides to the learning standards were also released, including *Learning Is Everywhere*, a birth-five activity guide that provides activities for families to do together in various learning locations and *Kindergarten, Here I Am*, a 15-month activity guide that supports skill-building activities before, during and after kindergarten.
- OCDEL published its second Program Reach and Risk Assessment Report, including information on risk and reach for each county and Pennsylvania's 27 largest cities.
- OCDEL published its English Language Learner Toolkit to help early education providers increase their cultural competence and provide higher quality experiences to English Language Learners and their families.
- OCDEL's Braiding Preschool Funding Task Force provided tools and professional development to early learning programs for making most efficient use of the various state and federal funding streams available for pre-kindergarten.
- OCDEL and Early Intervention Technical Assistance piloted a new professional development series that results in a credential in Early Intervention Language Special Instruction.
- In 2008, Pennsylvania was one of seven states invited to develop a plan to integrate the Strengthening Families approach into its programs.

RESULTS:

- Overall, the alignment study of Pennsylvania's Learning Standards for Early Childhood found the standards and assessments are strong and show good alignment across grade levels.
- Nearly one-third (32%) of Keystone STARS programs moved up at least one STAR level in 2008-2009. There was a 30% increase in the number of STAR 3 and 4 programs between 2007-2008 and 2008-2009.
- Environment Rating Scale scores have increased among Keystone STARS programs for 2008-2009. The overall average score for STAR 3 sites was 5.23 in 2008-2009, which is

One of my children I taught in Early Intervention from about 16 years ago just completed the Para educator academy at our IU and we hired her as an assistant teacher in one of our classrooms. I am so proud of her and her accomplishments, and she got her start in our program!

Cheri L. Woyurka, M. ED,

Berks County Intermediate Unit, Berks County

an increase from 2007-2008 when the average score was 5.06. STAR 4 sites scored an overall average of 5.48 in 2008-2009, which is an increase from 2007-2008 when the average score was 5.31.

- More families accessing Child Care Works subsidy using regulated care than ever before, with 70% of TANF children receiving child care assistance are using regulated child care in 2008-2009, a 38% increase since Child Care Information Services (CCIS) agencies began providing child care services to TANF families in 2006-2007.
- Nearly all (95%) children in Pennsylvania Pre-K Counts classrooms were affected by at least one risk factor for academic failure, such as living in low income families, learning English as a second language, or having disabilities or developmental delays. Most (77%) were affected by two or more risk factors, making them more likely to struggle in school.
- 60% more bachelor's degree scholarships were awarded through T.E.A.C.H. than in 2007-2008.
- There was a 76% increase in the number of Director's Credentials awarded between 2007-2008 and 2008-2009.
- Over the past two years, OCDEL has observed a nearly 15% increase in the number of children included in typical early childhood programs, resulting in a total of 63% of all children in preschool Early Intervention receiving their services in these settings (e.g. child care, Head Start, preschool) in 2008-2009.

Refine accountability and document positive outcomes for children

- In 2008 – 2009 Pennsylvania developed the Keystone STARS Technical Assistance Quality Assurance and Accountability System to support consistency and quality in technical assistance across the commonwealth.
- OCDEL continued development of Pennsylvania's Enterprise to Link Information for Children Across Networks (PELICAN) In 2008-2009, PELICAN Pennsylvania Pre-K Counts entered phase two. PELICAN Infant/Toddler Early Intervention was piloted in four counties and preparation began for development of PELICAN Preschool Early Intervention.
- The next phase of Pennsylvania's Early Learning Network began with Early Intervention programs and Pennsylvania Pre-K Counts programs reporting child outcomes online through the Ounce and Work Sampling online reporting tools.

RESULTS:

- In 2008-2009, ERS assessors conducted approximately 1680 classroom assessments, a 75% increase from 2007-2008.
- Nearly every child (99 percent) showed age-appropriate or emerging age-appropriate proficiency in literacy, numeracy, and social skills after attending the Pennsylvania Pre-K Counts program.
- 57% of the preschool children who entered Early Intervention after July 1, 2008 and exited Early Intervention prior to June 30, 2009 actually function within age expectations.
- 75% of children receiving Early Childhood Mental Health Consultation services demonstrated that their original issues had ceased or had significantly decreased or that had been successfully referred to other support services.

Build leadership in our communities and among state decisionmakers to champion quality early education as a priority for Pennsylvania

- Governor Rendell created by Executive Order the Pennsylvania Early Learning Council and Early Learning Investment Commission as avenues to include the early education and business communities in policy development and outreach.
- Expanded Pennsylvania's Promise for Children campaign with upgraded Pennsylvania's Promise for Children website to include "Early Education in My County" and Tell Your Story sections.

- Community Engagement Groups reported that over 1.6 million children, parents and community members throughout the commonwealth were involved in events such as recognition events, legislative meetings, Week of the Young Child events, or community fairs.

RESULTS:

- Between July 2008 - June 2009, the number of PA Promise declarations more than doubled from 4,303 to 9,887 declarations.
- Between July 2008-June 2009, the number of Build News subscribers more than doubled from 3,403 to 8,045 subscribers.

Vision for tomorrow

Building a quality early education continuum is a marathon, not a sprint. Each year Pennsylvania has refined its system through continuous quality improvement and serving more children.

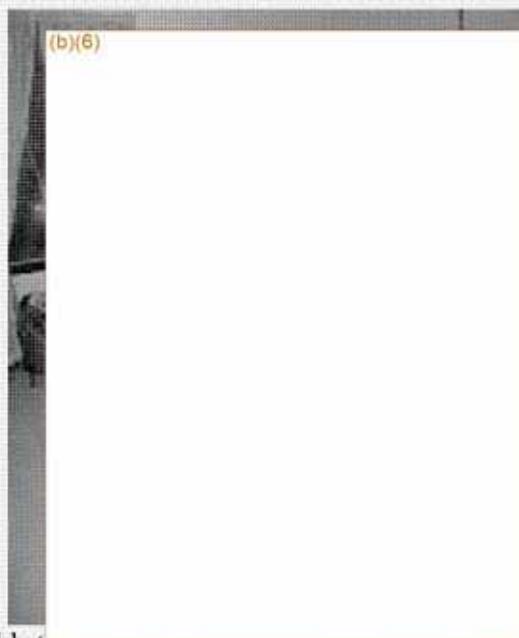
In 2009-2010, Pennsylvania will continue its work to create a more seamless pathway of professional development for early childhood educators at all levels; increase accountability and documenting positive outcomes; align the early education system with the full education continuum; and build leadership at all levels.

Ruby Alblasy, Amber and Logan Chester County

I am the mother of two children: (b)(6) years). I first became pregnant when I was 16. It was then that I enrolled in CAT Pickering Vocational school to pursue their child care program so that I could learn how to take care of my child while obtaining a real job skill. Their Young Parents Program became a major support for me. They encouraged me to stay in school and gave me an awareness and practical expectations as a mother to be and beyond. It was there that I began to develop parent and life skills that are still with me today.

After I had my daughter I was able to receive Child Care Works assistance. Child Care Works allowed me to continue school, work and adequately provide for my family. I was able to go to school part-time and work part-time at the child care center my child attended. It was crucial to me that my child had the chance to attend a quality program. With this peace of mind I was able to finish high school, graduating in the top of my class. After 10 years, I was able to finish my associate's degree with a 3.66 GPA and have started working towards my bachelor's degree.

This year I am hoping for funding to send my children to Warwick Child Care Center where I currently work and can attest to their STAR 4 quality of care. Warwick accepts Child Care Works, takes pride as a STAR 4 center, has a great Pennsylvania Pre-K Counts classroom and participates in the T.E.A.C.H. program. You can see the direct benefits in the children enrolled and their families, as well as in their valued employees, surrounding communities and outreach efforts. I am a product of these programs and I could never have done this without all the support.



II. Keeping Pennsylvania's Momentum

As Pennsylvania moves to the end of an Administration, now is the time to review progress made to educate our youngest citizens, identify gaps, and set a path for continuous quality improvement for the future.

Pennsylvania's Progress since 2003

Since 2003, Pennsylvania has moved from one of nine states to offer no publicly-funded pre-kindergarten to one of the nation's leaders in early education. Pennsylvania has committed to building an early education system with a culture of continuous quality improvement that works for families. By focusing on quality standards and program design; supports to meet standards; monitoring and accountability; financial supports; and community engagement and outreach, Pennsylvania has built the foundation for a system that offers more quality early education options for families.

Pennsylvania is one of the first states to:

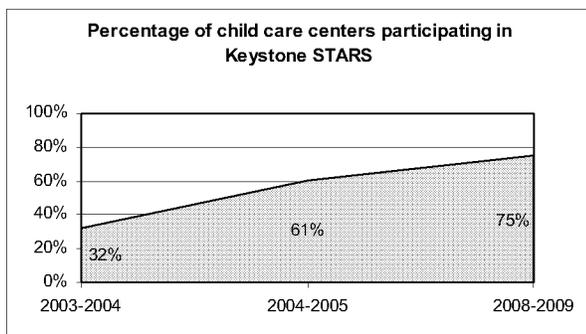
- Establish learning standards for early childhood from birth through third grade and commission an independent study to ensure alignment of all standards;
- Establish a state-funded quality pre-kindergarten system that includes both school-based and community-based early education programs (Pennsylvania Pre-K Counts);
- Create a cohesive Office of Child Development and Early Learning (OCDEL) that brings together the resources and expertise for early education, spanning across state agencies; and
- Develop a common set of child outcomes assessments for all state-funded early learning programs and a system to report outcomes (Early Learning Network).

Since 2003, Pennsylvania has also:

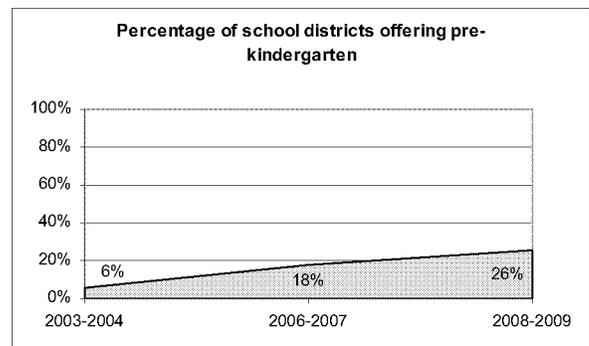
- Created an Early Childhood Education Career Lattice and established three professional credentials for early childhood teachers and directors;
- Brought to full implementation or created four new early childhood programs – Keystone STARS, Pennsylvania Pre-K Counts, Head Start Supplemental, and Early Childhood Mental Health Consultation;
- Increased early education programs' capacity to serve children from diverse backgrounds through the Race Matters Initiative, Higher Education Institute on Diversity, and English Language Learners Toolkit; and
- Successfully partnered with leading private foundations to build pre-kindergarten partnerships, increase public awareness for the value of early education, recruit business leaders as spokespeople for investment in early education, and create a more seamless system for early childhood professionals to increase their education.

As a result of these efforts to build a quality early education continuum:

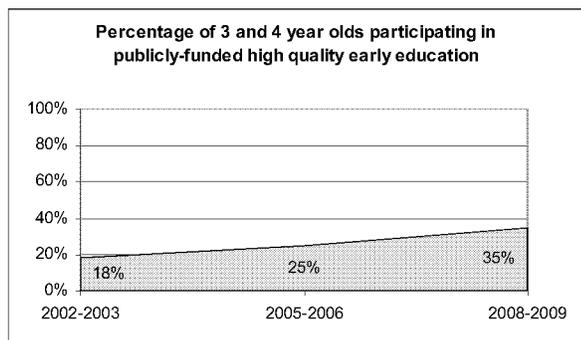
the percentage of child care centers participating in Keystone STARS has more than doubled;



the percentage of school districts offering pre-kindergarten programs has quadrupled; and



the percentage of Pennsylvania's three and four year olds participating in high quality early education programs has nearly doubled.



Child Care Works allows me to provide my son with stimulation and education a growing child needs. Without this program, we would both lose out on the opportunity to grow.

Parent, Northampton County

Recommended Next Steps for a Brighter Future

Pennsylvania's progress, though impressive, requires additional leadership and investment for an early education continuum that serves all the families who can benefit.

The need is clear:

According to OCDEL's Program Reach and Risk Assessment for 2008-2009:

- Of the 67 counties, children in 51 (76%) counties are at moderate-high or high risk of school failure; of the 27 largest cities, children in 24 (89%) are at moderate-high or high risk of school failure. Every community has children affected by risk factors for school failure. For example, approximately one-third of children in Pennsylvania (37%) under age five are living in low-income families; each county has at least 15% of its children under age five living in low-income families. In 20 of our 27 largest cities, more than half of the children under age five live in low-income families.
- Approximately one-third (36%) of Pennsylvania's children from birth to age five participate in publicly-funded quality early childhood programs, with thousands more children who could benefit from these programs that do not have access to them in every county in Pennsylvania.

Likewise, the demand from Pennsylvania families is clear:

- Waiting lists for OCDEL programs are rapidly multiplying:
 - Pennsylvania Pre-K Counts and Child Care Works have doubled the waiting lists they had a year ago:
 - More than 7,800 eligible children are on waiting lists for Pennsylvania Pre-K Counts for the 2009-2010 school year. This is more than twice the waiting lists that programs had at the beginning of the 2008-2009 school year.
 - 16,000 eligible children are on waiting lists for Child Care Works in April 2009, more than double the number of children who were on waiting lists April 2008.
 - At least 2,000 eligible children are on waiting lists for Head Start throughout the commonwealth.
 - Nearly 100 expectant mothers are on waiting lists for Nurse-Family Partnership, although most NFP programs do not maintain waiting lists but refer clients to other services. Expectant mothers in 30 of Pennsylvania's counties do not have access to NFP – 12 of those counties have actively expressed interest in implementing the program.

As Pennsylvania looks to a new chapter, it is essential to continue its momentum to provide a quality education for all of Pennsylvania's children. Three action steps include:

1. Deepen the investment to serve more children well. Pennsylvania has seen a positive trend of more early learning programs and school districts offering quality early education. In order for that trend to continue, Pennsylvania will need to deepen its investment in signature initiatives such as Pennsylvania Pre-K Counts, Keystone STARS, Nurse-Family Partnership, and Parent Child Home Program.

For example, Pennsylvania Pre-K Counts has demonstrated positive outcomes for our most at-risk children yet only about four percent (4%) of Pennsylvania's three and four year olds have access to the program. By serving more children in this high quality program, we can improve children's readiness for school and cut special education and remediation services. More investment is needed to expand this program to more children who can benefit.

Another example is Keystone STARS. Approximately 75% of child care centers participate in Keystone STARS, yet only 17% of these participating centers are at the STAR 3 or 4 level. There has been a positive trend of Keystone STARS programs moving up the STARS ladder; as they do so, Pennsylvania will see better outcomes for children enrolled in those programs. But a deepened investment in Keystone STARS will be necessary to support continued quality improvement in these programs and improved child outcomes. At the same time, ongoing support for Child Care Works subsidy is necessary to make quality early education programs financially accessible to our most vulnerable children and to provide the added supports necessary to programs to participate in quality improvement through Keystone STARS.

Several new teacher educational requirements also come into effect in the next few years. Thousands of early childhood professionals are earning credits and working towards CDAs, credentials and college degrees. These professionals, and the next generation of early childhood professionals, need access to colleges and coursework to move up the career lattice and be the best teachers, directors, and administrators they can be.

2. Complete the work to support effective accountability and documentation. Accurate data on children enrolled in OCDEL programs and their progress from birth through graduation is essential to effective program and financial management and a quality education for each child. As the PELICAN and Early Learning Network systems are implemented, Pennsylvania will have the most accurate information possible to make quality decisions at the child, classroom, program, regional and state levels. Our commonwealth and our nation need quality data to steer our early education continuum on the right course.

3. Increase access to quality early learning opportunities for infants and toddlers. Less than one-fifth (19%) of Pennsylvania's infants and toddlers participate in quality early education programs. Pennsylvania does not yet invest enough in its proven family support programs such as Nurse-Family Partnership and Parent-Child Home Program to meet need. And it lacks a major initiative, on par with Pennsylvania Pre-K Counts, to meet the needs of infants and toddlers for quality early childhood services in a group setting.

2008-2009 proved to be a year when Pennsylvania took a close look at the value of early education to the commonwealth's citizens and recognized that when our young children receive a quality early education, everyone in our communities benefit.

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III. Building a quality early education continuum

Effectively serving Pennsylvania's children and families so that our young children enter school ready to learn and to succeed requires a quality early education continuum that can serve all children from birth to five. In building this system, the Office of Child Development and Early Learning (OCDEL) has focused on three key objectives:

- Strive for higher quality and reach all children and families that can benefit;
- Refine accountability and document positive outcomes for children; and
- Build leadership among our communities and state decisionmakers to champion quality early education as a priority for Pennsylvania.

Several supports that OCDEL offers in building its system serve multiple early childhood programs. Those supports are described below.

Strive for higher quality and reach all children and families that can benefit

In order for Pennsylvania's early education continuum to produce results for our children and families, it needs to continue to improve quality while providing more children with access to these programs. Pennsylvania has made a commitment to move forward on both fronts with remarkable results.

Pennsylvania's efforts to improve quality while expanding access include:

- Teacher quality and career development supports;
- Program quality and supports;
- Alignment of programs; and
- Meeting the diverse needs of families.

Teacher quality and career development supports

Teacher quality is critical to the success of an early learning program. Qualified teachers keep children engaged, promote positive development, address concerns, and work with parents to create learning experiences both in school and at home. Several studies have found that the presence of teachers with a bachelor's degree specialized in early childhood education leads to better outcomes for young children.² The 2006 independent study of Keystone STARS programs also found that classrooms with teachers who had at least an associate's degree had significantly higher Environment Rating Scale scores.³ As with any profession, continuing professional development is necessary to refine skills and gain updated knowledge.

Because of new educational requirements slated to come into effect in 2010-2013, both early childhood education professionals and programs have increased their demand for access to higher education.

Although we always felt we provided quality, educational care, the Keystone STARS program has had us examine all aspects of our program and helped us to elevate our standards even higher. Our staff have achieved professional gains and we strive to continue to further their education and keep our goals elevated. All children, regardless of family income, deserve the best start possible. OCDEL's programs make this possible by helping a non-profit provider like us, make quality early education a reality to all.

Carol Martin, Jenkintown Day Nursery, Montgomery County

Teacher Certification (Ch. 49-2). In August 2007, changes were approved to the structure of teaching certificates in Pennsylvania beginning January 2013. Key aspects of the changes:

- By January 1, 2011, all teacher education programs must include nine credits or 270 hours of instruction and field experience in accommodations and adaptations for students with disabilities in an inclusive setting, including instruction in literacy skills development and cognitive skill development for students with disabilities. At least three credits or 90 additional hours must address the instructional needs of English language learners.
- January 1, 2013 is the effective date for issuing the new certificates – Early Childhood Education (PK-Grade 4); Elementary/Middle (Grades 4-8); Special Education (PK-Grade 8) with a dual in Early Childhood Education, Elementary/Middle, or Reading Specialist; Special Education (Grades 7-12) with a dual in Secondary Education or Reading Specialist.
- Community providers providing pre-kindergarten services on behalf of school districts must also use teachers who have an Early Childhood Education certificate, within five years of the effective date of the regulations (September 1, 2007) or within five years of the date of the contract.

Current Structure		Structure as of January 1, 2013	
Early Childhood Education	Nursery Kindergarten Grades 1 – 3 or Ages 3 - 8	Early Childhood Education	Pre-kindergarten Kindergarten Grades 1 – 4 or Ages 3 - 9
Elementary Education	Kindergarten Grades 1 – 6 or Ages 3 – 11	Elementary/Middle Education	Grades 4 – 8 or Ages 9 through 14
Special Education	Nursery through grade 12 Up to age 21	Special Education PK – Grade 8	Pre-kindergarten, Kindergarten, Grades 1 - 8 or Ages 3 - 14 with dual in Early Childhood Education, Elementary/Middle Education or Reading Specialist
		Special Education Grades 7-12	Grades 7 - 12 or Ages 11 through 21 with dual in Secondary Education or Reading Specialist

My son, Steven's, spoken English has improved tremendously and he has become more open and talkative after joining the Pennsylvania Pre-K Counts program. My husband and I are very excited about his impressive progress in language and social ability.
Yanhua Wang, Parent
Centre County

Individual early education programs in Pennsylvania also have higher educational requirements coming into effect in the next few years. For example:

In Pennsylvania Pre-K Counts:

- By 2011, all lead teachers in Pennsylvania Pre-K Counts classrooms must have their teacher certification in early childhood education (currently, only school district classrooms require certified lead teachers).
- By July 2009, all teacher aides must have a Child Development Associate credential or two years of post-secondary study (in 08-09, there were no educational requirements).
- By July 2009, all child care programs participating in Pennsylvania Pre-K Counts must have a STAR 3 rating or higher (in 08-09, programs needed a STAR 2 or higher. STAR 3 has higher education requirements for staff.)

In Head Start:

- By 2013, the Education Coordinator must have a bachelor's degree in early childhood education or related field (currently, they may have an associate's degree).
- By 2013, half of lead teachers must have their bachelor's degree in early childhood education or a related field (currently, they may have an associate's degree or CDA).
- By 2013, Teachers aides must have a CDA or associate's degree (currently, they must have a high school equivalency).

Also, as of 2010, Keystone STAR 4 programs will be required to have a higher percentage (50%) of lead teachers with bachelor's degrees in early childhood education or related field.

These new challenges for teachers are creating even greater demand for career development opportunities and supports. To help professionals meet these demands, Pennsylvania offers a number of supports including:

- Setting a career path in early education through the ECE Career Lattice;
- Improving access to higher education for early childhood professionals;
- Professional Credential programs for early childhood education;
- Education and Retention Awards;
- Early Intervention Technical Assistance;
- Pennsylvania Quality Assurance System (PQAS); and
- Early Childhood Mental Health Consultation Program.

Setting a career path in early education: Early Childhood Education Career Lattice. The Early Childhood Education Career Lattice outlines the career options available for individuals interested in working in early education. It helps those who are new and veteran to the field make smart education and professional development choices that can help advance their career.

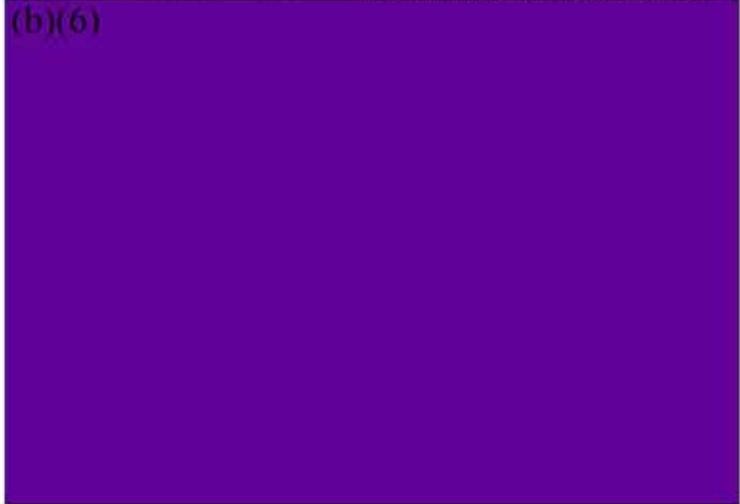
The Career Lattice⁴ is organized in eight levels that indicate the level of education that is required for positions in child care/ school-age care, Early Head Start/Head Start, Early Intervention, public schools, private academic schools, consultants/mentors/trainers, and higher education faculty.

Improving access to higher education for early childhood professionals. Staff who have college credits from credential programs or associate's degrees are increasingly returning to school to earn bachelor's degrees and teacher certification in Early Childhood Education. OCDEL's collaboration with the higher education and foundation communities is making it easier for higher education institutions to offer early childhood education degrees and for early childhood staff to earn those degrees.

Innovation Grant – Gate Opener Project. OCDEL in collaboration with the PA Key and the Grable Foundation, The Heinz Endowments, and the William Penn Foundation issued its first grants to nine higher education institutions which will support early childhood professionals to earn the degrees and certifications necessary for careers in early childhood education. These projects will assist teachers working in Keystone STARS programs; Head Start; and Pennsylvania Pre-K Counts to earn bachelor's degrees and certification in early childhood education. The grant period is FY 2009-2010.

Grantees will develop strategies to address seven barriers identified by approximately 650 early education professionals and 40 higher education institution representatives across the commonwealth. The barriers identified by students and programs include: student teaching requirements; accessibility to degree programs; upfront payment of tuition; PRAXIS I test; only needing the ECE Certification; experience not counting toward credits; and the fear/anxiety going back to school.

Higher Education Articulation Project. In 2007-2008, OCDEL in partnership with the State System of Higher Education began working with two and four year higher education institutions to develop a seamless program-to-program early childhood education (ECE) articulation and make it easier for early childhood students to transfer all associate's degree credits into a four year program. In 2008-2009, a total of 38 higher education institutions joined four program-to-program ECE articulation project teams led by Bloomsburg, West Chester, Shippensburg and Slippery Rock Universities. The four teams comprise of all the 13 community colleges, six private two-year institutions, nine state four year institutions and 10 private four-year colleges and universities.



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The focus of the projects is to develop ECE program-to-program articulation agreements between two-year and four-year ECE programs based on core competencies in NAEYC Standards and PreK-4 Guidelines for teacher preparation. Two year institutions are redesigning their curriculum to meet both NAEYC Standards and PreK-4 Guidelines. The first three teams funded for the pilot project, under the leadership of Bloomsburg, West Chester and Shippensburg Universities, have begun drafting program-to-program ECE articulation agreements between two and four year institutions. The articulation agreements will be in effect upon PDE approval of the new PreK-4 curriculum of the four-year institutions that are articulation pilot team members.

T.E.A.C.H. Scholarships. T.E.A.C.H. (Teacher Education and Compensation Helps) works with child care and Head Start programs, early childhood staff and higher education institutions to offer scholarship programs and supports that improve the education and compensation of early childhood staff. Scholarships are offered for Child Development Associate (CDA) credential coursework and assessment; Pennsylvania Director Credential; associate's and bachelor's degree programs and teacher certification.

In 2008-2009, approximately 3,357 individuals received T.E.A.C.H. scholarships to attend 48 colleges and universities throughout the commonwealth. Sixty percent (60%) more bachelor's degree scholarships were awarded in 2008-2009 than in 2007-2008. Four new higher education institutions signed agreements to collaborate with T.E.A.C.H. in 2008-2009.

Additionally 184 scholarship recipients graduated with a degree or credential in 2008-2009:

- 32 recipients earned a CDA Credential (through the Assessment Scholarship);
- 35 recipients completed CDA Coursework;
- 79 recipients earned an associate's degree;
- 20 recipients earned a bachelor's degree;
- 13 recipients earned a Director's Credential;
- 4 recipients earned a Master's Degree with Certification in ECE; and
- 1 recipient earned ECE Certification.

In 2008-2009 Pennsylvania was selected as one of three states to participate in a national initiative to pilot a T.E.A.C.H. scholarship for afterschool and youth work professionals. Implementation of the scholarship is accomplished through a partnership between the Pennsylvania Key, Pennsylvania Child Care Association (PACCA), Pennsylvania Afterschool Youth Development Network (PSAYDN), the United Way of Southeastern Pennsylvania and the National Institute on Out-of-School Time (NIOST). The new T.E.A.C.H. Afterschool and

I do not believe without Nurse-Family Partnership I would have been able to achieve the confidence and success I feel as a mother and a provider.

Shaniqua Gerard, Parent, Monroe County

Youth Work Scholarship provides financial assistance and other supports for 25 staff to earn college coursework toward a Pennsylvania School Age Professional Credential, Youth Work Certificate or Associate's degree. The initiative is funded by Cornerstones for Kids, OCDEL and United Way of Southeastern Pennsylvania.

Voucher Program. PA Keys to Professional Development Refund Voucher Program offers reimbursement to teachers working in STAR 1 or above child care programs and working in Pennsylvania Pre-K Counts classrooms for courses that earn college credits (including CDA coursework) and payment for the CDA assessment. In 2008-2009, approximately 3,030 vouchers were awarded to professionals for their coursework.

Professional Credential programs for early childhood education. Professional credentials are an important step on the career development ladder for early childhood education professionals. In addition to providing financial assistance to earn the CDA credential⁵, OCDEL developed the following credentials:

- Pennsylvania Director's Credential –The Pennsylvania Director's Credential provides a standard by which to measure program management, fiscal and leadership abilities of directors and administrators of early childhood and school-age programs. The Pennsylvania Director Credential is one of 17 States' director credential programs approved by the National Association for the Education of Young Children (NAEYC). Directors can earn the credential through coursework at 37 higher education institutions or through portfolio submission. There was a 76% increase in the number of Director's Credentials awarded in 2008-2009 than in 2007-2008.
- Pennsylvania School-Age Professional Credential – Modeled after the CDA credential, the Pennsylvania School-Age Professional Credential (SAPC) promotes quality services for children and families by providing specific standards, professional development, and evaluation of school-age practitioners. In 2008-09 the focus was on increasing access through increased online and credit-bearing options as well as a bilingual offering. Looking to the future the goal is to implement a "Second Setting" option for individuals working in school-age programs and currently holding a CDA. Approximately 125 individuals completed their coursework for the credential in 2008-2009, which is half of all professionals completing coursework since the credential was piloted in 2006-2007.
- Early Intervention Language Special Instruction Credential - In 2008-2009, OCDEL and Early Intervention Technical Assistance (EITA) piloted a new professional development series that results in a credential in Early Intervention Language Special Instruction. The credential is a series of four courses that upon demonstration of competency will improve teachers and special instructor's skills to support language and communication development. Eligible participants are teachers or special instructors working with infants, toddlers or preschoolers in Early Intervention. Each course has required documentation of competency. The courses are designed to provide participants with the skills and knowledge to facilitate children's language and communication skills. In 2008-2009, approximately 80 professionals participated in coursework. EITA plans to take this pilot course to scale statewide.

In 2008-2009, 1,683 credentials were awarded to directors, school-age and early childhood professionals, a 12% increase from 2007-2008.

Education and Retention Awards. The Keystone STARS Education & Retention Award (ERA) provides financial awards to highly qualified directors and/or teaching staff who have attained specialized degrees, credentials, or relevant credit-based coursework. Child care programs participating in STARS that meet eligibility requirements may apply each year for these awards for their qualified staff. The ERA helps STARS programs retain qualified staff and encourage other staff to pursue higher education, which improves the overall quality of their programs. In 2008-2009, approximately 4,762 early education professionals received Education and Retention Awards, a 22% increase from 2007-2008.

Early Intervention Technical Assistance. Early Intervention (EI) professionals have continuing education requirements to meet in their field:

- Teachers, speech and language therapists and supervisors who have PDE instructional certification must complete 180 hours of Act 48 continuing education credits every five years;
- EI professionals working with infants and toddlers must complete 24 hours of training each year.

Early Intervention Technical Assistance (EITA), Pennsylvania Training and Technical Assistance Network (PaTTAN) provides specialized professional development opportunities for Early Intervention professionals through credit-bearing coursework, workshops, professional development instructors institutes, leadership meetings, and online courses/distance learning.

In addition, EITA/PaTTAN offers a video conference-based professional development series that result in a Credential of Competency for Special Education Paraprofessionals. In 2008-2009 EITA piloted the Early Intervention Language Special Instructor Credential. This EITA/OCDEL credential consists of four competency-based courses which include videos demonstrating competencies with families.

Pennsylvania Quality Assurance System (PQAS). The Pennsylvania Quality Assurance System (PQAS) certifies instructors who provide professional development workshops to early childhood and school-age professionals in Pennsylvania. The PQAS System maintains a registry of approved Instructors to help ensure that professional development activities meet quality standards. Pennsylvania also offers PQAS Instructor Institutes to help build skills and knowledge. In 2008-2009, there were approximately 1,700 Professional Development Instructors included in the registry, conducting approximately 3,770 workshops. In 2008-2009, faculty from higher education institutions have been encouraged to become PQAS approved in order to provide their students the opportunity for some of the required professional development within their college class setting. Of the 562 new PQAS approved instructors, 31 higher education faculty received PQAS-approval.

Early Childhood Mental Health Consultation Program. Children who are emotionally healthy have a significantly greater chance of achieving success in school than those with emotional difficulties. Relationships that children form with trusted adults in the home, in an early learning program, and in other parts of their life play a major role in their overall development.⁶ Scientific research demonstrates that helping children address social/emotional issues in their early years can improve their ability to learn for life and improve their quality of life and those of their families.⁷

The Early Childhood Mental Health Consultation (ECMHC) program provides child specific consultation services to early learning programs to address social/emotional concerns of young children in order to reduce expulsions and promote healthy

I am so impressed with how knowledgeable and helpful my daughter's Early Intervention specialists are. They are fabulous and do a great job teaching me how to assist my daughter with using the hearing she has and with coping with and overcoming her challenges. What a fantastic program.

Heidi, Parent, Allegheny County

development. ECMHC services are offered within the framework of the "The Pyramid Model" introduced by The Center on Social and Emotional Foundations for Learning⁸. ECMHC provides both prevention and intervention services to minimize the child's need for more intensive services in the future and to increase early childhood practitioners' confidence and competence in dealing with children with challenging behaviors. ECMHC Consultants work closely with teachers and staff in early learning programs, helping to develop goals and strategies to enhance the development of positive relationships and create a learning environment which promotes positive behaviors. A synthesis of 26 studies concluded ECMHC consultation helped increase staff confidence and competence in dealing with children with challenging behaviors, lower stress, and provide a higher quality of service.⁹

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The final report of the project's pilot phase, from 2006-2008, written by the University of Pittsburgh, noted "the pilot project was very successful in building a solid foundation for the Early Childhood Mental Health Consultation Programs."¹⁰

During the pilot phase the project provided services in three of the six Regional Keys and served children ages birth to three. At the end of the pilot the project expanded services across the commonwealth to all six Regional Keys and to children under age five.

During the 2008-2009 fiscal year, 434 children in 48 counties received individualized ECMHC consultation services. Nearly 75% of children demonstrated that their original issues had ceased or had significantly decreased, or they had been successfully referred to other support services. In program feedback surveys completed by early learning program staff more than 75% of respondents noted improvement in their ability to foster healthy social and emotional development of all children.

Program quality and supports

Qualified teachers require a solid program to provide the best early learning opportunities possible for young children. Strong programs combine qualified teachers, research-based curriculum, observation, assessment and cooperation with the family to create the best possible learning environment for the child.

In order for young children to learn, they need stable relationships with trusted adults and learning environments that stimulate exploration and creativity. Recent research has reinforced that high quality teacher-child interactions correlate as strongly with children's learning and behavior as teacher education and small class sizes.¹¹

Pennsylvania helps all of its early education programs continue to improve their quality through:

- Pennsylvania Learning Standards for Early Childhood;
- Curriculum and child observation guidance that promotes child development; and
- Sound program management.

Pennsylvania Learning Standards for Early Childhood. OCDEL developed Learning Standards for Early Childhood¹² that apply to infants through second grade to establish a common language for quality, regardless of the type of early learning environment (home, school, community-based program). The standards for Infant-Toddler; Pre-Kindergarten, Kindergarten, First, and Second Grade establish Pennsylvania's age-appropriate

Pennsylvania Pre-K Counts has established consistent standards throughout the Commonwealth. credentialing requirements for teachers, standards for the curriculum used in classrooms, and uniform assessment and measurement of both classroom quality and child performance ensure that the program is high quality and that it results in the intended outcomes for children. The uniformity of these standards and tools across sites promotes this level of quality statewide. Truly, Pennsylvania Pre-K Counts is having a strong and positive impact on Pennsylvania's children. We at Cen-Clear Child Services are proud to participate in this groundbreaking early childhood education initiative.

Eugene M. Kephart, D.Ed., Executive Director, Cen-Clear Child Services, Clearfield and Centre Counties

expectations for children's skill development, regardless of the type of early learning environment (home, school, community-based program). All OCDEL early education programs use the Learning Standards for Early Childhood to guide instructional practice.

Pennsylvania's Learning Standards for Early Childhood outline the approaches to learning, communications, (emerging) literacy and numeracy, creative expression, social, and physical skills that a child should be able to know and do and provides guidance for activities to support this development in the learning environment. They are not a curriculum or assessment tool and should be used to guide teachers as they design appropriate learning activities for young children and work with families to engage them in supporting their children's growth and development.

In 2008-09, OCDEL completed a nine-part series of training videos on the Learning Standards for Early Childhood to help early learning directors, teachers and staff make the most of this resource.¹³ New parent companion guides to the learning standards were also released, including *Learning Is Everywhere*, a birth-five activity guide that provides activities for families to do together in various learning locations and *Kindergarten, Here I Am*, a 15-month activity guide that supports skill-building activities before, during and after the kindergarten year.

Curriculum and child observation that promotes child development. A quality, research-based curriculum guides a teacher to provide learning activities that help every child in the classroom develop. There is no one magic curriculum that is best for every classroom and every child, but a quality curriculum offers activities that are developmentally appropriate. Curriculum includes both the carefully planned environments and activities in the classroom, such as recurring story telling at circle time, and unplanned and spontaneous learning, such as learning about climate and weather during the first snowfall or developing self-regulation skills while waiting for a turn on the slide. No matter what model is used, curriculum "affects students by initiating learning and by exposing students to experiences designed to help all children to attain skills and knowledge and to change values and feelings."¹⁴ OCDEL programs, such as Keystone STARS, Pennsylvania Pre-K Counts and Head Start Supplemental are required to use one or more curricula that align with the PA Early Learning Standards.

In early childhood, a young child's progress cannot be measured by a series of tests; it requires ongoing observations by teachers and parents, collection of the child's work, and the use of a valid and reliable assessment tool. Regular child assessments guide teachers and parents as they work together to support the child's early learning and development. Child assessments are also a valuable tool when evaluating and refining program design and implementation.

Several of OCDEL's early education programs require observation and periodic assessment of a child's progress:

- Pennsylvania's child care certification regulations enacted September 2008 require providers to share information on the child's growth and development with parents as part of their service agreement.
- Pennsylvania selected the Ages and Stages and Ages and Stages: Social and Emotional screening tools for use with children & youth agencies and early learning programs. Ages and Stages have been distributed to children and youth agencies through the Office of Children, Youth and Families to OCDEL programs participating in Keystone STARS.
- Pennsylvania Pre-K Counts grantees are required to assess children three times a year and report those outcomes through Work Sampling Online which are then entered into the Early Learning Network.
- Early Intervention requires programs to assess children at the time of entry into the program, and again when they exit, report those outcomes through Work Sampling Online which are then entered into the Early Learning Network. Beginning July 2009, programs will report child outcomes annually.
- Keystone STARS programs at STAR 2 level and above complete two-three assessments per year, depending on the STAR level. In July 2009, Keystone STAR 3 & 4 programs will begin reporting those outcomes through Work Sampling Online and Ounce Scale which are entered into the Early Learning Network.
- The Head Start Supplemental Assistance Program grantees are required to assess children three times a year. In July 2009 these grantees will begin reporting outcomes through Work Sampling Online which are entered into the Early Learning Network.
- The Parent-Child Home Program assesses children twice a year using Ages & Stages¹⁵, Parent and Child Together (PACT) and the Child Behavior Traits (CBT).

For more information on OCDEL's plans to collect and track child outcomes, please see the Early Learning Network discussion on page 25.

Sound Program Management. OCDEL recognizes the importance of solid business practices in providing quality early education and integrates performance and fiscal standards into its program design. The creation of Keystone STARS, Early Intervention, Pennsylvania Pre-K Counts, and Child Care Information Services (CCIS) agencies performance standards provide early learning programs with quality expectations for staff qualifications and professional development, learning activities, working with parents and the community, and best business practices.

For example:

- Keystone STARS include performance standards for Leadership and Management that address the business practices of the early learning program (budgets, policies, staff benefits, etc.)
- Pennsylvania Pre-K Counts grantees must show that their organization provides sound program management in their application and must meet guidelines for fiscal reporting, staff compensation, and program operation.
- Head Start programs follow comprehensive federal Head Start performance standards. Programs participating in the Head Start Supplemental Assistance Program also meet fiscal guidelines.
- Child Care Information Services (CCIS) agencies must meet 12 performance standards that address accuracy and parent satisfaction.
- Early Intervention programs must meet performance indicators such as timeliness of services and providing services in the most inclusive settings possible.

Alignment of Programs

As Pennsylvania's early education system grows, part of OCDEL's continuous quality improvement is making sure that each program aligns with quality standards, with each other and the full education continuum. This alignment means that children and families can receive consistent services, which are important to children's early learning, and Pennsylvania can maximize its public resources. OCDEL's alignment initiatives include:

- Alignment of Learning Standards for Early Childhood;
- Braiding Preschool Funding Task Force;
- Cross Systems Technical Assistance;
- PILS Educational Leadership Training;
- Aligning the Professional Development Record (PDR) with new Teacher Certification requirements; and
- Title I Transition to Kindergarten Grants.

Alignment of Learning Standards for Early Childhood. In 2007-2008, Pennsylvania commissioned an independent evaluation of its Learning Standards for Early Childhood to make sure that they aligned with each other and our 3rd grade standards. Overall, the alignment study of Pennsylvania's Learning Standards for Early Childhood found the standards and assessments are strong and show good alignment across grade levels. Based upon the recommendations, revisions to the Infant-Toddler, Pre-Kindergarten and Kindergarten standards have been initiated in response to the recommendations from the Alignment Study completed by researchers Lynn Kagan from Columbia and Yale and Catherine Scott Little, University of North Carolina (Greensboro). In addition to providing more fully aligned standards along a continuum of learning, birth through grade three, the revised documents will be aligned with Pennsylvania's Standards Aligned Systems (SAS).

Braiding Preschool Funding Task Force. Under the Rendell Administration, multiple new preschool funding streams were established to promote the early education agenda and prepare the commonwealth's young children for school success. As a result of the new funding streams, the OCDEL convened the Braiding Preschool Funding Task Force with the goal of assisting early education programs to utilize the funds appropriately and efficiently. The Task Force looked to assist providers in understanding the fiscal requirements of the different programs, how these requirements worked in relationship with each other, and how to braid the funding to achieve the next level of best practice in fiscal accounting.

A task force of approximately 35 people from Head Start, Child Care, School Districts, Pennsylvania Pre-K Counts, Intermediate Units and OCDEL met over the course of six months in late 2008 to develop training and tools for all early learning programs accessing public funding. Approximately 200 people attended regional training conducted in March 2009; additional training is available locally through the Regional Keys as needed. Several fiscal responsibility and cost allocation tools, including a sample budget, financial statement, and Braiding Allocation Workbook were provided to attendees and are available on the PA Key website.¹⁶

This community lacked a quality preschool program until the Montgomery Area School District began to offer Pennsylvania Pre-K Counts. My child is learning skills that he otherwise would not have gained had he not had the opportunity to attend.

Parent, Lycoming County

Cross Systems Technical Assistance. Most OCDEL programs have technical assistance support available, such as Preschool Program Specialists for Head Start Supplemental and Pennsylvania Pre-K Counts programs, and STARS technical assistance for Keystone STARS programs. Although each program offers technical assistance support to address the unique requirements of the program, it is important that the technical assistance be aligned across common areas of support. The cross systems technical assistance workgroup is comprised of representatives from agencies within OCDEL that provide technical assistance and

other external agencies. The goal of this group is to explore ways to work together to ensure services are not duplicated and technical assistance is delivered to clients in a consistent way. Cross systems technical assistance work has continued with the development of competencies for technical assistance consultants and professional development for consultants.

PILS Educational Leadership Training. As Pennsylvania develops its early education continuum and aligns more closely with the K-12 school system, strong leadership across the education spectrum with understanding of the importance of early education is vital to student achievement. The Pennsylvania Department of Education has begun work to integrate early childhood education concepts and leaders into existing leadership training for educators. Preparation began in 2008-2009 with piloting to begin in 2009-2010.

- Pennsylvania Inspired Leadership Program: The Pennsylvania Inspired Leadership (PIL) Program is an initiative of the Department of Education that provides standards-based continuing professional education for school and system leaders throughout the Commonwealth. Since 2006, more than 2,000 school leaders have completed the coursework. Pennsylvania is working with the creators of PIL to integrate early childhood concepts into the leadership coursework.
- Early Childhood Executive Leadership Institute: The Early Childhood Executive Leadership (ECEL) Institute focuses on what early childhood leaders and educators need to know and be able to do in order to understand and connect the variety of systems serving children (Birth to Grade 3) and to ensure instructional improvements that will lead to student growth in cognitive, social, emotional, and attentional areas. The five-day ECEL Institute has been designed primarily for superintendents and assistant superintendents, principals and assistant principals, and early childhood development center/facility directors. Two pilot institutes are scheduled for 2009-2010.

Aligning the Professional Development Record (PDR) with new Teacher Certification requirements.

Keystone STARS requires early childhood education staff to develop a Professional Development Record (PDR) that includes the continuing education they have received and identifies areas in which they need further professional development. As more early education professionals begin moving towards ECE Certification, it is evident that all of our early childhood education professional development should align. The creation of new teacher certifications is the perfect opportunity to provide guidance to the higher education community to meet the new certification requirements and to begin work to align the PDR with the educational requirements for ECE certification, as well as to extend the use of the PDR beyond Keystone STARS to all OCDEL programs.

In 2008-2009 guidelines for Early Childhood Education Teacher Certification (Chapter 49-2 Pre-K to 4th grade) were completed and higher education institutions submitted revised curricula to the Department of Education for approval. In order to create a more seamless system for practitioners' education and professional development as they move through the career lattice, OCDEL began work to revise the Core Body of Knowledge (CBK) and Professional Development Record (PDR) to more clearly align with Chapter 49 and the National Association for the Education of Young Children's teacher preparation framework. With some additions, Chapter 49-2 will basically serve as the Core Body of Knowledge in order to assure the same content and approach through the early childhood professional development preparation and support processes. The revisions of both documents will be completed by June 2010. New documents and related professional development will begin in July 2010 with full implementation scheduled for January 2011.

Title I Transition to Kindergarten Grants. In December 2008, 23 Community Engagement Groups were awarded grants to develop or further expand comprehensive transition to kindergarten plans with early learning programs and Title I elementary schools. Through partnerships with 136 schools in 70 school districts and hundreds of early childhood providers, over 25,000 pre-kindergarten and kindergarten children and their

families were impacted through a variety of activities such as Kindergarten registrations, Kindergarten classroom visits, literacy events, Kindergarten summer camps, and school and community based transition events. Community Engagement Transition teams also designed, produced and distribute many innovative tools of kindergarten transition, such as Welcome to Kindergarten DVDs, kindergarten back packs, introduction booklets, rising K summer workbooks, rising K calendars, and Family Resource Guides. Through their involvement with the Transition teams, several school districts elected to implement their own transition plans as part of their outreach efforts to incoming students.

Meeting the Diverse Needs of Families

In order for Pennsylvania to fully benefit from quality early education, our early learning programs and professionals need to be adequately prepared to serve the diverse needs of Pennsylvania's families. OCDEL has introduced several initiatives to help understand and meet these diverse needs, including:

- OCDEL Reach and Risk Assessment Report;
- Race Matters Initiative;
- Strengthening Families Initiative;
- Higher Education Institute on Diversity;
- English Language Learners (ELL) Strategy and Toolkit; and
- Early Intervention Inclusion Initiative.

OCDEL Reach and Risk Assessment Report. In order to support sound programmatic and investment decisions regarding the distribution of early education services, OCDEL annually compiles the Program Reach and Risk Report. This report provides county and city specific information on the level of risk for school failure for children (based on seven risk factors) and the availability, or reach, of most OCDEL programs to children in each county and in the 27 largest cities in Pennsylvania.

Research consistently demonstrates that children at risk of school failure benefit from quality early learning opportunities, with economic and educational benefits which extend to our families, communities, and the commonwealth. This report provides information about how well the commonwealth is reaching its young children with quality early learning services, with special attention to at-risk children for Fiscal Year End 2007-2008. The report:

- compiles information on the number of children served through OCDEL programs;
- shows the funding levels for early childhood programs supported by state and federal investments;
- includes an analysis of educational and family risk factors; and
- identifies counties and cities most likely to benefit from early childhood investments, based on these risk factors.

This data can be used to: 1) track progress in reaching all children; 2) help communities better understand their early childhood programming needs, particularly in counties where there are high risks; and 3) inform future decisions regarding early education investments. This information is also used to inform OCDEL's policies and practices. Data from the 2008-2009 Reach and Risk Report is included in the State and County Profiles section.

Race Matters Initiative. In partnership with the Pennsylvania Build Initiative, OCDEL continues to implement strategies to better evaluate racial equity and diversity among OCDEL's programs and the broader early childhood community. Using the Annie E. Casey Foundation's *Race Matters* Toolkit, OCDEL began work to

examine to what extent its programs, policies, practices, and communications are effectively serving all of Pennsylvania's children and families, identify discrepancies among various racial or cultural groups, and ways in which the commonwealth can address those discrepancies.

OCDEL encourages its partners and programs to implement racial equity tools as they examine the makeup of their organizations, leadership, and access to services; analyze and collect data; and communicate needs. The goal is to integrate the examination of racial equity into all of the early childhood community's work by training Early Childhood Community Engagement Groups, providers of OCDEL services and OCDEL leadership staff on how to use these tools as program practices and policies are developed or revised tools are used. The racial equity lens is currently being applied to revisions of the Core Body of Knowledge for Early Childhood and School-Age Practitioners and the Professional Development Record.

Building on efforts started in 2007- 2008 the initiative continues to include Race Matters orientation workshops, including the development of a 12-hour series of professional development modules related to racial equity and tolerance in the classroom. In 2008-2009 a variety of professional development opportunities were offered for more than 300 participants from OCDEL, Regional Keys, national BUILD initiative, cross system technical assistance organizations and faculty from higher education institutions. Programs impacted include Keystone STARS, Pre-K Counts, Early Intervention, Early Childhood Mental Health, Head Start, Subsidy, Children's Trust Fund and Certification.

This is our first experience with Head Start and we could not be happier with this program. In the month that she has been in the pre-school we have noticed a definite difference in Annora. She counts everything that she can. She spells out loud. Her manners have been excellent and her interaction with her younger brother has been improved. This opportunity has been fantastic. We are very impressed and grateful to this program. This program is needed for those of us who can not afford pre-school to allow our precious children the tools they will need for a better future.

Eric Wesch, Parent, Beaver County

Strengthening Families Initiative. When families are vulnerable, children are less likely to succeed. Brain research has shown that abuse or neglect can limit a child's brain development, impeding their learning for life. Young children need a safe and stable family and home life in order to grow. By helping parents cope with challenges, build support networks and understand their child's development, early learning programs can help families and children thrive. To help prevent child abuse and neglect from occurring, Pennsylvania has joined with the national Strengthening Families¹⁷ approach to help early learning programs build Protective Factors around all families.

By using the Strengthening Families Protective Factors approach, early learning programs can help parents feel valued and supported, with opportunities to build social connections readily available, and staff can be trained to recognize signs of family stress that might precede abuse or neglect and then offer appropriate support in a positive fashion. Through training, program staff gains the tools, strategies, and support they need to build caring and trusting relationships with families.

In October 2008, Pennsylvania was one of seven states invited to develop a plan to integrate the Strengthening Families approach into its programs. For example, Pennsylvania is embedding the Strengthening Families/ Protective Factors approach and language into the best practice guides and tools for Keystone STARS. Also,

various professional development opportunities are being offered for early childhood professionals to promote the use of the Strengthening Families approach and to integrate Protective Factors language into their work.

Higher Education Institute on Diversity. OCDEL recognizes the critical importance of teachers who are sensitive to the cultural, linguistic, socio-economic and ability diversity of the children and families they serve.

Beginning in 2007-2008, OCDEL has hosted the Higher Education Institute on Diversity, a professional development opportunity for higher education faculty involved in pre-service teacher preparation programs and professional development for early education professionals.

The purpose of the Institute is to provide faculty, administrators, and other professional development providers with methods, research, and instructional strategies associated with meeting the unique educational needs of children who are racially, ethnically, linguistically, and socio-economically diverse and their families. Among the many benefits of attending the Institute are the opportunities to experience high-quality professional development workshops, learn in-depth content on the various workshop tracks and specific research-based best practice strategies as well network and interact with international, national and local experts on the subject. More than 250 faculty and professional development instructors have attended the conference each year.

English Language Learners (ELL) Strategy and Toolkit. It is estimated that one out of every five children in grades K-12 today is either a child who has newly arrived in the U.S. or is a child with at least one parent who has immigrated.¹⁸ The number of children who speak English as a Second Language continues to increase in Pennsylvania communities, creating unique challenges and opportunities for early learning programs. In 2009, the OCDEL commissioned Dr. Lisa C. Buenaventura to create the ECE English Language Learner Research Brief and Toolkit to help early learning programs to address the needs of infants, toddlers, and Pre K-3 English Language Learners (ELLs) from immigrant, refugee, and migrant families within the commonwealth.

The ELL Tool Kit has been developed to provide research-based information, guidelines, and principles for early learning professionals to promote culturally competent practice. While it provides a broad range of information about young ELLs and their families, its primary purposes are:

- To define cultural competence and proficiency;
- To describe second language acquisition;
- To unpack myths and realities about ELLs;
- To highlight research and best practices for educating and supporting young ELLs and their families; and
- To outline strategies to build and sustain culturally competent and proficient early learning professionals and organizations.

All programs and services served by OCDEL will be using resources contained in the ELL Toolkit such as the Cultural Competence Models and studying Guidelines for Culturally Competent Educational Practices.

Early Intervention Inclusion Initiative. When children with developmental delays participate in typical classrooms, all children benefit. Children with developmental delays and disabilities learn age-appropriate communication and social behaviors, while typically developing children learn to understand and accept differences.

We feel extremely fortunate to have reaped the benefits of Early Intervention. Our son would not have been ready for elementary school had it not been for the expertise and care of the itinerant teachers provided for his behavioral support in preschool.

Jeff and Tara Gense, Parents, Lancaster County

Historically in Pennsylvania, less than 50% of children in Preschool Early Intervention with developmental delays or disabilities received their services in typical early childhood settings. In 2007-2008, OCDEL began a concerted effort to accommodate as many children with developmental delays or disabilities in typical early childhood settings such as child care, Head Start, or preschool. Strategies included 1) outreach to Pennsylvania Pre-K Counts programs to ensure these new classrooms were inclusive of typically developing children and children with developmental delays or disabilities; 2) targeted technical assistance to help Preschool Early Intervention programs with the lowest numbers of children in inclusive settings increase the number of children served in typical settings; 3) aggressively monitoring classroom and enrollment data and severely limiting new early childhood special education classes and (4) participating in two national inclusion grant programs.

As a result, over the past two years, OCDEL has observed a nearly 15% increase in the number of children of preschool age included in typical early childhood programs, resulting in a total of 63% of all children in Early Intervention receiving their services in these settings (e.g. child care, Head Start, preschool) in 2008-2009.

Refine accountability and document positive outcomes for children

A comprehensive accountability system that can document positive outcomes for children helps keep early childhood programs, professional and the continuum as a whole focused on a common goal – providing the best possible early education for Pennsylvania’s young children. Pennsylvania continues to refine its accountability and documenting results through:

- Monitoring and continuous quality improvement among all programs;
- Environment Rating Scales Assessments
- Pennsylvania’s Enterprise to Link Information Across Networks (PELICAN); and
- The Early Learning Network (ELN).

Monitoring and continuous quality improvement among all programs

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at produce positive outcomes for our young children, OCDEL continues to develop a system of accountability among all programs. Through data review and site visits, OCDEL staff monitor adherence to performance standards and fiscal requirements. Regional specialists such as STARS specialists, Preschool Program Specialists, Early Intervention Advisors, and Subsidy Coordinators conduct site visits to monitor programs and provide technical assistance and supports for programs to continue to improve their quality. If programs are not meeting the requirements, they work with their specialist or OCDEL staff to develop a corrective action plan which is then monitored until fully implemented. OCDEL also collects customer satisfaction surveys from both parents and providers.

Accountability measures for individual programs are included in each program description; however, three initiatives that cross many programs are the Environment Rating Scales (ERS) Assessments, Pennsylvania’s Enterprise to Link Information Across Networks (PELICAN), and the Early Learning Network (ELN).

Environment Rating Scales Assessments

Pennsylvania has implemented the nationally-recognized Environment Rating Scales (ERS) as a standard tool to assess the quality of early learning programs participating in Keystone STARS, Head Start Supplemental Assistance Program and Pennsylvania Pre-K Counts. Independent ERS assessors visit classrooms in child care programs, Head Start programs, licensed nursery schools and pre-kindergarten classrooms in public schools. Programs are assessed every two years to promote continuous quality improvement. Assessors may visit a number of classrooms in one program, depending on the ages of children served and size of program, in order to better evaluate the quality of the classroom settings for each age group.

My child participates in a Keystone STAR 4 child care program at Little People Country Club. The girls at this center work extremely hard for this accreditation and it shows in my son. My son has autism and this program has helped my son improve tremendously. I would not be able to send my son here if it wasn't for child care subsidy through Child Care Works/CCIS.

Parent, Northampton County

Classrooms must earn certain ratings on the 7-point ERS scale based on the quality standards of the applicable OCDEL program. For example, Pennsylvania Pre-K Counts classrooms must earn a 5.5 rating on the Early Childhood Environment rating Scales. Keystone STAR 3 programs must meet an overall facility score of 4.25.

If programs do not earn the necessary ERS ratings, must work with their specialist to develop and implement an improvement plan that includes goals, improvement strategies, responsible person(s), and target dates for completion. If they do not meet the goals of that plan, the facility could lose their STAR level or be removed from Pennsylvania Pre-K Counts.

With the advent of Pennsylvania Pre-K Counts and a continuing expansion of child care programs participating in Keystone STARS, there has been a substantial increase in the number of ERS classroom assessments conducted. In 2008-2009, ERS assessors conducted approximately 1680 classroom assessments, a 75% increase from 2007-2008.

Pennsylvania's Enterprise to Link Information Across Networks (PELICAN).

A key to creating a quality early education continuum is the seamless transfer of information between programs and the ability to analyze comprehensive data on all of OCDEL's programs. The goal of Pennsylvania's Enterprise to Link Information for Children Across Networks (PELICAN) is to have a single integrated information system that will allow OCDEL to track how Pennsylvania children and families use OCDEL programs and, with a focus on quality, to provide easily accessible information for Pennsylvania parents about early learning programs and services. PELICAN supports:

- Child Care Works for subsidized child care services, including online client access to apply for services;
- Provider Certification for licensing of child care providers, including public access to a facility's operating history, complaint and enforcement management, and online provider access to update information;
- Early Learning Services for quality initiatives including Pennsylvania Pre-K Counts and Keystone STARS;
- Early Intervention, for management of these services; and
- Early Learning Network for child demographics, assessments and outcomes; classroom quality, and teacher experience;

In 2007-2008 OCDEL launched PELICAN Pennsylvania Pre-K Counts, and PELICAN Provider Certification. In 2008-2009, PELICAN Pennsylvania Pre-K Counts entered Phase Two. PELICAN Infant/Toddler Early Intervention was piloted in four counties and preparation began for development of PELICAN Preschool Early Intervention and PELICAN Keys to Quality.

By centralizing demographic and enrollment information for children, teachers, and families, PELICAN will streamline data management across OCDEL programs. The coordination of this information will also provide unprecedented aggregate data on children and families served throughout the commonwealth.

Over time, PELICAN will help Pennsylvania measure program, service, and provider performance as it relates to progress and outcomes of children participating in early childhood programs.

Early Learning Network

Pennsylvania's Early Learning Network (ELN) will provide unprecedented information to help analyze how well Pennsylvania's early education programs are serving our young children.

The Early Learning Network is:

- One reporting system reflecting results of authentic assessment used across programs, aligning with Pennsylvania's early learning standards;
- A standard system to be used by and coordinated among all of the Office of Child Development and Early Learning (OCDEL) programs (e.g., Pennsylvania Pre-K Counts, Early Intervention, Head Start, Keystone STARS); and
- A comprehensive data system designed to integrate financial, program, teacher, family and child information.

Supporting the PELICAN system, the ELN tracks outcomes for children who participate in OCDEL early learning programs. Because the ELN is a comprehensive system coordinating outcomes from OCDEL programs for children from birth until they enter kindergarten, OCDEL can document how Pennsylvania's quality early learning system is contributing to positive outcomes for children. Plans include the ability to link the information about children's participation in, and outcomes from, their early learning programs to their school-age participation and outcomes, such as PSSA scores.

In addition to providing fiscal and outcomes data for OCDEL administration, parents and teachers will have access to information about their children's progress, which will help guide curriculum and supporting the child's progress at home and in school. ELN will also track teacher educational levels and experience and provide information on how teacher education affects child outcomes.

This is a relatively new concept in early childhood education, although K-12 programs have already developed similar longitudinal data systems to respond to accountability demands imposed by No Child Left Behind.

In 2008-2009, Early Intervention programs and Pennsylvania Pre-K Counts programs began reporting child outcomes online through the Ounce and Work Sampling online reporting tools, and work continued to integrate data. The Early Learning Network is made possible in part through grants from the Grable Foundation, The Heinz Endowments, and William Penn Foundation.

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Build leadership in our communities and among state decisionmakers to champion quality early education as a priority for Pennsylvania

To be effective, OCDEL needs diverse input, opinions and resources to make a quality early education continuum possible and sustainable for Pennsylvania's children. Everyone makes a contribution, from the policymakers who consistently vote for early childhood education to the teacher who works day in and day out to help every child reach their promise. Through advisory committees, business and community engagement and Pennsylvania's Promise for Children, OCDEL is dedicated to building leadership at every level.

Early Learning Council and committees

An important component to the refinement of OCDEL's policies, procedures, and vision is the involvement of the Early Learning Council and its advisory committees. The Council and committees provide feedback on the successes and challenges of OCDEL programs in the field and recommendations for new directions in early education.

Early Learning Council

Early Learning Investment Commission

Program Committees:

Child Care Works
Full Day Kindergarten
Keystone STARS
Pennsylvania Pre-K Counts
State Interagency Coordinating Council (SICC)

Cross Sector Committees:

Communications Advisory Committee
Early Childhood Mental Health
Early Learning Career Preparation & Development
Early Learning Network
Infant Toddler Systems
Parent Council

Engaging business leaders through the Early Learning Investment Commission

More businesses are recognizing that quality early education opportunities directly impact their workforce. Today's employees are more productive at work when they have access to reliable, quality early education for their children. Tomorrow's employees have the reading, writing, mathematical and social skills to succeed in a competitive workforce when those skills are nurtured in their early years. By the age of five, the foundation for the skills that employers seek, such as communications, critical thinking, problem-solving, and teamwork are almost fully developed.

Recognizing a need to form new and broader coalitions in support of children's issues that include business leaders, OCDEL created the Pennsylvania Early Learning Investment Commission. Through the Commission, business, higher education and civic leaders have shown a keen interest in the role that quality early education plays in workforce development and have added their support to others in the community for continued public and private investment.

Some of their activities included: signing letters to the editor and opinion editorials; inserting information about early childhood development in organizational newsletters; educating legislators and other policy makers about the importance of investing in early education and presenting to community groups such as Community Economic Development Boards, Chambers of Commerce, Kiwanis Clubs, Rotary Clubs and United Ways.

In April 2009, nearly 170 business, civic and educational leaders attended the 2009 Annual Economic Summit for Early Childhood Investment in Harrisburg. Speakers included Rob Grunewald, Associate's Economist, Federal Reserve Bank of Minneapolis; Lydia Miles Logan, Vice President and Executive Director, Institute for a Competitive Workforce, US Chamber of Commerce; Dr. Jack Shonkoff, Center on the Developing Child, Harvard University; and Robert Dugger, Ph.D., managing partner of Hanover Investment Group.

Pennsylvania's business and law enforcement leaders recognize that today's children are tomorrow's employees, customers, neighbors, and community leaders. Unfortunately, some will also be tomorrow's juvenile delinquents and adult criminals. We need to invest in their early education to help kids stay on the right track so they can fill our jobs, open their own businesses, buy products and services, and become productive members of our community.

Philip A. Peterson, FSA Senior Vice President, Aon Consulting and Chief John M. Eller, Brookhaven Police Department, Published in the Delaware County Times, July 6, 2009

Early Childhood Community Engagement Groups

Local public awareness and support is critical to providing our young children with access to quality early education. When communities value early education, more families become aware of available services and decision makers recognize quality early education is a priority for public investment.

Pennsylvania's Early Childhood Community Engagement Groups (CEG) build support networks in every county for organizations and individuals interested in quality early education. CEGs bring together early childhood programs, parents, school districts and child-serving organizations to assess what quality early learning programs are currently available in the community and to develop ways to encourage quality early learning. They also work with school districts and community-based early learning programs to develop ways to make smooth transition from preschool to kindergarten for child, parents and teachers.

In their efforts to engage various members within their communities in 2008-2009, CEGs reported that over 1.6 million children, parents and community members throughout the commonwealth were involved in events such as recognition events, legislative meetings, Week of the Young Child events, or community fairs.

Working with their partnering school districts, Community Engagement Groups reported engaging nearly 500 schools in the commonwealth in kindergarten transition activities. Over \$1 million in cash and nearly \$800,000 of in-kind value was raised through contributions from foundations, businesses, volunteers, fees and other sources.

Pennsylvania's Promise for Children

Pennsylvania's Promise for Children is a campaign to raise awareness about the importance of providing Pennsylvania's young children with access to quality early learning opportunities. By creating the base of broad public support for quality early learning, we can better reach families who can benefit and more effectively build support for individual early education initiatives.

Pennsylvania's Promise for Children campaign offers easy-to-understand information on the benefits of quality early learning opportunities at home and in programs, tips for parents on helping their children learn, and ways for everyone to get involved and tell their story. Pennsylvanians can also sign PA's Promise for Children declaration to add their name to the thousands of others who value quality early education for Pennsylvania's young children.

By June 2009, more than 9,800 individuals and organizations in Pennsylvania had signed the Pennsylvania Promise for Children declaration, more than twice the number of declarations in June 2008. In 2008-2009, Pennsylvania's Promise for Children produced three "quick break" five-minute videos on brain development and early learning, school readiness, and the economic impact of quality early education. The videos are available online at <http://paprom.convio.net/videos>.

The campaign is sponsored by the Pennsylvania Build Initiative, Grable Foundation, The Heinz Endowments, William Penn Foundation and the Pennsylvania Key in cooperation with OCDEL.

OCDEL Listservs

OCDEL has created two electronic information resources for early education programs and those interested in early education.

- **Build Early Childhood Education E-News.** Sponsored by the Pennsylvania Office of Child Development and Early Learning and the Pennsylvania Build Initiative, the Build Early Childhood E-News is a biweekly e-newsletter to inform early learning professionals, the early childhood community, policymakers, community leaders and the public on developments in early childhood education in Pennsylvania. The newsletter is free and available to anyone. In June 2009, there were 8,045 subscribers to the listserv, a 130% increase from June 2008.
- **OCDEL Community Education Listserv.** The OCDEL Communications and Community Education Listserv is designed to support programs providing OCDEL services as they tell their story and conduct outreach in their communities. Subscribers to this special listserv include organizations that provide a program supported by the Office of Child Development and Early Learning (OCDEL) and members of an OCDEL advisory committee. As of June 2009, there were approximately 4,150 subscribers to the listserv, a 34% increase from June 2008.

Sharee McFadden & Josiah, York County

I found out I was pregnant when I was 19 years-old. I was a young, college student with a bright future. A couple months into my pregnancy, a friend of mine told me about a program called the Nurse-Family Partnership (NFP), where you have a nurse who visits with you as often as you'd like, offers resources and helps guide you through your pregnancy and the early years of parenthood. My nurse's name was Missi. She was one of the sweetest women I had ever met and made me feel comfortable instantly. She would listen about my relationship problems, let me know ways to relieve stress and most importantly, she helped me build my confidence as a woman and as a soon-to-be mom.

With the help of the NFP, I was able to look at my future as a parent and a woman with certainty and confidence.

Once I had (b)(6) Missi really helped me understand and adjust to my role as a mother and our new life together as mother and son. Even though we've been out of the program for two years, I still carry the lessons I learned from Missi and the NFP with me.

(b)(6) now four is enrolled at the YWCA Pennsylvania Pre-K Counts program and I have been very impressed with his success. He's a very bright little man, there's no doubt about that, and there were many people who felt he didn't need to go to pre-school. However, as his mom, I knew he could only get brighter and smarter. For the past year, it has been the highlight of our day to come home and talk about what he learned in school—Alligators, sharing, strangers or worms. I never realized how much I would love seeing the world from his point of view until he began going to Pennsylvania Pre-K Counts. It gives me peace of mind knowing that he's actually learning at pre-school instead of just finger painting and taking walks. They learn about nature, letter sounds, numbers, concepts, respect and a lot of other things that normally aren't introduced until kindergarten.

These programs have been blessings to my family and have had tremendous benefits on our success. I've graduated college and he's excited about learning and going to school. Please help us and other families continue to be blessed and benefited from these programs.



IV. Profiles of OCDEL Programs

Through the Office of Child Development and Early Learning, Pennsylvania offers a variety of early childhood programs for children from birth to age five and their families. Pennsylvania serves more than 300,000 young children through these early childhood initiatives.

Accountability Block Grant

Although Pennsylvania's school districts share the common goal of preparing our children for success in life, each district has unique needs. In order to help school districts implement strategies known to improve academic performance, Pennsylvania created the Accountability Block Grant (ABG). Started in 2004, the Accountability Block Grant provides funding to school districts toward 10 proven strategies to improve student achievement. Of these options for districts, one focuses on three areas of early childhood.

DESIGN: Using ABG funds, school districts are able to support early learning to: 1) establish, maintain, or expand pre-kindergarten; 2) establish, maintain or expand full day kindergarten; or 3) reduce class size in kindergarten through third grade to 17 or fewer students per classroom.

In December 2006, the State Board of Education approved regulations¹⁹ that established standards for public school-based pre-kindergarten programs and community-based pre-kindergarten programs partnering with public schools. Some elements of the regulations include development of a strategic plan, use of academic standards, and teacher education requirements for community-based partners. These standards apply to all pre-kindergarten programs in Pennsylvania including those programs funded through the Accountability Block Grant.

ACCOUNTABILITY: Districts provide a mid-year and end-of-year report on program implementation and outcomes. OCDEL staff conduct targeted site visits to districts to assess the use of early childhood best practices. If districts are not meeting best practices, OCDEL staff provide guidance and resources for improvement.

RESULTS: School districts have shown a strong commitment to early childhood by investing three-quarters of ABG funding to these three early childhood options.

Child Care Certification

Child care facilities provide care to Pennsylvania's youngest citizens. The majority of children in child care are from birth to age five. For many children the majority of their awake hours are spent in the care of someone other than their parents. It is essential that these facilities provide a safe and healthy environment for our children.

DESIGN: Pennsylvania regulates and enforces the minimum health and safety standards for child care programs to protect the health, safety and rights of children and to reduce risks to children in these settings. Pennsylvania revised its regulations for the first time in 16 years in September 2008.

Each type of child care facility (child care centers, group child care homes, and family child day care homes) has its own set of regulations for operation. Child care centers and group homes must receive a certificate of compliance to operate, while family child care homes receive a certificate of registration. These regulations are

developed by drawing upon expert resources such as the American Academy of Pediatrics, US Centers for Disease Control, and the US Consumer Products Safety Commission. Input is sought from providers, consumers, advocates and experts in determining the minimum standard, with consideration for what will protect children, but will not impose undue costs on child care facilities.

ACCOUNTABILITY: In order for individuals to open a child care center, group home, or family child care home, they must complete a comprehensive application. A child care center and group child care home is inspected before a certificate of compliance is issued and the facility may open.²⁰ Starting in October 2008, prospective child care providers are now required to attend orientation training in order to open a child care facility. This full day session provides persons seeking to operate a child care facility with information required to open a child care facility including the laws impacting on facility operation, issues to consider regarding operating a facility, choosing a facility location, how to apply for a certificate of compliance or registration and various types of programs that impact child care.

Each of the more than 5,000 child care centers and group child care homes is inspected by a certification representative at least once a year. Certification representatives also conduct unannounced inspections and complaint investigations at child care centers and group child care homes.

As of June 2009	Number of Facilities
Child care centers	4,186
Group child care homes	855
Family child care homes	3,536
Total	8,577

Certification representatives conduct random sample inspections at 15% of all registered family child care homes. In addition, the Department investigates complaints regarding alleged regulatory violations at family child care homes.

If the certification representative observes that a facility is not meeting a regulatory requirement, the certification representative asks for a plan of correction and verifies that the plan is implemented and the violation is corrected.

As of March 2009, Pennsylvania centralized and streamlined its information on regulated child care facilities into the PELICAN Provider Certification database. FY 2009-2010 will be the first full fiscal year of ongoing use of PELICAN Provider Certification that will reflect new applications, facility openings and facility closings.

RESULTS: In 2008-2009, 2400 prospective child care facility operators attended precertification orientation training across the commonwealth.

The revised regulations are available on the Pennsylvania Code website at www.pacode.com.

Child Care Works

Research has shown that families with access to child care assistance are up to 15 percent more likely to be employed, stay off welfare, and have higher earnings.²¹ When families are not able to access child care assistance, they may go into debt, return to public assistance, choose lower quality, less stable child care, or face untenable choices in their household budgets.²² Child care costs are extraordinarily high for working, low-income families - comparable with their housing costs. Child Care Works can be the difference between self-sufficiency and improving a family's quality of life or depending on public assistance and supports just to make ends meet. In 2008-2009, waiting lists for Child Care Works soared to more than 15,000 children due to the economic downturn.

DESIGN: Child Care Works makes it possible for low-income families to find reliable child care near their home or work and provides financial assistance to help them afford it. Through Child Care Works, families have access to quality early learning programs – including Keystone STARS programs – that may have been out of their reach financially.

Through the Child Care Works partnership, eligible parents²³ make a co-payment to the child care program in addition to the state subsidy that Child Care Works provides. Through a network of 59 Child Care Information Services (CCIS) agencies serving every county in the commonwealth, families receive information on nearby child care programs participating in Child Care Works as well as other quality early learning opportunities so they can make the best choices for their family.

In March 2008, Pennsylvania made it possible for parents to apply for Child Care Works online through the COMPASS website.²⁴ Parents can also search for child care programs online using a number of search criteria such as location, ages of children served, availability of transportation to local schools, etc.

In order to make it possible for Keystone STARS programs to serve more children receiving Child Care Works, OCDEL began offering a “subsidy add-on” rate for child care programs participating in Keystone STARS in 2007-2008. These programs receive an additional subsidy add-on amount to the daily rate for each child they serve that is participating in Child Care Works. This add-on rate was increased in 2008-2009 and helps to cover the additional costs of providing higher quality early education.

When I started to receive Child Care Works, my life began to flourish. I selected a quality child care program and I put my school-age child in an excellent after-school program. There is no way that I would have been able to pay for these programs on my own.

Ericka Gains, Parent
Philadelphia County

ACCOUNTABILITY: In order to receive Child Care Works, parents must submit proof of employment (or a combination of employment and training) and verification of income. Parents are asked to verify employment and income during a “re-determination” process conducted every six months. Child care programs that participate in Child Care Works submit monthly statements of children’s attendance to avoid overpayment.

OCDEL staff conduct an annual evaluation of CCIS agencies on 12 performance standards that address accuracy and parent satisfaction. If the CCIS is deficient in any area, it creates a Corrective Implementation Plan and OCDEL conducts follow-up monitoring to make sure the plan is implemented.

RESULTS: More families accessing Child Care Works subsidy are using regulated care than ever before:

- Approximately 72% of all children enrolled in Child Care Works use regulated child care;
- Approximately 70% of TANF children receiving child care assistance are using regulated child care in 2008-2009, a 38% increase since Child Care Information Services (CCIS) agencies began providing child care services to TANF families in 2006-2007; and
- Approximately 45% of Child Care Works children in regulated child care are enrolled with Keystone STARS providers.

Between March 2008 and May 2009, more than 18,350 online applications for Child Care Works were received, and more than 25,800 searches for child care providers were completed online.

According to the parent survey completed by parents when they enroll in Child Care Works, 98% responded that they were very happy with the service they received at their CCIS agency, and 96% responded that they had learned a lot about other OCDEL programs, including Keystone STARS, Head Start and Pennsylvania Pre-K Counts.

Children's Trust Fund

Brain research has shown that abuse or neglect can limit a child's brain development, impeding their learning for life.²⁵ When families are vulnerable, children are less likely to succeed. Young children need a safe and stable family and home life in order to grow. A vital piece of early learning is the engagement of the parents.

DESIGN: Pennsylvania's Children's Trust Fund (CTF) teaches parents and early education providers ways to strengthen families and build protective factors (such as parenting skills and resilience in times of stress, social connections and support network, and knowledge of child development) in an effort to prevent child abuse and neglect before it begins. Grants are awarded to community-based programs that are embedding the Strengthening Families protective factors framework developed by the Center for Study of Social Policy within their services to families and early learning providers.²⁶ A 15-member board comprised of public and legislative members appointed by the Governor administers CTF with support from OCDEL. Funds are generated from a \$10 surcharge on applications for marriage licenses and divorce complaints. Friends of the Children's Trust Fund was established in 2008 to raise additional funds for CTF.

In the 2007-2008 grant year, 29 CTF grantees served approximately 3,556 families and 1,799 early childhood education programs. Although the 2008-2009 grant year for the Children's Trust Fund did not complete until October 2009, it is anticipated that the number of families and practitioners served will be similar. Final figures will be available by January 2010.

ACCOUNTABILITY: Each grantee develops an action plan that tracks program and community level outcomes and submits quarterly progress reports to OCDEL. OCDEL staff also conduct annual site visits to each grantee.

RESULTS: All grantees are meeting their stated outcomes.

Early Intervention

All children learn best in the most inclusive setting possible, where typically developing children and those with disabilities or developmental delays can grow and learn together. Early Intervention provides services to help maximize the potential of eligible young children with disabilities or developmental delays with services to help maximize their potential so they are successful in any early education setting.

National longitudinal studies²⁷ indicate that with Early Intervention services

- Families are more confident about parenting issues and helping their child grow; and
- Children show increased development, with significantly high percentages of infants and toddlers showing mastery of the appropriate developmental milestones after receiving Early Intervention services for one year; and the majority of preschoolers performing similarly to their typical peers on standardized tests and behavior scales.

DESIGN: Early Intervention offers individualized services and supports designed to help families with children who have disabilities or developmental delays. These supports and services may include special instruction, developmental therapies parent education, and other support services to meet the unique needs of children

(b)(6)

who have developmental delays, as well as their families. Early Intervention builds upon the natural learning occurring in those first five years.

Early Intervention:

- Enhances the families' capacity and confidence to meet the developmental needs of their child in the settings where children would be if they did not have a disability;
- Helps prevent the need for more and costly intervention in the future by improving child outcomes in the early years;
- Embeds supports and services within learning opportunities that exist in the child's typical routines and within the home and community activities and/or early education programs; and
- Builds on existing supports and services in the family, community, and early education resources.

Before Early Intervention services, my little boy had no words, Autism stole the few he had. With the help and devotion of dedicated Early Intervention providers he has reclaimed his words, and has even found his voice. There aren't enough words that could express a mother's appreciation for a gift like that.

Diane, Parent
Montgomery County

In 2008-2009, smooth transitions and better outcomes children and their parents continued to be provided through the joint efforts of both Infant/Toddler and Preschool Early Intervention programs across the Commonwealth.

ACCOUNTABILITY: OCDEL monitors the performance of local Early Intervention programs and assesses parent satisfaction, and analyzes child outcome data to ensure that families are receiving quality services.

Monitoring and continuous quality improvement of programs. Local Early Intervention programs submit performance data on a monthly basis, which is reviewed and analyzed by OCDEL staff. In addition, local Early Intervention programs are reviewed by OCDEL every two years through onsite management verification reviews. As a result of this verification process, each local program, in collaboration with OCDEL, develops an Improvement Plan to increase program compliance with federal and state regulations and improve fiscal management. Once the Improvement Plan has been approved by OCDEL, OCDEL staff provide oversight to ensure progress is made in implementing the plan. Within one year of the issuance of verification findings, the local program is then validated for program compliance and successful implementation. The results of the statewide verifications are reported to State Interagency Coordinating Council (SICC).

In 2008-2009, OCDEL completed management verification reviews with 41 Early Intervention programs throughout the state.

Parent surveys. Annual surveys are sent statewide to all Pennsylvania families currently enrolled in both the Infant/Toddler and Preschool Early Intervention programs.

Child outcomes reporting. Early Intervention programs report child outcome information to OCDEL on all children receiving services as they enter and exit Early Intervention.

RESULTS:

Parent satisfaction. More than 8,000 families responded to the annual Family Survey in 2008, 1,000 more than in 2007. The results showed that most families agreed Early Intervention has empowered them to make the best choices for their children.

Positive child outcomes. Child assessment data from infants, toddlers and preschoolers who entered Early Intervention after July 1, 2008 and exited Early Intervention prior to June 30, 2009 shows that nearly every child (99%) made progress from entry to exit. In addition

- 78% of those children who entered the program below age expectations in development substantially increased their rate of growth by the time they exited the program.
- 57% of the preschool children who exited the program during that time period actually function within age expectations.

	Infant/Toddler Program Agreed, Strongly Agreed, Very Strongly Agreed	Preschool Program Infant/Toddler Program Agreed, Strongly Agreed, Very Strongly Agreed
EI services that my family received helped me communicate more effectively with the people who work with my child and family	95%	86%
EI services helped me understand my child's special needs.	95%	89%
EI staff explained what options parents have if they disagree with a decision made by EI personnel.	89%	84%
EI services helped me know about my child's and family's rights concerning EI services (such as: filing a complaint, requesting mediation, due process).	87%	82%

Full Day Kindergarten

Children attending full day kindergarten programs develop better socialization skills, demonstrate independent learning skills, are more productive in peer group projects and are reflective about their experiences and learning. In full day kindergarten, teachers have more time for direct interaction with children, to provide a variety of experiences and to implement screening and assessment. The benefits are significant for all children but are exceptional for at-risk children.

Attendance in full day kindergarten programs, although not mandated in Pennsylvania, has been increasing over the last thirty years.²⁸ In Pennsylvania, 78% of public school districts offer full day kindergarten.

DESIGN: In 2008-2009, school districts could supplement funding for full day kindergarten through the Accountability Block Grant and the ABG Full Day K Supplemental Fund.

Each school district receives a rubric outlining Early Childhood Best Practices based on research, the Accountability Block Grant Guidelines, and the Pennsylvania Early Learning Standards for Kindergarten. These best practices include small class size²⁹; student work displayed at the eye level of the child; and class schedule posted and organized to provide a balance of appropriate activities. Each district has the authority to design its program according to its own policies and needs.

ACCOUNTABILITY: OCDEL staff conduct site visits to districts using ABG funds in their first or second year. These visits include interviews, observations and data review to determine where districts fall on the Best Practices rubric, their use of the Learning Standards for Kindergarten, and the types of professional development opportunities provided to teachers.

RESULTS: School districts are encouraged to collect longitudinal data related to the impact of full day kindergarten in their district and provide that data to OCDEL to examine the long-term impact of full day kindergarten vs. half day kindergarten in Pennsylvania.

Head Start Supplemental Assistance Program (HSSAP)

Head Start began at the national level in 1965 to break the cycle of poverty by providing comprehensive early learning and family support services to young children living in poverty and their families. The comprehensive approach of Head Start addresses the nutrition, health, and early learning of the child while helping parents become more engaged in their child's development.

In 2004, Pennsylvania made it possible for more children to participate in this nationally-recognized program through the Head Start Supplemental Assistance Program (HSSAP). HSSAP is based on the federal model of Head Start targets providing services to three and four year olds and their families living up to 130% of the federal poverty guidelines.³⁰

DESIGN: HSSAP provides supplemental funding to existing Head Start programs to expand the number of children and families served by Head Start or to extend the length of day or program year for children currently receiving services or to serve additional children.

NIEER Quality Standard	NIEER Benchmark	Pennsylvania HSSAP Standards
Early Learning Standards	Comprehensive	Comprehensive
Teacher degree	Bachelor's degree	Minimum of CDA **
Teacher specialized training	Specializing in pre-k	Specializing in child development
Assistant teacher degree	Child Development Associate (CDA) credential or equivalent	High School Equivalency
Teacher in-service	At least 15 hours a year	At least 15 hours a year
Maximum class size	20 or less	3 year olds 15 -17 or less 4 year olds 17-20 or less
Staff-child ratio	1 staff per 10 children (1:10)	3 year olds- 2: 17 or less (classrooms must always have 2 paid staff) 4 year olds 2:20 (classrooms must always have 2 paid staff)
Required screening/referral and support services	Vision, hearing, health; and at least 1 support service	Programs required to develop collaborations with early intervention service providers to be able to provide support services/referrals; develop parent engagement strategies to support parents' involvement in child's early learning; and support the smooth transition of children into the preschool program and on to kindergarten
Meals	At least 1 a day	For full day - one meal and one snack; for half day - one snack
Required monitoring	Site visits	Site visits by preschool program specialists; ECERS-R ratings in select classrooms; voluntary participation in Keystone STARS; child outcomes reporting; monthly and quarterly program and fiscal reporting

** Head Start requirements state that 50 percent of teachers must have an AA in ECE. If teachers are employed by a school district, ECE certification is required.

Both federally-funded and state-funded Head Start programs must follow comprehensive federal Head Start Performance Standards. Services are comprehensive in nature, providing for child development, health/safety/nutrition, parent engagement, and family/community partnerships. Through professional development opportunities, Head Start Staff participate in ongoing professional development in an effort to constantly improve the overall quality of the Head Start classroom. In December 2007, legislation was approved requiring programs to meet higher standards of teacher qualifications by 2011 and 2013.

The quality components of Pennsylvania HSSAP meet or exceed eight of the quality benchmarks set by the National Institute for Early Education Research (NIEER) for a quality pre-kindergarten program that will prepare children for school.

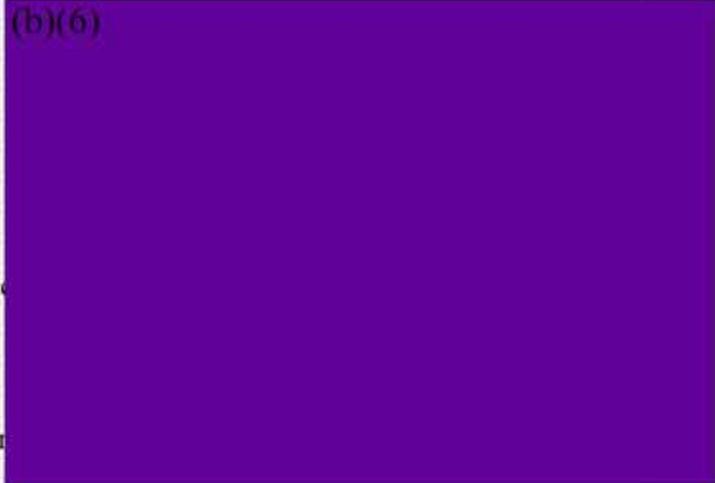
ACCOUNTABILITY: HSSAP programs submit quarterly reports containing enrollment and fiscal information. Preschool Program Specialists conduct site visits of programs. A federal team of peer reviewers conduct site visits every three years for a comprehensive review based on the Performance Standards. Additionally, HSSAP programs submit aggregate child outcomes information three times a year to OCDEL. Beginning in 2009-2010, HSSAP grantees will submit program and child outcomes data into the Early Learning Network.

Kurt Kondrich, Margie (mom), (b)(6)
Allegheny County

On May 16, 2003 my beautiful daughter (b)(6) entered this world, and shortly after her birth my wife and I were advised that she had Down syndrome. We were overcome with many emotions, (fear, anxiety, etc.), and we immediately decided we would do all we could to get the best possible supports and services for (b)(6). Shortly after we left the hospital we were connected to the world of Early Intervention through the Alliance for Infants and Toddlers in Allegheny County. The Early Intervention professionals who entered our life for the critical first three years of (b)(6) life provided us with support, education, hope and optimism that formed a solid foundation for our precious daughter.

When (b)(6) turned three we entered the early childhood education world through Pittsburgh Public School system. (b)(6) entered an inclusive classroom which incorporated children from Head Start, Pennsylvania Pre-K Counts, and children who were able to attend preschool because their families had access to the Child Care Works program. (b)(6) thrived and excelled in this top quality pre-k classroom and the educators and therapists who worked with (b)(6) are some of the finest and most dedicated individuals I have met. The two years (b)(6) spent in pre-k provided her with incredible social, academic, speech and motor skills and it created a stronger foundation to prepare (b)(6) for kindergarten in her neighborhood elementary school in an inclusive classroom with typical peers.

On (b)(6) first day of kindergarten we received numerous compliments from staff at how well prepared she was for this transition, and (b)(6) is totally accepted and embraced by her peers and other students at her school. The brain development children experience in their first five years of life is astronomical, and the investment in Early Intervention and early childhood education is priceless and yields a positive return for generations to come.



RESULTS: The Head Start Family and Child Experiences Survey (FACES), which publishes longitudinal data on a periodic basis on the characteristics, experiences, and outcomes of Head Start children and families, shows that that Head Start: narrows the gaps between disadvantaged children and all children in vocabulary and writing skills during the Head Start year; improves the social skills of Head Start children; and leads to continued improvements in word knowledge, letter recognition, math skills and writing skills by Head Start children relative to other children during the kindergarten year.³¹

Research on the benefits of quality early education

Numerous studies have shown that quality early education can prepare children for success in school and in life.

Quality early education is essential to healthy brain development. The circuits for key functions such as vision/hearing, language, and higher cognitive function develop most in the first five years of life. The creation of these circuits is affected by a child's early learning environment. Bad experiences actually chew away at brain connections, while good quality experiences spur healthy development. After age five, the number of new connections slows, making it more difficult to build the necessary cognitive and social skills. (Center on the Developing Child, Harvard University)

Improves academic skills. The Abecedarian Project, a carefully controlled study of at risk children randomly assigned to participate in either a high quality early education program or a non-treated control group, found that children who received high quality early education:

- Earned higher cognitive test scores from the toddler years to age 21.
- Had higher academic achievement in both reading and math from the primary grades through young adulthood.
- Completed more years of education and were more likely to attend a four-year college. (Source: Abecedarian Project, www.fpg.unc.edu/~abc/)

Benefits child, family and community. Studies of several early childhood interventions, including the High/Scope Perry Preschool Program, Abecedarian Project, Chicago Child-Parent Centers, and Parent Child Development Centers, show that children who participate in a quality early childhood education experience benefit in ways that go beyond the positive outcomes commonly emphasized. These studies also suggest that pre-kindergarten can:

- Strengthen commitment and attitude toward school.
- Lead participants to take better care of their health throughout their lives.
- Start children on the path to financial stability and independence.
- Increase the likelihood that mothers of participating children get good jobs.
- Enhance the parenting skills of participants' parents.
- Produce positive effects that extend into future generations.

(Overlooked Benefits of Pre-kindergarten, March 2005, <http://nieer.org/resources/policyreports/report6.pdf>)

Reduces crime. "Providing high-quality Head Start or other pre-kindergarten program to all eligible at-risk Pennsylvania children could prevent as many as 1,700 kids from committing crimes when they grow up." ("Head Start and Quality Pre-Kindergarten Could Prevent 1,700 Kids From Becoming Criminals Every Year in Pennsylvania," Fight Crime Invest in Kids PA, June 2006)

Stimulates today's economy. For every dollar Pennsylvania invests in early childhood programs, more than two dollars is circulated throughout our local economies through employment and purchasing of goods and services.

(Source: Zhilin Liu, Rosaria Ribeiro & Mildred Warner. "Comparing Child Care Multipliers in the Regional Economy: Analysis from 50 States," 2004 <http://government.cce.cornell.edu/doc/reports/childcare/reports.asp>)

Contributes to long-term economic growth. A key factor in economic growth is the quality of the workforce. Children who attend quality pre-kindergarten are more likely to be employed and have higher earnings, thus positively contributing to the tax base. Annual rates of return on preschool investments are estimated at 10 percent or higher each year over the students' lifetimes, exceeding the 6 to 7 percent average rate of return typically expected of government programs and the stock market ("The Economic Promise of Investing in High Quality Preschool," Committee for Economic Development, 2006)

Keystone STARS/ Early Learning Keys to Quality

Early learning programs in Pennsylvania, such as child care and Head Start, serve more than 300,000 children each year. The quality of these programs affects our children's early learning and preparation for school. Started as a pilot program in 2002, Keystone STARS has been proven to improve the quality of child care across the state and has reversed a 10-year trend of declining quality in child care.³²

I cannot say enough about the quality of education my daughter received in her Keystone STAR 4 facility. I have seen her transform and grow socially, cognitively, and emotionally.

Joy Blasick, Parent, Columbia County

DESIGN: Keystone STARS/ Early Learning Keys to Quality supports child care, Pennsylvania Pre-K Counts and Head Start programs that are committed to continuous quality improvement and offers families a valuable tool to gauge quality in early learning programs.

Keystone STARS improves quality in early learning programs through:

- **Standards:** Programs may enter Keystone STARS at Start with STARS and earn a STAR 1 through STAR 4 level based on research-based standards for quality, such as staff qualifications and professional development, the learning environment, partnerships with family and community, and business management. Programs must also earn certain scores on their Environment Rating Scales (ERS) assessments based on their STAR levels.
- **Training - Professional Development:** Keystone STARS standards require higher educational levels for staff as programs move up the quality ladder while offering financial assistance and professional development opportunities. For example, child care, and Head Start programs participating in Pennsylvania Pre-K Counts are eligible for T.E.A.C.H. scholarships to earn the Child Development Associate (CDA) credential or college degrees while continuing to work full-time. Early learning professionals also have access to issue-specific professional development workshops or professional credentials.³³ Program directors are required to take a Core Series of professional development workshops. The workshops are spread across STAR levels and are designed to provide the skills and information needed to advance in STAR levels.
- **Assistance:** Through six Regional Keys located throughout the commonwealth, programs participating in Keystone STARS may receive technical assistance on meeting the requirements for higher STARS levels.
- **Resources and Support:** Keystone STARS programs may be eligible for support grants, merit awards, and Education and Retention Awards to help continue to improve quality in their programs. Keystone STARS programs serving children who receive Child Care Works subsidy also receive a STARS add-on rate to supplement this subsidy.

As STARS programs continue to improve quality and move up the STARS ladder, they can access STARS technical assistance to meet the higher standards and prepare for ERS assessments.

ACCOUNTABILITY: OCDEL has expanded accountability measures for the Keystone STARS program to include both accountability to programs and technical assistance organizations.

Program accountability. All Keystone STARS programs participate in Environment Rating Scales (ERS) assessments.³⁴ Each program is required to attend training to learn the Environment Rating Scales and conduct a self-assessment of their classrooms. For STAR 3 and 4 programs, independent evaluators conduct an ERS assessment of one classroom for each age range (Infants, Toddlers, Preschoolers, School-Age). If programs do not meet the required ERS assessment scores, the assessor, STARS specialist, and program will develop an action plan and provide additional technical assistance to help them meet their goals.

Keystone STARS programs must also submit documentation to show they are meeting the standards for their STAR level. Programs must renew their STAR designation every two years.

Technical assistance. In 2008 – 2009 Pennsylvania developed the Keystone STARS Technical Assistance Quality Assurance and Accountability System to support consistency and quality in technical assistance across the commonwealth. The system consists of the following key performance areas and will be fully implemented in FY 2009 – 2010:

- **Qualifications, Professional Development and Professionalism** requirements of technical assistance consultants to ensure consultants are highly qualified and continue to stay current on trends, research and issues in the field.
- **Reporting Obligations** to include timely, accurate submission of reports, timely follow-up and completion of referrals, records management and targets.
- **Measurable Impact on Provider** establishes the expectation that technical assistance will have some influence on the measurable improvement of a program. Change affected may be in knowledge, skills, attitudes or behaviors in the target population resulting in improvement in specific standards, STAR level change and “stickiness” of the improvement.

Provider survey. As part of its work to continue to strengthen and improve the Keystone STARS program, OCDEL conducted a provider survey that focused on provider perception of the most beneficial aspects of STARS and on ease of use of the various STARS resources. Eighty percent of providers report that the processes associated with the Support and Merit Grants, and the Education and Retention Grants were somewhat easy to very easy to use and 75% of the providers found that the STARS Technical Assistance and Professional Development supports were at least good quality and were helpful.

RESULTS: In 2008-2009, approximately 32% of child care programs participating in Keystone STARS moved up at least one STAR level, increasing the quality early learning opportunities for children in their programs. The number of STAR 3 and 4 programs increased 30% between 2007-2008 and 2008-2009.

Environment Rating Scale scores have also increased among Keystone STARS programs for 2008-2009. The overall average score for STAR 3 sites was 5.23 in 2008-2009, which is an increase from 2007-2008 when the average score was 5.06. STAR 4 sites scored an overall average of 5.48 in 2008-2009, which is an increase from 2007-2008 when the average score was 5.31.

Providers Participating in Keystone STARS by STAR Level and Provider Type

STAR Level	SWS	STAR 1	STAR 2	STAR 3	STAR 4	STAR 4A	TOTAL
Provider Type	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09
Center	379	1,266	765	353	145	229	3,137
Group	54	271	94	26	5	19	469
Family	439	565	135	30	21	32	1,222
TOTAL	872	2,102	994	409	171	280	4,828

Estimated Children in Keystone STARS Providers by STAR Level and Provider Type

STAR Level	SWS	STAR 1	STAR 2	STAR 3	STAR 4	STAR 4A	TOTAL
Provider Type	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09
Center	20,087	67,098	40,545	18,709	7,685	12,137	166,261
Group	594	2,981	1,034	286	55	209	5,159
Family	2,195	2,825	675	150	105	160	6,110
TOTAL	22,876	72,904	42,254	19,145	7,845	12,506	177,530

Providers Participating in Keystone STARS by STAR Level and Region as of June 30, 2009

STAR Level	SWS	STAR 1	STAR 2	STAR 3	STAR 4	STAR 4A	TOTAL
Region	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09
Central	54	185	119	51	15	19	443
Northeast	91	296	175	90	27	44	723
Northwest	110	200	93	52	37	19	511
South Central	65	280	197	76	40	47	705
Southeast	388	874	310	94	38	88	1,792
Southwest	164	267	100	46	14	63	654
TOTAL	872	2,102	994	409	171	280	4,828

Estimated Children in Keystone STARS Providers by STAR Level and Region as of June 30, 2009

STAR Level	SWS	STAR 1	STAR 2	STAR 3	STAR 4	STAR 4A	TOTAL
Region	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09	Jun-09
Central	1,080	5,887	4,639	2,037	561	959	15,163
Northeast	2,321	11,032	8,015	4,446	1,335	2,284	29,433
Northwest	2,398	5,398	2,829	2,354	1,913	959	15,851
South Central	1,021	9,194	8,941	3,248	1,694	1,933	26,031
Southeast	10,412	31,544	13,622	4,754	1,918	3,416	65,666
Southwest	5,644	9,849	4,208	2,306	424	2,955	25,386
TOTAL	22,876	72,904	42,254	19,145	7,845	12,506	177,530

Parent-Child Home Program

Parents are a child's first teacher and the interaction between a parent and child has a tremendous effect on that child's early learning. When parents spend time talking, reading and playing with their child in ways that promote their development, it can have great results for children.³⁵

DESIGN: The Parent-Child Home Program (PCHP) is a nationally-replicated, research-based early literacy and home visitation program for families with infants and toddlers. A home visitor models for parents how to read and play with their children to promote positive parent-child interaction, literacy development, and a language-rich home environment. PCHP reinforces the parent's role as their child's first and most important teacher and provides them with the guidance and supports to promote quality early learning opportunities for their children. Home visitors provide half-hour home visits twice a week for two years.

Programs are also required to conduct developmental screenings of children and refer to Early Intervention or other services when appropriate. In 2008-2009, 1,600 children were served through 25 PCHP sites in 25 counties.

ACCOUNTABILITY: PCHP National Center and OCDEL staff independently conducts site visits, with OCDEL conducting visits every other year. Programs submit semi-annual narrative reports to OCDEL summarizing successes, challenges and anecdotal information. Programs also submit child outcomes to the National Center throughout the year.

RESULTS: An independent study by Indiana University of Pennsylvania showed positive gains in all areas being observed in both positive parent-child interactions (Parent and Child Together – PACT) and child behavior traits showing increases in language and literacy development (Child Behavior Traits – CBT)³⁶.

In 2008-2009, of the 1,600 children served by PCHP:

- 81 children were referred to Early Intervention Birth to Three
 - 55 followed through with services (68%)
- 64 children were referred to Early Intervention Three to Five
 - 41 followed through with services (64%)

Pennsylvania Nurse-Family Partnership

High quality in-home parent coaching services that begin when the mother is pregnant, such as Pennsylvania's Nurse-Family Partnership, help mothers deliver healthy babies and can cut cases of child abuse and neglect nearly in half.

The Pennsylvania Nurse Family Partnership (NFP) helps children and families reach their promise by giving first time mothers the supports necessary to provide an excellent start for their children. This research-based, nurse home visiting program helps low-income, first-time parents experience healthy pregnancies, learn how to take good care of their babies, and make plans for the future.

DESIGN: Home visits by registered nurses promote the physical, cognitive and social-emotional development of the children and provide general support as well as instructive parenting skills to the parents. Services are

When I signed up for Nurse-Family Partnership, I didn't expect what we got. I knew I would learn things that would prepare people for parenthood, help them become better moms and dads. But what we got was much more, an imprint on our hearts from the time we spent together. You not only taught us, but you listened. With your guidance, my daughter Cindy has better opportunities. I am grateful for that.

Sally Snow, Parent, Columbia County

provided to families prenatally until the child reaches two years of age. In 2008-2009, 4,449 families were served through 23 NFP programs in 39 counties.

ACCOUNTABILITY: A rigorous training and site certification process is conducted through the NFP National Service Office. Grantees report performance and family information to the National Office, and can receive technical assistance.

RESULTS: Nurse-Family Partnership prevents nearly half of all cases of abuse or neglect of at-risk children. According to Fight Crime: Invest in Kids, by the time the children in Nurse-Family Partnership had reached 15, both their mothers and the children had about 60% fewer arrests than mothers and children left out of the program.³⁷

Pennsylvania Pre-K Counts

Pennsylvania Pre-K Counts provides children at risk of school failure with a high quality pre-kindergarten experience that prepares them for success in school and in life. Research consistently shows that children with access to quality pre-kindergarten such as Pennsylvania Pre-K Counts can make up delays in development and enter school on par with their peers and ready to learn.

DESIGN: The quality components of Pennsylvania Pre-K Counts meet or exceed nearly every quality benchmark set by the National Institute for Early Education Research (NIEER) for a quality pre-kindergarten program that will prepare children for school. In 2008-2009, 151 Pennsylvania Pre-K Counts grantees with 168 partners served 11,841 children in 62 counties. Children residing in 78% of Pennsylvania’s school districts participated in Pennsylvania Pre-K Counts.

Total Pennsylvania Pre-K Counts Enrollment by Region, May 2009

Region	Total Enrollments	Estimated # of 3 year olds Enrolled*	Estimated # of 4 year olds Enrolled*
Central	1,210	345	865
Northeast	1,996	627	1,396
Northwest	1,973	501	1,472
South Central	1,417	433	987
Southeast	3,651	1,544	2,107
Southwest	1,594	572	1,022
TOTALS	11,841	4,022	7,819

*Estimated age groups determined by September 1, 2008 cut off date

ACCOUNTABILITY: Grantees submit monthly and quarterly reports which are monitored and reviewed by OCDEL staff. Preschool Program Specialists conduct site visits and, using a comprehensive review, evaluate each grantee on how it has met program requirements for reporting, communications/interactions, meeting and training attendance, continuous quality improvement, teacher qualifications, funds management, classroom environment, enrollment and

attendance of the children, and program review. Independent assessors also evaluate individual classrooms using the nationally recognized Early Childhood Environment Rating Scales-Revised (ECERS-R).

Grantees also submit periodic reports of each child’s progress. In 2008-2009 grantees began entering child outcomes data online over three reporting periods.

(b)(6)

RESULTS: Children affected by risk factors for academic failure benefit greatly from quality pre-kindergarten. Pennsylvania Pre-K Counts has a demonstrated track record of targeting its resources to vulnerable children and families. Nearly every (81.5%) classroom is located in a zip code where at least 30% of children under age five live in low-income families. Grantees report that:

- Nearly all (95%) children in Pennsylvania Pre-K Counts classrooms are affected by at least one risk factor for academic failure, such as living in low income families, learning English as a second language, or having disabilities or developmental delays: and
- Most (77%) are affected by two or more risk factors, making them more likely to struggle in school.

Outcomes for Pennsylvania Pre-K Counts children compare favorably to outcomes in other states that have had pre-k programs in place for as long as 20 years. Second year reports demonstrate positive results on children's progress.

NIEER Quality Standard	NIEER Benchmark	Pennsylvania Pre-K Counts Standards
Early Learning Standards	Comprehensive	Comprehensive
Teacher degree	Bachelor's degree	Bachelor's degree + ECE Certification*
Teacher specialized training	Specializing in pre-k	ECE certification*
Assistant teacher degree	Child Development Associate (CDA) credential or equivalent	CDA or equivalent [#]
Teacher in-service	At least 15 hours a year	Meet requirements of Act 48 (180 hours over five years)
Maximum class size	20 or less	20 or less
Staff-child ratio	1 staff per 10 children (1:10)	1 teacher and 1 aide per 20 children (1:10)
Required screening/referral and support services	Vision, hearing, health; and at least 1 support service	Programs required to develop collaborations with early intervention service providers to be able to provide support services/referrals; develop parent engagement strategies to support parents' involvement in child's early learning; and support the smooth transition of children into the preschool program and on to kindergarten
Meals	At least 1 a day	For full day - one meal and one snack; for half day - one snack
Required monitoring	Site visits	Site visits by preschool program specialists; ECERS-R ratings in select classrooms; child outcomes reporting online; monthly and quarterly program and fiscal online reporting

*as per the State Board of Education regulations, Private Academic Preschools, Head Start and child care programs have until December 2011 to meet ECE certification requirements, but now must have an associate's degree or higher in early childhood education. Licensed nursery schools must have a BA and private teaching license.

[#] Teacher assistants must complete at least 2 years of postsecondary study, or possess a CDA or associate's degree by 2009-2010

- Nearly every child (99 percent) showed age-appropriate or emerging age-appropriate proficiency in literacy, numeracy, and social skills after attending the Pennsylvania Pre-K Counts program.
 - Nearly 75 percent of children who attended Pennsylvania Pre-K Counts finished the school year with age-appropriate proficiency in literacy, numeracy and social skills. By the end of the year:

We have observed my son's Pennsylvania Pre-K Counts classroom and have consulted with his teachers and staff and know that the practices of the Pennsylvania Pre-K Counts program have made an impact on our son. We feel this program is invaluable to all.

The Bobersky Family, Luzerne County

- Five times as many children were proficient in Scientific Thinking (from 1,429 children upon entry to 7,686 at end of year)
- More than four times as many children were proficient in Mathematical Thinking (from 1,792 children upon entry to 7,910 at end of year)
- Nearly four times as many children were proficient in Language and Literacy (from 2,164 children upon entry to 8,135 at end of year)
- Nearly three times as many children were proficient in Personal and Social Development (from 2,984 children upon entry to 8,763 at end of year)

Public-Private Partnerships

A quality early education continuum requires support and participation of both the public and private sectors. Pennsylvania is fortunate to have a strong and supportive foundation community. OCDEL encourages partnerships with the foundation and research communities to develop pilot projects that may be replicated statewide and conduct research to reinforce the benefits of quality early education.

Pre K Counts Public-Private Partnership for Educational Success

When school districts and community-based early learning programs work together to provide quality early learning opportunities, everyone benefits.

Pre K Counts Public-Private Partnership for Educational Success is a public-private initiative created in 2004 that facilitates local pre-kindergarten partnerships among school districts, community-based providers and Early Intervention. In 2008-2009, seven participating communities implemented prekindergarten partnerships with more than 250 partners. Current funders of the Public-Private Partnership include Commonwealth of Pennsylvania, the Grable Foundation, and The Heinz Endowments.

DESIGN: The three primary objectives of the Public-Private Partnership are:

1. Increase the total number of children attending quality pre-kindergarten in Pennsylvania;
2. Develop quality model programs that are characterized by partnerships, professional development, standards of best practice, and community engagement; and
3. Establish a statewide network of early education and care leaders.

Through Pre K Counts coordinators, coach/consultants, and professional development activities, school district and community partners (such as child care, Head Start, Early Intervention) align curriculum to Pennsylvania early learning standards, share professional development opportunities, involve parents in their child's development, and educate business, education, legislative and community leaders about the value of quality early education to their community's future.

This year, the name of the Pre K Counts Public-Private Partnership for Educational Success Executive Leadership Council was changed to Partners of the Pennsylvania Early Learning Investment Commission. Through its steering group, the PA Early Learning Investment Commission, co-chaired by Governor Rendell and James Rohr, Chairman and Chief Executive Officer of PNC Financial Services Group, more than 165 business, education and civic leaders attended the first annual Economic Summit on Early Childhood Development Investment and many have become children's champions, expressing their support for quality pre-kindergarten opportunities for every child in Pennsylvania.

Through the Commission more and more business leaders are embracing early childhood education as a top priority issue as they become convinced of its strong connection to employer productivity, workforce development and economic investment.

Through a four year study by the UCLID Center at the Children's Hospital of Pittsburgh funded by The Heinz Endowments, the Public-Private Partnership will identify components of local pre-kindergarten partnerships that are most successful in preparing children for school and for life.

"We believe that [The Pre K Counts Public-Private Partnership study] is the definitive study in Pennsylvania on the issue of whether quality preschool education has been worth the public and private investments. The answer to that, we can say now based on hard numbers, is a resounding yes."

Teresa Heinz, Chairman, The Heinz Endowments

ACCOUNTABILITY: Partnerships submit quarterly performance and fiscal reports to OCDEL. Staff also conducts site visits to partnerships to ensure that they are meeting the grant requirements.

Each Partnership hires Pre K Counts coaches to visit classrooms and provide onsite technical assistance. In this final year of Phase I of Pre K Count the Public Private Partnership, seven communities have participated — Albert Gallatin School District, Aliquippa School District, Bellefonte Area School District, Huntingdon Area School District, New Kensington -Arnold School District, Southern Tioga School District and Wilkes-Barre Area School District. The project had seventeen coaches/coordinators that worked with a total of 128 teachers. The coaches/coordinators provided in class technical assistance, staff development and curriculum materials, and made 2,619 classroom visitations during the year, working with 58 partners. They improved the quality of education for 2,438 students, of whom 432 were special needs children.

RESULTS: The successes of the Public-Private Partnership helped to inform the program component of the Pennsylvania Pre-K Counts program.

Pre K Counts commissioned the SPECS Program Evaluation Research Team from Children's Hospital of Pittsburgh of UPMC and the UCLID Center at the University of Pittsburgh to conduct a four year study (2005-2009) of the impact and outcomes for children and participating in Public-Private Partnership programs. The independent SPECS research has been funded by The Heinz Endowments. The interim report³⁸ published in March 2008 found that children participating in Public-Private Partnership classrooms showed significant progress in acquiring early learning skills during their participation, particularly those who were at risk of school failure. In fact, the length of time the child was enrolled in the program was a good predictor of their progress. The final report will be published in late 2009.

Public-Private Partnership Phase II. Building upon the success of the first phase of the Pre K Counts Public-Private Partnership for Educational Success, the Grable Foundation, The Heinz Endowments and William Penn Foundation created a combined fund over three years to support the second phase of the partnership. The second phase of the partnership will focus on a) leadership development of the business and

early childhood community; b) quality outcomes for children through systematic measurement and reporting on program quality; and c) building the local capacity of teachers to deliver high quality education by meeting the required early childhood education bachelor's degree and credential requirements.

Early Childhood Assessment and Accountability Project

The William Penn Foundation supported the Office of Child Development's efforts to ensure that Pennsylvania's early childhood education programs promote child development and demonstrate children's progress. This grant helped support the study by Sharon Lynn Kagan and Catherine Scott Little of the horizontal and vertical alignments of the Pennsylvania Early Learning Standards for Infant-Toddler, Prekindergarten and Kindergarten; enabled more than 1,000 early childhood education teachers to be trained to conduct child assessments; and funded the Early Learning Network feasibility study, the blueprint for the development of the Early Learning Network.

Pennsylvania Build Initiative

The Build Initiative is a multi-state partnership that helps states construct a coordinated early learning system that responds to the needs of young children from birth to five and their families, so that children are safe, healthy, eager to learn and ready to succeed in school. It is supported by an Early Childhood Funders' Collaborative made up of 15 leading philanthropies. Pennsylvania is one of five states selected to participate in this national initiative. Pennsylvania has been a Build partner since 2004.

Build serves as a catalyst for change and a national resource on early learning. As a partner in Build, Pennsylvania receives grant money and technical assistance to support early childhood system building. Since 2007-2008, Pennsylvania Build has supported OCDEL's work to create a quality early education continuum with work in the areas of coordinated leadership, standards and assessment, professional development, and public engagement.

Coordinated Leadership. Through executive order, the PA Build assisted in the creation of The Pennsylvania Early Learning Council and The Pennsylvania Early Learning Investment Commission. These groups serve as vehicles to maintain active involvement of early childhood stakeholders and business leaders. The 75 member PA Early Learning Council will plan for the expansion of effective early learning services for young children and their families, and will make recommendations to ensure the plans are implemented successfully. With the input and assistance of business leaders, the PA Early Learning Investment Commission will increase public investment in early childhood investments by engaging business leaders across the state in education and advocacy, and increasing awareness of the importance of the early years.

Standards and Assessment. PA Build supported the development of first and second grade standards that were completed and mailed to school districts, school-age programs and other partners in June 2008.

Professional Development. Professional development supported by PA Build has focused around inclusive practices and racial equity, as well as support of articulation projects between two and four year higher education institutions.

Public Engagement. In addition to sponsoring research and publications such as the OCDEL annual report and biweekly Build ECE News, the Pennsylvania Build initiative is a co-sponsor (with the Pennsylvania Key) of the "Pennsylvania's Promise for Children" public awareness campaign. Pennsylvania's Promise for Children serves as a public website for parents, organizations, and communities to become involved in promoting early childhood education and learning about its benefits for children, families, and communities.

V – Vision for tomorrow

Building a quality early education continuum is a marathon, not a sprint. Each year Pennsylvania has refined a system through continuous quality improvement and serving more children.

In 2008-2009, Pennsylvania was able to serve more children in quality early education programs, add greater accountability and coordination of programs, and start the foundation of continuous teacher and program quality improvement.

In 2009-2010, Pennsylvania will continue its work to create a more seamless pathway of professional development for early childhood educators at all levels; increase accountability and documenting positive outcomes; align the early education system with the full education continuum; and build leadership at all levels.

Create a more seamless pathway of professional development for early childhood educators at all levels. As education requirements increase for early childhood staff among several programs, OCDEL will continue work to align all professional development for early childhood staff, whether in community-based or school-based settings.

In 2009-2010, Pennsylvania will require non-regulated child care providers (family/relative/neighbor care) receiving Child Care Works subsidy to complete 12 hours of professional development every two years. All Nurse-Family Partnership nurse supervisors and nurse home visitors will be required to document annual professional development hours offered by a PQAS-certified instructor or must meet qualifications to help maintain their nursing credential or as required by the National Service Office.

OCDEL will continue alignment of the Professional Development Record (PDR) with new ECE teacher certification requirements. Pennsylvania will also continue work on integrating early education concepts and leadership in the Pennsylvania Inspired Leadership Program.

Increase accountability and documenting positive outcomes. Pennsylvania will continue to develop PELICAN and the Early Learning Network to include Keystone STAR 3 & 4 centers, pre-kindergarten funded through the Accountability Block Grant, and Early Intervention.

Align the early education system with the full education continuum. OCDEL will expand its work in providing support to school districts and early education programs in building effective transition plans for children entering pre-kindergarten and kindergarten, which will also strengthen relationships between the early education and K-12 education communities. Pennsylvania will also evaluate the options for expanding the Early Learning Network to include kindergarten.

Build leadership at all levels. Pennsylvania, in partnership with leading foundations and nonprofit organizations, will continue to expand the Pennsylvania's Promise for Children campaign and engage more business leaders through the Early Learning Investment Commission.

Pennsylvania's quality early education is building a brighter future for Pennsylvania's children, families and communities.

When everyone rallies around a child who needs support, the results are amazing. The child arrives at kindergarten ready to succeed, the family learns and feels supported, the early childhood teachers gain new tools, and the community wins.

Sarah Shoffler, Parent, Bucks County

Endnotes

- ¹ Zhilin Liu, Rosaria Ribeiro & Mildred Warner. "Comparing Child Care Multipliers in the Regional Economy: Analysis from 50 States," 2004 <http://government.cce.cornell.edu/doc/reports/childcare/reports.asp>
- ² (Barnett, 2003a; Bowman, Donovan & Burns, 2001; Howes & Brown, 2000), www.iir.berkeley.edu/cscce/pdf/teacher.pdf
- ³ "Evaluation of Pennsylvania's STARS Quality Rating System in Child Care Settings," (December 2006), available at http://www.pakeys.org/uploadedContent/Docs/ELinPA/STARS_2006_Evaluation_FINAL.pdf
- ⁴ You can download the Lattice at http://www.pakeys.org/pages/get.aspx?page=Career_Requirements.
- ⁵ The Child Development Associate credential is a nationally recognized credential for early childhood professionals in center-based, family child care, and home visitor programs. The Child Development Associate (CDA) Competency Standards and Assessment System provide standards for training, evaluation, and recognition of practitioners based on their ability to meet the unique needs of an age group. For more information, visit <http://www.cdacouncil.org/cda.htm>.
- ⁶ C. Raver, "Young Children's Emotional Development and School Readiness," July 2003
- ⁷ Karoly, L.A., Kilburn, M.R. & Cannon, J.S. (2005). Early Childhood Interventions: Proven Results. Future Promise. Pittsburgh, PA: RAND Corporation
- ⁸ <http://www.vanderbilt.edu/csefel/>
- ⁹ (Brennan, E. M., Bradley, J. R., Allen, M. D., & Perry, D. F. [in press]. The evidence base for mental health consultation in early childhood settings: Research synthesis addressing staff and program outcomes. *Early Education and Development*.)
- ¹⁰ Janell Smith-Jones, Ph.D. and Maria Zeglen Townsend, Ph.D., "Evaluation of the Infant/Toddler Systems Building Initiatives: Final Report for the Early Childhood Mental Health Consultation program." University of Pittsburgh Office of Child Development, September 2008, <http://www.education.pitt.edu/ocd/publications/ecmh.pdf>.
- ¹¹ "Measures of Classroom Quality in Pre-Kindergarten and Children's Development of Academic, Language and Social Skills," University of Virginia, Mashburn, Andrew J. and Pianta, Robert C., May 2008, <http://www.virginia.edu/uvatoday/newsRelease.php?id=5217>
- ¹² Early Learning Standards are available online at www.pde.state.pa.us.
- ¹³ Following attendance at an early learning standards training event, center directors or administrators who are PQAS-certified, can order them through the PA Key.
- ¹⁴ Vold, E. B. (2003). Young children's affirmation of differences: Curriculum that is multicultural and developmentally appropriate. In J. P. Isenberg & M. R. Jalongo (Eds.), *Major trends and issues in early childhood education: Challenges, controversies, and insights (Second edition)* (pp. 30-46). New York: Teaches College Press, p. 31.
- ¹⁵ <http://www.brookespublishing.com/tools/asq/index.htm>
- ¹⁶ http://www.pakeys.org/pages/get.aspx?page=EarlyLearning_Tools
- ¹⁷ To learn more about the Strengthening Families initiative, visit <http://strengtheningfamilies.net/>
- ¹⁸ Camarota, 2005
- ¹⁹ Pennsylvania code Title 22, Chapters 4, 11 and 12
- ²⁰ All persons seeking to operate a child care facility must attend a precertification orientation training prior to opening.
- ²¹ Tekin, Erdal (2004), *Child Care Subsidy Receipt, Employment, and Child Care Choices of Single Mothers*
- ²² Matthews 2006
- ²³ Eligible parents are those earning 200% of the federal poverty level or less that meet the work requirement of 20 hours per week.
- ²⁴ www.compass.state.pa.us
- ²⁵ Long-Term Consequences of Child Abuse and Neglect", U.S. Department of Health and Human Services http://www.childwelfare.gov/pubs/factsheets/long_term_consequences.cfm
- ²⁶ www.strengtheningfamilies.net
- ²⁷ The National Early Intervention Longitudinal Study (NEILS) www.sri.com/neils/; *Pre-Elementary Education Longitudinal Study (PEELS)* Available at: www.peels.org
- ²⁸ Full-day kindergarten is defined as 5 hours of instruction per day for 180 days.
- ²⁹ class size ratio of 1:17
- ³⁰ With appropriate documentation, beginning in 2008 programs can serve up to 35% of their funded enrollment of families living between 100-130% of the Federal Poverty Guidelines.
- ³¹ Tarullo, L., Zill, N., Hubell-McKey, R., Resnick, G. (2002) A National Picture of Head Start: the FACES Study. Head Start Bulletin, Issue 74. Pages 40-44. http://eclkc.ohs.acf.hhs.gov/hslc/HSLIC_Search
- ³² "Evaluation of Pennsylvania's Keystone STARS Quality Rating System in Child Care Settings," December 2006, available at <http://www.pakeys.org/stars/KeystoneStarsEvaluation.aspx>
- ³³ See page 9 for more information on career development in the early childhood workforce.
- ³⁴ Please see page 23 for more information on assessments across OCDEL programs.
- ³⁵ (Bruner 1964, 1966; Vygotsky 1962)
- ³⁶ Parent-Child Home Program: Analysis of Pennsylvania Statewide PACT, CBT and TELD Findings 2005-2006; Center for Educational and Program Evaluation; Indiana University of Pennsylvania; Prepared by Becky A. Knickelbein, Heather Degroot & Shelley Strobel; June 21, 2007.
- ³⁷ "Breaking the cycle of child abuse and reducing crime in Pennsylvania: Coaching parents through intensive home visiting," Fight Crime: Invest in Kids Pennsylvania, 2008, www.fightcrime.org/reports/PACAN2.pdf
- ³⁸ Source: Bagnato, SJ, & Fevola, A. (2007) *The Impact of Early Learning Partnerships: Indicators of Progress for Pre K Counts in Pennsylvania —A Descriptive Study of Child and Program Outcomes (2005-2007)*, Pittsburgh, PA: Early Childhood Partnerships, Children's Hospital of Pittsburgh of UPMC.

Early Education in Pennsylvania

According to the US Census Bureau, Pennsylvania's 2008 population was 12,448,279, an increase of 1.4% since 2000. 81.9% of the population have earned at least a high school degree, with 22.4% of the population having earned a bachelor's degree or higher. The most frequently reported industry in Pennsylvania counties is Manufacturing, followed by Health Care/Social Services. The median household income in 2007 was \$48,562.

There are 732,956 children from birth to age five living in Pennsylvania County.

35.7% of children under age five participate in publicly-funded quality early education programs

Risk factors affecting children's success in school.

Family and community factors affect how well young children learn, leaving our at-risk children behind. Research has shown that children affected by risk factors such as poverty, family status, or poor school system, are more likely to enter school behind their peers, struggle in school, or drop out altogether. Risk factors like those listed below can hurt a child's chances of doing well in school.

In Pennsylvania:

- 36.9% of children under age five live in low-income families
- 16.5% of births are to mothers with less than a high school education
- 22.3% of third graders scored below proficient on the 2009 PSSA reading test

Quality early education programs.

Research has also shown that at-risk children who receive quality early education can catch up to their peers in cognitive and social emotional development before they reach kindergarten, so they are ready to succeed in school and in life. These benefits last a lifetime. Pennsylvania's quality early education programs are helping children overcome risk factors and succeed in school.

Of children from birth to age five in Pennsylvania:

- 8.2% participate in Child Care Works
- 10.7% participate in Early Intervention
- 4.2% participate in federal Head Start
- 0.3% participate in Head Start Supplemental Assistance Program
- 14.7% participate in Keystone STARS
- 0.6% participate in Nurse-Family Partnership
- 0.2% participate in Parent-Child Home program
- 1.6% participate in Pennsylvania Pre-K Counts
- 0.6% participate in pre-kindergarten funded PA PACT (formerly ABG)
- 2.5% participate in school-based pre-kindergarten

Source: Pennsylvania Office of Child Development and Early Learning Program Reach and Risk Assessment, State Fiscal Year 2008-2009, http://www.pakeys.org/pages/get.aspx?page=EarlyLearning_Reach.

<p>PA legislature approves funding for 07-08 to serve: Over 132,000 children (monthly average) through Child Care Works; Nearly 74,000 children through Early Intervention (birth-5); Nearly 65,000 children through ABG-funded full day kindergarten; Over 77,000 children through school-funded full day kindergarten; Nearly 6,000 children through Head Start Supplemental; Nearly 179,000 children through Keystone STARS; Over 4,000 children through Nurse-FamilyPartnership; Over 4,000 children through ABG-funded pre-kindergarten; Over 10,000 children through school-funded pre-k and K4; Nearly 11,000 children through PA Pre-K Counts 7/07</p> <p>Pennsylvania Pre-K Counts is created 7/07</p> <p>Full implementation of child outcomes reporting by Early Intervention programs statewide begins 7/07</p> <p>Pennsylvania receives federal grant for early literacy in special education from the US Office of Special Education called CELL (Center for Early Literacy Learning) 7/07</p> <p>Early Childhood Mental Health Consultation program moves from pilot to full implementation in all six Regional Keys 8/07</p>	<p>The Independent Regulatory Review Commission (IRRC) unanimously approved the final form Chapter 49-2 regulations—new teacher-certification rules which develop guidelines for higher education to implement the Early Childhood Education Certificate. 8/07</p> <p>New Advisory Committee for the Early Learning Network convened 8/07</p> <p>OCDEL commissions independent evaluation of the alignment of the Pennsylvania Early Learning Standards 8/07</p> <p>The Preschool and Infant-Toddler monitoring tools for Early Intervention are combined into one streamlined monitoring tool that can be used in both programs 10/07</p> <p>OCDEL partners with Office of Children, Youth and Families to provide Ages & Stages to child care providers 10/07</p> <p>Launch of STARS Advisory Committee statewide Listening Tour to hear from Keystone STARS programs and practitioners 11/07</p> <p>Pennsylvania Pre-K Counts Advisory Committee is formed 11/07</p> <p>Three Program-to-Program Articulation in Early Childhood Education (ECE) Pilot Project Grants Announced 11/07</p> <p>Launch of Pennsylvania's Enterprise to Link Information for Children Across Networks (PELICAN) 11/07</p>	<p>PA Learning Standards for Kindergarten is published 12/07</p> <p>Pennsylvania Pre-K Counts begins reporting child outcomes online 12/07</p> <p>PA Department of Public Welfare hosts Infant-Toddler Mental Health Symposium 12/07</p> <p>Pennsylvania's Promise for Children declarations posted online 1/08</p> <p>Governor releases first Performance Report for PA Government that describes the work of 25 state agencies and offices, during the 2006-2007 fiscal year 1/08</p> <p>OCDEL receives a technical assistance and training grant from SpecialQuest Birth-Five: Head Start/Hilton Foundation Training Program 2/08</p> <p>First targeted grants to promote pre-k to K transition plans awarded to select Community Engagement Groups 2/08</p> <p>Pennsylvania Pre-K Counts mid-year report published 2/08</p> <p>Early Childhood Mental Health Advisory Committee created 3/08</p> <p>Online self-service for Child Care Works and Child Care Provider Search becomes available on COMPASS, allowing online submission of an application or redetermination for Child Care Works financial assistance, and ability to search for a child care provider 3/08</p>	<p>OCDEL receives grant from the National Professional Development Center on Inclusion (NPDCI) 3/08</p> <p>Pennsylvania awarded grant to participate in Harvard Seminar on Early Childhood Science and Policy for Legislative, Business and Foundation Executives 3/08</p> <p>Pre K Counts Interim Report 2005-2007 by Children's Hospital of Pittsburgh of UPMC and the UCLID Center at the University of Pittsburgh shows that children participating in Pre K Counts Public-Private Partnership classrooms showed significant progress in acquiring early learning skills during their participation, particularly those who were at risk of school failure. In fact, the length of time the child was enrolled in the program was a good predictor of their progress. 3/08</p> <p>OCDEL begins implementing Race Matters Initiative 3/08</p> <p>Pennsylvania's One Book, Every Young Child Campaign kicks off 4/08</p> <p>Pennsylvania begins public awareness media campaign for Keystone STARS and Pennsylvania Pre-K Counts 4/08</p>
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Final form Child Care Regulations published which update health and safety requirements to reflect best practices & research; make the regulations easier to read and more accessible to providers and parents; reflect an update of the regulations to include correct reference to other applicable laws; and improve opportunity for facility compliance.
5/08

OCDEL hosts first Higher Education Institute on Diversity
5/08

Title 22, Chapter 49-2: Pre-K Through 4th Grade Teacher Preparation Guidelines Published which reflects the best characteristics of early childhood and elementary education.
5/08

OCDEL partners with Office of Children, Youth and Families to provide Ages & Stages to community providers
5/08

The Gate Opener Innovation grant announced. Nine institutions of higher education awarded grant money to improve access and opportunity to Bachelor's degree completion for early childhood professionals
5/08

25% of Keystone STARS programs move up at least one STAR level in 2007-2008
6/08

Inclusion of preschool children receiving Early Intervention services in typical early education settings increased to 58% (a 9% increase) in 2007-2008
6/08

Pennsylvania releases first-year outcomes for children in Pennsylvania Pre-K Counts: 94% of children showed age-appropriate skills and behaviors or emerging age-appropriate skills and behaviors at end of school year
6/08

PA legislature approves funding for 08-09 to serve: More than 135,000 families (monthly average) through Child Care Works; Nearly 34,000 infants and toddlers and nearly 44,000 preschoolers through Early Intervention (birth-5); Nearly 70,000 children through 448 school districts in full day kindergarten; Over 5,600 children through Head Start Supplemental; 170,000 children in 5,000 programs through Keystone STARS; 4,200 children through Nurse-Family Partnership; Over 55,000 children in 388 school districts through PA Pact-funded pre-kindergarten; Over 18,000 children through school-funded pre-k and K4; Nearly 12,000 children in 315 programs through PA Pre-K Counts
7/08

Pennsylvania Department of Labor and Industry renews both Child Care Workers and Pre-School Teachers to the 2008 High Priority Occupations (HPO)
7/08

OCDEL announces an increase in the tiered reimbursement rate for children who receive Child Care Works subsidy and are enrolled at a STAR 2, 3 or 4 program.
7/08

Keystone STARS was highlighted as a case study in the presentation by Charles J. Homer M.D., M.P.H., National Initiative for Children's Healthcare Quality and Harvard School of Public Health on Improving Quality in Early Childhood Programs at the Harvard/NGA National Symposium on Early Childhood Science and Policy Presentations
7/08

OCDEL receives grants from three foundations totaling \$3,550,000 to support leadership development of the business and early childhood provider community; the Early Learning Network, and the local capacity of teachers to deliver quality by meeting the required early childhood education B.A. degree and credential requirements.
7/08

Fiscal Year Budget 2008-2009 supports a new Early Learning Facilities Fund (ELFF) to subsidize some of the costs of constructing or renovating early learning centers who are Keystone STAR 2 or above with special consideration to programs participating in Pennsylvania Pre-K Counts
8/08

OCDEL launches its Community Education Listserv
8/08

The Early Childhood Governor's Institutes embraces the Pennsylvania STEM (Science, Technology, Engineering, Mathematics) Initiative, designed to develop and deploy statewide strategies and resources to enhance Pennsylvania's education and workforce development efforts targeted at the development of a globally competitive science, technology, engineering and mathematics workforce
9/08

Release of nine-part video series on the Learning Standards for Early Childhood to support program directors' work with their staff on applying the Learning Standards' to their curriculum and assessment practices
09/08

Governor Rendell signs Executive Orders creating the Pennsylvania Early Learning Council and the Pennsylvania Early Learning Investment Commission
09/08

2007-2008 Pennsylvania Pre-K Counts Year End Report Released - Ninety-four percent of Pennsylvania Pre-K Counts children finished the school year with age-appropriate skills and behavior or emerging age-appropriate skills and behavior
10/08

Early Intervention and Pennsylvania Pre-K Counts programs make their first data reports in Work Sampling System/Ounce online
10/08

Release of University of Pittsburgh's Early Childhood Mental Health Consultation Project Final Evaluation Report, demonstrating the quality of early education young children with social and emotional issues receive in early learning programs across the commonwealth 10/08	Kindergarten Advisory Committee formed 12/08	Communications Advisory Committee formed 5/09	OCDEL Cross Program Family Survey is implemented across Early Intervention Birth-Five, PA Pre-K Counts, and Child Care Works programs 6/09
Creation of the Bureau of Certification Listserv for registered and certified child care programs 10/08	OCDEL Cross-Program Family Survey is piloted. 01/09	Release of new Professional Development requirement for regulation exempt providers in Child Care Works 4/09	OCDEL's Learning Is Everywhere calendar, which provides activities for children from birth – age five based on the Learning Standards for Early Childhood, is published 6/09
Release of the second annual OCDEL Reach and Risk Report 2007-2008 which provides county, as well as city, specific information on the level of risk for school failure for children (based on seven risk factors) and the availability, or reach, of most OCDEL programs to children in each county and in the 27 largest cities in Pennsylvania. 11/08	OCDEL releases Kindergarten Entry Date Recommendations which reviews findings on kindergarten entry dates in the Commonwealth and provides a recommendation to districts about their policies for kindergarten age eligibility. 01/09	170 Pennsylvania business leaders take call to action to invest in early education at the Economic Summit on Early Childhood Investment in Harrisburg 4/09	OCDEL hosts second Higher Education Institute on Diversity 6/09
Children's Trust Fund awards \$714,620 in grants to six community-based agencies to implement child abuse and neglect prevention programs. 11/08	OCDEL and Office of Mental Health and Substance Abuse Services Issue Joint Announcement of Behavior Supports for Young Children to ensure that young children and their families have the tools to promote good mental health and access to an array of individualized services for more complex behavioral health treatment. 2/09	Child Care Works Waiting List Grows to 16,000 5/09	Nearly one-third (32%) of Keystone STARS programs move up at least one STAR level in 2008-2009; 30% increase in STAR 3 & 4 programs 6/09
Early Learning Council Members are announced 11/08	Pennsylvania Supreme Court issues decision in St. Elizabeth's case upholding the Department of Public Welfare's authority to require Certification of non-profit child care facilities. 2/09	OCDEL releases the handbook: Staffing OCDEL Councils, Committees, Work Groups, and Task Forces 5/09	70% of TANF children receiving child care assistance are using regulated child care in 2008-2009, a 38% increase since Child Care Information Services (CCIS) agencies began providing child care services to TANF families in 2006-2007 6/09
The Pennsylvania Governor's Forum: Linking Ready Kids to Ready Schools held in Philadelphia, during which leaders from K-12, early childhood, and higher education shared expertise and contributed to the new state policy framework on the transition from early childhood to the early elementary years and the alignment of practices between those systems, including higher education's role. 12/08	Deputy Secretary Dichter testifies before U.S. House Subcommittee on Early Childhood Education on Pennsylvania's Early Education Continuum 3/09	The first phase of the Early Learning Network completed, linking of existing child demographic database, PELICAN, with the child outcome reporting system, Work Sampling and Ounce Scale Online for a more complete analysis of child outcomes 5/09	
		Second year Pennsylvania Pre-K Counts outcomes released: Nearly every child (99 percent) showed age-appropriate or emerging age-appropriate proficiency in literacy, numeracy, and social skills after attending the Pennsylvania Pre-K Counts program	
		Inclusion of preschool children receiving Early Intervention services in typical early education settings increased to 63% in 2008-2009 6/09	

Quality Early Education Benefits Children, Families and Communities

Pennsylvania Pre-K Counts | Keystone STARS | Child Care Works | Early Intervention | Head Start | Nurse-Family Partnership

Benefits to communities

Taxpayer savings

Every dollar invested in quality early education saves \$7 in public costs like public assistance and crime control

Increased tax base

Communities receive more tax revenues as citizens earn more

Quality workforce

Businesses can hire skilled employees- new industries enter PA with quality jobs

School savings

Schools save on special education costs

School readiness

Children come to school with pre-academic and social skills for kindergarten

School success

Children are more likely to graduate high school, attend college or career training

Benefits to children

Financial Stability

Children are more likely to have higher earnings and own a home as adults

Quality of life

Children are less likely to commit crimes or need public assistance as adults

For a brighter future

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Build
Strong Foundations For
Pennsylvania's Youngest Children

**Governor's Commission
on College and Career Success
Commonwealth of Pennsylvania**

Final Report

December 22, 2006

Commission on College and Career Success

Final Report

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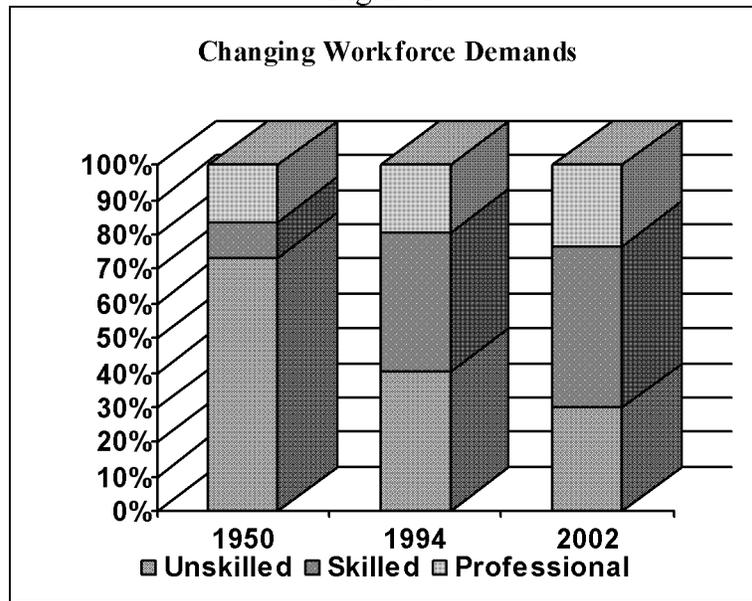
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Introduction

Globalization has arrived in Pennsylvania, with significant implications for business and education alike. Gone are the days when workers enjoyed a career in a single industry, perhaps even with a single employer, where the biggest competition they faced for jobs came from the town at the other end of the county. Instead, like never before in history, today's workers find themselves competing for jobs with other qualified applicants from around the world. Jobs once thought to be permanent bulwarks of the American economy have moved overseas, where tasks can be performed less expensively and with the same results. This means that not only are Pennsylvania students competing with those from Indiana and Ohio for jobs after graduation; they are also competing with students from Singapore and Hong Kong. In short, if Pennsylvania is to compete—and win—in the global economy, our students must be world-class. We have a long way to go to achieve this goal, both as a nation and as a commonwealth. Most research that compares U.S. students with their international peers shows us falling further and further behind. Even our highest performing students lag behind their international peers. Research conducted by the *Organization for Economic Cooperation and Development* (OECD) shows that the U.S. ranks 23rd out of 29 OECD countries in math achievement.

Not only have the competitors changed, but the rules of the game itself have changed as well. Many of the old unskilled jobs of mills, mines, and the field have been outsourced to other countries; and those that remain require a highly trained workforce, as can be seen in Figure 1 below. Whereas only 30% of jobs required skilled or professional labor in 1950, that proportion has risen to about 70% in 2002. In fact, we have moved beyond the “Information Age” to an era that can best be described as the “Conceptual Age.” It is no longer sufficient to train our citizens to merely absorb and adapt to new information; instead, we must develop and produce new knowledge ourselves if we are to maintain our position in the global economy.

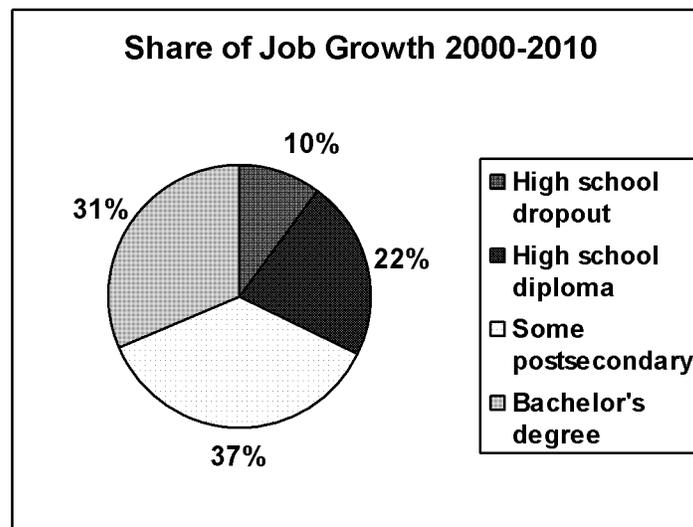
Figure 1.



Source: U.S. Bureau of Census and Pennsylvania Department of Labor and Industry, Center for Workforce Information and Analysis (Pennsylvania statewide)

This trend promises to continue in the coming years. As Figure 2 illustrates, by 2010, two-thirds of all new jobs created will require at least some postsecondary education. For those entering the job force directly from high school, stronger math, reading and technical skills will be needed to succeed. The picture is clear: our economy demands that more students graduate from high school with the skills needed to directly enter the new economy; or ready to enter and succeed in college.

Figure 2.



Source: Carnevale, Anthony P. and Donna M. Desrochers, *Standards for What? The Economic Roots of K-16 Reform*, Educational Testing Service, 2003.

These trends mean that low-skilled employment is fast becoming a thing of the past. The academic distinctions that had once been made between students going to college and those planning to go directly into the labor market are no longer useful. ACT's latest research provides empirical evidence that high school graduates need to be educated to a comparable level of readiness whether they plan to enter college or workforce training programs." (Ready for College and Ready for Work, p 2). In essence, the commonwealth must prepare all students to go to college, whether they choose to attend or not, as they will need "college level" skills and knowledge no matter what their choice.

This will require a radical shift in how we teach our students and what we expect of them. Most high school students (94%) expect to attend college at some time during their lives (US Department of Education, 2003). However, we know that many of these students never make it. In all of our districts, too high a percentage of students drop out. Fewer still manage to complete college—only 28% of ninth graders are estimated to graduate from college. (National Center for Public Policy and Higher Education, 2004). We must build the educational pathways that will make college attendance possible for all high school graduates.

Bringing our Schools into the 21st Century

Over the course of the last century, our changing economy has placed increasing demands on the high school experience. The American high school transformed from an elite college-preparatory institution that served only 10% of the population in 1910 to a large, inclusive socializing and sorting mechanism that serves 92% of the population but still prepares only a small fraction of students for college-level work. This misalignment of expectations between a high school designed for the industrial age, and the skills and knowledge needed for the information age, is no place more evident than in the state of Pennsylvania. Employers tell us they are being forced to lower their standards just to fill their empty positions. In fact, 82% of the businesses surveyed by the *Business Calling Program* since 2003 say they are having difficulty recruiting the skilled workforce they need. These results mirror those found in national surveys as well. In the latest in a series of national reports on this issue, *Are They Really Ready to Work*, a survey of four hundred top employers in the US reveals that over 40% of employer respondents rate the overall preparation of high school graduates for the entry-level jobs they fill as "deficient." And one third of all companies provide remedial basic skills training to bring recent graduates up to workplace expectations.

The booming industrial economy of 20th century America allowed nearly everyone with a strong back and a willingness to work to find employment with an income that could comfortably sustain a family. But as our economy has changed, our schools have not kept pace. In fact, the high schools that served America during the industrial age so well are still substantially in place today; but they cannot deliver a workforce that capable of meeting the demands of the global economy of the 21st century.

Colleges and universities are in a similar situation. Approximately 30% of all high school graduates entering college require at least some remediation (National Center for Education Statistics, 2003). And the one hundred and forty college professors that we worked with told us

they are often forced to teach material that they consider pre-college level by everyone's standards. Remediation in college is expensive both for the commonwealth but also for students, since they are less likely to obtain a college degree than those who do not require remediation.

In short, about 30-40% of our high school graduates are not ready for their next steps in life. (Rising to the Challenge: Are High School Graduates Prepared for College and Work? 2005). This is not just a personal loss for those individual students; it also constitutes an unbearable and unnecessary burden for the state.

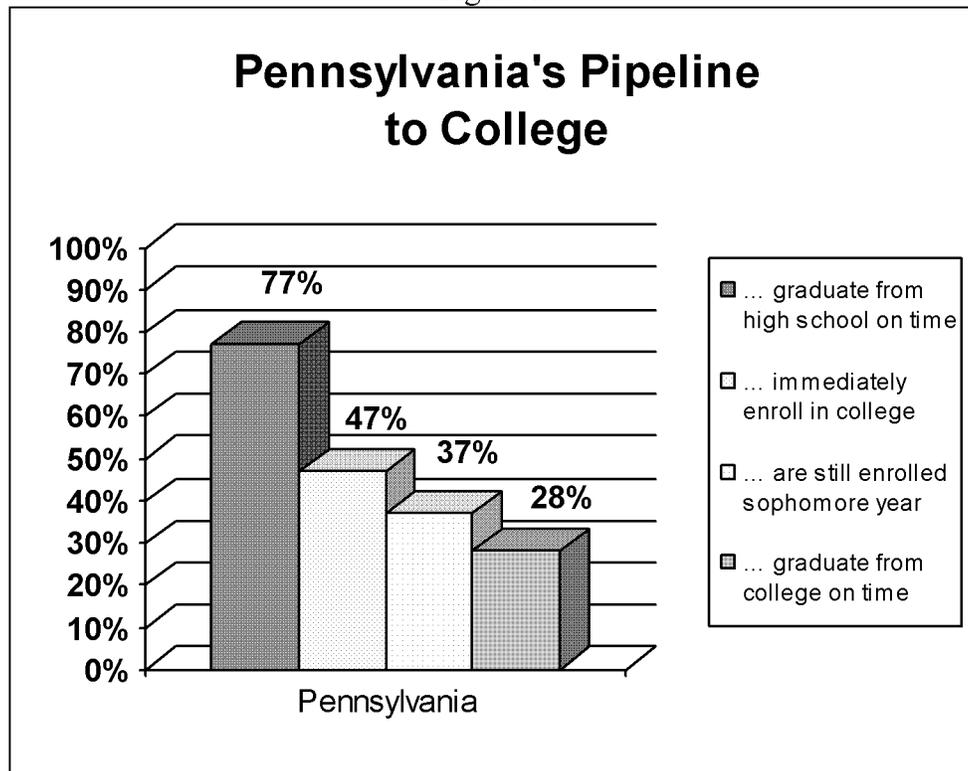
The Good News

Pennsylvania has a strong foundation on which to build. First, it is an educational pioneer among states, leading the charge to develop a standards-based system of instruction. This step has meant abandoning the all-too-familiar bell curve of relative achievement, and replacing it with uniformly high expectations for all students. Pennsylvania's standards are rigorous, comparable to the best in the world, and, if achieved by high school students, set graduates on pace to be extremely qualified to compete in today's international job market. The test currently used to measure the achievement of these standards at the high school level, the 11th grade Pennsylvania System of School Assessment (PSSA) exam, is a valid predictor of a student's readiness to succeed in current college-level work or entry-level jobs (Human Resources Research Organization, 2005). In fact, if a student performs at proficient or above on the 11th grade PSSA, they have a 90% chance of placing directly into college-level courses with no need for remediation. This system of standards-based education seems to be yielding fine results for our students through middle grades.

The Bad News

But in Pennsylvania, as in other states, increased standards have not yet yielded consistent results at the high school level. Student achievement has clearly improved at the elementary and middle-school level; but these improvements have not translated into across-the-board increases in high school performance. As can be seen in Figure 3, approximately one quarter of our students do not graduate from high school on time; and of those that do, less than half enroll in college upon graduation. Only 37% make it to their sophomore year, and less than one-third graduate from college on time. In short, Pennsylvania's educational pipeline is leaking with no low skill jobs paying reasonable wages to catch those students who do not make it through.

Figure 3.



Source: National Center for Public Policy and Higher Education, Policy Alert, April 2004. Data are estimates of pipeline progress rather than actual cohort.

Addressing the Problem

What follows are 12 policy recommendations designed to move Pennsylvania towards increasing the educational achievement of all of its students to meet the challenges of a 21st century economy and the requirements for productive citizenship.

The Commission recognizes that these 12 recommendations require that Pennsylvania not only increase the academic proficiency of its graduates, *but also do so while graduating more of its students*. This dual agenda is the only responsible route to take, given the lack of good jobs for those who do not have a diploma, and the needs for a robust 21st century Pennsylvania economy that includes a future tax base sufficient to support the needs of an increasingly aging population.

The Commission wishes to make one fact abundantly clear – there are currently tremendous inequities in our educational system. The data shows inequity by ethnicity, socio-economic status, and location at both the secondary and post-secondary levels (Education Trust, 2006). These persistent gaps are ensured by inequity of funding and resources which results in less credentialed teachers in front of our poorest children, larger class sizes and less college counseling for our children of color and less access to higher education for our rural students. (Graphs 15,16) A deep statewide commitment to the systemic implementation of this report's recommendations will lessen these inequities over time better than any single program could.

Lastly, the Commission recognizes that properly implementing these 12 recommendations will require new strategic educational investments. These new investments, however, will likely yield enormous returns. Governor Rendell's administration, together with the Pennsylvania Legislature, have already demonstrated their commitment to improving high schools as evidenced by their support of Project 720, Dual Enrollment, Classrooms for the Future, and improvements in college and career counseling. These are important first steps—steps that Pennsylvania can now build upon.

Recommendations

In August 2005, Governor Rendell asked a group of educators, business representatives, and educational advocates to come together as the Governor's Commission of College and Career Success. Much as the name suggests, the task before the Commission was to review research and make recommendations to ensure that today's high school graduates are prepared to be the citizens and workers that the commonwealth's economy demands. The Commission's specific charge was to:

- Create clear and consistent signals and policies for Pennsylvania's expectations for high school success.
- Conduct qualitative and quantitative research, which includes Pennsylvania, national and international studies.
- Create incentives for school districts to increase academic achievement in high school and higher education to increase retention through the first two years of postsecondary education.

For the last 18 months the Commission has heard from national experts, examined state data and spoken with hundreds of Pennsylvanians in order to determine what specific steps high schools, employers and postsecondary institutions needed to take to assure that Pennsylvania was preparing all students to meet with postsecondary and career success. While Pennsylvania was a national leader in some areas, in others, it was clear that all stakeholders needed to dramatically rethink both what our high schools ask of students and what sort of supports are provided to them. The demands placed on today's students are greater than ever before, and Pennsylvania needs an education system that understands today's changing economy and is nimble enough to meet students where they are and ensure that they graduate from high school college- and career-ready.

The Commission believes that raising graduation standards is imperative to ensuring a bright economic future for our commonwealth and its citizens. It is the Commission's belief that the following 12 recommendations provide a roadmap that will enable policymakers, high schools, postsecondary institutions, employers, parents, and students to confront the challenge of redesigning the Pennsylvania high school experience head on and emerge with the high quality workforce that our economy demands.

Recommendation 1

Require all Pennsylvania high school students to demonstrate proficiency on Pennsylvania's academic standards to graduate. Students can demonstrate proficiency by scoring proficient or advanced on the 11th grade PSSA or by passing a series of state-developed Graduation Competency Assessments.

The Commission recommends that the state require all students to take a progressive series of Graduation Competency Assessments (GCAs) within each of four major content areas: math (including but not limited to content traditionally instructed through Algebra II); English/Language Arts (demonstrating reading comprehension and written communication skills); laboratory science; and American History, Economics and Government. By linking these assessments more closely to the content covered in a rigorous college and work-ready curriculum, Graduation Competency Assessments allow in-depth assessment in each major subject area, and provide feedback to both students and teachers regarding a student's progress towards meeting state standards in these content areas. Assessments must be offered at least two times per year to maximize opportunity for students to succeed. Students should be able to take assessments as soon as they believe they have reached proficiency in a content area, even if they have yet to enter high school.

Currently, the Pennsylvania State Board of Education requires students to be proficient on the Pennsylvania standards prior to graduation. The regulations allow two methods of showing proficiency: performing proficient or better on the PSSA; or demonstrating proficiency on an equivalent local assessment. The local determination of equivalency does not ensure a common, statewide graduation standard. As we continue our transition to a 21st Century economy, where competition is international, not only inter- and intra-state, we need to make sure that the state as a whole is consistently producing high quality graduates. For this reason, the Commission recommends replacing the local assessment option with a series Graduation Competency Assessments.

While this recommendation provides two pathways for every student to reach graduation--proficiency on the 11th grade PSSA or passage of the GCAs—the Graduation Competency Assessments must be used by every district with every student. The urgency of this recommendation cannot be overstated. While achieving full development and phase-in of all GCAs may take up to five years, removing the local assessment option and rollout of initial GCAs should begin as soon as possible. This will allow sufficient time for the Pennsylvania Department of Education to develop appropriate, high quality assessments in all subject areas while at the same time providing schools with the latest assessments as soon as they are available. Such a phase-in will also allow schools the time that they need to transition to such a rigorous core curriculum for all students.

Requiring students to pass a set of Graduation Competency Assessments in order to graduate from high school will both ensure high graduation standards, and equip districts with the information they need to provide timely intervention to those students falling behind. In particular, this strategy has the following positive educational advantages:

- *Graduation Competency Assessments give districts timely information on student progress towards proficiency.* Because the tests can be taken as soon as the content area is mastered, most students will not have to wait until 11th grade to take them. As a result, test results can serve as an early indicator of progress; and deficiencies can be identified and addressed in a timely manner with targeted tutoring and other interventions.
- *Graduation Competency Assessments provide a more in-depth assessment on each subject area than can a single comprehensive exit exam.* Comprehensive exams, such as the PSSA, test students on a range of subjects, and due to time constraints include relatively few questions on each subject. In contrast, Graduation Competency Assessments provide schools with the opportunity to test students on a range of subjects individually, allowing for more in-depth examination of student mastery.
- *Graduation Competency Assessments can be graded by practitioners in Pennsylvania.* The Commission recommends that Graduation Competency Assessments be developed at the state level, so as to ensure uniformity across districts. The Commission also recommends that the exams be graded regionally within Pennsylvania. This practice will ensure that teachers are intimately familiar with student performance in both their own districts and in others as well.
- *Graduation Competency Assessments provide an excellent tool for credit recovery and completion for students who have failed to graduate and are returning to complete their high school education.* The results of Graduation Competency Assessments become a permanent part of a student's academic record (see Recommendation 2). As a result, if a student must leave high school for any reason or transfer to another high school, then these exams will indicate which subjects a student has mastered, and which areas require additional work.

The Commission also recommends that the Pennsylvania Department of Education investigate the best means of aligning Graduation Competency Assessments with the requirements of the federal No Child Left Behind Act, particularly Annual Yearly Progress (AYP) to ensure that Pennsylvania has a coherent system of assessment from both a state and federal perspective.

Recommendation 2

Require all school districts to record PSSA scores and Graduation Competency Assessments on all student transcripts, and further recommends that postsecondary institutions and employers in the commonwealth be encouraged to use this information for admission, placement and employment.

One of the most important outcomes of increasing the rigor of Pennsylvania’s high school curriculum is that a high school diploma once again becomes a meaningful credential. Given the other recommendations put in place by this Commission that serve to dramatically increase the demands on high school students, it is important that the achievements of Pennsylvania students be recognized. The commonwealth must be at the forefront of ensuring that the products of its educational system—students—are backed by a meaningful credential that is used by employers as well as college admissions officers when making decisions about a student’s postsecondary future.

By including both PSSA scores and the GCA results on these transcripts, the state will ensure that the high school diploma includes detailed, meaningful information for employers and college admissions officers to review. The information pertaining to Graduation Competency Assessments will provide all stakeholders with specific data related to any skill set that each may desire to focus on.

Including test completion information on the diploma will also assure that students understand the importance of these exams. By making the results of these scores a permanent part of the academic record that employers and colleges actually use, the state will ensure that students understand the importance of these exams. Similarly, when colleges and employers use the results of these examinations for determining which students to admit or hire, they will also create clear expectations for students and be more deeply committed to ensuring continued alignment between high school exit standards and postsecondary expectations.

Industry needs the diploma to have substantive meaning. We want to know that if a prospective employee has graduated from a Pennsylvania high school, s/he can read, communicate, compute and problem-solve at a high level. It is inefficient and costly for us and the region to re-teach the basics to someone with a diploma in their hand. Moreover, it limits the person's employability prospects."

Jennie Rodriguez-Ortiz
Manager - Employment and Diversity
Carpenter Technology Corporation

Recommendation 3

Accept the definitions of college and career ready in mathematics, English and science developed by the Commission for use in the review of standards, development of assessments, and development of curriculum.

With the help of Achieve, a non-profit educational policy organization, the Commission has developed subject specific definitions of college and career readiness, College and Career Essentials, that have been drafted and vetted in consultation with businesses and colleges across Pennsylvania. After comparing the American Diploma Project (ADP) benchmarks with Pennsylvania standards, in January and February of 2006 the Commission held five days of regional workshops with faculty from all sectors of the higher education community. Faculty were asked to define college-ready in math and English. Meeting at Penn State University, La Salle University and La Roche College the Commission collected input from 140 faculty from community colleges, state system universities and major search universities. Faculty represented a variety of disciplines and taught courses to a broad range of incoming freshmen.

After developing these definitions, the Commission met with business leaders from across the state and invited their comments on the proposed definitions and standards, and asked as well for their suggestions as to how to include any other necessary elements that might have been overlooked.

While the work for the development of College and Career Essentials in math and English has been complete, the Commission is still working to develop such definitions for science. As the national work on defining college and career ready in science is not at the same point as math and English, the Commission's work in this area had to follow a different trajectory. Finishing this task will be imperative to establishing a vetted definition of college and career ready in science. As such, the Commission urges the Pennsylvania Department of Education to complete this work.

In order to infuse these College and Career Essentials into math, English and science into the curriculum offered in the state's 501 school districts, the Commission urges these essentials to guide the State Board of Education as part of their regular review of already-established standards, which will in turn have implications for the 11th grade PSSA and the ECAs. Additionally, we encourage colleges, universities and other postsecondary institutions to consult these Pennsylvania College and Career Essentials in math, English and science when they design and review their placement exams. These documents, created through consensus building with Pennsylvania higher education faculty members, can be helpful in sending a clearer message to students by aligning assessments preK-16.

Finally, we urge the Department of Education and the State Board of Education to communicate these College and Career Essentials broadly in both the current educator version and an abridged public version to ensure broad understanding and attention. These Essentials are the definition of what a Pennsylvania high school graduate must know to be prepared for post-graduation success. Therefore, students and parents must have access to the Essentials and understand their importance.

Recommendation 4

Expand the definition of college and career ready content areas to include social studies and develop model curricula and Graduation Competency Assessments in this area in addition to the standards, curriculum, and evaluations that support math, science and language arts.

The Commission recognizes that the mastery of American constitutional governance is essential to the development of individuals capable of contributing productively to the nation and the commonwealth as informed and engaged citizens. Although not originally the primary focus of the Commission, the weight of our deliberations convinces us that social studies are a necessary and essential component of the academic preparation all Pennsylvania students must have to succeed in college and career.

Current research commissioned by the National Conference on Citizenship - a non-profit and non-partisan organization chartered by the U.S. Congress - finds that "the nation's civic health shows a steep decline over the last 30 years." Their findings were reported in 2006 in *America's Civic Health Index: Broken Engagement*. The conclusions reached in this report were consistent with concerns raised by the 1998 blue ribbon National Commission on Civic Renewal.

The Civic Health Index report notes "a growing civic divide between those with a college education and those without one, with a particularly substantial gap between college graduates and high school dropouts." Further, it would be unwise to assume that students in colleges and universities will receive the necessary civic instruction. The Intercollegiate Studies Institute National Civic Literacy Board's 2006 study, *The Coming Crisis in Citizenship* reports that college seniors scored on average just 1.5 percent higher than freshmen when tested on the basics of American government, economics, political science and history. Students must develop a clear understanding of their citizenship roles well before entering college and must be expected to understand citizenship regardless of whether they attend college.

Unless these trends are stemmed, success in math, science, and language arts alone will be insufficient to support college and career success. Like language arts, science, and math, formal education in social studies provides a foundation for citizenship. Without democratic capacity, our students will not be able to succeed in the 21st Century's political, economic, and social climate. It is imperative that the State develop a common definition of career and college readiness (which we would describe as citizenship-readiness) in Social Studies; that academic standards be developed that support a citizenship-readiness definition; and that all students be required to demonstrate proficiency in these Social Studies.

Recommendation 5

Develop preK-12 model curricula, including inquiry-based pedagogy, through which students can achieve academic standards and proceed on track to demonstrate proficiency on PSSA and Graduation Competency Assessments.

The Pennsylvania Department of Education should create innovative, model preK-12 curricula that blend theory and practice and are aligned with College and Career Essentials as established by this Commission. The development of the curriculum should incorporate hands-on, inquiry-based pedagogy. PDE should offer state sponsored professional development for teachers and principals on the implementation of this curriculum. This state support will enable all school districts to have access to a high quality curriculum that they can build upon and enhance as they so choose.

The importance of offering all students the highest quality curriculum cannot be overstated. A rigorous curriculum has been shown to increase student performance across the board. In *Ability Grouping and Student Learning* (2002), Maureen Hallinan finds that students, regardless of ability level, consistently perform better in more challenging coursework. Cliff Adelman's *Answers in the Tool Box* (1999) and the Southern Regional Education Board's *Middle Grades to High School: Mending a Weak Link* (2002) echo these findings for students regardless of ethnicity or socio-economic status. In fact, a solid high school curriculum might be called the great equalizer. Yet, the development and updating of such curricula for all grades is a monumental undertaking, which many districts cannot perform due to limited resources.

The Commission also recommends that the curriculum include supports for junior/senior year options, which allow students to experience post-secondary environments, such as dual enrollment. The Commission applauds the new Dual Enrollment program launched by Governor Rendell, and encourages its growth as well as recommending a similar statewide initiative in junior/senior year career internships. Pennsylvania students need to learn the Pennsylvania academic standards through real world examples, applications and experiences both inside and outside the classroom.

The commonwealth requires students to complete a senior year project in order to graduate. The Commission affirms this as a very important component of the high school. Both the national experts we consulted with, and the business members and faculty members we heard from underscored the importance of business project/research project development and management. The skills necessary to perform well in projects (problem-solving and written and oral communication) are best understood and evaluated in this manner as opposed to standardized testing. However, the quality of project support and grading seems to vary widely from district to district. A review of the guidelines related to the completion of state projects as well as the implementation of the effort should be conducted. To bring more support to districts in this area, the Commission recommends that the State Board and PDE develop supports, including scoring rubrics, professional development focused on project development and easily available exemplar projects, to schools as they increase the rigor of their expectations of senior projects.

Recommendation 6

Develop and implement a preK-16 student information system that is designed to collect information on student performance.

Making policy changes without having the data to understand their effect is akin to flying an airplane blindfolded. We must understand how our students are faring as they progress through the educational system; and we must know what factors predict success or, alternatively, place students at risk.

In 2005, the Bill and Melinda Gates Foundation launched The Data Quality Campaign, a national effort aimed at improving the collection, availability and use of high-quality, statewide educational data systems. As their most recent report states, “good information is critical to both the processes and outcomes of a high-performing education system. . . . It is widely acknowledged that vital policy conversations now under way—conversations about increasing the rigor and relevance of high school, improving teacher quality, promoting higher graduation rates and reducing achievement gaps among student populations—cannot be successful unless they are informed by reliable longitudinal data.”

In Pennsylvania, a preK-16 single unit record data system will be critical to ensuring that the recommendations proposed by the Commission are having the intended effect. Such a system will allow us to track student performance over time within the preK-12 system and also allow us to determine how students fare in the postsecondary arena. Further, a comprehensive data system will enable the preK-12 and postsecondary sectors to share data, and to work together to identify challenges associated with increasing student achievement and develop solutions. The continual feedback on student performance will enable a rich dialogue on the definition of readiness, and ensure consistent expectations across high schools and colleges.

Whenever possible, all data and analysis should be made available at the student and classroom level for education leaders in order to effectively drive curriculum, instruction, professional development and student assessments. Such data must include estimates of value added, like those currently calculated by the Pennsylvania Value-Added Assessment System (PVASS). Using data to help improve teacher and school performance will be critical to identifying student needs and ensuring that all of Pennsylvania’s students reach proficiency.

The *Data Quality Campaign* finds the benefits of longitudinal data to include the ability to:

- follow students’ academic progress by grade;
- determine the value-added and effectiveness of specific programs;
- identify consistently higher-performing schools so that educators and the public can learn from best practices; and
- focus school systems on preparing a higher percentage of students to succeed in rigorous high school courses, college and challenging jobs.

The state of Pennsylvania has already developed and is implementing Pennsylvania SecureID, which provides a unique student identifier for every student in the state’s K-12 system, thanks in part to a \$4 million grant from the United States Department of Education. This system provides an excellent opportunity for the state to expand the use of a unique student identification number both downward to preschool and upward to the college level.

Recommendation 7

Identify early on those students in danger of falling behind in their achievement of academic standards. Provide additional instruction and support services to put those students back on track for success. This early warning system should begin no later than the sixth grade.

Every year in Pennsylvania, approximately one out of five high school students fails to graduate from the high school where they began four years ago. A 2005 study conducted by Johns Hopkins University and the Philadelphia Education Fund found that 6th grade behavior and academic performance are critical early indicators of dropout risk. Their research shows that 6th grade students, who do not attend school regularly, receive poor behavior marks, or fail math or English have no more than a 10% chance of graduating on time, and only a 20% chance of graduating one year late. Before students drop out, they will typically have multiple years of low-test scores, poor behavior and weak attendance—factors that affect not only those students, but also the schools that they attend.

Aligned with the commonwealth’s PASecureID education data management initiative, districts should be required to collect data on these clearly identified risk indicators to ensure that individualized interventions occur early with students who exhibit one or more of the dropout predictors noted above. This practice will help get these students back on track to reduce the dropout rate and will also have positive impacts on students’ test scores, attendance and behavior in school.

Identifying and helping low-performing students to get back on track is essential to ensure that all students meet more rigorous expectations for performance. Middle and high school literacy programs in Boston, Alabama, and other locations demonstrate the power of identifying problems and intervening early. Talent Development High Schools, begun in 1994 and being implemented in a number of districts, including Philadelphia, provide novel programs to 9th graders with the goal of building skills to move them on to 10th grade work on time. In another example of the kind of innovation we envision, the Luzerne County Academic Assessment Tracking System joins schools, colleges, and community organizations to both identify students having difficulty staying on track and link them to programs and services designed to improve achievement and retention.

The Commission recommends that school districts work to develop intervention models that are grounded in best practices, but are tailored to the individual needs of their students, families, and communities.

Recommendation 8

Take all necessary action and expend adequate resources to redefine the role of guidance counselors and student service coordinators as school-wide facilitators of student advising to ensure that all high school students are well advised in school concerning post-graduation expectations and how to transition successfully into both college and career.

In order for students to successfully navigate the more rigorous curriculum and transition to postsecondary education or career successfully, we must reconfigure and expand the roles and responsibilities of guidance counselors and other student support service providers, beginning in middle school, during 8th grade at the very latest. To achieve this goal, the state should revise the counselor preparation program guidelines to require more expertise in postsecondary advising, as well as in facilitating school-wide advising. The curriculum of school administrator training programs should be revised to reflect these new requirements as well.

Recognizing that too often the school counselor often plays multiple roles such as vice-principal, social worker, crisis manager, or therapist, the Commission firmly believes that other staff must be assigned to these roles, including the referral of students to outside social service providers. Counselors should instead serve as an educational professional focused specifically on advising students and faculty on postsecondary matters and connecting students to needed services and postsecondary experiences. Their specific duties should include:

- Ensuring that all students are proficient on the State Career and Work Standards
- Identifying and providing information to students on requirements and expectations of the postsecondary arena
- Facilitating the use of statistical information (students demographic information, performance data, etc.) to improve school programs and services
- Connecting students to internships, dual enrollment opportunities and other activities that encourage students to experience the postsecondary world while in high school
- Utilizing the state-required senior project as an opportunity for students to find out more about careers in which they are interested while giving real-world lessons about the education they are receiving

To achieve these goals, the Commission recommends providing high-level professional development opportunities for counselors, on both a statewide and local level, geared toward assisting and educating counselors in their roles as school-wide facilitators. Districts should be encouraged to work together in regions to do in-service training for counselors, as opposed to “fitting in” their counselor to district-wide teacher training. PDE should develop a website which provides information on high quality professional development.

Recommendation 9

Establish new regional alliances of business, high schools, and higher education institutions where necessary and more fully utilize existing alliances to address specific challenges in preparing students to be college and career ready. These challenges, perhaps unique to specific regions, will be overcome most effectively with local stakeholders working in concert with statewide efforts to achieve college and career readiness.

Developing and upgrading Pennsylvania's system of education to produce college-and career-ready high school graduates who can successfully transition to and complete postsecondary studies or technical training is a statewide responsibility that will require regional collaborations with business, industry and institutions of higher education. Such regional partnerships can yield considerable return on investment by:

- Providing relevant professional development related to core subjects
- Advising school boards, administrators and teachers about college and career expectations
- Infusing school curricula with innovative instructional practices and updated content in fast-changing fields such as science, technology, business and medicine
- Facilitating communication and joint activities between teachers and college faculty
- Serving as research dissemination hubs of effective practices and school planning
- Providing students with better-informed academic and career guidance as they undertake the exciting, but often confusing, transition to career and post-secondary education.
- Sharing student performance data
- Sustaining momentum for the high school redesign agenda laid out in these recommendations
- Creating college- and career-ready expectations in students as young as 8th grade

Pennsylvania's local Workforce Investment Boards (WIBs) and their associated Youth Councils are uniquely positioned to accelerate these regional efforts. Successful local business education partnerships, such as the Lehigh Valley Business/Education Partnership have also proven that they can produce effective results over the long haul. In Kentucky, the Prichard Committee has sustained momentum for the state's long-term educational improvement efforts for 20 years, and has made the state a leader in demonstrating how consistent business involvement can help sustain a specific educational policy agenda. There are several creative and effective partnership models in Pennsylvania that can serve as models of school improvement infrastructures. Examples include: Science In Motion, The Math/Science Partnership of Greater Philadelphia, and the Southwest Pennsylvania Math Science Partnership. These partnerships provide a mechanism for cost-effective sharing of expensive infrastructures, materials and resources. Such savings are especially important in vocational, engineering, and laboratory science education where the cost of owning and maintaining resources can be prohibitive to individual school districts. Learning from these examples, it is clear that the state should not mandate a single partnership model, but should instead ensure that all key stakeholders are involved in each regional partnership.

Recommendation 10

Increase and enhance the number of educational options available to high school students to achieve high standards with particular attention to career and technical education.

The Commission is acutely aware that while the expectations of performance for all high school graduates must be consistent, the pathways on which students proceed to develop the knowledge and skills necessary for college and career success may be very different. That is, the high school experience does not need to be the same for all students in order to ensure that they achieve rigorous standards. Students can and do learn in very different ways, and aligning students' needs with curricular options is a key element in ensuring that all students complete their high school education ready for college and career. The diverse needs of our students should be addressed through diverse strategies, but these strategies must all be linked together by the common thread of rigor. The development of model curricula, as presented in other recommendations in this report, should generate multiple creative and promising pathways for student success. Indeed, multiple pathways are essential if we are to not simply ensure increased rigor, but also increased graduation rates.

In addition to the various pathways that might exist in any high school, Pennsylvania's career and technical schools need to be positioned to help students to achieve rigorous academic standards aligned with the economic and workforce development priorities of their region and the commonwealth. Now, more than ever before, greater numbers of career and technical school graduates enroll in postsecondary education after completing their studies. We must ensure that all CTE graduates are prepared to enter college and are well prepared to meet the needs of the economy and able to earn family-sustaining salaries and wages directly upon graduation. Lehigh Career and Technical Institute provides us with an excellent model for replication.

As Gary Hoachlander discusses in *Ready for College and Career*, all Career and Technical schools must now prepare students for both college and work. They must weave "academics and technical education into coherent programs of comprehensive, demanding preparation for post-secondary education and career." Career and technical education opportunities are available to all students in Pennsylvania—and we must ensure that these reflect the kind of programming discussed by Hoachlander. In most cases, opportunities are provided to students on a part-time basis. Fewer students are enrolled in career and technical education at a full time or comprehensive technical school. The Commission believes that part time career and technical schools must work to assure that their students are taking rigorous academic courses at the home district while students at comprehensive schools are required to take rigorous academic courses taught as part of the comprehensive school curricula.

The opportunity to develop curricula joining traditional courses and subjects with applied and workplace learning, internships and co-op assignments holds great promise. However, the success of implementing more rigorous standards to ensure that all students are college and career ready will hinge on our ability to strengthen the capacity of career and technical schools.

Recommendation 11

Facilitate the coordination of existing, and the development of new, programs designed to encourage economically and educationally disadvantaged students to attend, be retained and complete their postsecondary education programs.

Over the past two decades, efforts to increase the number of students graduating from high school and moving on to college have had some partial success. This improvement, however, has not been uniform. *A Rising Tide: the Current State of Higher Education in Pennsylvania* (2006) finds that the enrollment in postsecondary education of students of color and for students living in rural areas has not grown at the same pace as for other students in Pennsylvania. Similarly, there are clear differences in participation rates by level of family income: the higher the income, the higher the participation rate. Students and their families need more and better information about postsecondary education to inform their decisions throughout middle and high school years.

Preparation for and knowledge of options for postsecondary education is essential for all students and their families so that their educational and career choices make sense. Currently, Pennsylvania's strategy has been to employ a patchwork of federal, state and non-profit initiatives to do this work. Local and regional GEAR UP programs work to put middle and high school age students on track for college success through comprehensive counseling and support. Project Forward Leap provides middle school students with on-campus academic experiences to raise their aspirations and skills for college success. The Pennsylvania Higher Education Assistance Agency's (PHEAA) Education Planner is a powerful online tool providing college and career information and financial planning. Pennsylvania's Act 101 Programs, on more than 80 campuses across the state, provide counseling and tutoring for educationally and economically disadvantaged students for more than 30 years. But the state needs to harness these multiple efforts into a single, coordinated strategy for ensuring that all students have the information and support that they need to make informed choices about life after high school graduation.

Beyond expectations, though, low-income students are often confronted by the insurmountable obstacle of affording college. To overcome this barrier, the state, in partnership with the Pennsylvania Higher Education Assistance Agency (PHEEA), needs to develop a strategy to close the affordability gap. *Measuring Up 2006* the extremely influential report issued annually by the National Center for Public Policy and Higher Education, gave Pennsylvania and 42 other states an "F" for affordability. It takes 35% of the average annual family income to cover the costs of attending one of the state system universities, Penn State, Temple and the University of Pittsburgh after accounting for financial aid (placing Pennsylvania 47th in the nation). In Pennsylvania, as across the country, students and their families are covering an increasing percentage of the costs of public higher education. While Pennsylvania, through PHEEA, funds one of the largest need-based student aid programs in the nation, the net cost of attendance to student and families continues to grow. Ensuring that students who least can afford higher education have access to resources to cover the costs of attendance must continue to be a priority.

Recommendation 12

Build systematic approaches to re-engage and re-enroll former dropouts in high-quality programming that yields a high school diploma and leads to college and career success. The Pennsylvania Department of Education should lead this statewide effort in cooperation with other relevant commonwealth agencies.

Each year thousands of Pennsylvania students leave high school without earning a diploma. Without this most basic educational credential, these young people will struggle to maintain self-sufficiency, and are unlikely to realize their potential as productive citizens. The commonwealth, too, will suffer in terms of lower productivity and higher social services costs. By any measure, the losses associated with the failure to graduate from high school are catastrophic for these young people, for the citizens of Pennsylvania and for the overall well being of the commonwealth.

Fortunately, increasing attention is now being focused on the dropout crisis, and on efforts to re-engage former dropouts in high-quality programming that enables them to earn a diploma and prepare for successful adulthood. In *Making Good on the Promise: What Policymakers Can Do to Support the Educational Persistence of Dropouts*, Jobs for the Future recommends that dropout recovery programs begin by focusing on providing the students they serve with access to the skills that are in demand in today's 21st century economy. The commonwealth is well-positioned to become a national leader in this area by taking a series of steps that can substantially increase the numbers of young people with a high school diploma. In particular, it can do this by:

- Creating a cross-agency work group, with representatives from Pennsylvania's Departments of Education, Labor and Industry, Public Welfare, Community and Economic Development, and other relevant agencies, to identify state policy issues that create barriers to re-enrollment, and consider new approaches that ease the transition back to school and/or to high-quality alternative educational programming.
- Creating data-sharing arrangements across agencies so that disconnected young people can be tracked within and across public agencies and coordinated efforts at re-engagement and re-connection can be made efficiently and effectively.
- As a first step, focusing on high schools with the lowest graduation rates. Through its annual data collection efforts the Department of Education can identify graduation rates by high school, and should develop and help local districts to put in place a set of research-based strategies to improve them.
- Continuing to expand support for Project 720 and Dual Enrollment, particularly as they promote efforts to support struggling students and to re-engage out-of-school youth into programs.

Conclusion

Over the past 20 years, while America was busy focusing on other priorities, our economy changed substantially. Globalization, the rapid diffusion of ever-evolving technology, and rising educational levels around the world have all meant new roles for American workers, including those in Pennsylvania. In fact, we have moved beyond the Information Age to an era that can best be described as the Conceptual Age. To be successful, whether as individuals or as a commonwealth, today's new workers need to be nimble, with high-level skill-sets and the capacity to take on complex challenges. They must compete with the best and the brightest from around the world in Asia, India, and Europe. Unfortunately, these aren't the workers we are currently educating in the vast majority of Pennsylvania's schools. Walk into any high school. Chances are you will see an education system that is a mirror image of what high school was like 30 years ago. Even though many of our high schools do an excellent job at what they were designed to do in the 1950s, 60s and 70s, they are fulfilling the needs of yesterday's economy.

Such is the harsh reality that the Commission confronted time and again over the course of its work. Yet we remain hopeful, because not only have we seen high schools that are successful models of what all of our high schools need to be, but also because we are confident in the understanding we have reached about what needs to be done to get all of our high schools there. Taken together the recommendations of this Commission mean dramatic changes to the high school experience in Pennsylvania. Accomplishing even the first recommendation would be a significant step towards guaranteeing the college and career success of all of the state's students. However, if we are truly serious about transforming the high school experience for all students, we believe it is necessary to implement all 12 recommendations and to do so with a high degree of fidelity. Increasing rigor, expectations and supports will create a high challenge, high support environment in all of our high schools, where all of our students can succeed.

Fundamentally redesigning the high school experience in Pennsylvania will be difficult. It will require the collaboration of teachers, administrators, parents, students, policymakers, college faculty and employers. It will require even greater leadership from a Governor and Legislature who have already shown commitment to educational reform. And it will require that every citizen in this commonwealth recommit to providing every student in Pennsylvania with the best education possible. Failing to do so will not only foreclose opportunities for a living wage for our workforce; it will erode our overall competitiveness for jobs, sap our future tax base and thus diminish resources for every other vital government service from healthcare for the aged to rebuilding local infrastructure. But it can be done.

Every Pennsylvania student must graduate from high school college- and career-ready if our commonwealth's economy is to fulfill its promise. And it is our collective responsibility to make sure that happens. As teachers, administrators, students, legislators and most of all as Pennsylvanians, this Commission is confident in our ability to create high schools capable of offering the best in education to not just a select few, but to everyone. We hope that you will join us in this commitment.

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Appendix A.

Executive Order

**COMMONWEALTH OF PENNSYLVANIA
GOVERNOR'S OFFICE
EXECUTIVE ORDER**

Subject: **Commission on College and Career Success**
Date: **August 10, 2005**

Number: **2005-06**
By Direction of: **Edward G. Rendell, Governor**

WHEREAS, the education of all children is a moral and economic development priority for the Commonwealth of Pennsylvania; and

WHEREAS, for every 100 ninth graders in Pennsylvania only 77 graduate on time, 47 enroll in college after graduation and only 28 receive degrees; and

WHEREAS, the Commonwealth is one of only six states in the nation that fails to establish uniform graduation requirements for high school students; and

WHEREAS, the Commonwealth 46th among the states in its percentage of residents who have more than a high school diploma; and

WHEREAS, a high school graduate earns more than three times as much as a Pennsylvanian who does not graduate high school, and a college graduate earns nearly double the amount as a high school graduate earns; and

WHEREAS, the Commonwealth desires to prepare a citizenry and workforce of world-class quality that will enable industry to grow in Pennsylvania; and

WHEREAS, the Commonwealth's enacted 2005-06 Budget takes important strides in transforming Pennsylvania's high schools by providing \$4.7 million for the Project 720 High School Reform Initiative, \$5 million for dual enrollment and \$66 million for tutoring – much of which is focused on grades 7-12; and

NOW, THEREFORE, I, Edward G. Rendell, Governor of the Commonwealth of Pennsylvania, by virtue of the authority vested in me by the Constitution of the Commonwealth of Pennsylvania and other laws, do hereby establish the Commission on College and Career Success (hereinafter referred to as "Commission") as hereinafter set forth:

1. Purpose. The Commission shall:

- a. Undertake a comprehensive review of the Commonwealth's laws, regulations and policies to ascertain whether they set clear and consistent expectations for high school success to ensure that all students graduate ready for college and careers.
- b. Conduct qualitative and quantitative research, which includes Pennsylvania, national and international studies.
- c. Encourage and endorse strategies for school districts to increase academic achievement and graduation rates in high school.
- d. Encourage and endorse strategies for higher education to increase retention through the first two years of post-secondary education.
- e. Produce a final report that includes recommendations for any necessary changes to legislation, regulations and policies consistent with the mission of the Commission.

2. Responsibilities. The Commission shall:

- a. Define "college and career ready" in Mathematics, English, and Science.
- b. Examine and make specific recommendations for better alignment of academic standards and assessments across the secondary and post-secondary educational sectors as well as industry in Pennsylvania.
- c. Encourage local school districts to adopt a core high school curriculum for all Pennsylvania students.
- d. Present to the Governor a legislative and regulatory package that would address the needs outlined in their findings.
- e. Investigate policies and programs that ensure a higher number of prepared students enter and remain in our colleges and universities.

3. Composition and Appointments.

- a. The Commission's members shall be appointed by the Governor unless otherwise noted and shall consist of a wide spectrum of stakeholders that include the following:
 - (1) The Governor.
 - (2) The Secretary of Education.

(3) Three members of the State Board of Education, one of whom shall serve as vice-chair of the Commission.

(4) Three representatives of Pennsylvania higher education institutions, one of whom shall serve as co-chair of the Commission.

(5) Three representatives of the business community, one of whom shall serve as co-chair of the Commission.

(6) One local superintendent.

(7) One local high school teacher or principal.

(8) One member of a local board of school directors.

(9) Two members appointed by the Senate, one appointed by the Majority Leader of the Senate and one appointed by the Minority Leader of the Senate.

(10) Two members appointed by the House of Representatives, one appointed by the Majority Leader of the House of Representatives and one appointed by the Minority Leader of the House of Representatives.

b. A Commission member may designate an alternant to attend meetings.

c. Commission work groups, appointed by the Commission chairs and composed of select members of the Commission and others, will conduct work as designated by the Commission with the assistance of Pennsylvania Department of Education staff and consultants. Work groups and consultants will help facilitate key sessions, conduct necessary research and issue a final report. The topics and tasks of workgroups will be identified by the Commission.

d. The Pennsylvania Department of Education shall provide administrative support to the Commission.

e. A Commission member may designate an alternate to attend Commission meetings, if required.

4. Terms of membership.

a. Members of the Commission shall serve at the pleasure of the Governor.

b. Should a vacancy occur on the Commission due to resignation, disability, or death of a member, the Governor or other appointing authority, as applicable, should appoint a successor as expeditiously as possible.

5. Compensation. Members of the Commission shall receive no compensation for their services, except that members may be reimbursed for actual travel and related expenses in accordance with Commonwealth travel and subsistence policies.

6. Reports. The Commission shall issue a report containing a summary of its progress and recommendations for legislation, regulations and secondary and post-secondary policies in Pennsylvania. A preliminary report shall be produced no later than May 1, 2006, and a final report shall be produced no later than December 31, 2006.

7. Executive Agencies. All agencies under the Governor's jurisdiction shall provide assistance to the Commission as requested by the Chair(s).

8. Duration. This Executive Order shall be effective immediately.

9. Termination Date. This Executive Order shall continue in force for 18 months

Appendix B.

Commission Members

Commission on College and Career Success

Dr. Judy G. Hample (Co-Chair)
Chancellor
Pennsylvania State System of Higher Education

Mr. Daniel Fogarty (Co-Chair)
Director, Salaried Personnel and Development
Carpenter Technology Corporation

Mr. Karl R. Girton (Vice-Chair)
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Dr. Karen S. Angello
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Superintendent
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Mr. Jermaine Beaumont
Student Representative
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Ms. Joan Benso
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PA Partnerships for Children

Dr. Jerry Bourdeaux
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Dr. Jeremy Cohen
Associate Vice President and
Senior Associate Dean for
Undergraduate Education
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The Honorable Donna Cooper
Secretary of Planning and Policy
Office of the Governor

Ms. Pamela Crawley
Senior Vice President
Director of Public Affairs
Citizens Bank

The Honorable Frank Dermody
House of Representatives
Commonwealth of Pennsylvania

The Honorable Wayne Fontana
Senate of Pennsylvania
Commonwealth of Pennsylvania

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Council of Higher Education

Dr. Lorraine M. Mulfinger
Associate Professor and Director
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Juniata College

**The Honorable Michael Nutter
Councilman
Philadelphia City Council**

**The Honorable Bernard O'Neill
House of Representatives
Commonwealth of Pennsylvania**

**The Honorable James J. Rhoades
Senate of Pennsylvania
Commonwealth of Pennsylvania**

**Ms. Irene Runco
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**Ms. Rosie Saez
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Wachovia Bank**

**The Honorable Gerald Zahorchak
Secretary
Pennsylvania Department of Education**

Associate Participants

**Mr. Fred Dedrick
Executive Director
Pennsylvania Workforce Investment Board**

**Dr. Peter H. Garland
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Pennsylvania State System of Higher Education**

**Ms. Jamie Olson
Executive Policy Specialist
Pennsylvania Department of Education**

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Joe Bard
Executive Director
PA Association of Rural & Small Schools

James E. Barker
Superintendent
Erie City School District

William J. Bartle
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Lehigh Valley Business/Education Partnership

Joan Benso
President and CEO
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Professor, English Department
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Councilman
Philadelphia City Counsel**

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State Board of Education**

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Professor
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Audra Utley, Superintendent
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Eric R. White
Director of Undergraduate Studies
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Chester M. Winters, CISA, CPIM, CAM, CHS-II
Vice President – Director Security Services Division
WorldNet Technology Consultants, A Core BTS Company

Appendix C.

Presenters at Commission Meetings

Dr. Michael Cohen, President, Achieve, Inc.

Dr. Robert Feir, Executive Director, Governor's Commission on Training America's Teachers, and former Executive Director of the State Board of Education

Mr. Michael Golden, Deputy Secretary, Office of Educational Technology, Pennsylvania Department of Education

Dr. Kenneth C. Gray, Professor of Education, The Pennsylvania State University

Dr. Katie Haycock, Executive Director of the Education Trust

Dr. Gary Hoachlander, MPR Associates, Inc.

Mr. Raymond McNulty, Senior Consultant at International Center for Leadership in Education and Executive Director of the Successful Practices Network

Dr. Lorraine Mulfinger, Associate Professor and Director for Science Outreach at Juniata College and a member of the Governor's Commission on College and Career Success

Dr. Shula Nedley, Bureau of Assessment and Accountability, Office of Elementary and Secondary Education, Pennsylvania Department of Education

Dr. Amy Hodges Slamp, Assistant to the Superintendent, Elizabethtown Area School District, and former Director of Teaching and Learning, Pennsylvania Department of Education

Ms. Jan Somerville, Staff Officer, National Association of System Heads

Dr. Adria Steinberg, Associate Vice President, Jobs for the Future

Dr. Laurence Steinberg, Professor of Psychology at Temple University

Mr. David Wakelyn, Senior Policy Analyst, National Governor's Association

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Appendix E.

140 faculty members who teach freshmen at these 30 Pennsylvania colleges and universities created and reviewed the College and Career Essentials in English and Mathematics

Arcadia University
Butler County Community College
Bryn Mawr College
Community College of Allegheny County
Community College of Philadelphia
California University of Pennsylvania
Carnegie Mellon University
Drexel University
East Stroudsburg University
Edinboro University
Geneva College
Harrisburg Community College
Holy Family University
Juniata College
LaRoche College
LaSalle University
Lehigh Carbon Community College
Lockhaven University
Mansfield University
Montgomery County Community College
Northampton Community College
Pennsylvania Highlands Community College
Pennsylvania State University
St. Francis University
St. Vincent University
Shippensburg University
Slippery Rock University
University of Pittsburgh
Villanova University
West Chester University

These Corporations, Business Associations and Unions helped to create and edit the Pennsylvania College and Career Essentials in English and Mathematics.

1199C (Health Care Worker's Union)
Allied Personnel Services
AmeriCold Logistics-Bethlehem
Barry Isett & Associates, Inc
ESSROC Cement
Good Shepherd Rehabilitation Network
Greater Hotel Restaurant Association
Guardian Life Insurance
The Hartford
Lafayette Ambassador Bank
Lehigh Valley Workforce Investment Board, Inc
Lockheed Martin
Nestle Purina PetCare North America
PPL Corporation
Philadelphia Academies, Inc.
PECO
Right Management Consultants
Subaru
Sunoco

Appendix F.

Pennsylvania's College and Career Essentials in English and Mathematics	
PA Benchmarks: English	
A. Language – The high school graduate can:	
A1.	Demonstrate control of standard English conventions for punctuation, capitalization, spelling and sentence structure.
A2.	Use general and specialized dictionaries, thesauruses and glossaries (print and electronic) to determine the definition, pronunciation, etymology, spelling and usage of words.
A3.	Use roots, affixes, cognates to determine the meaning of unfamiliar words.
A4.	Use context to determine the meaning of unfamiliar words.
A5.	Identify literary, classical and biblical allusions as well as the meaning of common idioms; use them in oral and written communication.
A6.	Recognize nuances in the meanings of words; choose words precisely to enhance communication.
A7.	Comprehend and communicate quantitative, technical and mathematical information.
B. Communication – The high school graduate can:	
B1.	Give and follow spoken instructions to perform specific tasks, to answer questions or to solve problems.
B2.	Listen to information and ideas presented orally, for example, speeches, debates, lectures, dramatic presentations, meetings, briefings, oral readings, in order to: B6.1. Summarize

B6.2. Paraphrase
B6.3. Analyze
B6.4. Critique
B3. Identify the thesis or proposition of a speech and determine the essential elements that elaborate it.
B4. Analyze the ways in which the style and structure of a speech support or confound its meaning or purpose.
B5. Make oral presentations that <ul style="list-style-type: none"> B6.1. Exhibit a logical structure appropriate to the audience, context and purpose B6.2. Group related ideas and maintain a consistent focus B6.3. Include smooth transitions B6.4. Support judgments with sound evidence and well-chosen details B6.5. Make skillful use of rhetorical devices B6.6. Provide a coherent conclusion B6.7. Employ proper eye contact, speaking rate, volume, enunciation, inflection and gestures to communicate ideas effectively
B6. Participate productively in self-directed work teams for a particular purpose (for example, to interpret literature, write or critique a report, solve a problem, make a decision), including: <ul style="list-style-type: none"> B6.1. Posing relevant questions B6.2. Listening with civility to the ideas of others B6.3. Taking relevant notes B6.4. Extracting essential information from others' input B6.5. Building on the ideas of others and contributing relevant information or ideas in group discussions B6.6. Consulting texts as a source of ideas B6.7. Gaining the floor in respectful ways

B6.8. Defining individuals' roles and responsibilities and setting clear goals
B6.9. Acknowledging the ideas and contributions of individuals in the group
B6.10. Understanding the purpose of the team project and the ground rules for decision-making
B6.11. Maintaining independence of judgment, offering dissent courteously, ensuring a hearing for the range of positions on an issue and avoiding premature consensus
B6.12. Tolerating ambiguity and a lack of consensus
B6.13. Selecting a leader/spokesperson when necessary
C. Reading – The high school graduate can:
C1. Demonstrate fluency in the oral and silent reading of everyday texts that adults encounter
C2. Choose a stance toward the text according to the reader's purpose and the genre of the text.
C3. Adjust reading strategies according to reading purpose and the demands of the text
C4. Engage in reading, writing and speaking as interconnected processes.
C5. Construct a close reading, in writing, of a passage by paying attention to its language, syntax, tone and context
C6. Identify and define a text's key terms and concepts as the writer uses them throughout the essay
C7. Examine a text's ideas and examples in relation to personal experience or other texts (print or electronic media)
C8. Ask critical questions about the ideas, examples and assumption of a text.
D. Writing – The high school graduate can:
D1. Plan writing by taking notes, writing informal outlines and researching.
D2. Select and use formal, informal, literary or technical language appropriate for

the purpose, audience and context of the communication.
<p>D3. Organize ideas in writing with</p> <p>D10.1. An introduction that presents a thesis statement, research question or project statement</p> <p>D10.2. Well-developed body paragraphs or sections arranged in a logical order</p> <p>D10.3. A conclusion</p> <p>D10.4. Transitional sentences or elements to create a coherent whole</p>
<p>D4. Drawing on readers' comments on working drafts, revise documents to develop or support ideas more clearly, address potential objections, ensure effective transitions between paragraphs and correct errors in logic.</p>
<p>D5. Proofread and edit one's own work and the work of others for</p> <p>D10.1. Grammar</p> <p>D10.2. Style and tone appropriate to audience and purpose</p> <p>D10.3. Context</p>
<p>D6. Use sources responsibly and ethically:</p> <p>D10.1. Cite print or electronic sources properly when quoting, paraphrasing, or summarizing</p> <p>D10.2. Document sources using a bibliography, list of references or works cited</p>
<p>D7. Determine how, when and whether to employ technologies (such as computer software, photographs and video) in lieu of, or in addition to, written communication.</p>
<p>D8. Present written material using basic software programs (such as Word, Excel and PowerPoint) and graphics (such as charts, ratios and tables) to present information and ideas best understood visually.</p>
<p>D9. Write an academic essay (for example, a literary analysis, or critical argument) that:</p> <p>D10.1. Develops a thesis or sets up a project</p> <p>D10.2. Creates an organizing structure appropriate to purpose, audience and</p>

context
<p>D10.3. Includes relevant information and excludes extraneous information</p> <p>D10.4. Makes valid inferences</p> <p>D10.5. Uses relevant graphics (e.g., maps, charts, graphs, tables, illustrations, photographs) and formatting techniques (e.g., headings, graphics) to aid reader understanding</p> <p>D10.6. Supports judgments with relevant and substantial evidence and well-chosen details from primary and secondary materials</p> <p>D10.7. Cites sources correctly and documents quotations, paraphrases and other information using a standard format</p> <p>D10.8. Provides a coherent conclusion</p>
<p>D10. Produce work-related texts (for example, memos, e-mails, correspondence, project plans, work orders, proposals, bios, and resumes) that:</p> <p>D10.1. Address audience needs, stated purposes and context</p> <p>D10.2. Translate technical language into non-technical English</p> <p>D10.3. Include relevant information and exclude extraneous information</p> <p>D10.4. Use appropriate strategies, such as providing facts and details, describing or analyzing the subject, explaining benefits or limitations, comparing or contrasting, and providing a scenario to illustrate</p> <p>D10.5. Anticipate potential problems, mistakes and misunderstandings that might arise for the reader</p> <p>D10.6. Create predictable structures through the use of headings, white space and graphics, as appropriate</p> <p>D10.7. Adopt a customary format, including proper salutation, closing and signature, when appropriate</p>
<p>E. Research – The high school graduate can:</p>
<p>E1. Define and narrow a research problem/project and identify the audience.</p>
<p>E2. Locate, gather and organize relevant information from a variety of print and electronic sources, as well as from direct observation, interviews and surveys.</p>

E3. Use key words, Boolean operators, and advanced search protocols to locate information from electronic databases, indices, data sets and other reference materials.
E4. Make distinctions about the credibility, reliability, consistency, strengths and limitations of resources, including information gathered from Web sites.
E5. Report findings within prescribed time and/or length requirements, as appropriate, using various forms of media.
E6. Write an extended research essay or report (approximately 6 to 10 pages), building on primary and secondary sources, that <ul style="list-style-type: none"> E6.1. marshals evidence to address a research question, support a clear thesis and related claims, or carry out a stated project E6.2. paraphrases and summarizes with accuracy and fidelity the range of arguments and evidence pertinent to the research project, as appropriate E6.3. synthesizes materials from sources and original ideas E6.4. cites sources correctly and documents quotations, paraphrases, and other information using a standard format E6.5. develop a set of reasonable conclusions from the research and justify your choices.
F. Logic – The high school graduate can:
F1. Distinguish among facts and opinions, evidence and inferences.
F2. Identify false premises in an argument.
F3. Describe the structure of a given argument; identify its claims and evidence; evaluate connections among evidence, inferences and claims.
F4. Evaluate the range and quality of evidence used to support or oppose an argument or position.
F5. Recognize common logical fallacies, such as the appeal to pity (argumentum ad misericordiam), the personal attack (argumentum ad hominem), the appeal to common opinion (argumentum ad populum) and the false dilemma (assuming only two options when there are more options available); understand why these

fallacies do not prove the point being argued.
F6. Analyze and critique written or oral communications for false assumptions, errors, loaded terms, caricature, sarcasm, leading questions and faulty reasoning.
F7. Understand the distinction between a deductive argument (where, if the premises are all true and the argument’s form is valid, the conclusion is inescapably true) and inductive argument (in which the conclusion provides the best or most probable explanation of the truth of the premises, but is not necessarily true).
F8. Analyze two or more texts addressing the same topic to determine how authors reach similar or different conclusions.
F9. Construct arguments (both orally and in writing) that: <ul style="list-style-type: none"> F9.1. Develop a thesis that demonstrates clear and knowledgeable judgment F9.2. Structure ideas in a sustained and logical fashion F9.3. Use a range of strategies to elaborate and persuade, such as descriptions, anecdotes, case studies, analogies and illustrations F9.4. Clarify and defend positions with precise and relevant evidence, including facts, expert opinions, quotations and/or expressions of commonly accepted beliefs and logical reasoning F9.5. Anticipate and address the reader’s concerns and counterclaims F9.6. Provide clear and effective conclusions
G. Informational Text – The high school graduate can:
G1. Follow instructions in informational or technical texts to perform specific tasks, answer questions and/or predict and solve problems.
G2. Identify the main ideas of informational text and determine the essential elements that elaborate them.
G3. Summarize informational and technical texts, reflect on what is read or heard and explain the visual components that support the text.
G4. Distinguish between a summary and a critique.
G5. Interpret and use information in maps, charts, graphs, time lines, tables and

diagrams.
G6. Identify interrelationships between and among ideas and concepts within a text, such as cause-and-effect relationships.
G7. Synthesize information from multiple informational and technical sources.
G8. Draw conclusions based on evidence from informational and technical texts.
G9. Analyze the ways in which a text’s organizational structure supports or confounds its meaning or purpose.
G10. Recognize the use or abuse of ambiguity, contradiction, paradox, irony, incongruities, overstatement and understatement in text and explain their effect on the reader.
G11. Evaluate and critique informational and technical texts and public documents for their clarity, simplicity and coherence and for the appropriateness of their graphics and visual appeal.
H. Media – The high school graduate can:
H1. Evaluate the aural, visual and written images and other special effects used in television, radio, film, the Internet, and other media for their ability to inform, persuade and entertain (for example, anecdote, expert witness, vivid detail, tearful testimony, humor and other strategies).
H2. Examine the intersections and conflicts between the visual (such as media images, painting, film and graphic arts) and the verbal.
H3. Recognize how visual and sound techniques or design (such as special effects, camera angles and music) carry or influence messages in various media.
H4. Apply and adapt the principles of written composition by creating coherent media productions using effective images, text, graphics, music and/or sound effects — if possible — and present a distinctive point of view on a topic (for example, PowerPoint presentations, videos).
I. Literature – The high school graduate can:
I1. Demonstrate knowledge of 18th and 19th century foundational works of American literature.

I2.	Analyze foundational U.S. documents for their historical and literary significance (for example, The Declaration of Independence, the Preamble to the U.S. Constitution, the letters of John and Abigail Adams, Thomas Jefferson’s <i>Notes on the State of Virginia</i> , Abraham Lincoln’s “Gettysburg Address,” <i>Black Elk Speaks</i> , Martin Luther King’s “Letter from Birmingham Jail”).
I3.	Interpret significant works from various forms of literature: poetry, novel, biography, short story, essay and dramatic literature; use understanding of genre characteristics and figurative language (e.g. imagery, metaphor, symbol, allusion, irony, understatement) to make deeper and subtler interpretations of the meaning of the text.
I4.	Develop a knowledge of and analyze world literature, regional American literature and literature by women and people of color in the United States.
I5.	Analyze the setting, plot, theme, tone, style, characterization and narration of classic and contemporary short stories and novels.
I6.	Demonstrate knowledge of metrics, rhyme scheme, rhythm, organizational structure, alliteration, diction and other formal conventions of verse in poetry.
I7.	Identify how elements of dramatic literature (for example, dramatic irony, soliloquy, stage direction and dialogue) and articulate a playwright’s vision.
I8.	Analyze works of literature for what they suggest about the historical period in which they were written.
I9.	Analyze the moral dilemmas in works of literature, as revealed by characters’ motivation.
I10.	Identify and explain the themes found in a single literary work; analyze the ways in which writers develop similar themes in more than one literary work.

PA Benchmarks: Mathematics

Certain mathematics benchmarks are marked with an asterisk (*). These asterisked benchmarks represent content that is recommended for all students, but is required for those students who plan to take calculus in college, a requisite for mathematics and many mathematics intensive majors.

J. Number Sense and Numerical Operations - The high school graduate can:

<p>J1. Compute with rational numbers fluently and accurately without a calculator:</p> <ul style="list-style-type: none"> J4.1. Add, subtract, multiply and divide integers, fractions and decimals. J4.2. Calculate and apply ratios, proportions, rates and percentages to solve problems. J4.3. Use the correct order of operations to evaluate arithmetic expressions, including those containing parentheses, exponents and scientific notation. J4.4. Explain and apply basic number theory concepts such as prime number, factor, divisibility, least common multiple and greatest common divisor. J4.5. Multiply and divide numbers expressed in scientific notation. J4.6. Use and/or describe the concept of unit rate, ratio and slope in the context of rate of change.
<p>J2. Recognize and apply magnitude (absolute value) and ordering of real numbers:</p> <ul style="list-style-type: none"> J4.1. Locate the position of a number on the number line, know that its distance from the origin is its absolute value and know that the distance between two numbers on the number line is the absolute value of their difference. J4.2. Determine the relative position on the number line of numbers and the relative magnitude of numbers expressed in fractional form, in decimal form, as roots or in scientific notation. J4.3. Estimate the value of irrational numbers. J4.4. Distinguish between and order rational and irrational numbers.
<p>J3. Understand that to solve certain problems and equations, number systems need to be extended from whole numbers to the set of all integers (positive, negative and zero), from integers to rational numbers, from rational numbers to real numbers (rational and irrational numbers) and from real numbers to complex numbers; define and give examples of each of these types of numbers.</p>
<p>J4. Understand the capabilities and the limitations of calculators and computers in solving problems:</p> <ul style="list-style-type: none"> J4.1. Use calculators appropriately and make estimations without a calculator regularly to detect potential errors.

- J4.2. Use scientific and graphing calculators and computer spreadsheets to organize and analyze data.
- J4.3. Select and use appropriate strategies to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.
- J4.4. Construct and manipulate geometric figures using dynamic geometry tools (e.g., Geometer's Sketchpad, Cabri Geometre).
- J4.5. *Use graphing calculators to display periodic and circular functions; describe properties of the graphs.

K. Algebra - The high school graduate can:

- K1. Perform basic operations on algebraic expressions fluently and accurately:
 - K3.1. Understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions.
 - K3.2. *Understand the properties of rational exponents and apply these properties to simplify algebraic expressions.
 - K3.3. Add, subtract and multiply polynomials; divide a polynomial by a low degree polynomial.
 - K3.4. Factor polynomials by removing the greatest common factor; factor quadratic polynomials.
 - K3.5. Add, subtract, multiply, divide and simplify rational expressions.
 - K3.6. Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables.
 - K3.7. *Derive and use the formulas for the general term and summation of finite arithmetic and geometric series; find the sum of an infinite geometric series whose common ratio, r , is in the interval $(-1, 1)$.
- K2. Understand functions, their representations and their properties:
 - K3.1. Recognize whether a relationship given in symbolic or graphical form is a function

<p>K3.2. Determine the domain and range of a function represented in either symbolic or graphical form.</p>
<p>K3.3. Understand functional notation and evaluate a function at a specified point in its domain.</p> <p>K3.4. *Combine functions by composition, as well as by addition, subtraction, multiplication and division.</p> <p>K3.5. *Identify whether a function has an inverse and when functions are inverses of each other; explain why the graph of a function and its inverse are reflections of one another over the line $y = x$.</p> <p>K3.6. *Know the inverse of an exponential function is a logarithm, prove basic properties of a logarithm using properties of its inverse and apply those properties to solve problems.</p> <p>K3.7. Represent functional relationships in tables, charts and graphs.</p> <p>K3.8. Create and interpret functional models.</p> <p>K3.9. Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).</p> <p>K3.10. Analyze and categorize functions by their characteristics.</p> <p>K3.11. Determine maximum and minimum values of a function over a specified interval.</p> <p>K3.12. Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.</p> <p>K3.13. Estimate areas under curves using sequences of areas.</p> <p>K3.14. Interpret maximum and minimum values in problem situations.</p> <p>K3.15. *Analyze and categorize functions by their characteristics (e.g. linear, polynomial, rational, trigonometric, exponential, logarithmic).</p>
<p>K3. Apply basic algebraic operations to solve equations and inequalities:</p> <p>K3.1. Solve linear equations and inequalities in one variable including those involving the absolute value of a linear function.</p> <p>K3.2. Solve an equation involving several variables for one variable in terms of the others.</p> <p>K3.3. Solve systems of two linear equations in two variables.</p>

<p>K3.4. *Solve systems of three linear equations in three variables.</p>
<p>K3.5. Identify whether systems of equations and inequalities are <i>consistent</i> or <i>inconsistent</i></p> <p>K3.6. Solve linear, quadratic and exponential equations in one variable both symbolically and graphically.</p>
<p>K4. Graph a variety of equations and inequalities in two variables, demonstrate understanding of the relationships between the algebraic properties of an equation and the geometric properties of its graph, and interpret a graph:</p> <p>K7.1. Graph a linear equation and demonstrate that it has a constant rate of change.</p> <p>K7.2. Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.</p> <p>K7.3. Understand the relationship between the coefficients of a linear equation and the slope and x- and y-intercepts of its graph.</p> <p>K7.4. Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.</p> <p>K7.5. Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.</p> <p>K7.6. Understand the relationship between a solution of a system of two linear equations in two variables and the graphs of the corresponding lines.</p> <p>K7.7. Graph the solution set of a linear inequality and identify whether the solution set is an open or a closed half-plane; graph the solution set of a system of two or three linear inequalities.</p> <p>K7.8. Graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of its graph.</p> <p>K7.9. *Graph ellipses and hyperbolas whose axes are parallel to the x and y axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.</p> <p>K7.10. *Use equations to represent curves (e.g., circles, ellipses, parabolas, hyperbolas).</p>

K7.11. Graph exponential functions and identify their key characteristics.

K7.12. Read information and draw conclusions from graphs; identify properties of a graph that provide useful information about the original problem.

K5. Solve problems by converting the verbal information given into an appropriate mathematical model involving equations or systems of equations; apply appropriate mathematical techniques to analyze these mathematical models; and interpret the solution obtained in written form using appropriate units of measurement:

- K7.1. Recognize and solve problems that can be modeled using a linear equation in one variable, such as time/rate/distance problems, percentage increase or decrease problems, and ratio and proportion problems.
- K7.2. Recognize and solve problems that can be modeled using a system of two equations in two variables, such as mixture problems.
- K7.3. Recognize and solve problems that can be modeled using a quadratic equation, such as the motion of an object under the force of gravity.
- K7.4. Recognize and solve problems that can be modeled using an exponential function, such as compound interest problems.
- K7.5. *Recognize and solve problems that can be modeled using an exponential function but whose solution requires facility with logarithms, such as exponential growth and decay problems.
- K7.6. Recognize and solve problems that can be modeled using a finite geometric series, such as home mortgage problems and other compound interest problems.

K6. *Understand the binomial theorem and its connections to combinatorics, Pascal's triangle and probability.

K7. *Matrices

- K7.1. *Use matrices to organize and manipulate data, including matrix addition, subtraction, multiplication and scalar multiplication.
- K7.2. *Analyze and explain systems of matrices.
- K7.3. *Formulate matrices to model routine and non-routine problem

situations.

L. Geometry - The high school graduate can:

L1. Understand the different roles played by axioms, definitions and theorems in the logical structure of mathematics, especially in geometry:

L12.1. Identify, explain the necessity of and give examples of definitions, axioms and theorems.

L12.2. State and prove key basic theorems in geometry such as the Pythagorean theorem, the sum of the angles of a triangle is 180 degrees, and the line joining the midpoints of two sides of a triangle is parallel to the third side and half its length.

L12.3. Recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true.

L12.4. Model situations geometrically to formulate and solve problems.

L2. Identify and apply the definitions related to lines and angles and use them to prove theorems in (Euclidean) geometry, solve problems, and perform basic geometric constructions using a straight edge and compass:

L12.1. Identify and apply properties of and theorems about parallel lines and use them to prove theorems such as two lines parallel to a third are parallel to each other and to perform constructions such as a line parallel to a given line through a point not on the line.

L12.2. Identify and apply properties of and theorems about perpendicular lines and use them to prove theorems such as the perpendicular bisectors of line segments are the set of all points equidistant from the two end points and to perform constructions such as the perpendicular bisector of a line segment.

L12.3. Identify and apply properties of and theorems about angles and use them to prove theorems such as two lines are parallel exactly when the alternate interior angles they make with a transversal are equal and to perform constructions such as the bisector of an angle

L12.4. Draw, label, measure and list the properties of complementary, supplementary and vertical angles

L12.5. Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles).

<p>L3. Know the basic theorems about congruent and similar triangles and other polygons and use them to prove additional theorems and solve problems.</p>
<p>L4. Know the definitions and basic properties of a circle and use them to prove basic theorems and solve problems.</p> <p>L12.1. *Use the properties of angles, arcs, chords, tangents and secants to solve problems involving circles.</p> <p>L12.2. *Solve problems involving inscribed and circumscribed polygons.</p> <p>L12.3. Identify and/or use properties of triangles (e.g., medians, altitudes, angle bisectors, side/angle relationships, Triangle Inequality Theorem).</p> <p>L12.4. Recognize and/or apply properties of angles, triangles and quadrilaterals.</p> <p>L12.5. Identify and/or use properties of quadrilaterals (e.g., parallel sides, diagonals, bisectors, congruent sides/angles and supplementary angles).</p> <p>L12.6. Identify and/or use properties of isosceles and equilateral triangles</p>
<p>L5. Apply the Pythagorean theorem, its converse and properties of special right triangles to solve problems.</p>
<p>L6. Use rigid motions (compositions of reflections, translations and rotations) to determine whether two geometric figures are congruent and to create and analyze geometric designs.</p>
<p>L7. Know about the similarity of figures and use the scale factor to solve problems.</p>
<p>L8. Know that geometric measurements (length, area, perimeter, volume) depend on the choice of a unit and that measurements made on physical objects are approximations; calculate the measurements of common plane and solid geometric figures:</p> <p>L12.1. Understand that numerical values associated with measurements of physical quantities must be assigned units of measurement or dimensions; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert a measurement using one unit of measurement to another unit of measurement.</p>

<p>L12.2. Determine the perimeter of a polygon and the circumference of a circle; the area of a rectangle, a circle, a triangle and a polygon with more than four sides by decomposing it into triangles; the surface area of a prism, a pyramid, a cone and a sphere; and the volume of a rectangular box, a prism, a pyramid, a cone and a sphere.</p> <p>L12.3. Know that the effect of a scale factor k on length, area and volume is to multiply each by k, k^2 and k^3, respectively.</p>
<p>L9. Visualize solids and surfaces in three-dimensional space when given two-dimensional representations (e.g., nets, multiple views) and create two-dimensional representations for the surfaces of three-dimensional objects.</p>
<p>L10. Represent geometric objects and figures algebraically using coordinates; use algebra to solve geometric problems:</p> <p>L12.1. Express the intuitive concept of the “slant” of a line in terms of the precise concept of slope, use the coordinates of two points on a line to define its slope, and use slope to express the parallelism and perpendicularity of lines.</p> <p>L12.2. Describe a line by a linear equation.</p> <p>L12.3. Find the distance between two points and/or the midpoint between the points.</p> <p>L12.4. *Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.</p>
<p>L11. Understand basic right-triangle trigonometry and apply it to solve problems:</p> <p>L12.1. Understand how similarity of right triangles allows the trigonometric functions sine, cosine and tangent to be defined as ratios of sides and be able to use these functions to solve problems.</p> <p>L12.2. Apply the trigonometric functions sine, cosine and tangent to solve for an unknown length of a side of a right triangle, given one of the acute angles and the length of another side.</p> <p>L12.3. Use the standard formula for the area of a triangle, $A = \frac{1}{2}bh$, to explain the area formula, $A = \frac{1}{2}absinC$ where a and b are the lengths of two sides of a triangle and C is the measure of the included angle formed by these two sides, and use it to find the area of a triangle when given</p>

the lengths of two of its sides and the included angle.

L12. *Know how the trigonometric functions can be extended to periodic functions on the real line, derive basic formulas involving these functions, and use these functions and formulas to solve problems:

L12.1. *Know that the trigonometric functions sine and cosine, and thus all trigonometric functions, can be extended to periodic functions on the real line by defining them as functions on the unit circle, that radian measure of an angle between 0 and 360 degrees is the arc length of the unit circle subtended by that central angle, and that by similarity, the arc length s of a circle of radius r subtended by a central angle of measure t radians is $s = rt$.

L12.2. *Know and use the basic identities, such as $\sin^2(x) + \cos^2(x) = 1$ and $\cos(\pi/2 - x) = \sin(x)$ and formulas for sine and cosine, such as addition and double angle formulas.

L12.3. *Graph sine, cosine and tangent as well as their reciprocals, secant, cosecant and cotangent; identify key characteristics.

L12.4. *Know and use the law of cosines and the law of sines to find missing sides and angles of a triangle.

M. Data Interpretation, Statistics and Probability - The high school graduate can:

M1. Explain and apply quantitative information:

M4.1. Organize and display data using appropriate methods (including spreadsheets) stem-and-leaf and box-and-whisker, pictures, tallies, tables, charts, bar graphs and circle graphs to detect patterns and departures from patterns.

M4.2. Use scientific and graphing calculators and computer spreadsheets to organize and analyze data.

M4.3. Read and interpret tables, charts and graphs.

M4.4. Compute and explain summary statistics for distributions of data including measures of center (mean, median) and spread (range, percentiles, variance, standard deviation).

M4.5. Compare and contrast data sets using values of mean, median, mode, quartiles and range.

M4.6. Create scatter plots, analyze patterns and describe relationships in paired data.

M4.7. Know the characteristics of the Gaussian normal distribution (bell-shaped curve) and use its properties to answer questions about sets of data that are assumed to be normally distributed.

M2. Explain and critique alternative ways of presenting and using information:

M4.1. Evaluate reports based on data published in the media by considering the source of the data, the design of the study, and the way the data are analyzed and displayed.

M4.2. Identify and explain misleading uses of data.

M4.3. Recognize when arguments based on data confuse correlation with causation.

M3. Explain the use of data and statistical thinking to draw inferences, make predictions and justify conclusions:

M4.1. Explain the impact of sampling methods, bias and the phrasing of questions asked during data collection and the conclusions that can rightfully be made.

M4.2. Determine the validity of the sampling method described in a given study.

M4.3. Use sampling techniques to draw inferences about large populations.

M4.4. Explain effects of sampling procedures and missing or incorrect information on reliability

M4.5. Draw and justify a conclusion regarding the validity of a probability or statistical argument.

M4.6. Design and conduct simple experiments or investigations using random sampling to collect data to answer questions of interest. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs.

M4.7. Explain the differences between randomized experiments and

observational studies. Describe questions of experimental design, control groups, treatment groups, cluster sampling and reliability.

M4.8. Construct a scatter plot of a set of paired data, and if it demonstrates a linear trend, use a graphing calculator to find the regression line that best fits this data; recognize that the correlation coefficient measures goodness of fit and explain when it is appropriate to use the regression line to make predictions

M4. Explain and apply probability concepts and calculate simple probabilities:

M4.1. Explain how probability quantifies the likelihood that an event occurs in terms of numbers. Predict and determine why some outcomes are certain, more likely, less likely, equally likely or impossible.

M4.2. Explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome.

M4.3. Explain how the law of large numbers can be applied in simple examples.

M4.4. Apply probability concepts such as conditional probability and independent events to calculate simple probabilities.

M4.5. Determine the number of combinations and permutations for an event.

M4.6. Apply probability and/or odds to practical situations to make informed decisions.

N. Mathematical Reasoning: Woven throughout the four domains of mathematics — Number Sense and Numerical Operations; Algebra; Geometry; and Data Interpretation, Statistics and Probability — are the following mathematical reasoning skills:

N1. Use inductive and deductive reasoning to arrive at valid conclusions.

N2. Use multiple representations (literal, symbolic, graphic) to represent problems and solutions.

N3. Understand the role of definitions, proofs (direct and indirect) and counter-examples in mathematical reasoning; constructing simple proofs.

N4. *Use truth tables to reveal the logic of mathematical statements.

N5. *Use if... then statements to construct simple, valid arguments.

N6. Use the special symbols of mathematics correctly and precisely.

N7. Recognize when an estimate or approximation is more appropriate than an exact answer and understand the limits on precision of approximations.

N8. Distinguish relevant from irrelevant information, identify missing information and either find what is needed or make appropriate estimates.

N9. Recognize and use the process of mathematical modeling: recognize and clarify mathematical structures that are embedded in other contexts, formulate a problem in mathematical terms, use mathematical strategies (e.g., solving a simpler problem, drawing a picture or diagram) to reach a solution, and interpret the solution in the context of the original problem.

N10. When solving problems, think ahead about strategy, test ideas with special cases, try different approaches, check for errors and reasonableness of solutions as a regular part of routine work, and devise independent ways to verify results.

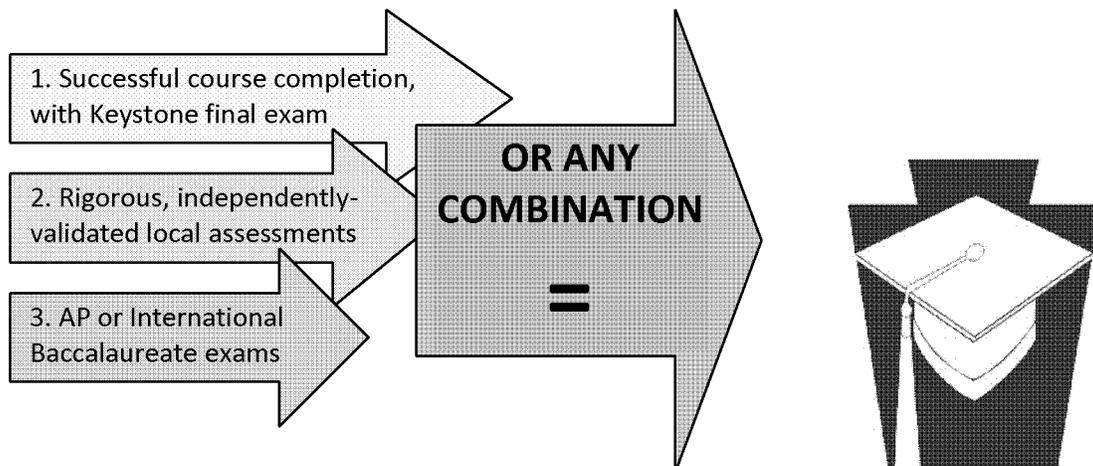
N11. Shift regularly between the specific and the general, using examples to understand general ideas, and extending specific results to more general cases to gain insight.

STRONGER HIGH SCHOOL GRADUATION REQUIREMENTS

Fact Sheet and Frequently Asked Questions

On January 8, 2010, following approvals by the state's Independent Regulatory Review Commission and the Attorney General, the State Board of Education published changes to Chapter 4 that set stronger, more consistent high school graduation requirements for students, beginning with the class of 2015.

Under the new regulation, students can meet graduation requirements through any or a combination of the following options:



OPTION 1 – DEMONSTRATE PROFICIENCY CORE SUBJECTS: For the class of 2014-15, students will demonstrate proficiency in English composition, literature, algebra I and biology, with a Keystone final exam counting for one-third of the final course grade. In 2017, requirements under this option will be expanded to include:

- passing 2 English courses (composition and literature);
- passing 2 math courses (algebra I, algebra II, or geometry);
- passing 1 science course (biology or chemistry); and
- passing 1 social studies course (options include civics, American history or world history).

Like existing final exams, Keystone Exams will be short (approximately 2 to 2 ½ hours), subject-specific assessments that students take at the end of a course. Unlike existing final exams, students will be able to retake the assessments in whole or in part and students who do not test well can complete a project-based alternative assessment. Under the regulation, no student will be denied a high school diploma based on test scores alone as teacher-assigned grades will constitute a majority (67%) of the course grade.

OPTION 2 – PASS LOCAL ASSESSMENTS that have been independently validated. This regulation preserves local control but sets consistent standards for locally-developed measures to ensure rigorous assessments, fair administration, and reliable results. The state will share validation costs with local districts.

OPTION 3 – PASS RIGOROUS NATIONAL ASSESSMENTS such as Advanced Placement or International Baccalaureate exams.

Importantly, the regulation also responds to calls to reduce the amount of testing in Pennsylvania’s high schools. Under this plan, beginning the 2012-13 school year, three Keystone Exams in algebra I, literature and biology will replace the 11th grade Pennsylvania System of School Assessment (PSSA) tests. This change will reduce annual testing time by approximately 18 hours – the equivalent of three school days. The PSSA will be retained for use in the elementary and middle grades.

FREQUENTLY ASKED QUESTIONS

LOCAL ASSESSMENT OPTION:

- 1. Our district is planning to use locally-developed assessments to comply with the new regulation. Must local assessments count for one-third of a student’s course grade?**

No – the state-designated 1/3 weight applies only to the state-developed Keystone Exams. The regulation does not set a weight for local assessments or Advanced Placement or International Baccalaureate exams.

- 2. How will the state evaluate locally-developed assessments?**

For local assessments to satisfy state graduation requirements, they must meet the following criteria:

- 1) Alignment with state academic standards;
- 2) Rigorous expectations, comparable to those used for the Keystone Exams; and
- 3) Administration to all students, except for those exempted by Individualized Education Plans or Gifted Individualized Education Plans

Additional criteria will be established by the Local Assessment Validation Advisory Committee.

3. If a district plans to use local assessments for one subject, must they use local assessments for all subjects?

No. The regulation permits districts to select assessment options by subject area from among the three options detailed on the previous page.

4. If a district decides to use only local assessments for graduation determinations, will these count for AYP when the PSSA is replaced by the Keystone exams?

No. Provided the U.S. Department of Education approves Keystone exams for AYP/NCLB purposes, students will have to take those Keystone exams (algebra 1, literature, and biology) to meet AYP/NCLB requirements and local assessments to meet state graduation requirements.

KEYSTONE EXAMS:

1. Can students retake a Keystone Exam?

Yes. The regulation permits students who do not score proficient or above to retake the exam (or exam module) at the next available testing date.

2. Can a student who scores proficient or advanced retake a Keystone Exam?

The regulation does not preclude proficient or advanced students from re-taking a Keystone Exam.

3. Can students “test-out” of a course by passing a Keystone Exam?

Yes, at the district’s discretion and provided that the student scores “Advanced” on the related Keystone.

4. What is the process and timeline for replacing the 11th grade PSSA with Keystone Exams?

The process requires PDE to document, collect, and submit evidence of test development and test quality for USDE peer review. We anticipate approval by 2013.

5. Will Keystone Exam scores for students in middle school count toward high school graduation requirements?

Yes. For example, if a student takes the Keystone algebra I exam in 8th grade, it will count for one-third of that final mark. If the student passes the course, he/she will have met the requirement for graduation.

6. When will the Keystone Exam scores for students in middle school count toward AYP?

For purposes of AYP, Keystone Exam scores will be attributed in 11th grade – even though students may – and likely, will – take the relevant courses and Keystones in an earlier grade.

AP/IB OPTIONS:

What score is required on an AP or IB test to satisfy graduation requirements?

The Department will issue policy guidance on this question by July 1, 2010.

ALTERNATIVE PATHWAYS:

1. How will students qualify to complete a project-based assessment?

Any student who does not score proficient on a Keystone Exam after two attempts will be eligible to complete a project-based assessment, provided the student has taken the course and met local attendance and supplemental instruction requirements.

2. Can a student who scores proficient or advanced complete a project-based assessment to raise their score?

The project-based assessment is designed expressly to help students supplement a Keystone Exam score in order to meet the graduation requirement of proficiency. A project-based assessment can raise a student's Keystone score to the proficient cut score, but not beyond it.

3. If a project-based assessment raises a student's Keystone score, will that proficient score count toward AYP?

No. The score from a student's original exam is used for the purpose of determining AYP.

4. How will the Secretary evaluate waiver requests based on extenuating circumstances?

The regulation includes a waiver provision – modeled on the policy used in Massachusetts – that allows the Secretary to exempt individual students from the

new graduation requirements based on personal or family crisis or other extenuating circumstances. The waiver request must be accompanied by an endorsement from the student's local superintendent. The Department will issue additional policy guidance on this question by July 1, 2010.



**Pennsylvania
Department of
Education**

**Dual Enrollment
2008-09
Final Report**

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For more information about the Dual Enrollment program visit:
www.education.state.pa.us or call 717-346-8400.

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Dual Enrollment 2008-09 Final Report

I. High School Reform Expectations in Pennsylvania

Expectations for Pennsylvania students are higher than ever before. These expectations, driven by the ever-increasing demands of our knowledge-based economy, flow out of the need to prepare all students to compete globally, not just with other states and regions of the U.S.

To be competitive all Pennsylvania students must graduate from high school prepared to enter college and the high-skills workforce. High schools must provide students a rigorous curriculum that prepares them to transition successfully from high school to postsecondary education and careers. Governor Rendell has introduced several initiatives aimed at reforming Pennsylvania's high schools to increase student achievement.

One of those initiatives is Dual Enrollment. The Dual Enrollment Program encourages a broad range of diverse students to experience postsecondary coursework and its increased academic rigor, while still being supported in the high school environment. The program allows high school juniors and seniors to take college-level, credit bearing courses at postsecondary institutions and receive secondary and postsecondary credit.

A total of \$43 million has been allocated for the program since its inception in 2005. Twenty-two percent of funds are now targeted funds to support low-income students, and the program also provides the opportunity for specialized programming to enhance college and career readiness among at-risk students through the Early College High School, Middle College High School and Gateway to College (EMG programs).

Consistently over the past few years of the program, the most significant benefit is the opportunity for seniors to experience the realities of college in their senior year. Students tell us that taking college courses has shown them how they need to accept responsibility for their academic work and to manage their time better. They also have mentioned that it is helpful to be familiar with a college syllabus and to receive feedback on their writing at the collegiate level. The primary impact on student achievement is that the students are highly motivated to do well in their college courses which might not have been true for a typical senior year course. Students participating in Dual Enrollment courses experience the converse of senioritis! Teachers report being gratified that their students were prepared by Upper Darby High School to do well in a post-secondary setting. Upper Darby School District Grant Coordinator.

II. Dual Enrollment: A High School Reform Strategy

Pennsylvania's Dual Enrollment Program allows high school students to earn high school and college credits for satisfactorily completing non-remedial college courses. Dual Enrollment funding is distributed through a formula that allows the Pennsylvania Department of Education to meet the following goals:

- Prepare students for postsecondary success by giving them firsthand exposure to college-level work.
- Support students as they make the transition from high school to postsecondary education.
- Increase students' access to postsecondary education—especially those from underserved populations.
- Provide at-risk students supportive, academically challenging environments where they can get a fresh start on learning.

Besides the obvious benefit of being able to take a college class in high school, it was extremely beneficial to the students as a motivator by proving to them that they can do the work! Students were extremely proud of this fact and were motivated by possible savings when they go to college. Most importantly, they felt self-worth in their abilities. Allentown City School District Executive Director of Secondary Education

The need for Dual Enrollment programs is clear:

- These programs are a research-based method for increasing postsecondary participation rates among all students, particularly among underrepresented populations, including African-American and Latino students.¹
- Approximately half of students entering college take remedial courses. Dual Enrollment programs help students better prepare for the rigors of college and decrease the need for remedial courses.
- As tuition costs have increased nationwide, low-income students are less likely to have the financial resources for higher education opportunities. Dual Enrollment programs help low-income students offset postsecondary costs and increase their ability to enter college and succeed.¹

¹ *The American Freshman - Forty Year Trends, University of California-Los Angeles. January 2008.*

- According to the U.S. Department of Education, college credits earned prior to high school graduation reduce the average time-to-degree and increase the likelihood of graduation for the students who participate in these programs. Time-

to-degree average for students was 4.65 compared to 4.25 years for students who earned nine or more credits through the Dual Enrollment Program.²⁻³

- The U.S. Department of Education also estimates that one in four students who earned a graduate degree earned nine or more credits through the Dual Enrollment Program.
- The Dual Enrollment Program can give the student a chance to experience college-level work while still in the supportive atmosphere of high school with the assistance of collaborating high school and college teachers.

III. Dual Enrollment Funding

The state's investment in Dual Enrollment is reaping results for students, families, educators and schools across Pennsylvania. The Dual Enrollment Program is enhancing access to postsecondary opportunities for Pennsylvania high school students, with an emphasis on those who might not otherwise pursue higher education.

Dual Enrollment has seen continued growth since the school year 2007-08. Ten million dollars of dedicated funds were invested for the school year 2008-09. The percentage growth over this one year period as reported in the Final Expenditure Reports from the school districts is as follows:

- A 24.2% increase in student participation, from 14,432 to 17,930.
- A 33% increase in the number of class enrollments, from 20,730 to 27,575.
- A 6.3% increase in the number of participating districts and Career and Technology Centers (CTCs), from 363 to 386.

Dual Enrollment funding is distributed to school districts and CTCs in a manner that is designed to provide funding for every student participating in the program while ensuring greater access for low-income students. In the school year 2008-09 Dual Enrollment funds were distributed as follows:

- \$6.6 million was provided in the form of Dual Enrollment grants to students in participating school districts and CTCs. Each school district's aid ratio was used to determine its share of the available resources. Because demand was greater than the amount of available funds, each school district and CTC received a prorated share of its request.
- \$2.2 million, or 22% of available funds, was used to provide supplemental Dual Enrollment grants on behalf of low-income students in accordance with the statute.
- \$600,000 was used to support students enrolled in the three innovative EMG programs. The Dual Enrollment enacting law limited these supplemental Dual Enrollment grants to 6% of all available funds.

² *Dual Enrollment: Policy Issues Confronting State Policymakers*. Carl Krueger. March 2006.

³ *On Ramp to College: A state Policymakers Guide to Dual Enrollment*. Hoffman et al. May 2008.

- \$600,000 was made available to provide Dual Enrollment grants on behalf of nonpublic, private, charter school and home education students through their district of residence, provided the district was a participating school district. The

Dual Enrollment enacting law limited grants for these students to 6% of all available funds.

IV. Dual Enrollment 2008-09: Overview and Highlights

A. Dual Enrollment helps students prepare for postsecondary success by giving them firsthand exposure to college-level work.

Dual Enrollment continues to help more Pennsylvania students become ready to compete and succeed in postsecondary education and careers.

- 17,930 students participated in Dual Enrollment classes, occupying a total of 27,575 class enrollments in 2,484 different college courses, a 24.2% increase in student participation over the previous year, and a 33% increase in the number of class enrollments.
- Approved institutions of higher education participating in Dual Enrollment included all 14 Pennsylvania community colleges and 7 of their branch campuses, 13 state owned institutions and 4 of their branch campuses, 4 state-related institutions and 21 of their branch campuses, 53 private institutions, and one out-of-state institution, Allegany College of Maryland, which is approved to offer instruction in Pennsylvania.

Providing the 11th and 12th grade students of the Chambersburg School District with an opportunity to attend at least one college course at a reduced cost exposes these students to the demands and challenges associated with college academics. This also helps prepare these students for the expectations of college course work and provides some marginal students with the "college experience" to assist them with their decision making process. We had one student who was economically disadvantaged who had the skills to attend college, but questioned whether she would be attending college. After successfully completing two college classes through the Dual Enrollment Program she decided to apply to college. She ended up receiving a full academic scholarship to the Dual Enrollment college partner where she had taken these courses. Chambersburg School District Counseling Supervisor.

B. Dual Enrollment supports students as they make the transition from high school to postsecondary education.

Participating students meet the challenge of Dual Enrollment courses and are on the path to high school and postsecondary success.

- Students passed 89.5% of the Dual Enrollment courses in which they were enrolled.
- 315 districts/CTCs (82% of those participating) allowed Dual Enrollment courses to be counted as core academic credits toward high school graduation.

- 213 districts/CTCs (55% of those participating) are keeping track of their participating students as they enter college and postsecondary careers.
- Dual Enrollment students took a wide variety of courses covering a range of subject areas, including Social Sciences (39%), Science and Math (31%), English/Language Arts (25%), and World Languages (5%). Some of the more specialized course work included:
 - Climate Change, Energy and Biodiversity
 - Human Body: Form and Function
 - Mandarin Chinese
 - Arabic
 - Ordinary and Partial Differential Equations

C. Dual Enrollment increases students' access to postsecondary education.

Participating districts and CTCs structured programs to encourage a broad range of students to participate and achieve in their courses.

- 3,654 participating students (20.4% of participants) were from low-income families. The majority of these students were from high-poverty districts that would be unable to support students' postsecondary experiences without the help of the Dual Enrollment Grant Program. Although low-income student participation as a percentage of total program enrollments was 2% lower than the previous year, the number of low-income students enrolled was actually 12.5% higher than the previous year.
- Courses took place at various times of the day; during school, after school and on weekends to accommodate students' schedules.
- 71% of courses took place on campuses of postsecondary institutions, 24% took place on high school campuses and 5% took place in other venues or formats, including online courses and via distance learning.
- 38% of courses were offered by local community colleges, 27% were offered by private institutions, 19% were offered by state-related institutions, 14% were offered by state owned institutions, and 2% were offered by the one out-of-state institution that serves participating school districts.

V. Dual Enrollment Specialty Programs 2008-09 Overview and Highlights

Dual Enrollment specialty programs provide at-risk students supportive and academically challenging environments.

In addition to regular Dual Enrollment courses, grants also supported specialized programming for students who were underperforming or who had disengaged from their own high schools to become re-engaged in learning, earn their diplomas and pursue postsecondary education and careers. In the school year 2008-09, a total of \$600,000 was dedicated to these programs, with a total of 448 students participating. Districts participating in the Early College High School, Middle College High School and Gateway to College programs have cited the following reasons for success:

- Smaller learning environments with an adult hands-on focus
- Free from traditional high school popular culture
- More focused and individualized instruction provided by postsecondary instructors
- Increased autonomy, combined with enhanced learning support, helped motivate students who previously lacked motivation
- Advantages of a campus setting removed from the traditional high school environment
- Credit earned toward a postsecondary credential serves as a future-oriented motivator

A Middle College graduate contacted one of our district teachers this year. Her words express the profound positive impact a program like this can have on a young person: "I remember when you came to my meeting at my outpatient program. You and (my school counselor) told me that I would be attending Middle College. Going to that school was the best opportunity; I am so thankful that you were able to help me get to that point. I can't believe I am a college student. I was responsible enough to make it on my own and get good enough grades to be admitted full-time." Tredyffrin-Easttown School District

A. Early College High School

- Early College High Schools (ECHS) are designed so low-income youth, first-generation college students, English Language Learner students, students of color, and other young people underrepresented in higher education can simultaneously earn a high school diploma and an Associate's degree or up to two years of credit toward a Bachelor's degree tuition free.
- ECHS programs are based on the principle that academic rigor, combined with the opportunity to save time and money, is a powerful motivator for students to work hard and meet serious intellectual challenges.

- ECHS blends high school and college in a rigorous yet supportive program by compressing the time it takes to complete a high school diploma and courses necessary in the first two years of college.
- Since 2002, almost 160 schools in 24 states and District of Columbia were involved in ECHS.

B. Middle College High School

- Middle College High Schools (MCHS) focus on academically able but underachieving students who are at risk of dropping out and often have high absenteeism.
- MCHS serve a segment of the student population that does not function optimally in a traditional high school environment and are not identified with Individualized Education Plans.
- Of the 30 middle colleges nationwide, two are in Pennsylvania: Delaware County Community College and the Community College of Allegheny County at its Boyce Campus in Monroeville.
- Twenty districts participated in two Middle College High School programs operated by the Community College of Allegheny County and the Delaware County Community College.

C. Gateway to College

- Gateway to College programs serve at-risk youth, 16-20 years old, who have already dropped out of school.
- Gateway to College gives students an opportunity to earn a high school diploma at the same time they are earning college credits.
- Students simultaneously accumulate high school and college credits, earning their high school diploma while progressing toward an Associate degree or certificate from the postsecondary institution.
- The Philadelphia School District participated in the state's only Gateway to College program in collaboration with the Community College of Philadelphia.

VI. Challenges and Opportunities: Looking Ahead

The Dual Enrollment Program provides thousands of Pennsylvania students the financial support necessary to experience college-level course work before leaving high school.

For the school year 2009-10 school year, the funding for the Dual Enrollment Program was reduced to \$8 million. Consequently three school districts cancelled the Dual Enrollment Program altogether. Other school districts made adjustments, resulting in cancellation of either the fall or spring semester. The reduction in overall funding likewise resulted in a dramatic decrease in the percentage of funding to all grant categories, including low-income supplemental grants, the EMG specialty programs and funds for private, nonpublic, charter school and home education students.

Due to the extraordinary demand and interest on the part of students, this funding was outpaced by an increase in requests for Dual Enrollment funds, as can be seen in the chart below.

	Requested Amount	Funded Amount	% Funded
2005-06	\$11.2 million	\$5 million	45%
2006-07	\$16.0 million	\$8 million	50%
2007-08	\$17.3 million	\$10 million	58%
2008-09	\$28.0 million	\$10 million	36%
2009-10	\$37.7 million	\$8 million	21%

The level of reimbursement students receive directly affects their participation in the program, especially for low-income students. The number of low-income students participating in 2008-09 reached an all-time high of 3,654; however, total participation requests increased 24% even as the level of funding remained constant at \$10 million. This means that the amount of funds available to each participating student was less than in the previous year. Thus, while low income students comprised 21.4% of total participants last year (almost at the 22% low-income supplement maximum), the percentage as a fraction of total participation dropped to 20.4% in 2008-09.

Low-income students rely upon the state subsidy that covers tuition, books and transportation. When the subsidy is reduced or redistributed due to a higher number of overall participants, these students are not able to make up the difference financially. It is likely that some low-income students chose not to participate at all due to the fact that the state subsidy would not cover as much of their costs as in the previous years. Low-income students who did choose to participate were more likely to take fewer Dual Enrollment courses than students who were not identified as low-income. In 2007-08, low-income students and non-low-income students both took, on average, approximately 1.4 Dual Enrollment courses during the school year. In 2008-09, however, low-income students took an average of 1.3 courses, while non-low-income students took an average of 1.6 courses.

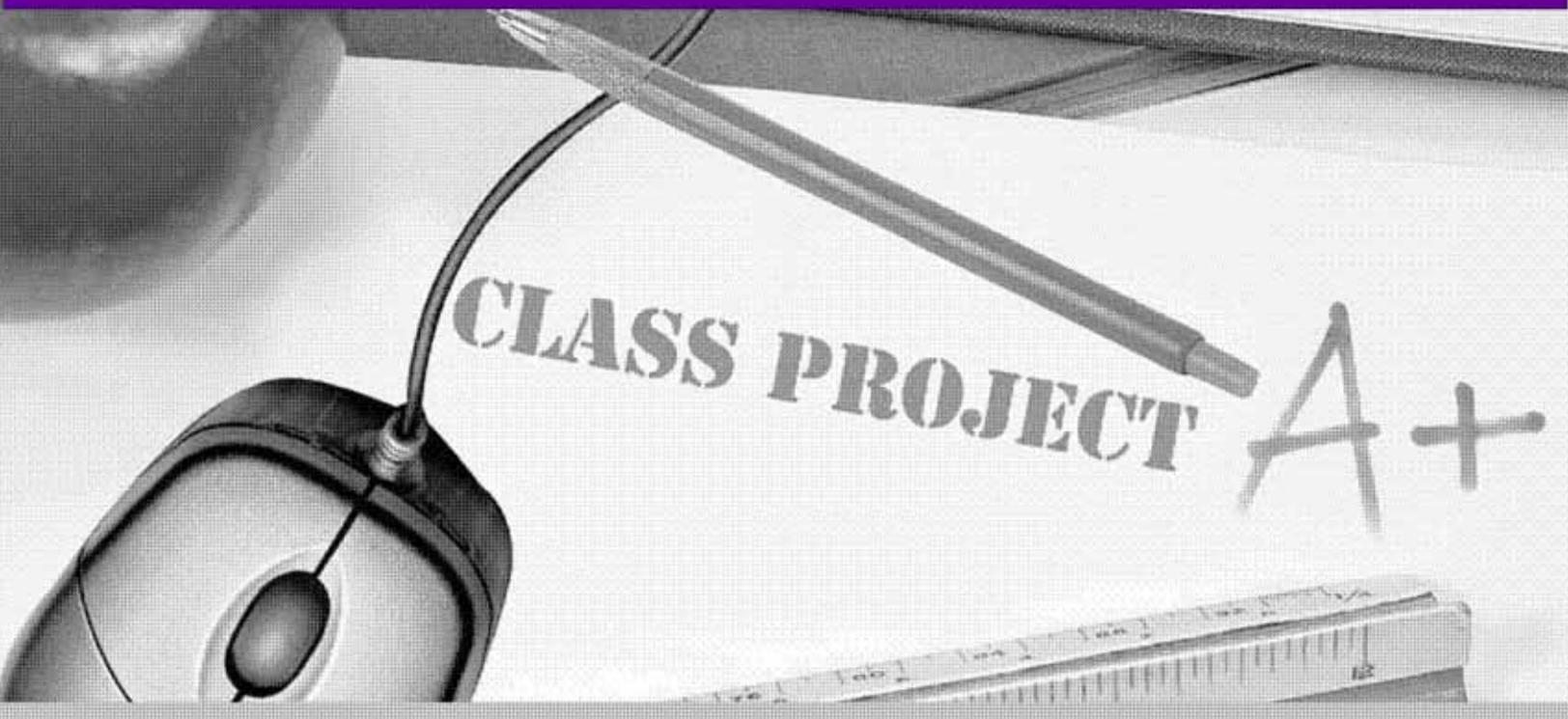
In all probability, the situation will not improve during school year 2009-10 in which \$8 million was appropriated for the Dual Enrollment Program (\$2 million less than in 2008-09). With student demand continuing to increase, combined with the reduction in funding, only 21% of districts' initial requests could be funded. As funds are further reduced by the growing number of students participating, students with the most need may be among the first to defer participation.

One fact is certain, however: Pennsylvania students want to participate in challenging opportunities like Dual Enrollment, and when they participate, they succeed beyond all expectations. The Dual Enrollment program is an investment that benefits today's students and families, and will reward all Pennsylvanians for generations to come.

This Final Report meets the requirement of 24 P.S. Section 1603-B(f) which requires that the Pennsylvania Department of Education report to the members of the General Assembly. The department shall produce an annual report on concurrent enrollment programs using the reporting information submitted by school entities under section 1611-B (b). The annual report shall be provided to:

1. the chairman of the Appropriations Committee of the Senate.
2. the minority chairman of the Appropriations Committee of the Senate.
3. the chairman of the Appropriations Committee of the House of Representatives.
4. the minority chairman of the Appropriations Committee of the House of Representatives.
5. the chairman of the Education Committee of the Senate.
6. the minority chairman of the Education Committee of the Senate.
7. the chairman of the Education Committee of the House of Representatives.
8. the minority chairman of the Education Committee of the House of Representatives.

The report shall be published on the department's publicly accessible website.

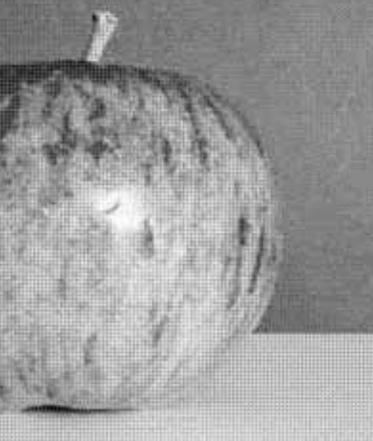


**2009–2010
Accountability Block Grant Mid-Year Report**

Extra Time Makes a Difference...

"Student performance in regular math classes has improved due to students' having extra time to practice concepts and demonstrate understanding in a small group setting. In the 2009 PSSA, the proficiency in math improved by seven percentage points to 63 percent. For the first time, 17 percent of special education students at the high school level reached proficiency on last year's test. Since special education students are strengthening their math skills and understanding of concepts, some are being placed in an inclusion algebra class for the first time this year."

Pen Argyl Area School District



ABG FUNDING

YEAR	AMOUNT
2009-10	\$271.4 million
2008-09	\$271.4 million
2007-08	\$275 million
2006-07	\$250 million
2005-06	\$200 million
2004-05	\$200 million

HIGHLIGHTS

ACCOUNTABILITY BLOCK GRANT PROGRAM

(b)(6)

In 2004-2005, Governor Rendell and the General Assembly launched the Accountability Block Grant, a landmark investment that has provided \$1.5 billion to Pennsylvania's school districts. The Accountability Block Grant program ensures that taxpayer dollars are focused in four areas most likely to increase student achievement.

1. Early Childhood Education Programs
2. Support for Struggling Students
3. Enhancing Teacher Quality
4. Support for Research-Based Programs

The mid-year report provides a brief description of each strategy and highlights of the data.

EARLY EDUCATION PROGRAMS

Pre-Kindergarten • Full-Day Kindergarten (FDK) • Class Size Reduction (Grades K-3)

\$199.5 M invested | 87,856 students served

School districts have overwhelmingly chosen to invest Accountability Block Grant funds in early childhood education. For 2009-2010, almost seventy-five percent of the grant resources are being used for programs that benefit our youngest students.

Pre-kindergarten programs, which are aligned with the Pennsylvania Early Learning Standards, reduce the need for special education and put our children on track to achieve. Full-day kindergarten programs ensure a strong social, emotional and academic foundation necessary for future success in school. Class size reduction in K-3 means more time for individualized attention.

PSSA results demonstrate the impact of implemented ABG strategies. Students that were enrolled in

FDK programs since the beginning of ABG funding in 2004-2005, took the 3rd Grade PSSA in 2008 and 2009. Comparing the PSSA math and reading results from prior years, improvements can be noted. For example, the students who attended full day kindergarten programs in 2004-2005 took the 3rd Grade PSSA in the Spring of 2008. Seventy-seven percent of 3rd grade students were proficient and advanced in reading in 2008 compared to sixty-nine percent of 3rd grade students in 2006*. These results were repeated in 2009. In addition, PSSA results demonstrate that economically disadvantaged children, those especially at high risk, progressed from fifty-six percent proficient/advanced in 2007 (prior to FDK) to sixty-three percent in 2009.

SUPPORT FOR STRUGGLING STUDENTS

Increased Instructional Time • Support for Academic Performance of Student Subgroups

Increased Instructional Time: \$16 M invested | 144,895 students served

Academic Performance of Student Subgroups: \$9.9 M invested | 79,819 students served

INCREASED INSTRUCTIONAL TIME

Increased instructional time is an effective intervention for students who are not proficient on the PSSA. Students in these programs receive at least 45 hours of personalized instruction in math and reading, before or after school, during study periods and/or over the summer months. The most often used strategy in this category is Tutoring Assistance.

(b)(6)

SUPPORT FOR ACADEMIC PERFORMANCE OF STUDENT SUBGROUPS

Students in subgroups identified under the No Child Left Behind Act (NCLB) must also reach proficiency levels in reading and math. These subgroups include: Ethnic (White, Black, Asian/Pacific Islander, Latino/Hispanic, Native American, Multi-racial), students with IEP (Individualized Education Program), ED (Economically Disadvantaged) and LEP (Limited English Proficiency).

"Public Schools: High School Graduates 2007-08" published by the Department of Education, sites that all subgroups had increased graduation rates each year from 2002 to 2008. The subgroup strategy data in the 2009-2010 ABG Mid-Year Report Appendices shows that ABG funding is providing research-based interventions to help close the achievement gap for students in these subgroups.

FDK makes a Difference...

"Academically, the children who have attended the district's full-day kindergarten program enter first grade with a solid foundation in reading and math. Kindergarten Dynamic Indicators of Basic Early Literacy Skills (DIBELS) scores in reading at the end of the 2007-2008 school year show 99 percent of these students were established or emerging in the area of initial sound fluency, while 100 percent were established or emerging in phoneme segmentation, the building blocks of successful reading."

Riverside Beaver County School District

ENHANCING TEACHER QUALITY

Literacy and Math Coaching • Professional Development for Teachers and Administrators

Literacy and Math Coaching: \$20 M invested | 212,762 students served
Professional Development for Teachers and Administrators: \$6.9 M invested | 375,512 students served

LITERACY AND MATH COACHING

Literacy and Math Coaching programs provide teachers with individualized job-embedded professional development aimed at increasing student achievement. Literacy and Math coaches model instruction, co-teach and provide feedback to teachers having an immediate impact on instructional effectiveness.

PROFESSIONAL DEVELOPMENT FOR TEACHERS AND ADMINISTRATORS

Many factors influence student achievement, but the most important factor is the quality of instructional techniques employed by teachers. Professional development must focus on the analysis of student achievement data, incorporating technology into instruction, curriculum alignment and how to implement research proven instructional strategies

SUPPORT FOR RESEARCH-BASED PROGRAMS

Science and Applied Knowledge Skills • Research-Based Improvement Strategies

Science and Applied Knowledge Skills: \$4.1 M invested | 127,526 students served
Research-Based Improvement Strategies: \$4.2 M invested | 51,895 students served

SCIENCE AND APPLIED KNOWLEDGE SKILLS

Students learn better by "doing". ABG provides schools with the tools to offer instruction based on real world scenarios and hands-on activities. These activities are supported by the development of higher order thinking skills using the hands-on inquiry approach, enhanced research skills and enhanced technology skills.

strengths and weaknesses, districts select a research-based program that will best apply to their students' needs. Districts must ensure the Department that the research-based strategies are implemented with fidelity.

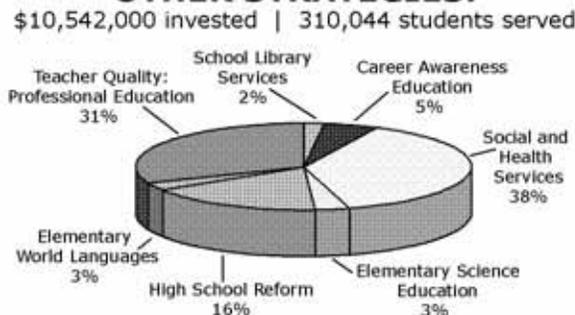
Other ABG strategies provide districts with the ability to choose research based programs and/or promising practices that are supported by clear evidence of student achievement.

An external evaluation of inquiry-based elementary science education programs*** supported with ABG funding, found the following results from 2008-2009:

- a high level of student interest in science,
- a positive relationship between inquiry-supported modules and student learning in science,
- a greater positive change in students' scores from the pre- to post-tests.

These strategies and percentage of investment can be seen in Figure 1 below:

**FIGURE 1:
OTHER STRATEGIES:**



RESEARCH-BASED IMPROVEMENT STRATEGIES

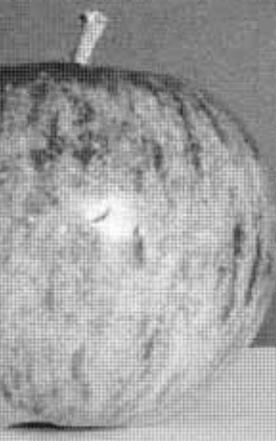
School districts can also investigate and select programs best suited to their individual students. Based on data driven analysis of student academic



Closing the Achievement Gap...

"Data suggests the achievement gap is narrowing as demonstrated in 2009 PSSA. Eighth grade reading results showed 87 percent of non-disadvantaged students were proficient while 74 percent of the economically disadvantaged students were proficient, compared to 2006 performance numbers, where 80 percent of non-economically disadvantaged 8th graders reached proficiency in the PSSA in reading while only 59 percent of the economically disadvantaged reached proficiency."

Solanco School District



(b)(6)

CONCLUSION

Since the inception of the ABG program in 2004-2005, seventy percent of each year's funding has provided Early Childhood Education strategies and this trend continues in 2009-2010.

Students that were enrolled in FDK programs since the beginning of ABG funding in 2004-2005, have already demonstrated on the 3rd Grade 2008 and 2009 Pennsylvania System of School Assessment (PSSA) increased numbers of those who are proficient and advanced than in prior years.

These students will be taking the 5th grade PSSA this school year. It is expected that their performance on the PSSA will continue to demonstrate the academic benefits provided to them through the ABG funding.

The purpose of the Accountability Block Grant funding is to improve Pennsylvania's students academic performance in reading, mathematics, writing and science, so that they graduate from our high schools adequately prepared for college and the high-skilled workforce in the 21st century.

Through the hard work of Pennsylvania's school districts and funding made available through the Accountability Block Grant, significant progress has been made over the last six years. The number of students that are advanced and proficient in reading and math in every grade level is increasing. The achievement gap is closing. All Pennsylvania's children are receiving the high quality education they richly deserve.

PURPOSE OF THE ACCOUNTABILITY BLOCK GRANT MID-YEAR REPORT

This Mid-Year Report and enclosed Appendices meet the requirement of 24 PS 25-2599.2 (b)(5) which requires that the Pennsylvania Department of Education report to the members of the General Assembly:

1. the district allocations,
2. the strategies the districts are selecting and allocation per strategy
3. number of students per district strategy
4. the history of how many years the districts are funding each program.

This information is contained in the appendices to this report.

FOOTNOTES:

* 3rd Grade was not tested in Spring, 2005.

** website: http://www.education.state.pa.us/portal/server.pt/community/graduation_education_rates/7426/public_schools_high_school_graduates_and_postsecondary_education_rates/509961

*** "Science: It's Elementary — Year Three Evaluation Report", July 2009.

Academic Standards for Environment and Ecology



Pennsylvania Department of Education

Academic Standards for Environment and Ecology

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Academic Standards for Environment and Ecology

XI. INTRODUCTION

This document includes Environment and Ecology standards that describe what students should know and be able to do in these areas:

- ◇ 4.1. Watersheds and Wetlands
- ◇ 4.2. Renewable and Nonrenewable Resources
- ◇ 4.3. Environmental Health
- ◇ 4.4. Agriculture and Society
- ◇ 4.5. Integrated Pest Management
- ◇ 4.6. Ecosystems and their Interactions
- ◇ 4.7. Threatened, Endangered and Extinct Species
- ◇ 4.8. Humans and the Environment
- ◇ 4.9. Environmental Laws and Regulations

The Declaration of Rights, Article I of the Pennsylvania Constitution states in Section 27: “The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and aesthetic values of the environment. Pennsylvania’s public natural resources are the common property of all people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.” To this end it is our responsibility to develop a citizenry that is aware of and concerned about the total environment and has the knowledge and skills to work toward solutions to current problems and the prevention of new ones.

Environment and Ecology is grounded in the complexity of the world we live in and our impact on its sustainability. The human interactions with the ecosystem and the results of human decisions are the main components of this academic area. Environment and Ecology examines the world with respect to the economic, cultural, political and social structure as well as natural processes and systems. This integration across systems is what sets this academic area apart from all others.

Environment and Ecology places its main emphasis in the real world. It allows students to understand, through a sound academic content base, how their everyday lives evolve around their use of the natural world and the resources it provides. As we move into a more technologically driven society, it is crucial for every student to be aware of his/her dependence on a healthy environment. The 21st century will demand a more sophisticated citizen capable of making sound decisions that will impact our natural systems forever.

Academic Standards for Environment and Ecology

These standards establish the essential elements of what students should know and be able to do at the end of grades four, seven, ten and twelve. The sequential nature of this document reflects the need for rigorous academic content that students will be expected to achieve. The standards will help students understand decision-making processes, the art of compromise and problem solving skills. The document reinforces all areas across the grade levels with increasing degrees of difficulty as the students mature intellectually.

Environment and Ecology is a very engaging academic area that captivates students' innate interests in their surroundings of the natural and built environment. The skills and knowledge that are addressed in this area of study will serve as tools for student participation in a democratic world of constantly evolving issues and concerns. As they achieve these standards, students will become aware of the role they play in the community in reaching decisions related to the environment.

The study of Environment and Ecology will allow students to be active participants and problem solvers in real issues that affect them, their homes, schools and communities.

A glossary is included to assist the reader in understanding terminology contained in the standards.

Academic Standards for Environment and Ecology

4.1. Watersheds and Wetlands			
4.1.4. GRADE 4	4.1.7. GRADE 7	4.1.10. GRADE 10	4.1.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify various types of water environments.</p> <ul style="list-style-type: none"> • Identify the lotic system (e.g., creeks, rivers, streams). • Identify the lentic system (e.g., ponds, lakes, swamps). <p>B. Explain the differences between moving and still water.</p> <ul style="list-style-type: none"> • Explain why water moves or does not move. • Identify types of precipitation. 	<p>A. Explain the role of the water cycle within a watershed.</p> <ul style="list-style-type: none"> • Explain the water cycle. • Explain the water cycle as it relates to a watershed. <p>B. Understand the role of the watershed.</p> <ul style="list-style-type: none"> • Identify and explain what determines the boundaries of a watershed. • Explain how water enters a watershed. • Explain factors that affect water quality and flow through a watershed. 	<p>A. Describe changes that occur from a stream's origin to its final outflow.</p> <ul style="list-style-type: none"> • Identify Pennsylvania's major watersheds and their related river systems. • Describe changes by tracing a specific river's origin back to its headwaters including its major tributaries. <p>B. Explain the relationship among landforms, vegetation and the amount and speed of water.</p> <ul style="list-style-type: none"> • Analyze a stream's physical characteristics. • Describe how topography influences streams. • Explain the influence of mountains on precipitation. • Explain how vegetation affects storm water runoff. • Delineate the boundaries of a watershed. • Describe factors that affect the quality of groundwater. • Explain how the speed of water and vegetation cover relates to erosion. 	<p>A. Categorize stream order in a watershed.</p> <ul style="list-style-type: none"> • Explain the concept of stream order. • Identify the order of watercourses within a major river's watershed. • Compare and contrast the physical differences found in the stream continuum from headwater to mouth. <p>B. Explain the relationships that exist within watersheds in the United States.</p> <ul style="list-style-type: none"> • Understand that various ecosystems may be contained in a watershed. • Examine and describe the ecosystems contained within a specific watershed. • Identify and describe the major watersheds in the United States.

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<p>C. Identify living things found in water environments.</p> <ul style="list-style-type: none"> • Identify fish, insects and amphibians that are found in fresh water. • Identify plants found in fresh water. <p>D. Identify a wetland and the plants and animals found there.</p> <ul style="list-style-type: none"> • Identify different kinds of wetlands. • Identify plants and animals found in wetlands. • Explain wetlands as habitats for plants and animals. 	<p>C. Explain the effects of water on the life of organisms in a watershed.</p> <ul style="list-style-type: none"> • Explain how water is necessary for all life. • Explain how the physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations. • Describe the life cycle of organisms that depend on water. • Identify organisms that have aquatic stages of life and describe those stages. <p>D. Explain and describe characteristics of a wetland.</p> <ul style="list-style-type: none"> • Identify specific characteristics of wetland plants and soils. • Recognize the common types of plants and animals. • Describe different types of wetlands. • Describe the different functions of a wetland. 	<p>C. Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments.</p> <ul style="list-style-type: none"> • Describe and explain the physical factors that affect a stream and the organisms living there. • Identify terrestrial and aquatic organisms that live in a watershed. • Categorize aquatic organisms found in a watershed continuum from headwater to mouth (e.g., shredder, predator, decomposer). • Identify the types of organisms that would live in a stream based on the stream's physical characteristics. • Explain the habitat needs of specific aquatic organisms. <p>D. Describe the multiple functions of wetlands.</p> <ul style="list-style-type: none"> • Describe wetlands in terms of their effects (e.g., habitat, flood, buffer zones, prevention areas, nurseries, food production areas). • Explain how a wetland influences water quality, wildlife and water retention. • Analyze wetlands through their indicators (e.g., soils, plants, hydrology). 	<p>C. Analyze the parameters of a watershed.</p> <ul style="list-style-type: none"> • Interpret physical, chemical and biological data as a means of assessing the environmental quality of a watershed. • Apply appropriate techniques in the analysis of a watershed (e.g., water quality, biological diversity, erosion, sedimentation). <p>D. Analyze the complex and diverse ecosystems of wetlands.</p> <ul style="list-style-type: none"> • Explain the functions of habitat, nutrient production, migration stopover and groundwater recharge as it relates to wetlands. • Explain the dynamics of a wetland ecosystem. • Describe and analyze different types of wetlands.
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<p>E. Recognize the impact of watersheds and wetlands on animals and plants.</p> <ul style="list-style-type: none"> • Explain the role of watersheds in everyday life. • Identify the role of watersheds and wetlands for plants and animals. 	<p>E. Describe the impact of watersheds and wetlands on people.</p> <ul style="list-style-type: none"> • Explain the impact of watersheds and wetlands in flood control, wildlife habitats and pollution abatement. • Explain the influence of flooding on wetlands. 	<p>E. Identify and describe natural and human events on watersheds and wetlands.</p> <ul style="list-style-type: none"> • Describe how natural events affect a watershed (e.g., drought, floods). • Identify the effects of humans and human events on watersheds. 	<p>E. Evaluate the trade-offs, costs and benefits of conserving watersheds and wetlands.</p> <ul style="list-style-type: none"> • Evaluate the effects of natural events on watershed and wetlands. • Evaluate the effects of human activities on watersheds and wetlands.
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4.2. Renewable and Nonrenewable Resources

4.2.4. GRADE 4	4.2.7. GRADE 7	4.2.10. GRADE 10	4.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify needs of people.</p> <ul style="list-style-type: none"> Identify plants, animals, water, air, minerals and fossil fuels as natural resources. Explain air, water and nutrient cycles. Identify how the environment provides for the needs of people. <p>B. Identify products derived from natural resources.</p> <ul style="list-style-type: none"> Identify products made from trees. Identify by-products of plants and animals. Identify the sources of manmade products (e.g., plastics, metal, aluminum, fabrics, paper, cardboard). 	<p>A. Know that raw materials come from natural resources.</p> <ul style="list-style-type: none"> Identify resources used to provide humans with energy, food, housing and water. Explain how plants and animals may be classified as natural resources. Compare means of growing or acquiring food. Identify fiber and other raw materials used in clothing and shelter production. Identify types of minerals and fossil fuels used by humans. <p>B. Examine the renewability of resources.</p> <ul style="list-style-type: none"> Identify renewable resources and describe their uses. Identify nonrenewable resources and describe their uses. Compare finished products to their original raw material. Identify the waste derived from the use of renewable and nonrenewable resources. Determine how consumption may impact the availability of resources. Compare the time spans of renewability for fossil fuels and 	<p>A. Explain that renewable and nonrenewable resources supply energy and materials.</p> <ul style="list-style-type: none"> Identify alternative sources of energy. Identify and compare fuels used in industrial and agricultural societies. Compare and contrast the cycles of various natural resources. Explain food and fiber as renewable resources. <p>B. Evaluate factors affecting availability of natural resources.</p> <ul style="list-style-type: none"> Describe natural occurrences that may affect the natural resources. Analyze technologies that affect the use of our natural resources. Evaluate the effect of consumer desires on various natural resources. 	<p>A. Analyze the use of renewable and nonrenewable resources.</p> <ul style="list-style-type: none"> Explain the effects on the environment and sustainability through the use of nonrenewable resources. Evaluate the advantages and disadvantages of reusing our natural resources. <p>B. Analyze factors affecting the availability of renewable and nonrenewable resources.</p> <ul style="list-style-type: none"> Evaluate the use of natural resources and offer approaches for using them while diminishing waste. Compare the economics of different areas based on the availability and accessibility of the natural resources.

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<p>C. Know that some natural resources have limited life spans.</p> <ul style="list-style-type: none"> • Identify renewable and nonrenewable resources used in the local community. • Identify various means of conserving natural resources. • Know that natural resources have varying life spans. 	<p>alternative fuels.</p> <p>C. Explain natural resource distribution.</p> <ul style="list-style-type: none"> • Distinguish between readily available and less accessible resources. • Identify the locations of different concentrations of fossil fuels and mineral resources. • Analyze the effects of management practices on air, land and water in forestry, agriculture, fisheries, wildlife, mining and food and fiber production that is unique to different climates. 	<p>C. Analyze how man-made systems have impacted the management and distribution of natural resources.</p> <ul style="list-style-type: none"> • Explain the complete cycle of a natural resource, from extraction to disposal, detailing its uses and effects on the environment. • Analyze energy uses and energy conservation in different regions. • Examine conservation practices in different countries. • Analyze the costs and benefits of different man-made systems and how they use renewable and nonrenewable natural resources. • Analyze the impact of information systems on management and distribution of natural resources. 	<p>C. Analyze factors that influence the availability of natural resources.</p> <ul style="list-style-type: none"> • Compare the use of natural resources in different countries. • Determine how delivery systems influence the availability of resources at the local, regional and national level.
<p>D. Identify by-products and their use of natural resources.</p> <ul style="list-style-type: none"> • Understand the waste stream. • Identify those items that can be recycled and those that can not. • Identify use of reusable products. • Identify the use of compost, landfills and incinerators. 	<p>D. Describe the role of recycling and waste management.</p> <ul style="list-style-type: none"> • Identify materials that can be recycled in the community. • Explain the process of closing the loop in recycling. • Compare the decomposition rates of different organic materials. • Describe methods that could be used to reuse materials for new products. • Evaluate the costs and benefits of disposable products. 	<p>D. Explain different management alternatives involved in recycling and solid waste management.</p> <ul style="list-style-type: none"> • Analyze the manufacturing process (before, during and after) with consideration for resource recovery. • Compare various methods dealing with solid waste (e.g., incineration, compost, land application). • Differentiate between pre/post-consumer and raw materials. • Illustrate how one natural resource can be managed through reduction, recycling, reuse or use. 	<p>D. Evaluate solid waste management practices.</p> <ul style="list-style-type: none"> • Examine and explain the path of a recyclable material from collection to waste, reuse or recycling identifying the market forces. • Understand current regulations concerning recycling and solid waste. • Research new technologies in the use, reuse or recycling of materials.

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4.3. Environmental Health			
4.3.4. GRADE 4	4.3.7. GRADE 7	4.3.10. GRADE 10	4.3.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know that plants, animals and humans are dependent on air and water.</p> <ul style="list-style-type: none"> • Know that all living things need air and water to survive. • Describe potentially dangerous pest controls used in the home. • Identify things that cause sickness when put into the air, water or soil. • Identify different areas where health can be affected by air, water or land pollution. • Identify actions that can prevent or reduce waste pollution. <p>B. Identify how human actions affect environmental health.</p> <ul style="list-style-type: none"> • Identify pollutants. • Identify sources of pollution. • Identify litter and its effect on the environment. • Describe how people can reduce 	<p>A. Identify environmental health issues.</p> <ul style="list-style-type: none"> • Identify various examples of long-term pollution and explain their effects on environmental health. • Identify diseases that have been associated with poor environmental quality. • Describe different types of pest controls and their effects on the environment. • Identify alternative products that can be used in life to reduce pollution. <p>B. Describe how human actions affect the health of the environment.</p> <ul style="list-style-type: none"> • Identify land use practices and their relation to environmental health. • Explain how natural disasters affect environmental health. 	<p>A. Describe environmental health issues.</p> <ul style="list-style-type: none"> • Identify the effects on human health of air, water and soil pollution and the possible economic costs to society. • Describe how indoor pollution may affect human health (e.g., dust mites, fumes, cat dandruff). • Explain the costs and benefits of cleaning up contaminants. • Explain how common household cleaning products are manufactured and how to dispose of their by-products after use. <p>B. Explain how multiple variables determine the effects of pollution on environmental health, natural processes and human practices.</p> <ul style="list-style-type: none"> • Explain how human practices affect the quality of the water and soil. 	<p>A. Analyze the complexity of environmental health issues.</p> <ul style="list-style-type: none"> • Identify environmental health issues and explain how they have been addressed on a worldwide level. • Analyze efforts to prevent, control and/or reduce pollution through cost and benefit analysis and risk management. • Describe the impact of occupational exposures as they relate to environmental health issues. • Identify invisible pollutants and explain their effects on human health. • Explain the relationship between wind direction and velocity as it relates to dispersal and occurrence of pollutants. • Explain the different disposal methods used for toxic and hazardous waste. <p>B. Analyze the local, regional and national impacts of environmental health.</p> <ul style="list-style-type: none"> • Analyze the cost of natural disasters in both dollars and loss of natural habitat. • Research and analyze the local, state and national laws that deal with

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<p>pollution.</p> <p>C. Understand that the elements of natural systems are interdependent.</p> <ul style="list-style-type: none"> • Identify some of the organisms that live together in an ecosystem. • Understand that the components of a system all play a part in a healthy natural system. • Identify the effects of a healthy environment on the ecosystem. 	<ul style="list-style-type: none"> • Identify residential and industrial sources of pollution and their effects on environmental health. • Explain the difference between point and nonpoint source pollution. • Explain how nonpoint source pollution can affect the water supply and air quality. • Explain how acid deposition can affect water, soil and air quality. • Explain the relationship between resource use, reuse, recycling and environmental health. <p>C. Explain biological diversity.</p> <ul style="list-style-type: none"> • Explain the complex, interactive relationships among members of an ecosystem. • Explain how diversity affects ecological integrity of the natural resources. 	<ul style="list-style-type: none"> • Identify evidence of natural events around the world and their effects on environmental health (e.g., Yellowstone National Park fires). • Identify local and state environmental regulations and their impact on environmental health. • Analyze data and explain how point source pollution can be detected and eliminated. • Identify and explain ways of detecting pollution by using state-of-the-art technologies. <p>C. Explain biological diversity as an indicator of a healthy environment.</p> <ul style="list-style-type: none"> • Explain species diversity. • Analyze the effects of species extinction on the health of an ecosystem. 	<p>point and nonpoint source pollution; evaluate the costs and benefits of these laws.</p> <ul style="list-style-type: none"> • Explain mitigation and its role in environmental health. • Explain industry's initiatives to meet state and federal mandates on clean air and water. • Describe the impacts of point and nonpoint source pollution on the Chesapeake Bay. • Identify and evaluate the costs and benefits of laws regulating air and water quality and waste disposal. <p>C. Analyze the need for a healthy environment.</p> <ul style="list-style-type: none"> • Research the relationship of some chronic diseases to an environmental pollutant. • Explain how man-made systems may affect the environment.
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<p>4.4. Agriculture and Society</p>	<p>4.4.4. GRADE 4</p>	<p>4.4.7. GRADE 7</p>	<p>4.4.10. GRADE 10</p>	<p>4.4.12. GRADE 12</p>
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>				
<p>A. Know the importance of agriculture to humans.</p> <ul style="list-style-type: none"> • Identify people's basic needs • Explain the influence of agriculture on food, clothing, shelter and culture from one area to another. • Know how people depend on agriculture. 	<p>A. Explain society's standard of living in relation to agriculture.</p> <ul style="list-style-type: none"> • Compare and contrast agricultural changes that have been made to meet society's needs. • Compare and contrast how animals and plants affect agricultural systems. • Compare several technological advancements and their effect(s) on the historical growth of agriculture. • Compare different environmental conditions related to agricultural production, cost and quality of the product. 	<p>A. Describe the importance of agriculture to society.</p> <ul style="list-style-type: none"> • Identify the major cash crops of Pennsylvania. • Identify what percentage of the United States' population is involved in the food and fiber industry. • Compare and contrast the influence of agriculture on a nation's culture, standard of living and foreign trade. • Identify laws that affect conservation and management of food and fiber production in the local area and analyze their impact. • Compare a contemporary economic issue in agriculture to its historical origin. 	<p>A. Analyze the management practices in the agriculture business.</p> <ul style="list-style-type: none"> • Define the components of an agriculture system that would result in a minimal waste of resources. • Identify the diversity in crop production and analyze the advantages and disadvantages of such diversity. • Research and analyze environmental practices related to agricultural systems. • Analyze the effects of agricultural practices on the economy. • Analyze the impact of nutrient management laws on Pennsylvania agriculture. • Assess the role of agriculture cooperatives. 	
<p>B. Identify the role of the sciences in Pennsylvania agriculture.</p> <ul style="list-style-type: none"> • Identify common animals found on Pennsylvania farms. • Identify common plants found on Pennsylvania farms. • Identify the parts of important agricultural related plants 	<p>B. Investigate how agricultural science has recognized the various soil types found in Pennsylvania.</p> <ul style="list-style-type: none"> • Explain the importance of particle sizes in different soil types. • Determine how water has influenced the development of Pennsylvania soil types. 	<p>B. Assess the influence of agricultural science on farming practices.</p> <ul style="list-style-type: none"> • Compare the practices of no-till farming to traditional soil preparation (e.g., plow, disc). • Analyze and explain the various practices of nutrient management on the farm. 	<p>B. Describe how agricultural science has influenced biotechnology.</p> <ul style="list-style-type: none"> • Investigate how bio-engineered crops may influence the food supply. • Analyze the use of specific bacteria for the control of agricultural pests. • Evaluate the use of feed additives 	

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<p>(i.e., corn, soybeans, barley).</p> <ul style="list-style-type: none"> Identify a fiber product from Pennsylvania farms. 	<ul style="list-style-type: none"> Investigate how soil types have influenced the plant types used on Pennsylvania farms. Analyze how soil types and geographic regions have impacted the profitability of Pennsylvania farms. 	<ul style="list-style-type: none"> Analyze and explain how farm efficiencies have changed human nutrition. 	<p>in shifting metabolism to increase muscle mass and reduce fat in farm animals.</p>
<p>C. Know that food and fiber originate from plants and animals.</p> <ul style="list-style-type: none"> Define and identify food and fiber. Identify what plants and animals need to grow. Identify agricultural products that are local and regional. Identify an agricultural product based on its origin. Describe several products and tell their origins. Describe the journey of a local agricultural product from production to the consumer. 	<p>C. Explain agricultural systems' use of natural and human resources.</p> <ul style="list-style-type: none"> Analyze the needs of plants and animals as they relate to climate and soil conditions. Identify the plants and animals that can be raised in the area and explain why. Identify natural resources necessary for agricultural systems. Compare the need for crop production to the need for animal production. Define issues associated with food and fiber production. 	<p>C. Explain the functions of the components of the food and fiber system.</p> <ul style="list-style-type: none"> Compare and analyze growing conditions in the United States to determine which plants and animals are most suitable to each region. Compare the management practices needed for a commodity (i.e., production, processing, research and development, marketing, distribution and regulations). Identify a commodity, its origin and its steps of production. Compare and analyze the cost of a commodity to its production cost. Identify and describe how food safety issues have impacted production in agriculture. 	<p>C. Analyze and research the social, political and economic factors that affect agricultural systems.</p> <ul style="list-style-type: none"> Analyze the costs and benefits associated with agriculture practices and how they affect economic and human needs. Analyze the costs and benefits of agriculture research practices in society. Research the use of by-products that are the results of agriculture production (e.g., manure handling, bird feathers).
<p>D. Identify technology and energy use associated with agriculture.</p> <ul style="list-style-type: none"> Identify the various tools and machinery necessary for farming. Identify the types of energy used in producing food and fiber. Identify tools and machinery used in the production of agricultural products. 	<p>D. Explain the improvement of agricultural production through technology.</p> <ul style="list-style-type: none"> Compare the technologies that have advanced agricultural production. Explain how energy sources have changed to meet agricultural technology. 	<p>D. Analyze the efforts of increased efficiency in agriculture through technology.</p> <ul style="list-style-type: none"> Compare various technological advancements and analyze each for its contribution toward labor and cost efficiency. Compare the current market value of both natural and alternative 	<p>D. Analyze research and development activities as they relate to agriculture.</p> <ul style="list-style-type: none"> Analyze the role of research, development and technology as it relates to the food and fiber system. Research and analyze energy sources used and/or generated by producing, processing and marketing agricultural products.

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		energy sources involved in the production of food and fiber.	
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4.5. Integrated Pest Management			
4.5.4. GRADE 4	4.5.7. GRADE 7	4.5.10. GRADE 10	4.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Know types of pests.</p> <ul style="list-style-type: none"> Identify classifications of pests. Identify and categorize pests. Know how pests fit into a food chain. <p>B. Explain pest control.</p> <ul style="list-style-type: none"> Know reasons why people control pests. Identify different methods for controlling specific pests in the home, school and community. Identify chemical labels (e.g., caution, poison, warning). 	<p>A. Explain benefits and harmful effects of pests.</p> <ul style="list-style-type: none"> Identify different examples of pests and explain the beneficial or harmful effects of each. Identify several locations where pests can be found and compare the effects the pests have on each location. <p>B. Explain how pest management affects the environment.</p> <ul style="list-style-type: none"> Explain issues related to integrated pest management including biological technology, resistant varieties, chemical practices, medical technology and monitoring techniques. Describe how integrated pest management and related technology impact human activities. Identify issues related to integrated pest management that affect the environment. 	<p>A. Identify similar classifications of pests that may or may not have similar effects on different regions.</p> <ul style="list-style-type: none"> Identify environmental effect(s) of pests on different regions of the world. Identify introduced species that are classified as pests in their new environments. <p>B. Analyze health benefits and risks associated with integrated pest management.</p> <ul style="list-style-type: none"> Identify the health risks associated with chemicals used in common pesticides. Assess various levels of control within different integrated pest management practices including increased immunity to pesticides, food safety, sterilization, nutrient management and weed control. 	<p>A. Research integrated pest management systems.</p> <ul style="list-style-type: none"> Analyze the threshold limits of pests and the need for intervention in a managed environment. Research the types of germicides and analyze their effects on homes industry, hospitals and institutions. Design and explain an integrated pest management plan that uses a range of pest controls. <p>B. Research and analyze integrated pest management practices globally.</p> <ul style="list-style-type: none"> Research worldwide integrated pest management systems and evaluate the level of impact. Research and analyze the international regulations that exist related to integrated pest management. Explain the complexities associated with moving from one level of control to the next with different integrated pest management practices and compare the related costs of each system.

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<p>C. Understand society's need for integrated pest management.</p> <ul style="list-style-type: none"> • Identify integrated pest management practices in the home. • Identify integrated pest management practices outside the home. 	<p>C. Explain various integrated pest management practices used in society.</p> <ul style="list-style-type: none"> • Compare and contrast integrated pest management monitoring methods utilized in different community settings. • Compare integrated pest management to past practices. • Compare and analyze the long-term effects of using integrated pest management products. 	<p>C. Determine the effects of integrated pest management practices on society over time.</p> <ul style="list-style-type: none"> • Analyze the risks to the environment and society associated with alternative practices used in integrated pest management. • Analyze the benefits to the environment and society associated with alternative practices used in integrated pest management. 	<p>C. Analyze the historical significance of integrated pest management on society.</p> <ul style="list-style-type: none"> • Explain the dynamics of integrated pest management practices and their relative effects upon society. • Identify historic events affecting integrated pest management and cite the practices used (e.g., avian flu, bubonic plague, potato blight). • Research and analyze the long-term effects of pest management practices on the environment.
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4.6. Ecosystems and their Interactions	4.6.4. GRADE 4	4.6.7. GRADE 7	4.6.10. GRADE 10	4.6.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>	<p>A. Understand that living things are dependent on nonliving things in the environment for survival.</p> <ul style="list-style-type: none"> • Identify and categorize living and nonliving things. • Describe the basic needs of an organism. • Identify basic needs of a plant and an animal and explain how their needs are met. • Identify plants and animals with their habitat and food sources. • Identify environmental variables that affect plant growth. • Describe how animals interact with plants to meet their needs for shelter. • Describe how certain insects interact with soil for their needs. • Understand the components of a food chain. • Identify a local ecosystem and its living and nonliving components. • Identify a simple ecosystem and its living and nonliving components. • Identify common soil textures. • Identify animals that live 	<p>A. Explain the flows of energy and matter from organism to organism within an ecosystem.</p> <ul style="list-style-type: none"> • Identify and explain the characteristics of biotic and abiotic. • Describe and explain the adaptations of plants and animals to their environment. • Demonstrate the dependency of living components in the ecosystem on the nonliving components. • Explain energy flow through a food web. • Explain the importance of the predator/prey relationship and how it maintains the balances within ecosystems. • Understand limiting factors and predict their effects on an organism. • Identify niches for producers, consumers and decomposers within an ecosystem. • Compare and contrast the major ecosystems of Pennsylvania. • Identify the major characteristics of a biome. • Compare and contrast different 	<p>A. Explain the biotic and abiotic components of an ecosystem and their interaction.</p> <ul style="list-style-type: none"> • Identify the major biomes and explain their similarities and differences. • Compare and contrast the interactions of biotic and abiotic components in an ecosystem. • Analyze the effects of abiotic factors on specific ecosystems. • Describe how the availability of resources affects organisms in an ecosystem. • Explain energy flow in a food chain through an energy pyramid. • Evaluate the efficiency of energy flow in a food chain. • Explain the concept of carrying capacity in an ecosystem. • Explain trophic levels. • Identify a specific environmental impact and predict what change may take place to affect homeostasis. • Examine and explain how organisms modify their 	<p>A. Analyze the interdependence of an ecosystem.</p> <ul style="list-style-type: none"> • Analyze the relationships among components of an ecosystem. • Evaluate the efficiency of energy flow within an ecosystem. • Explain limiting factors and their impact on carrying capacity. • Understand how biological diversity impacts the stability of an ecosystem. • Analyze the positive or negative impacts of outside influences on an ecosystem. • Analyze how different land use practices can affect the quality of soils.

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<ul style="list-style-type: none"> • underground. <p>B. Understand the concept of cycles.</p> <ul style="list-style-type: none"> • Explain the water cycle. • Explain the carbon dioxide/oxygen cycle (photosynthesis). <p>C. Identify how ecosystems change over time.</p>	<p>biomes and their characteristics.</p> <ul style="list-style-type: none"> • Identify the relationship of abiotic and biotic components and explain their interaction in an ecosystem. • Explain how different soil types determine the characteristics of ecosystems. <p>B. Explain the concepts of cycles.</p> <ul style="list-style-type: none"> • Identify and explain cycles within an ecosystem. • Analyze the role of different cycles within an ecosystem. <p>C. Explain how ecosystems change over time.</p> <ul style="list-style-type: none"> • Explain how ecosystems change. • Identify the succession stages of a given ecosystem. • Explain how specific organisms may change an ecosystem. • Explain a change in an ecosystem that relates to humans. 	<p>environments to sustain their needs.</p> <ul style="list-style-type: none"> • Assess the effects of latitude and altitude on biomes. • Interpret possible causes of population fluctuations. • Explain how erosion and sedimentation have changed the quality of soil related habitats. <p>B. Explain how cycles affect the balance in an ecosystem.</p> <ul style="list-style-type: none"> • Describe an element cycle and its role in an ecosystem. • Explain the consequences of interrupting natural cycles. <p>C. Analyze how ecosystems change over time.</p> <ul style="list-style-type: none"> • Identify and explain the succession stages in an ecosystem. • Identify causes of succession. • Analyze consequences of interrupting natural cycles. 	<p>B. Analyze the impact of cycles on the ecosystem.</p> <ul style="list-style-type: none"> • Evaluate the materials necessary for natural cycles. • Explain the processes involved in the natural cycles. <p>C. Analyze how human action and natural changes affect the balance within an ecosystem.</p> <ul style="list-style-type: none"> • Analyze the effects of substances that move through natural cycles. • Analyze the effects of natural occurrences and their effects on ecosystems. • Analyze effects of human action on an ecosystem. • Compare the stages of succession and how they influence the cycles existing in an ecosystem.
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4.7. Threatened, Endangered and Extinct Species	4.7.7. GRADE 7	4.7.10. GRADE 10	4.7.12. GRADE 12
<p>4.7.4. GRADE 4</p> <p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p> <p>A. Identify differences in living things.</p> <ul style="list-style-type: none"> • Explain why plants and animals are different colors, shapes and sizes and how these differences relate to their survival. • Identify characteristics that living things inherit from their parents. • Explain why each of the four elements in a habitat is essential for survival. • Identify local plants or animals and describe their habitat. <p>B. Know that adaptations are important for survival.</p> <ul style="list-style-type: none"> • Explain how specific adaptations can help a living organism to survive. • Explain what happens to a living thing when its food, water, shelter or space is changed. 	<p>A. Describe diversity of plants and animals in ecosystems.</p> <ul style="list-style-type: none"> • Select an ecosystem and describe different plants and animals that live there. • Identify adaptations in plants and animals. • Recognize that adaptations are developed over long periods of time and are passed on from one generation to the next. • Understand levels of ecosystem organization (e.g., individuals, populations, species). <p>B. Explain how species of living organisms adapt to their environment.</p> <ul style="list-style-type: none"> • Explain the role of individual variations in natural selection. • Explain how an adaptation is an inherited structure or behavior that helps an organism survive and reproduce. • Describe how a particular trait may be selected over time and account for a species' adaptation. • Compare and contrast animals and plants that have very specific survival requirements with those that have more general requirements for survival. 	<p>A. Explain the significance of diversity in ecosystems.</p> <ul style="list-style-type: none"> • Explain the role that specific organisms have in their ecosystem. • Identify a species and explain what effects its increase or decline might have on the ecosystem. • Identify a species and explain how its adaptations are related to its niche in the environment. <p>B. Explain how structure, function and behavior of plants and animals affect their ability to survive.</p> <ul style="list-style-type: none"> • Describe an organism's adaptations for survival in its habitat. • Compare adaptations among species. 	<p>A. Analyze biological diversity as it relates to the stability of an ecosystem.</p> <ul style="list-style-type: none"> • Examine and explain what happens to an ecosystem as biological diversity changes. • Explain the relationship between species' loss and bio-diversity. • Examine and explain how a specialized interaction between two species may affect the survival of both species. <p>B. Examine the effects of extinction, both natural and human caused, on the environment.</p> <ul style="list-style-type: none"> • Predict how human or natural action can produce change to which organisms cannot adapt. • Identify species that became extinct through natural causes and explain how that occurred. • Identify a species that became extinct due to human actions and explain what occurred.

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<p>C. Define and understand extinction.</p> <ul style="list-style-type: none"> • Identify plants and animals that are extinct. • Explain why some plants and animals are extinct. • Know that there are local and state laws regarding plants and animals. 	<p>for survival.</p> <ul style="list-style-type: none"> • Explain how living things respond to changes in their environment. • Explain how one species may survive an environmental change while another might not. <p>C. Explain natural or human actions in relation to the loss of species.</p> <ul style="list-style-type: none"> • Identify natural or human impacts that cause habitat loss. • Explain how habitat loss can affect the interaction among species and the population of a species. • Analyze and explain the changes in an animal population over time. • Explain how a habitat management practice affects a population. • Explain the differences among threatened, endangered and extinct species. • Identify Pennsylvania plants and animals that are on the threatened or endangered list. • Describe state laws passed regarding threatened and endangered species in Pennsylvania. • Explain why one species may be more susceptible to becoming endangered than another species. 	<p>C. Identify and explain why adaptations can lead to specialization.</p> <ul style="list-style-type: none"> • Explain factors that could lead to a species' increase or decrease. • Explain how management practices may influence the success of specific species. • Identify and explain criteria used by scientists for categorizing organisms as threatened, endangered or extinct. 	<p>C. Analyze the effects of threatened, endangered or extinct species on human and natural systems.</p> <ul style="list-style-type: none"> • Identify and explain how a species' increase, decline or elimination affects the ecosystem and/or human social, cultural and economic structures. • Explain why natural populations do not remain constant. • Analyze management strategies regarding threatened or endangered species. • Identify laws, agreements or treaties at national or international levels regarding threatened or endangered species. • Analyze the role of zoos and wildlife preserves on species that have been identified as threatened or endangered. • Examine the influence of wildlife management in preserving different species in Pennsylvania (e.g., bobcat, elk, bald eagle).
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4.8. Humans and the Environment			
4.8.4. GRADE 4	4.8.7. GRADE 7	4.8.10. GRADE 10	4.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>			
<p>A. Identify the biological requirements of humans.</p> <ul style="list-style-type: none"> • Explain how a dynamically changing environment provides for sustainability of living systems. • Identify several ways that people use natural resources. <p>B. Know that environmental conditions influence where and how people live.</p> <ul style="list-style-type: none"> • Identify how regional natural resources influence what people use. • Explain the influence of climate on how and where people live. 	<p>A. Describe how the development of civilization relates to the environment.</p> <ul style="list-style-type: none"> • Explain how people use natural resources in their environment. • Locate and identify natural resources in different parts of the world. • Compare and contrast how people use natural resources throughout the world. <p>B. Explain how people use natural resources.</p> <ul style="list-style-type: none"> • Describe how natural resources are used for survival. • Explain how natural resources and technological changes have affected the development of civilizations. • Explain how climate and extreme weather events (e.g., drought, flood) influence people's lives. 	<p>A. Analyze how society's needs relate to the sustainability of natural resources.</p> <ul style="list-style-type: none"> • Explain why some societies have been unable to meet their natural resource needs. • Compare and contrast the use of natural resources and the environmental conditions in several countries. • Describe how uses of natural resources impact sustainability. <p>B. Analyze the relationship between the use of natural resources and sustaining our society.</p> <ul style="list-style-type: none"> • Explain the role of natural resources in sustaining society. • Analyze the effects of a natural resource's availability on a community or region. 	<p>A. Explain how technology has influenced the sustainability of natural resources over time.</p> <ul style="list-style-type: none"> • Describe how technology has changed the use of natural resources by business and industry. • Analyze the effect of natural resource conservation on a product over time (e.g., automobile manufacturing, aluminum can recycling, paper products). <p>B. Analyze technology's role on natural resource sustainability.</p> <ul style="list-style-type: none"> • Explain how technology has decreased the use of raw natural resources. • Explain how technology has impacted the efficiency of the use of natural resources. • Analyze the role of technology in the reduction of pollution.

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<p>C. Explain how human activities may change the environment.</p> <ul style="list-style-type: none"> Identify everyday human activities and how they affect the environment. Identify examples of how human activities within a community affect the natural environment. 	<p>C. Explain how human activities may affect local, regional and national environments.</p> <ul style="list-style-type: none"> Describe what effect consumption and related generation of wastes have on the environment. Explain how a particular human activity has changed the local area over the years. 	<p>C. Analyze how human activities may cause changes in an ecosystem.</p> <ul style="list-style-type: none"> Analyze and evaluate changes in the environment that are the result of human activities. Compare and contrast the environmental effects of different industrial strategies (e.g., energy generation, transportation, logging, mining, agriculture). 	<p>C. Analyze how pollution has changed in quality, variety and toxicity as the United States developed its industrial base.</p> <ul style="list-style-type: none"> Analyze historical pollution trends and project them for the future. Compare and contrast historical and current pollution levels at a given location.
<p>D. Know the importance of natural resources in daily life.</p> <ul style="list-style-type: none"> Identify items used in daily life that come from natural resources. Identify ways to conserve our natural resources. Identify major land uses in the community. 	<p>D. Explain the importance of maintaining the natural resources at the local, state and national levels.</p> <ul style="list-style-type: none"> Explain how human activities and natural events have affected ecosystems. Explain how conservation practices have influenced ecosystems. Define the roles of Pennsylvania agencies that deal with natural resources. 	<p>D. Explain how the concept of supply and demand affects the environment.</p> <ul style="list-style-type: none"> Identify natural resources for which societal demands have been increasing. Identify specific resources for which human consumption has resulted in scarcity of supply (e.g., buffalo, lobsters). Describe the relationship between population density and resource use and management. 	<p>D. Analyze the international implications of environmental occurrences.</p> <ul style="list-style-type: none"> Identify natural occurrences that have international impact (e.g., El Nino, volcano eruptions, earthquakes). Analyze environmental issues and their international implications.

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4.9. Environmental Laws and Regulations	4.9.7. GRADE 7	4.9.10. GRADE 10	4.9.12. GRADE 12
<p>4.9.4. GRADE 4</p> <p>A. Know that there are laws and regulations for the environment.</p> <ul style="list-style-type: none"> Identify local and state laws and regulations regarding the environment. Explain how the recycling law impacts the school and home. Identify and describe the role of a local or state agency that deals with environmental laws and regulations. 	<p>A. Explain the role of environmental laws and regulations.</p> <ul style="list-style-type: none"> Identify and explain environmental laws and regulations (e.g., Clean Air Act, Clean Water Act, Recycling and Waste Reduction Act, Act 26 on Agricultural Education). Explain the role of local and state agencies in enforcing environmental laws and regulations (e.g., Department of Environmental Protection, Department of Agriculture, Game Commission). 	<p>A. Explain why environmental laws and regulations are developed and enacted.</p> <ul style="list-style-type: none"> Explain the positive and negative impacts associated with passing environmental laws and regulations. Understand conflicting rights of property owners and environmental laws and regulations. Analyze the roles that local, state and federal governments play in the development and enforcement of environmental laws. Identify local and state environmental regulations and their impact on environmental health. Explain the positive and negative impacts of the Endangered Species Act. 	<p>A. Analyze environmental laws and regulations as they relate to environmental issues.</p> <ul style="list-style-type: none"> Analyze and explain how issues lead to environmental law or regulation (e.g., underground storage tanks, regulation of water discharges, hazardous, solid and liquid industrial waste, endangered species). Compare and contrast environmental laws and regulations that may have a positive or negative impact on the environment and the economy. Research and describe the effects of an environmental law or regulation and how it has impacted the environment.
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>			

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XII. GLOSSARY

Abiotic:	A nonliving factor or element (e.g., light, water, heat, rock, energy, mineral).
Acid deposition:	Precipitation with a pH less than 5.6 that forms in the atmosphere when certain pollutants mix with water vapor.
Biological diversity:	The variety and complexity of species present and interacting in an ecosystem and the relative abundance of each.
Biotic:	An environmental factor related to or produced by living organisms.
Closing the loop:	A link in the circular chain of recycling events that promotes the use of products made with recycled materials.
Commodities:	Economic goods or products before they are processed and/or given a brand name, such as a product of agriculture.
Composting:	The process of mixing decaying leaves, manure and other nutritive matter to improve and fertilize soil.
Consumer:	1) Those organisms that obtain energy by feeding on other organisms and their remains. 2) a person buying goods or services for personal needs or to use in the production of other goods for resale.
Decomposer:	An organism, often microscopic in size, that obtains nutrients by consuming dead organic matter, thereby making nutrients accessible to other organisms; examples of decomposers include fungi, scavengers, rodents and other animals.
Delineate:	To trace the outline; to draw; to sketch; to depict or picture.
Ecosystem:	A community of living organisms and their interrelated physical and chemical environment.
Endangered species:	A species that is in danger of extinction throughout all or a significant portion of its range.

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Environment:	The total of the surroundings (air, water, soil, vegetation, people, wildlife) influencing each living being's existence, including physical, biological and all other factors; the surroundings of a plant or animal, including other plants or animals, climate and location.
Equilibrium:	The ability of an ecosystem to maintain stability among its biological resources (e.g., forest, fisheries, crops) so that there is a steady optimum yield.
Extinction:	The complete elimination of a species from the earth.
Groundwater:	Water that infiltrates the soil and is located in underground reservoirs called aquifers.
Hazardous waste:	A solid that, because of its quantity or concentration or its physical, chemical or infectious characteristics, may cause or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.
Homeostasis:	The tendency for a system by resisting change to remain in a state of equilibrium.
Incinerating:	Burning to ashes; reducing to ashes.
Integrated pest management:	A variety of pest control methods that include repairs, traps, bait, poison, etc. to eliminate pests.
Lentic:	Relating to or living in still water
Lotic:	Relating to or living in actively moving water.
Mitigation:	The policy of constructing or creating man-made habitats, such as wetlands, to replace those lost to development.
Niche (ecological):	The role played by an organism in an ecosystem; its food preferences, requirements for shelter, special behaviors and the timing of its activities (e.g., nocturnal, diurnal), interaction with other organisms and its habitat.
Nonpoint source Pollution:	Contamination that originates from many locations that all discharge into a location (e.g., a lake, stream, land area).

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Nonrenewable resources:	Substances (e.g., oil, gas, coal, copper, gold) that, once used, cannot be replaced in this geological age.
Point source pollution:	Pollutants discharged from a single identifiable location (e.g., pipes, ditches, channels, sewers, tunnels, containers of various types).
Pest:	A label applied to an organism when it is in competition with humans for some resource.
Recycling:	Collecting and reprocessing a resource or product to make into new products.
Regulation:	A rule or order issued by an executive authority or regulatory agency of a government and having the force of law.
Renewable:	A naturally occurring raw material or form of energy that will be replenished through natural ecological cycles or sound management practices (e.g., the sun, wind, water, trees).
Risk management:	A strategy developed to reduce or control the chance of harm or loss to one's health or life; the process of identifying, evaluating, selecting and implementing actions to reduce risk to human health and to ecosystems.
Shredder:	Through chewing and/or grinding, microorganisms feed on non-woody coarse particulate matter, primarily leaves.
Stream order:	Energy and nutrient flow that increases as water moves toward the oceans (e.g., the smallest stream (primary) that ends when rivers flow into oceans).
Succession:	The series of changes that occur in an ecosystem with the passing of time.
Sustainability:	The ability to keep in existence or maintain. A sustainable ecosystem is one that can be maintained.
Trophic levels:	The role of an organism in nutrient and energy flow within an ecosystem (e.g., herbivore, carnivore, decomposer).
Waste Stream:	The flow of (waste) materials from generation, collection and separation to disposal.
Watershed:	The land area from which surface runoff drains into a stream, channel, lake, reservoir or other body of water; also called a drainage basin.

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Wetlands:

Lands where water saturation is the dominant factor determining the nature of the soil development and the plant and animal communities (e.g., sloughs, estuaries, marshes).

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APPENDIX A

Academic Standards for Reading, Writing, Speaking
and Listening

and

Academic Standards for Mathematics

Academic Standards for Mathematics



Pennsylvania Department of Education

Academic Standards for Mathematics

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Academic Standards For Mathematics

V. INTRODUCTION

This document includes Mathematics Standards:

- ◇ 2.1. Numbers, Number Systems and Number Relationships
- ◇ 2.2. Computation and Estimation
- ◇ 2.3. Measurement and Estimation
- ◇ 2.4. Mathematical Reasoning and Connections
- ◇ 2.5. Mathematical Problem Solving and Communication
- ◇ 2.6. Statistics and Data Analysis
- ◇ 2.7. Probability and Predictions
- ◇ 2.8. Algebra and Functions
- ◇ 2.9. Geometry
- ◇ 2.10. Trigonometry
- ◇ 2.11. Concepts of Calculus

The Mathematics Standards describe what students should know and be able to do at four grade levels (third, fifth, eighth and eleventh). They reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

This document avoids repetition of learned skills, making an obvious progression across grade levels less explicit. Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level. Consequently, previous learning is reinforced but not retaught.

Students who achieve these mathematical standards will be able to communicate mathematically. Although it is an interesting and enjoyable study for its own sake, mathematics is most appropriately used as a tool to help organize and understand information from other academic disciplines. Because our capacity to deal with all things mathematical is changing rapidly, students must be able to bring the most modern and effective technology to bear on their learning of mathematical concepts and skills.

A glossary is included to assist the reader in understanding terminology contained in the standards.

Academic Standards for Mathematics

2.1. Numbers, Number Systems and Number Relationships			
2.1.3. GRADE 3	2.1.5. GRADE 5	2.1.8. GRADE 8	2.1.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>			
<p>A. Count using whole numbers (to 10,000) and by 2's, 3's, 5's, 10's, 25's and 100's.</p> <p>B. Use whole numbers and fractions to represent quantities.</p> <p>C. Represent equivalent forms of the same number through the use of concrete objects, drawings, word names and symbols.</p> <p>D. Use drawings, diagrams or models to show the concept of fraction as part of a whole.</p> <p>E. Count, compare and make change using a collection of coins and one-dollar bills.</p> <p>F. Apply number patterns (even and odd) and compare values of numbers on the hundred board.</p> <p>G. Use concrete objects to count, order and group.</p> <p>H. Demonstrate an understanding of one-to-one correspondence.</p>	<p>A. Use expanded notation to represent whole numbers or decimals.</p> <p>B. Apply number theory concepts to rename a number quantity (e.g., six, 6, $\frac{12}{2}$, 3×2, $10 - 4$).</p> <p>C. Demonstrate that mathematical operations can represent a variety of problem situations.</p> <p>D. Use models to represent fractions and decimals.</p> <p>E. Explain the concepts of prime and composite numbers.</p> <p>F. Use simple concepts of negative numbers (e.g., on a number line, in counting, in temperature).</p> <p>G. Develop and apply number theory concepts (e.g., primes, factors, multiples, composites) to represent numbers in various ways.</p>	<p>A. Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).</p> <p>B. Simplify numerical expressions involving exponents, scientific notation and using order of operations.</p> <p>C. Distinguish between and order rational and irrational numbers.</p> <p>D. Apply ratio and proportion to mathematical problem situations involving distance, rate, time and similar triangles.</p> <p>E. Simplify and expand algebraic expressions using exponential forms.</p> <p>F. Use the number line model to demonstrate integers and their applications.</p> <p>G. Use the inverse relationships between addition, subtraction, multiplication, division, exponentiation and root extraction to determine unknown quantities in equations.</p>	<p>A. Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).</p>

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<p>I. Apply place-value concepts and numeration to counting, ordering and grouping.</p> <p>J. Estimate, approximate, round or use exact numbers as appropriate.</p> <p>K. Describe the inverse relationship between addition and subtraction.</p> <p>L. Demonstrate knowledge of basic facts in four basic operations.</p>			
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Academic Standards for Mathematics

2.2. Computation and Estimation		2.2.5. GRADE 5	2.2.8. GRADE 8	2.2.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i>				
<p>A. Apply addition and subtraction in everyday situations using concrete objects.</p> <p>B. Solve single- and double-digit addition and subtraction problems with regrouping in vertical form.</p> <p>C. Demonstrate the concept of multiplication as repeated addition and arrays.</p> <p>D. Demonstrate the concept of division as repeated subtraction and as sharing.</p> <p>E. Use estimation skills to arrive at conclusions.</p> <p>F. Determine the reasonableness of calculated answers.</p> <p>G. Explain addition and subtraction algorithms with regrouping.</p>	<p>A. Create and solve word problems involving addition, subtraction, multiplication and division of whole numbers.</p> <p>B. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with decimals with and without regrouping.</p> <p>C. Develop and apply algorithms to solve word problems that involve addition, subtraction, and/or multiplication with fractions and mixed numbers that include like and unlike denominators.</p> <p>D. Demonstrate the ability to round numbers.</p> <p>E. Determine through estimations the reasonableness of answers to problems involving addition, subtraction, multiplication and division of whole numbers.</p> <p>F. Demonstrate skills for using fraction calculators to verify conjectures, confirm computations and explore complex problem-solving situations.</p>	<p>A. Complete calculations by applying the order of operations.</p> <p>B. Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.</p> <p>C. Estimate the value of irrational numbers.</p> <p>D. Estimate amount of tips and discounts using ratios, proportions and percents.</p> <p>E. Determine the appropriateness of overestimating or underestimating in computation.</p> <p>F. Identify the difference between exact value and approximation and determine which is appropriate for a given situation.</p>	<p>A. Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.</p> <p>B. Use estimation to solve problems for which an exact answer is not needed.</p> <p>C. Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.</p> <p>D. Describe and explain the amount of error that may exist in a computation using estimates.</p> <p>E. Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.</p> <p>F. Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.</p>	

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	<p>G. Apply estimation strategies to a variety of problems including time and money.</p> <p>H. Explain multiplication and division algorithms.</p> <p>I. Select a method for computation and explain why it is appropriate.</p>		
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2.3. Measurement and Estimation	2.3.3. GRADE 3	2.3.5. GRADE 5	2.3.8. GRADE 8	2.3.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p> <p>A. Compare measurable characteristics of different objects on the same dimensions (e.g., time, temperature, area, length, weight, capacity, perimeter).</p> <p>B. Determine the measurement of objects with non-standard and standard units (e.g., US customary and metric).</p> <p>C. Determine and compare elapsed times.</p> <p>D. Tell time (analog and digital) to the minute.</p> <p>E. Determine the appropriate unit of measure.</p> <p>F. Use concrete objects to determine area and perimeter.</p> <p>G. Estimate and verify measurements.</p> <p>Demonstrate that a single object has different attributes that can be measured in different ways (e.g., length, mass, weight, time, area, temperature, capacity, perimeter).</p>	<p>A. Select and use appropriate instruments and units for measuring quantities (e.g., perimeter, volume, area, weight, time, temperature).</p> <p>B. Select and use standard tools to measure the size of figures with specified accuracy, including length, width, perimeter and area.</p> <p>C. Estimate, refine and verify specified measurements of objects.</p> <p>D. Convert linear measurements within the same system.</p> <p>E. Add and subtract measurements.</p>	<p>A. Develop formulas and procedures for determining measurements (e.g., area, volume, distance).</p> <p>B. Solve rate problems (e.g., rate \times time = distance, principal \times interest rate = interest).</p> <p>C. Measure angles in degrees and determine relations of angles.</p> <p>D. Estimate, use and describe measures of distance, rate, perimeter, area, volume, weight, mass and angles.</p> <p>E. Describe how a change in linear dimension of an object affects its perimeter, area and volume.</p> <p>F. Use scale measurements to interpret maps or drawings.</p> <p>G. Create and use scale models.</p>	<p>A. Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.</p> <p>B. Measure and compare angles in degrees and radians.</p> <p>C. Demonstrate the ability to produce measures with specified levels of precision.</p>	

Academic Standards for Mathematics

2.4. Mathematical Reasoning and Connections	2.4.3. GRADE 3	2.4.4. GRADE 5	2.4.8. GRADE 8	2.4.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p> <p>A. Make, check and verify predictions about the quantity, size and shape of objects and groups of objects.</p> <p>B. Use measurements in everyday situations (e.g., determine the geography of the school building).</p>	<p>A. Compare quantities and magnitudes of numbers.</p> <p>B. Use models, number facts, properties and relationships to check and verify predictions and explain reasoning.</p> <p>C. Draw inductive and deductive conclusions within mathematical contexts.</p> <p>D. Distinguish between relevant and irrelevant information in a mathematical problem.</p> <p>E. Interpret statements made with precise language of logic (e.g., “all”, “or”, “every”, “none”, “some”, “or”, “many”).</p> <p>F. Use statistics to quantify issues (e.g., in social studies, in science).</p>	<p>A. Make conjectures based on logical reasoning and test conjectures by using counter-examples.</p> <p>B. Combine numeric relationships to arrive at a conclusion.</p> <p>C. Use if...then statements to construct simple, valid arguments.</p> <p>D. Construct, use and explain algorithmic procedures for computing and estimating with whole numbers, fractions, decimals and integers.</p> <p>E. Distinguish between inductive and deductive reasoning.</p> <p>F. Use measurements and statistics to quantify issues (e.g., in family, consumer science situations).</p>	<p>A. Use direct proofs, indirect proofs or proof by contradiction to validate conjectures.</p> <p>B. Construct valid arguments from stated facts.</p> <p>C. Determine the validity of an argument.</p> <p>D. Use truth tables to reveal the logic of mathematical statements.</p> <p>E. Demonstrate mathematical solutions to problems (e.g., in the physical sciences).</p>	

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2.5. Mathematical Problem Solving and Communication			
2.5.3. GRADE 3	2.5.5. GRADE 5	2.5.8. GRADE 8	2.5.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p>			
<p>A. Use appropriate problem-solving strategies (e.g., guess and check, working backwards).</p> <p>B. Determine when sufficient information is present to solve a problem and explain how to solve a problem.</p> <p>C. Select and use an appropriate method, materials and strategy to solve problems, including mental mathematics, paper and pencil and concrete objects.</p>	<p>A. Develop a plan to analyze a problem, identify the information needed to solve the problem, carry out the plan, check whether an answer makes sense and explain how the problem was solved.</p> <p>B. Use appropriate mathematical terms, vocabulary, language symbols and graphs to explain clearly and logically solutions to problems.</p> <p>C. Show ideas in a variety of ways, including words, numbers, symbols, pictures, charts, graphs, tables, diagrams and models.</p> <p>D. Connect, extend and generalize problem solutions to other concepts, problems and circumstances in mathematics.</p> <p>E. Select, use and justify the methods, materials and strategies used to solve problems.</p> <p>F. Use appropriate problem-solving strategies (e.g., solving a simpler problem, drawing a picture or diagram).</p>	<p>A. Invent, select, use and justify the appropriate methods, materials and strategies to solve problems.</p> <p>B. Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams.</p> <p>C. Justify strategies and defend approaches used and conclusions reached.</p> <p>D. Determine pertinent information in problem situations and whether any further information is needed for solution.</p>	<p>A. Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.</p> <p>B. Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.</p> <p>C. Present mathematical procedures and results clearly, systematically, succinctly and correctly.</p> <p>D. Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.</p>

Academic Standards for Mathematics

2.6. Statistics and Data Analysis			
2.6.3. GRADE 3	2.6.5. GRADE 5	2.6.8. GRADE 8	2.6.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Gather, organize and display data using pictures, tallies, charts, bar graphs and pictographs.</p> <p>B. Formulate and answer questions based on data shown on graphs.</p> <p>C. Predict the likely number of times a condition will occur based on analyzed data.</p> <p>D. Form and justify an opinion on whether a given statement is reasonable based on a comparison to data.</p>	<p>A. Organize and display data using pictures, tallies, tables, charts, bar graphs and circle graphs.</p> <p>B. Describe data sets using mean, median, mode and range.</p> <p>C. Sort data using Venn diagrams.</p> <p>D. Predict the likely number of times a condition will occur based on analyzed data.</p> <p>E. Construct and defend simple conclusions based on data.</p>	<p>A. Compare and contrast different plots of data using values of mean, median, mode, quartiles and range.</p> <p>B. Explain effects of sampling procedures and missing or incorrect information on reliability.</p> <p>C. Fit a line to the scatter plot of two quantities and describe any correlation of the variables.</p> <p>D. Design and carry out a random sampling procedure.</p> <p>E. Analyze and display data in stem-and-leaf and box-and-whisker plots.</p> <p>F. Use scientific and graphing calculators and computer spreadsheets to organize and analyze data.</p> <p>G. Determine the validity of the sampling method described in studies published in local or national newspapers.</p>	<p>A. Design and conduct an experiment using random sampling. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs. (Use standard deviation, variance and t-tests.)</p> <p>B. Use appropriate technology to organize and analyze data taken from the local community.</p> <p>C. Determine the regression equation of best fit (e.g., linear, quadratic, exponential).</p> <p>D. Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.</p> <p>E. Determine the validity of the sampling method described in a given study.</p> <p>F. Determine the degree of dependence of two quantities specified by a two-way table.</p>

Academic Standards for Mathematics

			<p>G. Describe questions of experimental design, control groups, treatment groups, cluster sampling and reliability.</p> <p>H. Use sampling techniques to draw inferences about large populations.</p> <p>I. Describe the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed.</p>
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Academic Standards for Mathematics

2.7. Probability and Predictions			
2.7.3. GRADE 3	2.7.5. GRADE 5	2.7.8. GRADE 8	2.7.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to:</i></p>			
<p>A. Predict and measure the likelihood of events and recognize that the results of an experiment may not match predicted outcomes.</p> <p>B. Design a fair and an unfair spinner.</p> <p>C. List or graph the possible results of an experiment.</p> <p>D. Analyze data using the concepts of largest, smallest, most often, least often and middle.</p>	<p>A. Perform simulations with concrete devices (e.g., dice, spinner) to predict the chance of an event occurring.</p> <p>B. Determine the fairness of the design of a spinner.</p> <p>C. Express probabilities as fractions and decimals.</p> <p>D. Compare predictions based on theoretical probability and experimental results.</p> <p>E. Calculate the probability of a simple event.</p> <p>F. Determine patterns generated as a result of an experiment.</p> <p>G. Determine the probability of an event involving “and”, “or” or “not”.</p> <p>H. Predict and determine why some outcomes are certain, more likely, less likely, equally likely or impossible.</p>	<p>A. Determine the number of combinations and permutations for an event.</p> <p>B. Present the results of an experiment using visual representations (e.g., tables, charts, graphs).</p> <p>C. Analyze predictions (e.g., election polls).</p> <p>D. Compare and contrast results from observations and mathematical models.</p> <p>E. Make valid inferences, predictions and arguments based on probability.</p>	<p>A. Compare odds and probability.</p> <p>B. Apply probability and statistics to perform an experiment involving a sample and generalize its results to the entire population.</p> <p>C. Draw and justify a conclusion regarding the validity of a probability or statistical argument.</p> <p>D. Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.</p> <p>E. Solve problems involving independent simple and compound events.</p>

Academic Standards for Mathematics

	<p>I. Find all possible combinations and arrangements involving a limited number of variables.</p> <p>J. Develop a tree diagram and list the elements.</p>		
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Academic Standards for Mathematics

2.8. Algebra and Functions	2.8.3. GRADE 3	2.8.5. GRADE 5	2.8.8. GRADE 8	2.8.11. GRADE 11
<p>2.8. Algebra and Functions</p> <p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p>	<p>A. Recognize, describe, extend, create and replicate a variety of patterns including attribute, activity, number and geometric patterns.</p> <p>B. Use concrete objects and trial and error to solve number sentences and check if solutions are sensible and accurate.</p> <p>C. Substitute a missing addend in a number sentence.</p> <p>D. Create a story to match a given combination of symbols and numbers.</p> <p>E. Use concrete objects and symbols to model the concepts of variables, expressions, equations and inequalities.</p> <p>F. Explain the meaning of solutions and symbols.</p> <p>G. Use a table or a chart to display information.</p> <p>H. Describe and interpret the data shown in tables and charts.</p> <p>I. Demonstrate simple function rules.</p>	<p>A. Recognize, reproduce, extend, create and describe patterns, sequences and relationships verbally, numerically, symbolically and graphically, using a variety of materials.</p> <p>B. Connect patterns to geometric relations and basic number skills.</p> <p>C. Form rules based on patterns (e.g., an equation that relates pairs in a sequence).</p> <p>D. Use concrete objects and combinations of symbols and numbers to create expressions that model mathematical situations.</p> <p>E. Explain the use of combinations of symbols and numbers in expressions, equations and inequalities.</p> <p>F. Describe a realistic situation using information given in equations, inequalities, tables or graphs.</p> <p>G. Select and use appropriate strategies, including concrete materials, to solve number sentences and explain the method of solution.</p>	<p>A. Apply simple algebraic patterns to basic number theory and to spatial relations</p> <p>B. Discover, describe and generalize patterns, including linear, exponential and simple quadratic relationships.</p> <p>C. Create and interpret expressions, equations or inequalities that model problem situations.</p> <p>D. Use concrete objects to model algebraic concepts.</p> <p>E. Select and use a strategy to solve an equation or inequality, explain the solution and check the solution for accuracy.</p> <p>F. Solve and graph equations and inequalities using scientific and graphing calculators and computer spreadsheets.</p> <p>G. Represent relationships with tables or graphs in the coordinate plane and verbal or symbolic rules.</p>	<p>A. Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.</p> <p>B. Give examples of patterns that occur in data from other disciplines.</p> <p>C. Use patterns, sequences and series to solve routine and non-routine problems.</p> <p>D. Formulate expressions, equations, inequalities, systems of equations, systems of inequalities and matrices to model routine and non-routine problem situations.</p> <p>E. Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).</p> <p>F. Identify whether systems of equations and inequalities are consistent or inconsistent.</p> <p>G. Analyze and explain systems of equations, systems of inequalities and matrices.</p>

Academic Standards for Mathematics

<p>J. Analyze simple functions and relationships and locate points on a simple grid.</p>	<p>H. Locate and identify points on a coordinate system.</p> <p>I. Generate functions from tables of data and relate data to corresponding graphs and functions.</p>	<p>H. Graph a linear function from a rule or table.</p> <p>I. Generate a table or graph from a function and use graphing calculators and computer spreadsheets to graph and analyze functions.</p> <p>J. Show that an equality relationship between two quantities remains the same as long as the same change is made to both quantities; explain how a change in one quantity determines another quantity in a functional relationship.</p>	<p>H. Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software.</p> <p>I. Use matrices to organize and manipulate data, including matrix addition, subtraction, multiplication and scalar multiplication.</p> <p>J. Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane.</p> <p>K. Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.</p> <p>L. Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.</p> <p>M. Given a set of data points, write an equation for a line of best fit.</p> <p>N. Solve linear, quadratic and exponential equations both symbolically and graphically.</p>
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Academic Standards for Mathematics

			<p>O. Determine the domain and range of a relation, given a graph or set of ordered pairs.</p> <p>P. Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.</p> <p>Q. Represent functional relationships in tables, charts and graphs.</p> <p>R. Create and interpret functional models.</p> <p>S. Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, logarithmic).</p> <p>T. Analyze and categorize functions by their characteristics.</p>
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Academic Standards for Mathematics

2.9. Geometry			
2.9.3. GRADE 3	2.9.5. GRADE 5	2.9.8. GRADE 8	2.9.11. GRADE 11
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i>			
<p>A. Name and label geometric shapes in two and three dimensions (e.g., circle/sphere, square/cube, triangle/pyramid, rectangle/prism).</p> <p>B. Build geometric shapes using concrete objects (e.g., manipulatives).</p> <p>C. Draw two- and three-dimensional geometric shapes and construct rectangles, squares and triangles on the geoboard and on graph paper satisfying specific criteria.</p> <p>D. Find and describe geometric figures in real life.</p> <p>E. Identify and draw lines of symmetry in geometric figures.</p> <p>F. Identify symmetry in nature.</p> <p>G. Fold paper to demonstrate the reflections about a line.</p> <p>H. Show relationships between and among figures using reflections.</p>	<p>A. Give formal definitions of geometric figures.</p> <p>B. Classify and compare triangles and quadrilaterals according to sides or angles.</p> <p>C. Identify and measure circles, their diameters and their radii.</p> <p>D. Describe in words how geometric shapes are constructed.</p> <p>E. Construct two- and three-dimensional shapes and figures using manipulatives, geoboards and computer software.</p> <p>F. Find familiar solids in the environment and describe them.</p> <p>G. Create an original tessellation.</p> <p>H. Describe the relationship between the perimeter and area of triangles, quadrilaterals and circles.</p> <p>I. Represent and use the concepts of line, point and plane.</p>	<p>A. Construct figures incorporating perpendicular and parallel lines, the perpendicular bisector of a line segment and an angle bisector using computer software.</p> <p>B. Draw, label, measure and list the properties of complementary, supplementary and vertical angles.</p> <p>C. Classify familiar polygons as regular or irregular up to a decagon.</p> <p>D. Identify, name, draw and list all properties of squares, cubes, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, spheres, triangles, prisms and cylinders.</p> <p>E. Construct parallel lines, draw a transversal and measure and compare angles formed (e.g., alternate interior and exterior angles).</p> <p>F. Distinguish between similar and congruent polygons.</p>	<p>A. Construct geometric figures using dynamic geometry tools (e.g., Geometer's Sketchpad, Cabri Geometre).</p> <p>B. Prove that two triangles or two polygons are congruent or similar using algebraic, coordinate and deductive proofs.</p> <p>C. Identify and prove the properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles and diagonals using deductive proofs.</p> <p>D. Identify corresponding parts in congruent triangles to solve problems.</p> <p>E. Solve problems involving inscribed and circumscribed polygons.</p> <p>F. Use the properties of angles, arcs, chords, tangents and secants to solve problems involving circles.</p> <p>G. Solve problems using analytic geometry.</p>

Academic Standards for Mathematics

<p>I. Predict how shapes can be changed by combining or dividing them.</p>	<p>J. Define the basic properties of squares, pyramids, parallelograms, quadrilaterals, trapezoids, polygons, rectangles, rhombi, circles, triangles, cubes, prisms, spheres and cylinders.</p> <p>K. Analyze simple transformations of geometric figures and rotations of line segments.</p> <p>L. Identify properties of geometric figures (e.g., parallel, perpendicular, similar, congruent, symmetrical).</p>	<p>G. Approximate the value of π (π) through experimentation.</p> <p>H. Use simple geometric figures (e.g., triangles, squares) to create, through rotation, transformational figures in three dimensions.</p> <p>I. Generate transformations using computer software.</p> <p>J. Analyze geometric patterns (e.g., tessellations, sequences of shapes) and develop descriptions of the patterns.</p> <p>K. Analyze objects to determine whether they illustrate tessellations, symmetry, congruence, similarity and scale.</p>	<p>H. Construct a geometric figure and its image using various transformations.</p> <p>I. Model situations geometrically to formulate and solve problems.</p> <p>J. Analyze figures in terms of the kinds of symmetries they have.</p>
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Academic Standards for Mathematics

2.10. Trigonometry			
2.10.3. GRADE 3	2.10.5. GRADE 5	2.10.8. GRADE 8	2.10.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p>			
<p>A. Identify right angles in the environment.</p> <p>B. Model right angles and right triangles using concrete objects.</p>	<p>A. Identify and compare parts of right triangles, including right angles, acute angles, hypotenuses and legs.</p> <p>B. Create right triangles on a geoboard.</p>	<p>A. Compute measures of sides and angles using proportions, the Pythagorean Theorem and right triangle relationships.</p> <p>B. Solve problems requiring indirect measurement for lengths of sides of triangles.</p>	<p>A. Use graphing calculators to display periodic and circular functions; describe properties of the graphs.</p> <p>B. Identify, create and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.</p>

Academic Standards for Mathematics

2.11. Concepts of Calculus			
2.11.3. GRADE 3	2.11.5. GRADE 5	2.11.8. GRADE 8	2.11.11. GRADE 11
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills to:</i></p>			
<p>A. Identify whole number quantities and measurements from least to most and greatest value.</p> <p>B. Identify least and greatest values represented in bar graphs and pictographs.</p> <p>C. Categorize rates of change as faster and slower.</p> <p>D. Continue a pattern of numbers or objects that could be extended infinitely.</p>	<p>A. Make comparisons of numbers (e.g., more, less, same, least, most, greater than, less than).</p> <p>B. Identify least and greatest values represented in bar and circle graphs.</p> <p>C. Identify maximum and minimum.</p> <p>D. Describe the relationship between rates of change and time.</p> <p>E. Estimate areas and volumes as the sums of areas of tiles and volumes of cubes.</p> <p>F. Describe the relationship between the size of the unit of measurement and the estimate of the areas and volumes.</p>	<p>A. Analyze graphs of related quantities for minimum and maximum values and justify the findings.</p> <p>B. Describe the concept of unit rate, ratio and slope in the context of rate of change.</p> <p>C. Continue a pattern of numbers or objects that could be extended infinitely.</p>	<p>A. Determine maximum and minimum values of a function over a specified interval.</p> <p>B. Interpret maximum and minimum values in problem situations.</p> <p>C. Graph and interpret rates of growth/decay.</p> <p>D. Determine sums of finite sequences of numbers and infinite geometric series.</p> <p>E. Estimate areas under curves using sequences of areas.</p>

Academic Standards for Mathematics

VI. GLOSSARY

- Absolute value:** A number's distance from zero on a number line. The absolute value of 2 is equal to the absolute value of -2.
- Algorithm:** A method of performing an arithmetic operation.
- Analog time:** Time displayed on a timepiece having hour and minute hands.
- Array:** Arrangement of a series of items according to the values of the items (e.g., largest to smallest).
- Box-and-whisker plot:** A graphic method for showing a summary of data using median, quartiles and extremes of data.



- Combination:** A subset of the elements in a given set, without regard to the order in which those elements are arranged.
- Composite number:** Any positive integer exactly divisible by one or more positive integers other than itself and 1.
- Congruent:** Having the same shape and the same size.
- Conjecture:** A statement believed to be true but not proved.
- Coordinate system:** A method of locating points in the plane or in space by means of numbers. A point in the plane is located by its distances from both a horizontal and a vertical line called the axes. The horizontal line is called the x-axis. The vertical line is called the y-axis. The pairs of numbers are called ordered pairs. The first number, called the x-coordinate, designates the distance along the horizontal axis. The second number, called the y-coordinate, designates the distance along the vertical axis. The point at which the two axes intersect has the coordinates (0,0) and is called the origin.
- Correlation:** A measure of the mutual relationship between two variables.

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Customary system:	A system of weights and measures frequently used in the United States. The basic unit of weight is the pound; the basic unit of capacity is the quart.
Deductive reasoning:	The process of reasoning from statements accepted as true to reach a conclusion.
Direct variation:	Two variables are so related that their ratio remains constant.
Domain:	The set of all possible values for the unknown in an open sentence.
Equation:	A statement of equality between two mathematical expressions (e.g., $X + 5 = Y - 2$).
Equivalent forms:	Different forms of numbers that name the same number (e.g., fraction, decimal, percent as $\frac{1}{2}$, .5, 50%).
Expanded notation:	Involves writing the number in expanded form to show the value of each digit (e.g., $15,629 = 10,000 + 5,000 + 600 + 20 + 9$).
Exponential function:	A function whose general equation is $y = a \times b^x$ or $y = a \times b^{kx}$, where a, b and k stand for constants.
Exponent:	A numeral used to tell how many times a number or variable is used as a factor (e.g., a^2 , 2^n , y^x).
Expression:	A mathematical phrase that can include operations, numerals and variables. In algebraic terms: $2l + 3x$; in numeric terms: 13.4 - 4.7.
Factor:	The number or variable multiplied in a multiplication expression.
Factorial:	The expression $n!$ (n factorial) is the product of all the numbers from 1 to n for any positive integer n.
Function:	A relation in which each value of an independent variable is associated with a unique value of the dependent value.

Academic Standards for Mathematics

Geoboard:	A board with pegs aligned in grid fashion that permits rubber bands to be wrapped around pegs to form geometric figures.
Graphing calculator:	A calculator that will store and draw the graphs of several functions at once.
Independent events:	Events such that the outcome of the first event has no effect on the probabilities of the outcome of the second event (e.g., two tosses of the same coin are independent events).
Inductive reasoning:	Generalizations made from particular observations in a common occurrence.
Inequality:	A mathematical sentence that contains a symbol (e.g., $>$, $<$, \geq , \leq or \neq) in which the terms on either side of the symbol are unequal (e.g., $x < y$, $7 > 3$, $n \geq 4$).
Infinite:	Has no end or goes on forever.
Integer:	A number that is a positive whole number, a negative whole number or zero.
Inverse:	A new conditional formed by negating both the antecedent and the consequent of a conditional.
Inverse operations:	Operations that undo each other (e.g., addition and subtraction are inverse operations; multiplication and division are inverse operations).
Inverse variation:	When the ratio of one variable to the reciprocal of the other is constant, one of them is said to vary inversely as the other.
Irrational number:	A number that cannot be written as a simple fraction. It is an infinite and non-repeating decimal.
Limit:	A number to which the terms of a sequence get closer so that beyond a certain term all terms are as close as desired to that number.

Academic Standards for Mathematics

- Line of best fit:** The line that fits a set of data points with the smallest value for the sum of the squares of the errors (vertical distances) from the data points to the line; the regression line.
- Linear function:** A function whose general equation is $y = mx + b$, where m and b stand for constants and $m \neq 0$.
- Linear measurement:** Measurement in a straight line.
- Logarithm:** The exponent indicating the power to which a fixed number, the base, must be raised to produce a given number. For example, if $n^x = a$, the logarithm of a , with n as the base, is x ; symbolically, $\log_n a = x$. If the base is 10, the log of 100 is 2.
- Manipulatives:** Materials that allow students to explore mathematical concepts in a concrete mode.
- Mathematical model:** A representation in the mathematical world of some phenomenon in the real world. It frequently consists of a function or relation specifying how two variables are related.
- Matrix:** A rectangular array of numbers representing such things as the coefficients in a system of equations arranged in rows and columns.
- Maximum:** The greatest number in a set of data.
- Mean:** The sum of the set of numbers divided by n , the number of numbers in the set.
- Median:** The number that lies in the middle when a set of numbers is arranged in order. If there are two middle values, the median is the mean of these values.
- Metric system:** A system of measurement used throughout the world based on factors of 10. It includes measures of length, weight and capacity.
- Minimum:** The least number in a set of data.

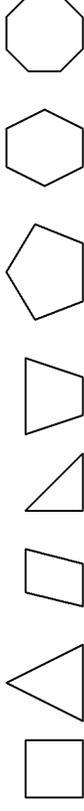
Academic Standards for Mathematics

Missing addend:	A member of an addition number sentence in which that term is missing (e.g., $5 + \underline{\quad} = 8$).
Mode:	The number(s) that occurs most often in a set of numbers (e.g., in the set 1, 2, 3, 3, 5, 8; the mode is 3).
Multiple:	A number that is the product of a given integer and another integer (e.g., 6 and 9 are multiples of 3).
Normal curve:	A graphical plot of a mathematical function (frequency distribution) which is unimodal and symmetrical.
One-to-one correspondence:	When one and only one element of a second set is assigned to an element of a first set, all elements of the second set are assigned, and every element of the first set has an assignment, the mapping is called one-to-one (e.g., in the set Bill Clinton, George Bush, Ronald Reagan, Jimmy Carter, Hillary Clinton, Barbara Bush, Nancy Reagan and Rosalynn Carter, there is a one-to-one correspondence between the pairs).
Open sentence:	A statement that contains at least one unknown. It becomes true or false when a quantity is substituted for the unknown (e.g., $x + 5 = 9$, $y - 2 = 7$).
Order of operations:	Rules for evaluating an expression: work first within parentheses; then calculate all powers, from left to right; then do multiplications or divisions, from left to right; then do additions and subtractions, from left to right.
Patterns:	Regularities in situations such as those in nature, events, shapes, designs and sets of numbers (e.g., spirals on pineapples, geometric designs in quilts, the number sequence 3, 6, 9, 12, ...).
Permutation:	An arrangement of a given number of objects from a given set in which the order of the objects is significant.
Perpendicular lines:	Two lines that intersect to form right angles (e.g., \perp , \lrcorner , \ulcorner).
Plotting points:	Locating points by means of coordinates, or a curve by plotted points, representing an equation by means of a curve so constructed.

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Polygon:

A union of segments connected end to end, such that each segment intersects exactly two others at its endpoints.



Powers:

A number expressed using an exponent. The number 5^3 is read five to the third power or five cubed.

Prime:

An integer greater than one whose only positive factors are 1 and itself (e.g., 2, 3, 5, 7, 11, 13, 17, and 19).

Probability:

A number from 0 to 1 that indicates how likely something is to happen.

Problem-solving:

Finding ways to reach a goal when no routine path is apparent.

Proof by contradiction:

A proof in which, if s is to be proven, one reasons from not- s until a contradiction is deduced; from this it is concluded that not- s is false, which means that s is true.

Proportion:

An equation of the form $\frac{a}{b} = \frac{c}{d}$ that states that the two ratios are equivalent.

Quadrilateral:

A four-sided polygon.

Quartiles:

The three values that divide an ordered set into four subsets of approximately equal size. The second quartile is the median.

Radian:

A unit of angular measure equal to $\frac{1}{2\pi}$ of a complete revolution.

Range (1) :

The difference between the greatest number and the least number in a set of data.

Range (2) :

The set of output values for a function.

Rate of change:

The limit of the ratio of an increment of the function value at the point to that of the independent variable as the increment of the variable approaches zero.

Academic Standards for Mathematics

Ratio:	A comparison of two numbers by division.
Rational numbers:	Any number that can be written in the form $\frac{a}{b}$ where a is any integer and b is any integer except zero.
Real numbers:	The set consisting of all rational numbers and all irrational numbers.
Reasonableness:	Quality of a solution such that it is not extreme or excessive.
Reciprocal:	The fractional number that results from dividing one by the number.
Rectangular prism:	A three-dimensional figure whose sides are all rectangles; a box.
Reflection:	A transformation that produces the mirror image of a geometric figure.
Regression:	The line that represents the least deviation from the points in a scatter plot of data.
Regular polygon:	A polygon in which all sides have the same measure and all angles have the same measure.
Relation:	A set of ordered pairs.
Reliability:	The extent to which a measuring procedure yields the same results on repeated trials.
Repeated addition:	A model for multiplication (e.g., $2 + 2 + 2 = 3 \times 2$).
Rotation:	A transformation that maps every point in the plane to its image by rotating the plane around a fixed point or line.
Scientific calculator:	A calculator that represents very large or very small numbers in scientific notation with the powering, factorial, square root, negative and reciprocal keys.
Scientific notation:	A way in writing a number of terms of an integer power of 10 multiplied by a number greater than or equal to 1 and less than 10.

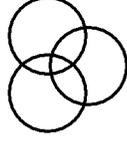
Academic Standards for Mathematics

- Sequence:** A set of ordered quantities (e.g., positive integers).
- Series:** The indicated sum of the terms of a sequence.
- Similarity:** Having the same shape but not necessarily the same size.
- Simple event:** An event whose probability can be obtained from consideration of a single occurrence (e.g., the tossing of a coin is a simple event).
- Simulation:** Modeling a real event without actually observing the event.
- Slope:** The slope of a line is the ratio of the change in y to the corresponding change in x ; the constant m in the linear function equation; rise/run.
- Standard deviation:** The square root of the variance.
- Stem-and-leaf plot:** A frequency distribution made by arranging data (e.g., student scores on a test were 98, 96, 85, 93, 83, 87, 85, 87, 93, 75, 77 and 83). This data is displayed in a stem-and-leaf plot below.
- | | |
|---|------------------|
| 9 | 8, 6, 3, 3 |
| 8 | 7, 7, 5, 5, 3, 3 |
| 7 | 7, 5 |
- Systems of equations:** Two or more equations that are conditions imposed simultaneously on all the variables, but may or may not have common solutions (e.g., $x + y = 2$, and $3x + 2y = 5$).
- Symmetry:** A line of symmetry separates a figure into two congruent halves, each of which is a reflection of the other (e.g., \emptyset , the line through the center of the circle divides it into congruent halves).

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- t-test:** A statistical test done to test the difference of means of two samples.
- Tessellation:** A repetitive pattern of polygons that covers an area with no holes and no overlaps (e.g., floor tiles).
- Transformation:** An operation on a geometric figure by which each point gives rise to a unique image.
- Translation:** A transformation that moves a geometric figure by sliding each of the points the same distance in the same direction.
- Tree diagram:** A diagram used to show the total number of possible outcomes in a probability experiment.
- Trigonometric functions:** A function (e.g., sine, cosine, tangent, cotangent, secant, cosecant) whose independent variable is an angle measure, usually in degrees or radians.
- Valid argument:** An argument with the property that no matter what statements are substituted in the premises, the truth value of the form is true. If the premises are true, then the conclusion is true.
- Variable:** A symbol used to stand for any one of a given set of numbers or other objects (e.g., in the equation $y = x + 5$, y and x are variables).
- Variance:** In a data set, the sum of the squared deviations divided by one less than the number of elements in the set (sample variance s^2) or by the number of elements in the set (population variance σ^2).
- Vector:** A quantity that has both magnitude and direction (e.g., physical quantities such as velocity and force).

Venn diagram: A display that pictures unions and intersections of sets.



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Volume:

The amount of space enclosed in a space (3-dimensional) figure, measured in cubic units.

Y-intercept:

The y-intercept of a line is the y-coordinate of the point at which the graph of an equation crosses the y-axis.

π :

pi, the ratio of the circumference of a circle to its diameter: 3.1415926535.

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VIII. INTRODUCTION

This document describes what students should know and be able to do in the following eight areas:

- ◇ 3.1. Unifying Themes of Science
- ◇ 3.2. Inquiry and Design
- ◇ 3.3. Biological Sciences
- ◇ 3.4. Physical Science, Chemistry and Physics
- ◇ 3.5. Earth Sciences
- ◇ 3.6. Technology Education
- ◇ 3.7. Technological Devices
- ◇ 3.8. Science, Technology and Human Endeavors

These standards describe what students should know and be able to do by the end of fourth, seventh, tenth and twelfth grade. In addition, these standards reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

This document avoids repetition, making an obvious progression across grade levels less explicit. Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level. Consequently, previous learning is reinforced but not retaught.

Standards are arranged by categories, for example, 3.5 Earth Science. Under each category are standard statements that are preceded by a capital letter, for example, in 3.1 Unifying Themes, grade 10.B, "Describe concepts of models as a way to predict and understand science and technology." Following the standard statements are bulleted standard descriptors, which explain the nature and scope of the standard. Descriptors specify the nature of the standard and the level of complexity needed in meeting that standard in a proficient manner. Descriptors serve to benchmark the standard statement. Curriculum, instruction and assessment should focus on meeting the standard statement. Technology Education, computer applications and science are separate curricular areas. Meeting standards should be approached as a collaborative effort among all curricular areas.

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The following descriptors explain the intent of each standard category:

3.1. Unifying Themes

Unifying themes of science and technology provide big ideas that integrate with significant concepts. There are only a few fundamental concepts and processes that form the framework upon which science and technology knowledges are organized - motion and forces, energy, structure of matter, change over time and machines. These themes create the context through which the content of the disciplines can be taught and are emphasized in each standard.

3.2. Inquiry and Design

The nature of science and technology is characterized by applying process knowledge that enables students to become independent learners. These skills include observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, raising questions, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models, and producing solutions. Everyone can use them to solve real-life problems. These process skills are developed across the grade levels and differ in the degree of sophistication, quantitative nature and application to the content.

3.3. Biological Sciences

Biology concerns living things, their appearance, different types of life, the scope of their similarities and differences, where they live and how they live. Living things are made of the same components as all other matter, involve the same kinds of transformations of energy and move using the same basic kinds of forces as described in chemistry and physics standards. Through the study of the diversity of life, students learn to understand how life has changed over a long period of time. This great variety of life forms continues to change even today as genetic instructions within cells are passed from generation to generation, yet the amazing integrity of most species remain.

3.4. Physical Science Chemistry and Physics

Physics and chemistry involve the study of objects and their properties. Students examine changes to materials during mixing, freezing, heating and dissolving and then learn how to observe and measure results. In chemistry students study the relationship between matter, atomic structure and its activity. Laboratory investigations of the properties of substances and their changes through a range of chemical interactions provide a basis for students to understand atomic theory and a variety of reaction types and their

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applications in business, agriculture and medicine. Physics deepens the understanding of the structure and properties of materials and includes atoms, waves, light, electricity, magnetism and the role of energy, forces and motion.

3.5. Earth Sciences

The dynamics of earth science include the studies of forces of nature that build the earth and wear down the earth. The understanding of these concepts uses principles from physical sciences, geography and mathematics.

3.6. Technology Education

Technology education is the use of accumulated knowledge to process resources to meet human needs and improve the quality of life. Students develop the ability to select and correctly use materials, tools, techniques and processes to answer questions, understand explanations and solve problems encountered in real life situations. These overriding themes require students to design, create, use, evaluate and modify systems of Biotechnologies, Information Technologies, and Physical Technologies.

3.7. Technological Devices

Students use tools to observe, measure, move and make things. New technological tools and techniques make it possible to enact far-reaching changes in our world. Technology enhances the students' abilities to identify problems and determine solutions. Computers play an integral role in every day life by extending our abilities to collect, analyze and communicate information and ideas.

3.8. Science, Technology and Human Endeavors

Scientific knowledge and societal needs often create a demand for new technology. Conversely, new technology advances scientific knowledge. Both influence society through the impact of their products and processes.

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What Is Science? Any study of science includes the search for understanding the natural world and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.

Acquiring scientific knowledge involves constructing hypotheses using observation and knowledge in the content area in order to formulate useful questions that provoke scientific inquiry. As a result of repeated, rigorous testing over time and applying multiple perspectives to a problem, consistent information emerges. A theory describes this verifiable event or phenomena. Theories are powerful elements in science and are used to predict other events. As theories lose their ability to predict, they are modified, expanded or generalized or incorporated into a broader theory.

Knowledge of what science is incorporates carefully developed and integrated components:

- **Nature of science** -- the ways in which scientists search for answers to questions and explanations of observations about the natural world; includes process knowledge of observing, classifying, inferring, predicting, measuring, hypothesizing, experimenting and interpreting data
- **Unifying themes of science** -- concepts, generalizations and principles that result from and lead to inquiry
- **Knowledge** -- facts, principles, theories and laws verifiable through scientific inquiry by the world community of scientists; includes physics, chemistry, earth science and biological sciences
- **Inquiry** -- an intellectual process of logic that includes verification of answers to questions about and explanations for natural objects, events and phenomena
- **Process skills** -- Recognition by students how knowledge is acquired and applied in science by observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models and producing solutions.
- **Problem solving** -- application of concepts to problems of human adaptation to the environment that often leads to recognition of new problems; has social implications and leads to personal decision-making and action; a process which forms the link for interactions between scientific and technological results or findings; involves operational definitions, recognizing variables, formulating models and asking questions
- **Scientific thinking** -- the disposition to suspend judgment, not make decisions and not take action until results, explanations or answers have been tested and verified with information.
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What Is Technology Education? It is the means by which we teach technology. Technology is a body of knowledge separate from but related to the sciences, with specific content, curriculum and specific certification requirements. Technology is the application of tools, materials, processes and systems by humans to solve problems and provide benefits to humankind. We use technology in an attempt to improve our environment. These improvements may relate to survival needs (e.g., food, shelter, defense) or they may relate to human aspirations (e.g., knowledge, art, control). They can include unexpected benefits, unexpected costs and unexpected risks.

Technology education involves a broad spectrum of knowledge and activities. Effective technology education combines knowledge of content, process and skills to provide students with a holistic approach to learning. Technology education offers unique opportunities to apply numerous academic concepts through practical, hands-on applications. Instructional technology, on the other hand, deals specifically with use of computers and different software to solve problems and communicate effectively. Knowledge of content, process and skills should be used together to effectively engage students and promote a complete understanding of the sciences, related technologies and their interrelationship. The relationship between science and technology is one where science builds principles or theories and technology provides the practical application of those principles or theories.

Knowledge of content, process and skills in technology involves learning processes that include these components:

- Methods of designing and developing solutions
- Standards for selecting and using appropriate materials, tools and processes
- Experimental and design specifications for testing and evaluating solutions
- Criteria for judging the performance and impact of the solutions
- Evaluating the impact of modifying a system to improve performance.

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Technology education can be divided into three main systems that include biotechnological, informational, and physical technologies:

Biotechnological Systems	Informational Systems	Physical Systems
Bioconversion Bioprocessing Environment Ergonomics Engineering / Design Systems Research and Development	Computer-Aided Drafting / Design (CADD) Drafting & Design Desktop Publishing Electronic Communications Engineering / Design Systems Graphic Communications Communications Systems Multimedia Technology Networking Systems Research and Development Video and Television Production World Wide Web Design & Publishing	Automation / Robotics Computer-Aided and Integrated Manufacturing (CAM/CIM) Construction Electronic Circuits / Control Systems Energy Systems Architecture and Community Planning Engineering / Design Systems Enterprise Organization & Operation Manufacturing Material Processes Research and Development Transportation

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<p>3.1. Unifying Themes</p>	<p>3.1.4. GRADE 4</p>	<p>3.1.7. GRADE 7</p>	<p>3.1.10. GRADE 10</p>	<p>3.1.12. GRADE 12</p>
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>				
<p>A. Know that natural and human-made objects are made up of parts.</p> <ul style="list-style-type: none"> Identify and describe what parts make up a system. Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy). Describe the purpose of analyzing systems. Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. 	<p>A. Explain the parts of a simple system and their relationship to each other.</p> <ul style="list-style-type: none"> Describe a system as a group of related parts that work together to achieve a desired result (e.g., digestive system). Explain the importance of order in a system. Distinguish between system inputs, system processes and system outputs. Distinguish between open loop and closed loop systems. Apply systems analysis to solve problems. 	<p>A. Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.</p> <ul style="list-style-type: none"> Identify the function of subsystems within a larger system (e.g., role of thermostat in an engine, pressure switch). Describe the interrelationships among inputs, processes, outputs, feedback and control in specific systems. Explain the concept of system redesign and apply it to improve technological systems. Apply the universal systems model to illustrate specific solutions and troubleshoot specific problems. Analyze and describe the effectiveness of systems to solve specific problems. 	<p>A. Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.</p> <ul style="list-style-type: none"> Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems. Apply systems analysis to predict results. Analyze and describe the function, interaction and relationship among subsystems and the system itself. Compare and contrast several systems that could be applied to solve a single problem. Evaluate the causes of a system's inefficiency. 	
<p>B. Know models as useful simplifications of objects or processes.</p> <ul style="list-style-type: none"> Identify different types of models. Identify and apply models as tools for prediction and insight. Apply appropriate simple modeling tools and techniques. Identify theories that serve as models (e.g., molecules). 	<p>B. Describe the use of models as an application of scientific or technological concepts.</p> <ul style="list-style-type: none"> Identify and describe different types of models and their functions. Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms). 	<p>B. Describe concepts of models as a way to predict and understand science and technology.</p> <ul style="list-style-type: none"> Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications (e.g., kinetic gas theory, DNA). Examine the advantages of using models to demonstrate processes and outcomes (e.g., blue print analysis, structural stability). 	<p>B. Apply concepts of models as a method to predict and understand science and technology.</p> <ul style="list-style-type: none"> Evaluate technological processes by collecting data and applying mathematical models (e.g., process control). Apply knowledge of complex physical models to interpret data and apply mathematical models. 	

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<p>C. Illustrate patterns that regularly occur and recur in nature.</p> <ul style="list-style-type: none"> Identify observable patterns (e.g., growth patterns in plants, crystal shapes in minerals, climate, structural patterns in bird feathers). Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns, lunar phases). 	<ul style="list-style-type: none"> Explain systems by outlining a system's relevant parts and its purpose and/or designing a model that illustrates its function. <p>C. Identify patterns as repeated processes or recurring elements in science and technology.</p> <ul style="list-style-type: none"> Identify different forms of patterns and use them to group and classify specific objects. Identify repeating structure patterns. Identify and describe patterns that occur in physical systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. 	<ul style="list-style-type: none"> Apply mathematical models to science and technology. <p>C. Apply patterns as repeated processes or recurring elements in science and technology.</p> <ul style="list-style-type: none"> Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order. Examine and describe stationary physical patterns. Examine and describe physical patterns in motion. 	<ul style="list-style-type: none"> Appraise the importance of computer models in interpreting science and technological systems. <p>C. Assess and apply patterns in science and technology.</p> <ul style="list-style-type: none"> Assess and apply recurring patterns in natural and technological systems. Compare and contrast structure and function relationships as they relate to patterns. Assess patterns in nature using mathematical formulas.
<p>D. Know that scale is an important attribute of natural and human made objects, events and phenomena.</p> <ul style="list-style-type: none"> Identify the use of scale as it relates to the measurement of distance, volume and mass. Describe scale as a ratio (e.g., map scales). Explain the importance of scale in producing models and apply it to a model. 	<p>D. Explain scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Apply various applications of size and dimensions of scale to scientific, mathematical, and technological applications. Describe scale as a form of ratio and apply to a life situation. 	<p>D. Apply scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Apply dimensional analysis and scale as a ratio. Convert one scale to another. 	<p>D. Analyze scale as a way of relating concepts and ideas to one another by some measure.</p> <ul style="list-style-type: none"> Compare and contrast various forms of dimensional analysis. Assess the use of several units of measurement to the same problem. Analyze and apply appropriate measurement scales when collecting data.
<p>E. Recognize change in natural and physical systems.</p> <ul style="list-style-type: none"> Recognize change as fundamental to science and technology concepts. Examine and explain change by using time and measurement. Describe relative motion. 	<p>E. Identify change as a variable in describing natural and physical systems.</p> <ul style="list-style-type: none"> Describe fundamental science and technology concepts that could solve practical problems. Explain how ratio is used to describe change. 	<p>E. Describe patterns of change in nature, physical and man made systems.</p> <ul style="list-style-type: none"> Describe how fundamental science and technology concepts are used to solve practical problems (e.g., momentum, Newton's laws of universal gravitation, tectonics, conservation of mass and energy, 	<p>E. Evaluate change in nature, physical systems and man made systems.</p> <ul style="list-style-type: none"> Evaluate fundamental science and technology concepts and their development over time (e.g., DNA, cellular respiration, unified field theory, energy measurement, automation,

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<ul style="list-style-type: none"> Describe the change to objects caused by heat, cold, light or chemicals. 	<ul style="list-style-type: none"> Describe the effect of making a change in one part of a system on the system as a whole. 	<p>cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, gas laws, feedback systems).</p> <ul style="list-style-type: none"> Recognize that stable systems often involve underlying dynamic changes (e.g., a chemical reaction at equilibrium has molecules reforming continuously). Describe the effects of error in measurements. Describe changes to matter caused by heat, cold, light or chemicals using a rate function. 	<p>miniaturization, Copernican and Ptolemaic universe theories).</p> <ul style="list-style-type: none"> Analyze how models, systems and technologies have changed over time (e.g., germ theory, theory of evolution, solar system, cause of fire). Explain how correlation of variables does not necessarily imply causation. Evaluate the patterns of change within a technology (e.g., changes in engineering in the automotive industry).
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3.2. Inquiry and Design			
3.2.4. GRADE 4	3.2.7. GRADE 7	3.2.10. GRADE 10	3.2.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Identify and use the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> Distinguish between a scientific fact and a belief. Provide clear explanations that account for observations and results. Relate how new information can change existing perceptions. <p>B. Describe objects in the world using the five senses.</p> <ul style="list-style-type: none"> Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough). Use observations to develop a descriptive vocabulary. 	<p>A. Explain and apply scientific and technological knowledge.</p> <ul style="list-style-type: none"> Distinguish between a scientific theory and a belief. Answer "What if" questions based on observation, inference or prior knowledge or experience. Explain how skepticism about an accepted scientific explanation led to a new understanding. Explain how new information may change existing theories and practice. <p>B. Apply process knowledge to make and interpret observations.</p> <ul style="list-style-type: none"> Measure materials using a variety of scales. Describe relationships by making inferences and predictions. Communicate, use space / time relationships, define operationally, raise questions, formulate hypotheses, test and experiment. Design controlled experiments, recognize variables, and manipulate variables. Interpret data, formulate models, design models, and produce solutions. 	<p>A. Apply knowledge and understanding about the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> Compare and contrast scientific theories and beliefs. Know that science uses both direct and indirect observation means to study the world and the universe. Integrate new information into existing theories and explain implied results. <p>B. Apply process knowledge and organize scientific and technological phenomena in varied ways.</p> <ul style="list-style-type: none"> Describe materials using precise quantitative and qualitative skills based on observations. Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions. Use process skills to make inferences and predictions using collected information and to communicate, using space / time relationships, defining operationally. 	<p>A. Evaluate the nature of scientific and technological knowledge.</p> <ul style="list-style-type: none"> Know and use the ongoing scientific processes to continually improve and better understand how things work. Critically evaluate the status of existing theories (e.g., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of aids). <p>B. Evaluate experimental information for appropriateness and adherence to relevant science processes.</p> <ul style="list-style-type: none"> Evaluate experimental data correctly within experimental limits. Judge that conclusions are consistent and logical with experimental conditions. Interpret results of experimental research to predict new information or improve a solution.

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<p>C. Recognize and use the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Design an investigation. • Conduct an experiment. • State a conclusion that is consistent with the information. <p>D. Recognize and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Recognize and explain basic problems. • Identify possible solutions and their course of action. • Try a solution. • Describe the solution, identify its impacts and modify if necessary. • Show the steps taken and the results. 	<p>C. Identify and use the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with limited variables to investigate a question. • Conduct a two-part experiment. • Judge the significance of experimental information in answering the question. • Communicate appropriate conclusions from the experiment. <p>D. Know and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Define different types of problems. • Define all aspects of the problem, necessary information and questions that must be answered. • Propose the best solution. • Design and propose alternative methods to achieve solutions. • Apply a solution. • Explain the results, present improvements, identify and infer the impacts of the solution. 	<p>C. Apply the elements of scientific inquiry to solve problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • Conduct a multiple step experiment. • Organize experimental information using a variety of analytic methods. • Judge the significance of experimental information in answering the question. • Suggest additional steps that might be done experimentally. <p>D. Identify and apply the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Examine the problem, rank all necessary information and all questions that must be answered. • Propose and analyze a solution. • Implement the solution. • Evaluate the solution, test, redesign and improve as necessary. • Communicate the process and evaluate and present the impacts of the solution. 	<p>C. Apply the elements of scientific inquiry to solve multi-step problems.</p> <ul style="list-style-type: none"> • Generate questions about objects, organisms and/or events that can be answered through scientific investigations. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • Organize experimental information using analytic and descriptive techniques. • Evaluate the significance of experimental information in answering the question. • Project additional questions from a research study that could be studied. <p>D. Analyze and use the technological design process to solve problems.</p> <ul style="list-style-type: none"> • Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered. • Propose, develop and appraise the best solution and develop alternative solutions. • Implement and assess the solution. • Evaluate and assess the solution, redesign and improve as necessary. • Communicate and assess the process and evaluate and present the impacts of the solution.
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3.3. Biological Sciences	3.3.7. GRADE 7	3.3.10. GRADE 10	3.3.12. GRADE 12
<p>3.3.4. GRADE 4</p> <p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>	<p>A. Describe the similarities and differences that characterize diverse living things.</p> <ul style="list-style-type: none"> Describe how the structures of living things help them function in unique ways. Explain how to use a dichotomous key to identify plants and animals. Account for adaptations among organisms that live in a particular environment. 	<p>A. Explain the structural and functional similarities and differences found among living things.</p> <ul style="list-style-type: none"> Identify and characterize major life forms according to their placement in existing classification groups. Explain the relationship between structure and function at the molecular and cellular levels. Describe organizing schemes of classification keys. Identify and characterize major life forms by kingdom, phyla, class and order. 	<p>A. Explain the relationship between structure and function at all levels of organization.</p> <ul style="list-style-type: none"> Identify and explain interactions among organisms (e.g., mutually beneficial, harmful relationships). Explain and analyze the relationship between structure and function at the molecular, cellular and organ-system level. Describe and explain structural and functional relationships in each of the five (or six) kingdoms. Explain significant biological diversity found in each of the biomes.
<p>B. Know that living things are made up of parts that have specific functions.</p> <ul style="list-style-type: none"> Identify examples of unicellular and multicellular organisms. Determine how different parts of a living thing work together to make the organism function. 	<p>B. Describe the cell as the basic structural and functional unit of living things.</p> <ul style="list-style-type: none"> Identify the levels of organization from cell to organism. Compare life processes at the organism level with life processes at the cell level. Explain that cells and organisms have particular structures that underlie their functions. Describe and distinguish among cell cycles, reproductive cycles and life cycles. Explain disease effects on structures or functions of an organism. 	<p>B. Describe and explain the chemical and structural basis of living organisms.</p> <ul style="list-style-type: none"> Describe the relationship between the structure of organic molecules and the function they serve in living organisms. Identify the specialized structures and regions of the cell and the functions of each. Explain how cells store and use information to guide their functions. Explain cell functions and processes in terms of chemical reactions and energy changes. 	<p>B. Analyze the chemical and structural basis of living organisms.</p> <ul style="list-style-type: none"> Identify and describe factors affecting metabolic function (e.g., temperature, acidity, hormones). Evaluate metabolic activities using experimental knowledge of enzymes. Evaluate relationships between structure and functions of different anatomical parts given their structure. Describe potential impact of genome research on the biochemistry and physiology of life.

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<p>C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.</p> <ul style="list-style-type: none"> Identify characteristics for animal and plant survival in different climates. identify physical characteristics that appear in both parents and offspring and differ between families, strains or species. <p>D. Identify changes in living things over time.</p> <ul style="list-style-type: none"> Compare extinct life forms with living organisms. 	<p>C. Know that every organism has a set of genetic instructions that determines its inherited traits.</p> <ul style="list-style-type: none"> Identify and explain inheritable characteristics. Identify that the gene is the basic unit of inheritance. Identify basic patterns of inheritance (e.g., dominance, recessive, co-dominance). Describe how traits are inherited. Distinguish how different living things reproduce (e.g., vegetative budding, sexual). recognize that mutations can alter a gene. Describe how selective breeding, natural selection and genetic technologies can change genetic makeup of organisms. <p>D. Explain basic concepts of natural selection.</p> <ul style="list-style-type: none"> Identify adaptations that allow organisms to survive in their environment. Describe how an environmental change can affect the survival of organisms and entire species. know that differences in individuals of the same species may give some advantage in surviving and reproducing. recognize that populations of organisms can increase rapidly. Describe the role that fossils play in studying the past. Explain how biologic extinction is a natural process. 	<p>C. Describe how genetic information is inherited and expressed.</p> <ul style="list-style-type: none"> Compare and contrast the function of mitosis and meiosis. Describe mutations' effects on a trait's expression. Distinguish different reproductive patterns in living things (e.g., budding, spores, fission). Compare random and selective breeding practices and their results (e.g., antibiotic resistant bacteria). Explain the relationship among DNA, genes and chromosomes. Explain different types of inheritance (e.g., multiple allele, sex-influenced traits). Describe the role of DNA in protein synthesis as it relates to gene expression. <p>D. Explain the mechanisms of the theory of evolution.</p> <ul style="list-style-type: none"> analyze data from fossil records, similarities in anatomy and physiology, embryological studies and DNA studies that are relevant to the theory of evolution. Explain the role of mutations and gene recombination in changing a population of organisms. Compare modern day descendants of extinct species and propose possible scientific accounts for their present appearance. describe the factors (e.g., isolation, differential 	<p>C. Explain gene inheritance and expression at the molecular level.</p> <ul style="list-style-type: none"> Analyze gene expression at the molecular level. Describe the roles of nucleic acids in cellular reproduction and protein synthesis. Describe genetic engineering techniques, applications and impacts. Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup. <p>D. Analyze the theory of evolution.</p> <ul style="list-style-type: none"> Examine human history by describing the progression from early hominids to modern humans. apply the concept of natural selection as a central concept in illustrating evolution theory.
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		<p>reproduction) affecting gene frequency in a population over time and their consequences.</p> <ul style="list-style-type: none"> • describe and differentiate between the roles of natural selection and genetic drift. • Describe changes that illustrate major events in the earth's development based on a time line. • explain why natural selection can act only on inherited traits. • Apply the concept of natural selection to illustrate and account for a species' survival, extinction or change over time. 	
<p>Ecosystem Standards are in the Environment and Ecology Standard Category (4.6).</p>			

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3.4. Physical Science, Chemistry and Physics

3.4.4. GRADE 4	3.4.7. GRADE 7	3.4.10. GRADE 10	3.4.12. GRADE 12
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p> <p>A. Recognize basic concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Describe properties of matter (e.g., hardness, reactions to simple chemical tests). Know that combining two or more substances can make new materials with different properties. Know different material characteristics (e.g., texture, state of matter, solubility). 	<p>A. Describe concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Identify elements as basic building blocks of matter that cannot be broken down chemically. Distinguish compounds from mixtures. Describe and conduct experiments that identify chemical and physical properties. Describe reactants and products of simple chemical reactions. 	<p>A. Explain concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Know that atoms are composed of even smaller sub-atomic structures whose properties are measurable. Explain the repeating pattern of chemical properties by using the repeating patterns of atomic structure within the periodic table. Predict the behavior of gases through the use of Boyle's, Charles' or the ideal gas law, in everyday situations. Describe phases of matter according to the Kinetic Molecular Theory. Explain the formation of compounds and their resulting properties using bonding theories (ionic and covalent). Recognize formulas for simple inorganic compounds. Describe various types of chemical reactions by applying the laws of conservation of mass and energy. Apply knowledge of mixtures to appropriate separation techniques. Understand that carbon can form several types of compounds. 	<p>A. Apply concepts about the structure and properties of matter.</p> <ul style="list-style-type: none"> Apply rules of systematic nomenclature and formula writing to chemical substances. Classify and describe, in equation form, types of chemical and nuclear reactions. Explain how radioactive isotopes that are subject to decay can be used to estimate the age of materials. Explain how the forces that bind solids, liquids and gases affect their properties. Characterize and identify important classes of compounds (e.g., acids, bases, salts). Apply the conservation of energy concept to fields as diverse as mechanics, nuclear particles and studies of the origin of the universe. Apply the predictability of nuclear decay to estimate the age of materials that contain radioactive isotopes. Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.

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<p>B. Know basic energy types, sources and conversions.</p> <ul style="list-style-type: none"> Identify energy forms and examples (e.g., sunlight, heat, stored, motion). Know the concept of the flow of energy by measuring flow through an object or system. Describe static electricity in terms of attraction, repulsion and sparks. Apply knowledge of the basic electrical circuits to design and construction simple direct current circuits. Classify materials as conductors and nonconductors. Know and demonstrate the basic properties of heat by producing it in a variety of ways. Know the characteristics of light (e.g., reflection, refraction, absorption) and use them to produce heat, color or a virtual image. 	<p>B. Relate energy sources and transfers to heat and temperature.</p> <ul style="list-style-type: none"> Identify and describe sound changes in moving objects. Know that the sun is a major source of energy that emits wavelengths of visible light, infrared and ultraviolet radiation. Explain the conversion of one form of energy to another by applying knowledge of each form of energy. Explain the parts and functions in an electrical circuit. 	<p>B. Analyze energy sources and transfers of heat.</p> <ul style="list-style-type: none"> Determine the efficiency of chemical systems by applying mathematical formulas. Use knowledge of chemical reactions to generate an electrical current. Evaluate energy changes in chemical reactions. Use knowledge of conservation of energy and momentum to explain common phenomena (e.g., refrigeration system, rocket propulsion). Explain resistance, current and electro-motive force (Ohm's Law). 	<p>B. Apply and analyze energy sources and conversions and their relationship to heat and temperature.</p> <ul style="list-style-type: none"> Determine the heat involved in illustrative chemical reactions. Evaluate mathematical formulas that calculate the efficiency of specific chemical and mechanical systems. Use knowledge of oxidation and reduction to balance complex reactions Apply appropriate thermodynamic concepts (e.g., conservation, entropy) to solve problems relating to energy and heat.
<p>C. Observe and describe different types of force and motion.</p> <ul style="list-style-type: none"> Identify characteristics of sound (pitch, loudness and echoes) Recognize forces that attract or repel other objects and demonstrate them. Describe various types of motions. Compare the relative movement of objects and describe types of motion that are evident. Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up). 	<p>C. Identify and explain the principles of force and motion.</p> <ul style="list-style-type: none"> Describe the motion of an object based on its position, direction and speed. Classify fluid power systems according to fluid used or mode of power transmission (e.g., air, oil). Explain various motions using models. Explain how convex and concave mirrors and lens change light images. Explain how sound and light travel in waves of differing speeds, sizes and frequencies. 	<p>C. Distinguish among the principles of force and motion.</p> <ul style="list-style-type: none"> Identify the relationship of electricity and magnetism as two aspects of a single electromagnetic force. Identify elements of simple machines in compound machines. Explain fluid power systems through the design and construction of appropriate models. Describe sound effects (e.g., Doppler effect, amplitude, frequency, reflection, refraction, absorption, sonar, seismic). 	<p>C. Apply the principles of motion and force.</p> <ul style="list-style-type: none"> Evaluate wave properties of frequency, wavelength and speed as applied to sound and light through different media. Propose and produce modifications to specific mechanical power systems that will improve their efficiency. Analyze the principles of translational motion, velocity and acceleration as they relate to free fall and projectile motion.

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<p>D. Describe the composition and structure of the universe and the earth's place in it.</p> <ul style="list-style-type: none"> • Recognize earth's place in the solar system. • Explain and illustrate the causes of seasonal changes. • Identify planets in our solar system and their general characteristics. • Describe the solar system motions and use them to explain time (e.g., days, seasons), major lunar phases and eclipses. 	<p>D. Describe essential ideas about the composition and structure of the universe and the earth's place in it.</p> <ul style="list-style-type: none"> • Compare various planets' characteristics. • Describe basic star types and identify the sun as a star type. • Describe and differentiate comets, asteroids and meteors. • Identify gravity as the force that keeps planets in orbit around the sun and governs the rest of the movement of the solar system and the universe. • Illustrate how the positions of stars and constellations change in relation to the Earth during an evening and from month to month. • Identify equipment and instruments that explore the universe. • Identify the accomplishments and contributions provided by selected past and present scientists in the field of astronomy. 	<ul style="list-style-type: none"> • Describe light effects (e.g., Doppler effect, dispersion, absorption, emission spectra, polarization, interference). • Describe and measure the motion of sound, light and other objects. • Know Newton's laws of motion (including inertia, action and reaction) and gravity and apply them to solve problems related to forces and mass. • Determine the efficiency of mechanical systems by applying mathematical formulas. <p>D. Explain essential ideas about the composition and structure of the universe.</p> <ul style="list-style-type: none"> • Compare the basic structures of the universe (e.g., galaxy types, nova, black holes, neutron stars). • Describe the structure and life cycle of star, using the Hertzsprung-Russell diagram. • Describe the nuclear processes involved in energy production in a star. • Explain the "red-shift" and Hubble's use of it to determine stellar distance and movement. • Compare absolute versus apparent star magnitude and their relation to stellar distance. • Explain the impact of the Copernican and Newtonian thinking on man's view of the universe. • Identify and analyze the findings of several space instruments in regard to the extent and composition of the 	<ul style="list-style-type: none"> • Analyze the principles of rotational motion to solve problems relating to angular momentum, and torque. • Interpret a model that illustrates circular motion and acceleration. • Describe inertia, motion, equilibrium, and action/reaction concepts through words, models and mathematical symbols. <p>D. Analyze the essential ideas about the composition and structure of the universe.</p> <ul style="list-style-type: none"> • Analyze the Big Bang Theory's use of gravitation and nuclear reaction to explain a possible origin of the universe. • Compare the use of visual, radio and x-ray telescopes to collect data regarding the structure and evolution of the universe. • Correlate the use of the special theory of relativity and the life of a star.
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- Identify and articulate space program efforts to investigate possibilities of living in space and on other planets.

solar system and universe.

Refer to Technology Standard Category 3.6 for applied uses of these concepts and principles.

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3.5. Earth Sciences			
3.5.4. GRADE 4	3.5.7. GRADE 7	3.5.10. GRADE 10	3.5.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know basic landforms and earth history.</p> <ul style="list-style-type: none"> Describe earth processes (e.g., rusting, weathering, erosion) that have affected selected physical features in students' neighborhoods. Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models. Identify the composition of soil as weathered rock and decomposed organic remains. Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert). 	<p>A. Describe earth features and processes.</p> <ul style="list-style-type: none"> Describe major layers of the earth. Describe the processes involved in the creation of geologic features (e.g., folding, faulting, volcanism, sedimentation) and that these processes seen today (e.g., erosion, weathering, crustal plate movement) are similar to those in the past. Describe the processes that formed Pennsylvania geologic structures and resources including mountains, glacial formations, water gaps and ridges. Explain how the rock cycle affected rock formations in the state of Pennsylvania. Distinguish between examples of rapid surface changes (e.g., landslides, earthquakes) and slow surface changes (e.g., weathering). Identify living plants and animals that are similar to fossil forms. 	<p>A. Relate earth features and processes that change the earth.</p> <ul style="list-style-type: none"> Illustrate and explain plate tectonics as the mechanism of continental movement and sea floor changes. Compare examples of change to the earth's surface over time as they related to continental movement and ocean basin formation (e.g., Delaware, Susquehanna, Ohio Rivers system formations, dynamics). Interpret topographic maps to identify and describe significant geologic history/structures in Pennsylvania. Evaluate and interpret geologic history using geologic maps. Explain several methods of dating earth materials and structures. Correlate rock units with general geologic time periods in the history of the earth. Describe and identify major types of rocks and minerals. 	<p>A. Analyze and evaluate earth features and processes that change the earth.</p> <ul style="list-style-type: none"> Apply knowledge of geophysical processes to explain the formation and degradation of earth structures (e.g., mineral deposition, cave formations, soil composition). Interpret geological evidence supporting evolution. Apply knowledge of radioactive decay to assess the age of various earth features and objects.

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<p>B. Know types and uses of earth materials.</p> <ul style="list-style-type: none"> Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants). Identify and sort earth materials according to a classification key (e.g., soil/rock type). <p>C. Know basic weather elements.</p> <ul style="list-style-type: none"> Identify cloud types. Identify weather patterns from data charts (including temperature, wind direction and speed, precipitation) and graphs of the data. Explain how the different seasons affect plants, animals, food availability and daily human life. 	<p>B. Recognize earth resources and how they affect everyday life.</p> <ul style="list-style-type: none"> Identify and locate significant earth resources (e.g., rock types, oil, gas, coal deposits) in Pennsylvania. Explain the processes involved in the formation of oil and coal in Pennsylvania. Explain the value and uses of different earth resources (e.g., selected minerals, ores, fuel sources, agricultural uses). Compare the locations of human settlements as related to available resources. <p>C. Describe basic elements of meteorology.</p> <ul style="list-style-type: none"> Explain weather forecasts by interpreting weather data and symbols. Explain the oceans' impact on local weather and the climate of a region. Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns in different regions of the country. Explain and illustrate the processes of cloud formation and precipitation. Describe and illustrate the major layers of the earth's atmosphere. Identify different air masses and global wind patterns and how they relate to the weather patterns in different regions of the U.S. 	<p>B. Explain sources and uses of earth resources.</p> <ul style="list-style-type: none"> Compare the locations of strategic minerals and earth resources in the world with their geologic history using maps and global information systems. Demonstrate the effects of sedimentation and erosion before and after a conservation plan is implemented. Evaluate the impact of geologic activities/hazards (e.g., earthquakes, sinkholes, landslides). Evaluate land use (e.g., agricultural, recreational, residential, commercial) in Pennsylvania based upon soil characteristics. <p>C. Interpret meteorological data.</p> <ul style="list-style-type: none"> Analyze information from meteorological instruments and online sources to predict weather patterns. Describe weather and climate patterns on global levels. Evaluate specific adaptations plants and animals have made that enable them to survive in different climates. 	<p>B. Analyze the availability, location and extraction of earth resources.</p> <ul style="list-style-type: none"> Describe how the location of earth's major resources has affected a country's strategic decisions. Compare locations of earth features and country boundaries. Analyze the impact of resources (e.g., coal deposits, rivers) on the life of Pennsylvania's settlements and cities. <p>C. Analyze atmospheric energy transfers.</p> <ul style="list-style-type: none"> Describe how weather and climate involve the transfer of energy in and out of the atmosphere. Explain how unequal heating of the air, ocean and land produces wind and ocean currents. Analyze the energy transformations that occur during the greenhouse effect and predict the long-term effects of increased pollutant levels in the atmosphere. Analyze the mechanisms that drive a weather phenomena (e.g., El Nino, hurricane, tornado) using the correlation of three methods of heat energy transfer.
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<p>D. Recognize the earth's different water resources.</p> <ul style="list-style-type: none"> • Know that approximately three-fourths of the earth is covered by water. • identify and describe types of fresh and salt-water bodies. • Identify examples of water in the form of solid, liquid and gas on or near the surface of the earth. • Explain and illustrate evaporation and condensation. • Recognize other resources available from water (e.g., energy, transportation, minerals, food). 	<p>D. Explain the behavior and impact of the earth's water systems.</p> <ul style="list-style-type: none"> • Explain the water cycle using the processes of evaporation and condensation. • Describe factors that affect evaporation and condensation. • Distinguish salt from fresh water (e.g., density, electrical conduction). • Compare the effect of water type (e.g., polluted, fresh, salt water) and the life contained in them. • Identify ocean and shoreline features, (e.g. bays, inlets, spit, tidal marshes). 	<p>D. Assess the value of water as a resource.</p> <ul style="list-style-type: none"> • Compare specific sources of potable water (e.g., wells, public systems, rivers) used by people in Pennsylvania. • Identify the components of a municipal/agricultural water supply system and a wastewater treatment system. • Relate aquatic life to water conditions (e.g., turbidity, temperature, salinity, dissolved oxygen, nitrogen levels, pressure). • Compare commercially important aquatic species in or near Pennsylvania. • Identify economic resources found in marine areas. • Assess the natural and man-made factors that affect the availability of clean water (e.g., rock and mineral deposits, man-made pollution). 	<p>D. Analyze the principles and history of hydrology.</p> <ul style="list-style-type: none"> • Analyze the operation and effectiveness of a water purification and desalination system. • Evaluate the pros and cons of surface water appropriation for commercial and electrical use. • Analyze the historical development of water use in Pennsylvania (e.g., recovery of Lake Erie). • Compare the marine life and type of water found in the intertidal, neritic and bathyal zones.
<p>Refer to Environment and Ecology Standards Categories 4.1, 4.3, 4.8 for standards that deal with environmental impact of Earth structures and forces.</p>			

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3.6. Technology Education	3.6.7. GRADE 7	3.6.10. GRADE 10	3.6.12. GRADE 12
<p>3.6.4. GRADE 4</p> <p>A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Identify agricultural and industrial production processes that involve plants and animals. • Identify waste management treatment processes. • Describe how knowledge of the human body influences or impacts ergonomic design. • Describe how biotechnology has impacted various aspects of daily life (e.g., health care, agriculture, waste treatment). 	<p>A. Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Identify the environmental, societal and economic impacts that waste has in the environment. • Identify and explain the impact that a specific medical advancement has had on society. • Explain the factors that were taken into consideration when a specific object was designed. • Define and describe how fuels and energy can be generated through the process of biomass conversion. • Identify and group basic plant and animal production processes. • Explain the impact that agricultural science has had on biotechnology. 	<p>A. Apply biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Apply knowledge of plant and animal production processes in designing an improvement to existing processes. • Apply knowledge of biomedical technology applications in designing a solution to a simple medical problem (e.g., wheel chair design, artificial arteries). • Apply knowledge of how biomedical technology affects waste products in designing a solution that will result in reduced waste. • Apply ergonomic engineering factors when devising a solution to a specific problem. • Describe various methods of biochemical conversion. • describe specific examples that reflect the impact that agricultural science has had on biotechnology. 	<p>A. Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.</p> <ul style="list-style-type: none"> • Analyze and solve a complex production process problem using biotechnologies (e.g., hydroponics, fish farming, crop propagation). • Analyze specific examples where engineering has impacted society in protection, personal health application or physical enhancement. • Appraise and evaluate the cause and effect and subsequent environmental, economic and societal impacts that result from biomass and biochemical conversion. • Evaluate and apply biotechnical processes to complex plant and animal production methods. • Apply knowledge of biochemical-related technologies to propose alternatives to hazardous waste treatment. • apply knowledge of agricultural science to solve or improve a biochemical related problem.
<p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>			

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<p>B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Identify electronic communication methods that exist in the community (e.g., digital cameras, telephone, internet, television, fiber optics). Identify graphic reproduction methods. Describe appropriate image generating techniques (e.g., photography, video). Demonstrate the ability to communicate an idea by applying basic sketching and drawing techniques. 	<p>B. Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Demonstrate the effectiveness of image generating technique to communicate a story (e.g., photography, video). Analyze and evaluate the effectiveness of a graphic object designed and produced to communicate a thought or concept. Apply basic technical drawing techniques to communicate an idea or solution to a problem. Apply the appropriate method of communications technology to communicate a thought. 	<p>B. Apply knowledge of information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Describe the proper use of graphic and electronic communication systems. Apply a variety of advanced mechanical and electronic drafting methods to communicate a solution to a specific problem. Apply and analyze advanced communication techniques to produce an image that effectively conveys a message (e.g., desktop publishing, audio and/or video production). Illustrate an understanding of a computer network system by modeling, constructing or assembling its components. 	<p>B. Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.</p> <ul style="list-style-type: none"> Apply and analyze advanced information techniques to produce a complex image that effectively conveys a message (e.g., desktop publishing, audio and/or video production). Analyze and evaluate a message designed and produced using still, motion and animated communication techniques. Describe the operation of fiber optic, microwave and satellite informational systems. Apply various graphic and electronic information techniques to solve real world problems (e.g., data organization and analysis, forecasting, interpolation).
<p>C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.</p> <ul style="list-style-type: none"> Identify and group a variety of construction tasks. Identify the major construction systems present in a specific local building. Identify specific construction systems that depend on each other in order to complete a project. Know skills used in construction. Identify examples of manufactured goods present in the home and school. 	<p>C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design.</p> <ul style="list-style-type: none"> Use knowledge of material effectiveness to solve specific construction problems (e.g., steel vs. wood bridges). Differentiate among the different types of construction applications (e.g., microwave tower, power plants, aircrafts). 	<p>C. Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.</p> <ul style="list-style-type: none"> Describe and classify common construction by their characteristics and composition. Compare and contrast specific construction systems that depend on each other in order to complete a project. Evaluate material failure common to specific applications. 	<p>C. Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.</p> <ul style="list-style-type: none"> Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem. Compare resource options in solving a specific manufacturing problem.

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<ul style="list-style-type: none"> • Identify basic resources needed to produce a manufactured item. • Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching). • Identify waste and pollution resulting from a manufacturing enterprise. • Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object). • Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Identify and experiment with simple machines used in transportation systems. • Explain how improved transportation systems have changed society. 	<ul style="list-style-type: none"> • Explain basic material processes that manufactured objects undergo during production. (e.g., separating, forming, combining). • Evaluate a construction activity by specifying task analyses and necessary resources. • Explain the relationships among the basic resources needed in the production process for a specific manufactured object. • Explain the difference between design engineering and production engineering processes. • Analyze manufacturing steps that affect waste and pollutants. • Explain transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Identify and explain the workings of several mechanical power systems. • Model and explain examples of vehicular propulsion, control, guidance, structure and suspension systems. • Explain the limitations of land, marine, air and space transportation systems. 	<ul style="list-style-type: none"> • Demonstrate knowledge of various construction systems by building or interpreting models. • Select and apply the necessary resources to successfully conduct a manufacturing enterprise. • Apply concepts of design engineering and production engineering in the organization and application of a manufacturing activity. • Apply the concepts of manufacturing by redesigning an enterprise to improve productivity or reduce or eliminate waste and/or pollution. • Evaluate the interrelationship of various transportation systems in the community. • Analyze the impacts that transportation systems have on a community. 	<ul style="list-style-type: none"> • Analyze and apply complex skills needed to process materials in complex manufacturing enterprises. • Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems. • Assess the importance of capital on specific construction applications. • Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications. • Analyze transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting. • Analyze the concepts of vehicular propulsion, guidance, control, suspension and structural systems while designing and producing specific complex transportation systems.
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3.7. Technological Devices	3.7.7. GRADE 7	3.7.10. GRADE 10	3.7.12. GRADE 12
<p>3.7.4. GRADE 4</p> <p><i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i></p>	<p>A. Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems.</p> <ul style="list-style-type: none"> Identify uses of tools, machines, materials, information, people, money, energy and time that meet specific design criteria. Describe safe procedures for using tools and materials. Assess materials for appropriateness of use. <p>B. Use appropriate instruments and apparatus to study materials.</p> <ul style="list-style-type: none"> Select appropriate instruments to measure the size, weight, shape and temperature of living and non-living objects. Apply knowledge of different measurement systems to measure and record objects' properties. 	<p>A. Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.</p> <ul style="list-style-type: none"> Select and safely apply appropriate tools, materials and processes necessary to solve complex problems. Apply advanced tool and equipment manipulation techniques to solve problems. <p>B. Apply appropriate instruments and apparatus to examine a variety of objects and processes.</p> <ul style="list-style-type: none"> Describe and use appropriate instruments to gather and analyze data. Compare and contrast different scientific measurement systems; select the best measurement system for a specific situation. Explain the need to estimate measurements within error of various instruments. Apply accurate measurement knowledge to solve everyday problems. Describe and demonstrate the 	<p>A. Apply advanced tools, materials and techniques to answer complex questions.</p> <ul style="list-style-type: none"> Demonstrate the safe use of complex tools and machines within their specifications. Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution. Evaluate and use technological resources to solve complex multi-step problems. <p>B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.</p> <ul style="list-style-type: none"> Apply and evaluate the use of appropriate instruments to accurately measure scientific and technologic phenomena within the error limits of the equipment. Evaluate the appropriate use of different measurement scales (macro and micro). Evaluate the utility and advantages of a variety of absolute and relative measurement scales for their appropriate application.

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		<p>operation and use of advanced instrumentation in evaluating material and chemical properties (e.g., scanning electron microscope, nuclear magnetic resonance machines).</p>	
<p>Computer literacy, including the use of hardware and software in standard statements C, D, and E, should be integrated across all content areas.</p>			
<p>C. Identify basic computer operations and concepts.</p> <ul style="list-style-type: none"> Identify the major parts necessary for a computer to input and output data. Explain and demonstrate the basic use of input and output devices (e.g., keyboard, monitor, printer, mouse). Explain and demonstrate the use of external and internal storage devices (e.g., disk drive, CD drive). 	<p>C. Explain and demonstrate basic computer operations and concepts.</p> <ul style="list-style-type: none"> Know specialized computer applications used in the community. Describe the function of advanced input and output devices (e.g., scanners, video images, plotters, projectors) and demonstrate their use. Demonstrate age appropriate keyboarding skills and techniques. 	<p>C. Apply basic computer operations and concepts.</p> <ul style="list-style-type: none"> Identify solutions to basic hardware and software problems. Apply knowledge of advanced input devices. Apply knowledge of hardware setup. Describe the process for basic software installation and demonstrate it. Analyze and solve basic operating systems problems. Apply touch keyboarding skills and techniques at expectable speed and accuracy. Demonstrate the ability to perform basic software installation. 	<p>C. Evaluate computer operations and concepts as to their effectiveness to solve specific problems.</p> <ul style="list-style-type: none"> Describe and demonstrate atypical software installation. Analyze and solve hardware and advanced software problems. Assess and apply multiple input and output devices to solve specific problems.
<p>D. Use basic computer software.</p> <ul style="list-style-type: none"> Apply operating system skills to perform basic computer tasks. Apply basic word processing skills. Identify and use simple graphic and presentation graphic materials generated by the computer. Apply specific instructional software. 	<p>D. Apply computer software to solve specific problems.</p> <ul style="list-style-type: none"> Identify software designed to meet specific needs (e.g., Computer Aided Drafting, design software, tutorial, financial, presentation software). Identify and solve basic software problems relevant to specific software applications. Identify basic multimedia 	<p>D. Utilize computer software to solve specific problems.</p> <ul style="list-style-type: none"> Identify legal restrictions in the use of software and the output of data. Apply advanced graphic manipulation and desktop publishing techniques. Apply basic multimedia applications. Apply advanced word processing, database and spreadsheet skills. 	<p>D. Evaluate the effectiveness of computer software to solve specific problems.</p> <ul style="list-style-type: none"> Evaluate the effectiveness of software to produce an output and demonstrate the process. Design and apply advanced multimedia techniques. Analyze, select and apply the appropriate software to solve complex problems. Evaluate the effectiveness of the

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<p>E. Identify basic computer communications systems.</p> <ul style="list-style-type: none"> • Apply a web browser. • Apply basic electronic mail functions. • Use on-line searches to answer age appropriate questions. 	<p>applications.</p> <ul style="list-style-type: none"> • Demonstrate a basic knowledge of desktop publishing applications. • Apply intermediate skills in utilizing word processing, database and spreadsheet software. • Apply basic graphic manipulation techniques. <p>E. Explain basic computer communications systems.</p> <ul style="list-style-type: none"> • Describe the organization and functions of the basic parts that make up the World Wide Web. • Apply advanced electronic mail functions. • Apply basic on-line research techniques to solve a specific problem. 	<ul style="list-style-type: none"> • Describe and demonstrate how two or more software applications can be used to produce an output. • Select and apply software designed to meet specific needs. <p>E. Apply basic computer communications systems.</p> <ul style="list-style-type: none"> • Identify and explain various types of on-line services. • Identify and explain the function of the parts of a basic network. • Describe and apply the components of a web page and their function. • Explain and demonstrate file transfer within and out side of a computer network. • Identify, describe and complete advanced on-line research. 	<p>computer as a presentation tool.</p> <ul style="list-style-type: none"> • Analyze the legal responsibilities of computer users. <p>E. Assess the effectiveness of computer communications systems.</p> <ul style="list-style-type: none"> • Assess the effectiveness of a computer based communications system. • Transfer files among different computer platforms. • Analyze the effectiveness of on-line information resources to meet the needs for collaboration, research, publications, communications and productivity. • Apply knowledge of protocol standards to solve connectivity problems.
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3.8. Science, Technology and Human Endeavors

3.8.4. GRADE 4	3.8.7. GRADE 7	3.8.10. GRADE 10	3.8.12. GRADE 12
<i>Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .</i>			
<p>A. Know that people select, create and use science and technology and that they are limited by social and physical restraints.</p> <ul style="list-style-type: none"> Identify and describe positive and negative impacts that influence or result from new tools and techniques. Identify how physical technology (e.g., construction, manufacturing, transportation), informational technology and biotechnology are used to meet human needs. Describe how scientific discoveries and technological advancements are related. Identify interrelationships among technology, people and their world. Apply the technological design process to solve a simple problem. 	<p>A. Explain how sciences and technologies are limited in their effects and influences on society.</p> <ul style="list-style-type: none"> Identify and describe the unavoidable constraints of technological design. Identify changes in society as a result of a technological development. Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives. 	<p>A. Analyze the relationship between societal demands and scientific and technological enterprises.</p> <ul style="list-style-type: none"> Identify past and current tradeoffs between increased production, environmental harm and social values (e.g., increased energy needs, power plants, automobiles). Compare technologies that are applied and accepted differently in various cultures (e.g., factory farming, nuclear power). Describe and evaluate social change as a result of technological developments. Assess the social impacts of a specific international environmental problem by designing a solution that applies the appropriate technologies and resources. 	<p>A. Synthesize and evaluate the interactions and constraints of science and technology on society.</p> <ul style="list-style-type: none"> Compare and contrast how scientific and technological knowledge is both shared and protected. Evaluate technological developments that have changed the way humans do work and discuss their impacts (e.g., genetically engineered crops). Evaluate socially proposed limitations of scientific research and technological application.
<p>B. Know how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify and distinguish between human needs and improving the quality of life. Identify and distinguish between 	<p>B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify interrelationships between systems and resources. Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life. 	<p>B. Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.</p> <ul style="list-style-type: none"> Identify several problems and opportunities that exist in your community, apply various problem-solving methods to design and evaluate possible solutions. Analyze a recently invented item, 	<p>B. Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.</p> <ul style="list-style-type: none"> Apply appropriate tools, materials and processes to solve complex problems. Use knowledge of human abilities to design or modify technologies that extend and enhance human

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<p>natural and human-made resources.</p> <ul style="list-style-type: none"> Describe a technological invention and the resources that were used to develop it. 	<ul style="list-style-type: none"> identify and explain specific examples of how agricultural science has met human needs and has improved the quality of life. 	<p>describing the human need that prompted its invention and the current and potential social impacts of the specific invention.</p> <ul style="list-style-type: none"> Apply knowledge of oceanography, meteorology, geology and human anatomy to explain important considerations that need to be made for construction of homes, buildings and businesses in the United States. Assess the impacts that agricultural science has had on meeting human needs and improving the quality of life. 	<p>abilities.</p> <ul style="list-style-type: none"> Apply appropriate tools, materials and processes to physical, informational or biotechnological systems to identify and recommend solutions to international problems. apply knowledge of agricultural science to develop a solution that will improve on a human need or want.
<p>C. Know the pros and cons of possible solutions to scientific and technological problems in society.</p> <ul style="list-style-type: none"> Compare the positive and negative expected and unexpected impacts of technological change. Identify and discuss examples of technological change in the community that have both positive and negative impacts. 	<p>C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society.</p> <ul style="list-style-type: none"> Describe the positive and negative expected and unexpected effects of specific technological developments. Describe ways technology extends and enhances human abilities. 	<p>C. Evaluate possibilities consequences and impacts of scientific and technological solutions.</p> <ul style="list-style-type: none"> Relate scientific and technological advancements in terms of cause and effect. Describe and evaluate the impacts that financial considerations have had on specific scientific and technological applications. Compare and contrast potential solutions to technological, social, economic and environmental problems. Analyze the impacts on society of accepting or rejecting scientific and technological advances. 	<p>C. Evaluate the consequences and impacts of scientific and technological solutions.</p> <ul style="list-style-type: none"> Propose solutions to specific scientific and technological applications, identifying possible financial considerations. Analyze scientific and technological solutions through the use of risk/benefit analysis. Analyze and communicate the positive or negative impacts that a recent technological invention had on society. Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints).

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IX. GLOSSARY

Allele: Any of a set of possible forms of a gene.

Biochemical conversion: The changing of organic matter into other chemical forms.

Biomass conversion: The changing of organic matter that has been produced by photosynthesis into useful liquid, gas or fuel.

Biomedical technology: The application of health care theories to develop methods, products and tools to maintain or improve homeostasis.

Biomes: A community of living organisms of a single major ecological region.

Biotechnology: The ways that humans apply biological concepts to produce products and provide services.

Carbon chemistry: The science of the composition, structure, properties and reactions of carbon based matter, especially of atomic and molecular systems; sometimes referred to as organic chemistry.

Construction technology: The ways that humans build structures on sites.

Desalinization: To remove salts and other chemicals from sea or saline water.

Dichotomous: Divided or dividing into two parts or classifications.

Electronic communication: System for the transmission of information using electronic technology (e.g., digital cameras, cellular telephones, Internet, television, fiber optics).

Embryology: The branch of biology dealing with the development of living things from fertilized egg to its developed state.

Engineering: The application of scientific, physical, mechanical and mathematical principles to design processes, products and structures that improve the quality of life.

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Enzyme:	A protein that increases the rate of a chemical reaction without being changed by the reaction; an organic catalyst.
Ergonomical:	Of or relating to the design of equipment or devices to fit the human body's control, position, movement and environment.
Evolution:	A process of change that explains why what we see today is different from what existed in the past; it includes changes in the galaxies, stars, solar system, earth and life on earth. biological evolution is a change in hereditary characteristics of groups of organisms over the course of generations.
Fact:	Information that has been objectively verified.
Geologic hazard:	A naturally occurring or man-made condition or phenomenon that presents a risk or is a potential danger to life and property (e.g., landslides, floods, earthquakes, ground subsidence, coastal and beach erosion, faulting, dam leakage and failure, mining disasters, pollution and waste disposal, sinkholes).
Geologic map:	A representation of a region on which is recorded earth information (e.g., the distribution, nature and age relationships of rock units and the occurrences of structural features, mineral deposits and fossil localities).
Hydrology:	The scientific study of the properties, distribution and effects of water on the earth's surface, in the soil and underlying rocks and in the atmosphere.
Hypothesis:	An assertion subject to verification or proof as a premise from which a conclusion is drawn.
Information technology:	The technical means that humans create to store and transmit information.
Inquiry:	A systematic process for using knowledge and skills to acquire and apply new knowledge.
Instructional technology:	Any mechanical aid (including computer technology) used to assist in or enhance the process of teaching and learning.
Law:	Summarizing statement of observed experimental facts that has been tested many times and is generally accepted as true.

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Manufacturing technology: The ways that humans produce goods and products.

Mitosis: The sequential differentiation and segregation of replicated chromosomes in a cell's nucleus that precedes complete cell division.

Model: A description, analogy or a representation of something that helps us understand it better (e.g., a physical model, a conceptual model, a mathematical model).

Nova: A variable star that suddenly increases in brightness to several times its normal magnitude and returns to its original appearance in a few weeks to several months or years.

Patterns: Repeated processes that are exhibited in a wide variety of ways; identifiable recurrences of the element and/or the form.

Physical technology: The ways that humans construct, manufacture and transport products.

Radioactive isotope: An atom that gives off nuclear radiation and has the same number of protons (atomic number) as another atom but a different number of neutrons.

Relationship between science and technology: Science builds principles or theories while technology is the practical application of those principles or theories.

Scale: Relates concepts and ideas to one another by some measurement (e.g., quantitative, numeral, abstract, ideological); provides a measure of size and/or incremental change.

Science: Search for understanding the natural world using inquiry and experimentation.

System: A group of related objects that work together to achieve a desired result.

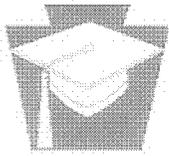
Open Loop system: A group of related objects that do not have feedback and cannot modify themselves.

Closed Loop system: A group of related objects that have feedback and can modify themselves.

Subsystem: A group of related objects that make up a larger system (e.g., automobiles have electrical systems, fuel systems).

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- Technology education:** The application of tools, materials, processes and systems to solve problems and extend human capabilities.
- Technological design process:** Recognizing the problem, proposing a solution, implementing the solution, evaluating the solution and communicating the problem, design and solution.
- Theory:** Systematically organized knowledge applicable in a relatively wide variety of circumstances; especially, a system of assumptions, accepted principles and rules of procedure devised to analyze, predict or otherwise explain the nature or behavior of a specified set of phenomena.
- Theory of evolution:** A theory that the various types of animals and plants have their origin in other preexisting types and that the distinguishable differences are due to modification in successive generations.
- Topographic map:** A representation of a region on a sufficient scale to show detail, selected man-made and natural features of a portion of the land surface including its relief and certain physical and cultural features; the portrayal of the position, relation, size, shape and elevation of the area.
- Transportation systems:** A group of related parts that function together to perform a major task in any form of transportation.
- Transportation technology:** The physical ways humans move materials, goods and people.
- Tool:** Any device used to extend human capability including computer-based tools.



**PA Inspired Leadership Program
Advanced Studies for Leadership in STEM Education:
Mathematics**

Program Goals:

1. For participants, individually, to expand their notions of the mathematical knowledge and dispositions students need to have to be mathematically literate in today's world.
2. For participants, individually, to expand their notions of the learning opportunities that need to be created in order to make significant mathematics accessible to all students.
3. To help school leaders become more effective in their roles as instructional leaders through a deepened understanding of subject matter, teaching, learning and assessment.
4. To provide school leaders with the tools to gather and analyze quantitative and qualitative data to inform a system-wide action plan for improvement in student achievement.

Program Outline:

Day 1

- What does it mean to really know math content at the secondary level?
- What does high quality math instruction look like, (Part 1)?

Day 2

- What does high quality math instruction look like, (Part 2)?
- How can assessment support learning and instruction?

Day 3

- Equitable Practices: How can we hold high expectations and provide strong support for all students?

Day 4

- What are the significant considerations when thinking about how to make instructional improvements in the secondary school?

Day 5

- Mathematics Improvement Process: How can school leaders advance their mathematics program toward success for all?