NEED FOR PROJECT

Arts Link: Building Mathematics Competencies Through an Arts Integration Model

The School District of Philadelphia, (SDP) is one of the largest public school systems in the country – and unfortunately it is among the most socio-economically distressed and academically challenged as well. The District currently enrolls approximately 175,000 students in grades preK-12 in 265 schools across the city, and an additional 30,000 students attend the 61 charter schools operating within the city. The overwhelming majority of the District's students come from low-income (over 74% eligible for Free or Reduced Price Lunch) and historically underserved racial minority (over 79% African-American or Latino) backgrounds. More than 18,000 students have been diagnosed with physical and/or learning disabilities severe enough to require special educational services. Nearly 14,000 have limited English proficiency, coming from homes where over 60 different primary languages are spoken. Philadelphia has one of the highest citywide crime rates in the country and many of the schools are located in neighborhoods that simply are not safe. Teachers struggle to maintain order and discipline in their classrooms, where enrollments of 30 or more students are commonplace.

The District is now in "Corrective Action II" status under *No Child Left Behind* for the fifth consecutive year. At the start of the 2007/08 academic year, there were some 128 schools in Philadelphia (not including charter schools) that failed to make Adequate Yearly Progress (AYP) for the current year, and 106 that had been placed in "School Improvement" or "Corrective Action" due to long-standing failure to make AYP. It is especially critical that forward momentum not be lost due to a lack of resources.

Further, reduced levels of student motivation, engagement, and sustained focus are barriers seen not only in low test scores in mathematics and reading but also in unacceptably low

levels of pro-social behavior and daily attendance at school. Acknowledging this challenge, the Philadelphia Arts in Education Partnership, (PAEP) southeastern Pennsylvania's non-profit, 501(C)(3) resource for arts in education programming, research, and professional development proposes to continue its ten year longstanding working relationship with The School District of Philadelphia, (SDP) towards meeting their strategic planning goals to increase student success and teacher effectiveness. By working with a partnership of more than 100 teaching artists representing all arts disciplines and 83 arts and cultural organizations, PAEP will deploy its resources in service to the school children of Philadelphia. Since 2001, more than 75,000 students in 2,200 classrooms have participated in experiential arts residencies through PAEP's programs, and over 4,500 teachers and arts specialists have attended PAEP sponsored professional development workshops and conferences. PAEP is housed in the Graduate Art Education Department at the University of the Arts and, as such, will provide full access to the department's resources including state-of-the-art art classrooms and studios, exhibition space, and the intellectual capital of its esteemed faculty who will serve as formal and informal consultants to the program.

While research (see Appendix A, Reference List) affirms that arts education correlates positively with fostering improved student performance in all of these factors, there has been a history at the SDP of reductions in staffing and arts programming, and a gap in service delivery. Schools with the highest poverty levels and the lowest student test scores have seen the greatest reduction of music or art specialists on staff; those cutting arts' staffs cite an urgency to channel budget resources into mathematics and literacy achievement so schools might more likely meet AYP. Many SDP elementary schools lack art or music education specialists; most elementary school teachers are ill equipped to facilitate music or art education unaided. Rejecting the

premise that schools must choose between having either an *arts specialist* or another teacher (who focuses on content mastery needed for test scores to rise) a key, research-based premise of the model here proposed is that a well-rounded education --- including substantive engagement with the arts --- will enhance student test scores in mathematics, science, and content level reading skill at a level equal to other instructional methods.

Research highlights other aspects of unmet need in mathematics as early as grade 3, and across the elementary school grade levels in science. Herbert Ginsburg, member of the Committee on Early Childhood Mathematics has maintained that, "There is evidence of a lot more mathematics anxiety around second and third grade. The kids find it harder. The gap between those doing well and not so well widens" (Chute, 2009). The problem of skill acquisition is then compounded year after year. Dr. Ginsburg has further stated, "If they don't have the real basics in terms of what does it mean to add and subtract, what does this written mathematics mean on a page, if it's rote, mechanical, then in mathematics the difficulty starts to build" (Chute, 2009). Science education in elementary school has been treated as an afterthought, as teachers report being so overwhelmed with language arts, mathematics, and reading that science education has traditionally been neglected. In 2007-2008, *No Child Left Behind* mandated standards-based testing of science at the elementary school level, (grades 3, 4 and 5 in Pennsylvania) suggesting a refocus on science education to promote scientific literacy. Writing in 2006, Allen (2009) asserted that a key need is to address mathematics and science skill acquisition as early as the second grade, as a pivotal year for learning development in these academic subject areas.

Student success for grade level academic standards and eligible content for the Pennsylvania System of School Assessment (PSSA) tests is repeatedly challenged by the wide

range of differing abilities prevalent in diverse, inclusion classrooms. This issue is magnified by the fact that students take in information and make sense of ideas in different ways. (Hall, Strangman, and Meyer, 2009). Based on the premise that instructional approaches should vary and be adapted in relation to individual and diverse students in classrooms (Tomlinson, 2001), arts-integration applied through a differentiated instructional approach is a powerful methodology that will help more students in diverse classroom settings experience success. This instructional approach is central to our project.

The Arts Link program is focused on Grades 2, 3, 4 and 5 to address grade level academic standards for mathematics, science, and content area reading skills included in state standardized tests as well as the state's Arts and Humanities Standards. (The mathematics and science tests are administered in grades 3, 4, and 5.) When students see the interrelationship of their schoolwork through a creative lens, they can boost academic skills and develop critical thinking skills embedded in hands-on arts engagements. "We know that learning takes place most effectively in classrooms where knowledge is clearly and powerfully organized, where students are highly active in the learning process, and students feel a sense of safety and connection" (Wiggins and McTighe as cited in Tomlinson, 2001). The proposed program addresses the development of teaching/learning teams inclusive of classroom teachers, certified art teachers (titled *art specialists* by the SDP), and master teaching artists to develop standards-based, arts-integrated curricular units, and to improve instruction by offering ideas and processes for employing the arts as a vehicle for instruction during the school day, while sustaining focus on the benchmarked goals of the state's Arts and Humanities Standards (Baumgartner, 1994). Further, this proposal, anchored in the District's core beliefs of equity, excellence, and children first, is aligned with SDP's CEO, Dr. Arlene C. Ackerman's 2014 Strategic Planning Document.

SIGNIFICANCE

Arts Link: Building Mathematics and Science Competencies through an Arts Integration Model

Since its publication of *Toward Civilization* in 1988, the National Endowment for the Arts has supported an agenda in which the arts are central to the education of future generations of children. However, serious social problems plaguing education (especially in major cities like Philadelphia) have relegated the arts to a marginal presence in the education of our children. If educators do not embrace the arts as critical to the development of all children, then our society faces a crisis of magnifying proportions.

Elliot Eisner (2002) has asserted that those interested in enhancing the processes of education have much to learn from the arts. Furthermore, Eisner (2002) states that learning in and through the arts develops complex and subtle aspects of the mind that have profound implications for all academic areas of learning. Educators and researchers agree that "mathematics and science embody habits of mind and methods for discerning meaning that enable students to learn deeply and critically in all areas" (Carnegie-IAS, 2009). However, this same report calls attention to the disappointing performance of American students in mathematics and science (2009). Current discussion about strategies for improvement and a new approach to mathematics and science learning focus on igniting student curiosity, ambition, innovation, and problem solving. The arts can provide students with strategies to make critical connections between concepts, facts, and inquiry in both intellectual and hands-on aspects. Furthermore, the arts promote multiple ways of problem-solving and multiple ways of taking in new information supporting deeper, more meaningful learning. Current brain-based research asserts that the more ways new information is learned, the more memory pathways are built, leading to better retention and retrieval of information and ideas (Willis, 2006).

Employing an arts-integration approach to mathematics and science learning would improve academic achievement in these subjects. The way to achieve this is by developing students' skills and values in and through the arts. Moreover, Karkou and Glasman (2004) report on research that stresses the role of the arts to promote the emotional well-being and pro-social behavior of young people. These studies stress the value to children of interacting with art teachers and master teaching artists in the art making process.

The Philadelphia Arts in Education Partnership (PAEP) proposes to work with the School District of Philadelphia (SDP) to implement a comprehensive arts-integrated program addressing the mathematics, science, and content area reading skills of the Grade 2, 3, 4, and 5 populations in four (4) "School Improvement" schools not making *adequate yearly progress (AYP)*. The overarching goal of this program is to improve student academic achievement through rich, experiential arts engagements through the design and implementation of arts-integrated curricula. Following are the program's measurable outcome objectives: 1) Improvement in students' academic performance in mathematics and science; 2) Improvement in students' attitudes towards self, school, and the arts, fostering pro-social behavior in the school setting; 3) Improvement of student academic behavior in terms of study habits, homework completion, and parental/guardian involvement in academic assignments; 4) Enhancement of classroom teachers' pedagogical and classroom management skills relating to the use of differentiated instruction to build mathematics and science skills in students; 5) Enhanced classroom teacher capacity to design and implement arts-integrated instructional strategies to deliver mandated curriculum; 6) Enhanced classroom teacher capacity to engage in productive partnerships with art specialists and teaching artists to deliver mandated curriculum; 7) Enhanced ability of the art specialist to assume a leadership role in the establishment of a partnership between classroom teachers and

master teaching artists to utilize arts-integrated instructional strategies to deliver mandated curriculum.

This four-year program will engage students in arts-based teaching/learning communities integrating the arts into the core mathematics and science curriculum at the four grade levels and address Pennsylvania State Mathematics Anchors: 1) Numbers and Operations, 2) Measurement, 3) Geometry, 4) Algebraic Concepts, 5) Data Analysis and Probability; and Science Anchors: 1) The Nature of Science, 2) Biological Sciences, 3) Physical Sciences, 4) Earth and Space Sciences. Literacy across the four grade levels will be addressed through content area reading, writing, and research.

Each grade-level, arts-integrated collaborative project will include a thirty (30) session visual arts residency with a master teaching artist conducted over an eight-month period and will begin with a pilot visual arts residency to directly engage students in mathematics and art integrated activities in the first year of the project. Year I of the project is designated the pilot year of the project in which extensive professional development for the arts specialists, classroom teachers, and master teaching artists will precede "testing" a discrete, fifteen (15) session visual arts project. In the second, third, and fourth years of the project, both mathematics and science will be the focus of the visual arts residency. In the second, third, and fourth years of the project, additional visiting artist residencies in music, dance, or theater may be requested by the grade level teaching/learning teams as a ten (10) session complement and organic overlay to the on-going visual arts residency enhancing and extending the mathematics and science goals for the specific grade level. The request for a visiting artist(s) will arise from the students' thematic, arts-based project investigations, demonstrating application of a differentiated teaching and learning approach. Conceivably, each project could support between 2-3 visiting artists per

year to increase the depth of student exploration of mathematics and science curricula through the arts. This will build greater potential for students to make connections that will enable them to demonstrate new found skills and interests promoting a more positive attitude toward learning and school (Karkou and Glasman, 2004).

The structure of this collaborative model for designing and implementing an arts-integrated program consists of creating *teaching/learning teams* in each grade level to include: the school art specialist, the grade-level classroom teacher, and a master teaching artist. Each grade level team will begin the program in year one and participate for the full, four years. After year one, students will move up a grade with a new 2nd grade class added to the team. By year four, there will be a total of 48 grade level interventions. Each grade level team will include one master teaching artist and the inclusion in years 2, 3, and 4 of a short-term visiting artist(s). The master teaching artist, representing the visual arts, will be in residence in the school for fifteen (15) sessions in the year one pilot phase, and for thirty (30) sessions in years 2, 3, and 4 of the project. In years 2, 3, and 4, as the program progresses, an array of visiting artists representing the performing arts will be available to provide up to ten (10) sessions total each year to add value to and complement the work of the art specialist and artist in residence. Artists will be selected from the Pennsylvania Council on the Arts' *Directory of Pennsylvania Artists in Education*. PAEP, as the Council's regional partner, vets these artists through a rigorous three-stage process before they are permitted to work in K-12 classrooms. PAEP has been the honored, contracted institution to work with the School District of Philadelphia on a prior Model Development and Dissemination Program grant, and both entities learned that attempting to introduce all art forms at the initial stages of a model program does not allow teachers or artists to work collaboratively or consistently across grade levels in the development of finely tuned

arts-integrated units and lesson plans. Further, PAEP learned that the most successful integration projects were those initially grounded in the visual arts. It is for this reason that the program begins with visual arts and allows for the addition of other art forms in years 2, 3, and 4 while maintaining and deepening the visual art component.

The teaching/learning teams across 2nd, 3rd, 4th, and 5th grades will identify critical grade-level mathematics and science goals as defined by the SDP Core Curriculum, establish an eight-month arts-integrated themed approach to address these goals, and develop scope and sequence curricula for implementation. The art specialist will tie the arts-integration curricula to the grade level arts and humanities curricula delivered in his/her art classroom when appropriate. The master teaching artist will work in both the grade level classrooms and at times, with the art specialist in the art classroom. These teaching/learning teams will engage in professional development, in-school planning and reflection sessions, formative assessments of student progress, and program evaluation to develop and renew instructional strategies to increase their effectiveness in employing the arts to improve student mathematics and science achievement. Art specialists, master teaching artists, and curriculum and evaluation specialists will facilitate these professional development sessions with an emphasis on a "trainer of trainers" model to place the arts specialist central to the teaching/learning team. The art specialist knows and applies the arts and humanities standards in his/her art classroom, but also has a breadth of knowledge about grade level academic standards, and as such, can make the appropriate curricular connections. The art specialist will be cast as the liaison between the master teaching artists and classroom teachers, mentoring them in implementing the arts into core curricula over the course of the four-year program (Corcoran, Nov 1998).

This program will document for dissemination a model for arts-based learning

collaborations integrating the arts into core mathematics and science curriculum along with strategies for developing literacy across content areas, and will provide teachers, working with artists a greater variety of teaching and learning methodologies to enhance the learning of hard-to-reach students. The impact of these teaching and learning models on strengthening arts skills, academic skills, improving students' standardized test scores, improving students' pro-social behavior and attitudes toward school, and enhancing teacher pedagogy will be examined through scientifically-based research methodology. (Please see Evaluation Plan.)

Recent education reforms and policy changes have had a great impact upon arts education, leading to a loss of both financial and programmatic support. The decline of the arts as a significant component in schools has accelerated over the last 25 to 30 years. During this same period, urban schools have undergone dramatic decline in student academic skills. This program will address these issues by applying a school-community partnership model that taps into the expertise of the teaching artist and arts community and expands capacity by building teaching and learning teams to design, implement, and assess a project in which the arts are integrated within content areas, meeting both arts and humanities standards, and building mathematics and science skills through multiple applications in the arts (Dreezen, 1992; Myers, 2000). While the emphasis on this program is to meet the needs of Philadelphia's Grade 2, 3, 4 and 5 students, these models for both cooperative management of projects and development of content have wide applicability in any K-12 school, locally, regionally and nationally.

PAEP and SDP will disseminate findings of this program at annual conferences. Information will be posted on the project Web site (and thus available to teachers within the District, across the Commonwealth of Pennsylvania). PAEP and SDP will also disseminate findings through publications and presentations at state and national professional conferences.

PROJECT DESIGN

Arts Link: Building Mathematics and Science Competencies through an Arts Integration Model

PAEP in concert with SDP will implement this program to build mathematics, science and literacy across content area skills through extended learning experiences in and through the arts for Grade 2, 3, 4, and 5 students in four schools over a four-year period. Both the proposed project and attendant professional development activities are designed by PAEP and SDP to accomplish the following outcome objectives: : 1) Improvement in students' academic performance in mathematics and science; 2) Improvement in students' attitudes towards self, school, and the arts, fostering pro-social behavior in the school setting; 3) Improvement of student academic behavior in terms of study habits, homework completion, and parental/guardian involvement in academic assignments; 4) Enhancement of classroom teachers' pedagogical and classroom management skills relating to the use of differentiated instruction to build mathematics and science skills in students; 5) Enhanced classroom teacher capacity to design and implement arts-integrated instructional strategies to deliver mandated curriculum; 6) Enhanced classroom teacher capacity to engage in productive partnerships with Arts Specialists and Teaching Artists to deliver mandated curriculum; 7) Enhanced ability of the Arts Specialist to assume a leadership role in the establishment of a partnership between classroom teachers and master teaching artists to utilize arts-integrated instructional strategies to deliver mandated curriculum.

To accomplish these outcome objectives, which are an effort to improve teaching and learning and support Pennsylvania's rigorous academic standards, PAEP and SDP will utilize an arts-integrated partnership model, design and implement professional development supporting components of the project design including differentiated instruction, and through the evaluation

services of TAP, Inc., and the SDP's Office of Research and Evaluation measure the impact of these projects in multiple ways.

Project Design and Implementation

Schools will be selected by a matched randomization process based on the following criteria: a) neighborhood elementary schools in the School District of Philadelphia with at least two Grade 2, Grade 3, Grade 4, and Grade 5 classrooms (teachers), b) employ an art specialist, and c) have a "School Improvement" status designation, defined as not meeting the Adequate Yearly Progress in 2008-09. PAEP has selected not to work with the most severely underperforming schools, "Empowerment Schools" for this project. From lessons learned in engaging with these schools on a regular basis, PAEP has found that the corrective measures taken by the District, including an additional 90 minutes per day focused on special mathematics and phonics programs, severely impact the time needed for the inclusion of arts programming in the classroom. Teachers at these schools struggle with attending special professional development sessions or to commit to integrating the arts fully into their classrooms. While all children are deserving of an arts-integrated program, PAEP has chosen to focus work on schools with "School Improvement" status whose student population does not require the same level of remediation. These schools are still not making Adequate Yearly Progress, but do have greater flexibility in their schedules for inclusion of the Arts Link Program. Schools meeting the aforementioned criteria will be informed of the program opportunity and prompted to apply to participate if they agree to meet the training and program implementation requirements. Participating schools will be informed that 10 schools will be selected by random lottery into the intervention group (n=4) and the control group (n=6) by the SDP staff liaison and the PAEP evaluation team. Letters will be sent to the principals of the selected 10 schools outlining the

scope of their participation over four years. Once the four schools have been identified for intervention, PAEP will, in concert with the classroom teachers, art specialists, and principals, match schools with master teaching artists as described in the preceding section to begin the formation of the project's teaching/learning teams. PAEP and SDP will convene these teams along with the schools' principals to review program goals, objectives, and timelines by the end of October 2010.

The scope of this program over four years is as follows: Grades 2, 3, 4, and 5 are targeted to receive arts-integrated interventions. All four grade levels in all four schools will begin the program in Year I as the pilot year and participate through Year IV. Mathematics and science curricula will be phased into the program as follows. Year I will focus on mathematics. In years 2, 3, and 4, science will be added to the program so that students will engage in arts-integrated projects focused on both academic subject areas. Throughout the four year project, content area reading and writing skills will be strengthened as students will be required to research, read, write formal reports, and journal about their projects. From November 2010 through March 2011 of Year 1, the art specialists, master teaching artists, and classroom teachers will receive intensive professional development to prepare them for program implementation. The grade level teaching/learning teams will then pilot one discrete visual arts-integrated mathematics project in May and June. Immediately following this pilot, the teams will assess their successes, challenges to success, and identify program and instructional improvements to be implemented in Year 2.

Students in the program will be engaged in arts-integrated activities to promote art making skills and develop mathematics and science skills with content area literacy skills. These projects will span an eight-month period in each school year for Years 2, 3, and 4 after the Year 1 pilot phase. To ensure quality in the design and delivery of these projects, ongoing professional

development, and teaching/learning team planning sessions are included as integral components of the program design. PAEP has learned through its experience with implementation of professional development for teachers that timing and location are paramount to teacher attendance and sustainability of training overtime. PAEP proposes to use Year I as the pilot year of the program with an emphasis on professional development; 10, 3-hour sessions for art specialists, to prepare them to assume a leadership role for the teaching/learning teams at their schools, 7, 3-hour sessions for master teaching artists, and 5, 3-hour sessions for the classroom teachers. Art specialists from the four schools will attend three sessions together. The teaching artists will join the team for the remaining seven sessions. Classroom teachers will join in for the last five professional development sessions. This additive process will provide an opportunity for the artists, classroom teachers, and art specialists to receive the appropriate training at the front of the program so that they will be able to apply newly learned concepts and techniques within the context of the program implementation. After Year I, professional development will occur once a year during three consecutive days, 6 hours a day, at the end of August for all participants so as not to overwhelm teachers during the school year. In-school teaching/learning team meetings that require common meeting and planning time, 2 hours per month, will be required. This type of common meeting and planning time could build sustainability for the project beyond the funding period of the grant as the project will foster the value of collaboration and build strong teacher relationships. Content for professional development will be designed by the PAEP Program Director, Curriculum Design and Development Consultant, and Assessment and Evaluation Consultant in a structured, sequential format focusing on the development of arts-integrated project teams' skill sets. Master teachers and teaching artists identified by PAEP, SDP, and the project consultants will facilitate professional development.

Professional Development

One of the goals of this program is to develop the leadership skills of the art specialist to take a pivotal role as liaison between classroom teachers and teaching artists. The program will provide ample training time for the arts specialists to learn and model this role in Year 1. Further, techniques for promoting a differentiated learning and teaching environment for these arts integration projects will be highlighted through specific professional development sessions in Year 1 and reinforced throughout the four years of professional development.

To ensure program sustainability, professional development workshops will include sessions on building project infrastructure as well as building project content design and implementation. Infrastructure sessions will focus on creating effective collaborations and will include but are not limited to: 1) Project Management and Collaboration; 2) Project Leadership Roles and Responsibilities; and 3) Project Problem-Solving.

Project Content Design and Implementation sessions will target the creation of authentic arts-integrated learning projects that will increase the probability of meeting mathematics and science goals for each grade level with a focus on differentiated instruction implementation. The content will include but is not limited to: 1) Project Curriculum Design; 2) Sequential Lesson Planning; 3) Student Assessment Strategies; and 4) Differentiated Instruction Methodology and Implementation.

Examples of arts integration workshops focusing on Project Content Design could include: 1) Applying Mondrian Techniques to Building an Understanding of Patterns and Number Systems; 2) Using Architecture, Drawing, and Mapping to Understand Measurement and Scale; 3) Exploring Flora and Fauna through 3-D Model Making; and 4) Using Principles and Elements of Design to Trace the Life Cycle of Plants.

The purpose of this rich and ongoing professional development is to enable teaching/learning teams to acquire new techniques for classroom use, to develop strategies for reaching and engaging at-risk students in the learning process, to increase student pro-social behavior, to enhance teachers' skills, and to build confidence in their ability to apply arts-integrated learning methods in other classroom learning situations. Most importantly, during these professional development sessions and in the school meetings described below, the teaching/learning teams will design the actual content of the arts-integrated mathematics and science curriculum and lesson plans for classroom implementation each program year.

An integral component of this program will be the delivery of a one-day conference to be held at the end of each school year of the four year project to disseminate the findings and highlight the mathematics and science, arts-integrated curricula models developed. PAEP, through its association with other PA Council on the Arts regional partners, will invite teachers and artists from across Pennsylvania to participate in the conferences, thus, expanding the potential dissemination of the findings to a broader audience. PAEP will also prepare a catalogue of student work for dissemination each year of the grant.

PAEP has piloted this type of professional development over the past 8 years with SDP. Based on the following independent evaluation results of this original pilot by Policy Studies Associates, Inc., Washington, DC, (2005), PAEP and the SDP are committed to building, codifying, and creating a replicable model through the proposed arts integration project. Evaluation results on professional development workshops delivered by PAEP from 2002-2010 indicate that: 85% of participating teachers acquired new techniques to employ in the classroom; 80% indicated that the professional development program increased their knowledge of how to

use the arts in education; and over 90% reported that they would be able to transfer what they learned in professional development sessions to other classrooms learning situations.

Peer-to-Peer Planning Meetings

Another significant aspect of this arts integration model project design is the inclusion of peer-to-peer interaction as a means to build strong teaching/learning teams. The classroom teachers, master teaching artists, and art specialists will observe, nurture, and facilitate their arts-based project teams as they implement best practices in their design and delivery of arts-integrated projects. These monthly peer to peer planning meetings will include identification of major project milestones, working with the group to design a plan and timeline to accomplish these milestones, and review of progress towards meeting the project milestones. Teams will be required to report out this progress to the program management team. PAEP Curriculum Specialist consultants, Arts Education specialists, and the Program Manager will make formal and informal classroom observations, and attend and report out on monthly peer to peer meetings.

Further, the in-school meeting and planning sessions will focus on all aspects of curriculum implementation, student assessment, and effectiveness of instructional strategies. There will be constant peer-to-peer interaction that will act as both a safety net and a reinforcement of best practices in instructional strategies and tactics. Research in the field indicates that the most effective professional development derives from peer-to-peer encounters. According to Letman (2005), these types of interactions contribute greatly to teachers' professional learning as they build upon the proposition that "more able peers encourage less experienced colleagues to make a connection between what is being learned and what is already known" (p. 3).

Classroom Implementation of Arts-Integrated Literacy Curriculum

School teaching/learning teams will begin delivery of their jointly created arts-integrated mathematics and science lesson plans designed in professional development sessions and in school planning meeting sessions. In Year 1, all projects will begin with a pilot visual arts residency to focus student learning activities on grade level appropriate mathematics skills. This approach is grounded in the Pennsylvania State Mathematics Anchors including: 1) Numbers and Operations, 2) Measurement, 3) Geometry, 4) Algebraic Concepts, 5) Data Analysis and Probability. In Years 2, 3, and 4, science curriculum at the four grade levels will be added to the arts-integrated residency and focus on 1) The Nature of Science, 2) Biological Sciences, 3) Physical Sciences, 4) Earth and Space Sciences. Literacy across the four grade levels will be addressed through content area reading, writing, and research, and visual arts activities could include 2-D and 3-D projects employing multiple mediums such as painting, drawing, and sculpture. As an outgrowth of the Year 1, 15-session pilot, in Years 2, 3, and 4, the 30-session visual arts-integrated activities may be complemented with an additional 10 session residency with master teaching artists in the performing arts including music, theater, or dance. These art forms may be incorporated into the arts integration projects as deemed relevant through the students' exploration guided by their teachers, thus enhancing and extending the projects' mathematics and science goals. This differentiated instructional approach fosters student inquiry and maximizes their capacity as learners (Tomlinson, 2007).

Each school's teaching/learning team will adopt a theme to provide the framework for arts-integrated student exploration of mathematics and science concepts and will be adapted to meet grade level curriculum. Philadelphia is a city rich in history and well known for its neighborhoods. A school, for example, in the Germantown section of Philadelphia could adopt

the overarching theme of "Creating Community" and explore its own community from the past to the present day. Through differentiated instruction that promotes team teaching, the classroom teacher works with students to research and write about what their community looked like at different historic periods, what plants and trees were native to the area, what caused settlements to develop, and how increased population and the advent of modern transportation have made a major impact on the environment. As some students are researching, others could be working under the guidance of the teaching artist on a variety of projects reflecting their research. Within the context of their grade level mathematics curriculum, they could learn to read maps, learn about scale and measurement, and then, with their art teacher and visual teaching artist, map a square mile surrounding their school building. They could draw the buildings, make comparisons between the historical buildings and those built in more modern day, and construct 3-dimensional scale representations of their community requiring the use geometric principles. The students could research the flora and fauna indigenous to the area, and compare changes in the environment from colonial times to the present and write reports across the science curricula. The students could take field trips to the historic Morris Arboretum with their teaching artist and do on-site drawings of the indigenous trees representative of their neighborhood community. As the students begin to use their mathematics and science knowledge to investigate their community and learn to look at their community through an arts lens, they will be led by their classroom teachers to ponder other aspects of their community, then and now. Students may want to research the key historical highlights of their neighborhood including Germantown's significant role in the Revolutionary War and later, during the Civil War, when the area became an important stop on the Underground Railroad. The students could take a field trip to the Rosenbach Museum & Library where they can review antique maps and historical books about

their neighborhood during the Civil War. This research and reporting would be a means for the classroom teacher to encourage reading and writing across the content area. The writing could then be used as an impetus for the arts specialist and master teaching artist to create a bookmaking project that would incorporate the students' mathematics skills, writing skills, and art making skills to create a finished product. In addition to creating visual arts representations of this research, perhaps creating a timeline of the historical events that would require counting and gathering data, (two second grade SDP curriculum requirements), students might also choose to work with a visiting theater artist to create a dramatization of the historical events. This residency could culminate in an exhibit of student art work in the school and a performance of their historical dramatization. A school could choose to work with one theme for the four years of the program or vary themes throughout. The importance of the thematic approach to the application of this program is that it will serve to anchor the grade level projects and allow for inquiry and investigation of concepts and ideas in the core curricular areas of mathematics and science.

According to Witherell (2000), a substantive arts-integrated model helps children by providing "stimuli to a child's learning environment to produce a more active brain, thereby increasing his or her learning" (p.2). Further, studies indicate that employing concepts from an art form to magnify and clarify concepts in other subject areas have great potential to impact not only learning for low-achieving students but also to reinvigorate teachers (Catterall, 1995). This type of learning utilizing multiple ways of knowing is well served by an arts-integrated model providing students with the ability to absorb concepts and make connections to their learning in other core content areas (Dewey, 1938; Gardner, 1993). Studies from *Champions of Change* confirm that the arts impact learning for hard-to reach students by engaging and motivating

them, connecting them to other students as well as themselves, and by transforming the learning environment through authentic experiences (Fiske, 2000). Children, especially those in urban environments, come from many socio-economic and cultural backgrounds. These children bring many multifaceted ways of knowing and representing what they know. Teachers must find ways to engage students that reflect this diversity through what they teach and how the students learn. An interdisciplinary, differentiated approach to learning with the arts as the key facilitation method incorporates a multimodal approach to learning**.** This assumes that "meanings are made, distributed, received, interpreted, and remade in interpretation through many representational and communicative modes not just through language" (Kress & Jewitt, 2003, p.1).

A variety of assessment strategies will be employed by the project teaching/learning teams designed in professional development sessions with an Assessment and Evaluation instructor. These strategies will include but are not limited to: process portfolios, journaling, peer critiques, teacher critiques, vocabulary understanding and retention, video documentation, self-reflection and assessment, content knowledge tests, and final student productions and exhibitions (Pistone, 2002). Additionally, project team members will keep individual journals to document progress and personal reflections on issues that arise during student facilitation. Findings will be shared at the school common meeting and planning sessions for collective insights on practice and processes in keeping with practitioner inquiry methods (Cochran-Smith, Lytle, 1993).

Project Sustainability and Replicability

Each year of the project, teaching/learning teams comprised of classroom teachers, art specialists, and teaching artists will increase their capacity to design and implement these arts-integrated projects as well as increase their ability to advocate for support of this work in the greater Philadelphia community.

One of the underlying goals of this project is to build and deepen relationships between the region's teaching artists and PAEP's partner cultural institutions with individual SDP schools. *Learning Partnerships: Improving Learning in Schools with Arts Partners in the Community* (1999), reported that when a substantial, quality partnership evolves over time, many benefits accrue to both the schools and to the arts organizations. This partnership increases community awareness of educational issues and helps mobilize outside resources. Schools experience an increased ability to offer comprehensive arts education, resulting in improved student performance (Catterall, 1995; Fowler, 1995; Myers, 2000). Measured by grades, test scores, attendance, and retention rates, schools with powerful arts programs have reported increases in student academic performance and improved attitudes toward school (Fiske, 2000).

This program will document for dissemination a model for project management of school artist collaborations that will have undergone rigorous assessment for establishing standards of project success and sustainability and will have provided teachers, working with their peer art specialists and artists in their classrooms, with a greater variety of teaching and learning strategies to enhance the learning of low-achieving students. It will also document for dissemination an arts-integrated model as a methodology to strengthen students' mathematics and science skills. The impact of these models on strengthening arts skills, mathematics and science skills, improving students' standardized test scores and student self-esteem, and enhancing teacher pedagogy will be examined through scientifically-based research methodology.

PAEP and the SDP will disseminate the project's model processes and products including but not limited to curricula and lesson plans, professional development course content, and

project infrastructure models through the project Web site, through articles published in appropriate education journals, and presentations made at state and national conferences.

QUALITY OF PERSONNEL

A Management Team comprised of PAEP Executive Director/CEO, PAEP Education Director, PAEP Director of Administration, TAP Consulting Independent Program Evaluator, the SDP Office of Comprehensive Arts Education Director, and SDP Evaluation Support Personnel will oversee the program. A Program Manager will provide support to the program on a part-time basis and report directly to PAEP's Executive Director/CEO. A group of consultants from the education and arts arenas will provide direct support to the program through the content design and implementation of professional development, evaluation of the program, and ongoing assessment and support of the implementation of arts-integration activities. All are seasoned educators and artists with a deep commitment to the education of our youth. PAEP maintains a strict policy of encouraging applications for all positions from under-represented groups and does not discriminate based on race, color, gender, age or disability.

Management Team

Pearl Schaeffer, Executive Director/CEO PAEP, has taught at the University of the Arts for the past 25 years as a professor in both the dance and graduate art education departments. Ms. Schaeffer holds a B.S. degree from Drexel University in English secondary education, and a MFA in dance from The University of the Arts. She has taught English and dance extensively in private and public K-12 schools, and holds state certification in Pennsylvania and Delaware.

Raye Cohen, Education Director , ***PAEP*** , is an art educator and visual artist. She has taught at the University of the Arts for 12 years in the Graduate Art Education and Museum Studies Departments. Ms. Cohen holds a B.A. degree from the University of Pennsylvania, a four-year certificate from the Pennsylvania Academy of Fine Arts, and an MFA in Sculpture, and an M.A.

in art education from the University of the Arts. She has taught English and elementary 4th and 5th grades in Washington, DC and Los Angeles, CA.

Dr. Evan Leach, Independent Program Evaluator, is presently a principal in TAP Consulting, Inc. where he oversees the firm's practice on organizational research and evaluation. He holds a doctorate in Organizational Behavior from Yale University and has extensive experience and expertise in all aspects of program evaluation, including evaluation design, instrument design, data collection management, and qualitative and quantitative data analyses. He is presently an associate professor of Management at West Chester University and the University of Pennsylvania.

Dr. Dennis W. Creedon, Director of Comprehensive Arts Education, Office of Teaching and Learning for the School District of Philadelphia, developed the Opera Company of Philadelphia's arts-integrated and literacy based "Sounds of Learning" program awarded the Best Practice Site in Arts-Integration by the Pennsylvania Department of Education, and the Pennsylvania Alliance for Arts Education. Dr. Creedon was awarded the 1992 Excellence in Teaching Award by the School District of Philadelphia and the Philadelphia Federation of Teachers. He has presented at local, state, and national conferences on assessment, constructivism and integrative arts pedagogy, at risk students, and literacy issues. He is a guest lecturer at the University of Pennsylvania and a panelist for the NEA on Arts Learning. Dr. Creedon received his Ed.D. from the University of Pennsylvania.

Additional Program Personnel

Program Consultants

Dr. Catherine Richmond-Cullen, Curriculum Design and Development Consultant, is the curriculum specialist and arts administrator for the northeastern Educational Intermediate Unit,

of the PA Department of Education, and the regional director of the PA Council on the Arts Education Program. She is a national award-winning teacher, has worked as an elementary educator for 15 years, and was recognized for best practices in the arts by the PA Department of Education. She received her Ed.D. from Temple University.

Barbara Suplee, Ph.D. Art Education Consultant, and faculty at the University of the Arts served as chair, Department of Art Education and Art Therapy, for five years. A visible advocate for Art Education, the Pennsylvania Art Education Association named her the 2003 Pennsylvania Art Educator of the Year. Dr. Suplee is especially committed to developing and promoting quality art education curricula especially for children with disabilities and special learning needs. As the founding chair of the Special Needs in Art Education Issues Group (SNAE), National Art Education Association, Dr. Suplee has conducted numerous workshops and presentations on "best practices" in teaching art to special needs populations. She received her Ph.D. from Penn State University.

MANAGEMENT PLAN

The SDP and the PAEP have aligned all management components to maximize the success of the program as reflected in the program timeline including milestone identification appearing as asterisks (***)** next to monthly activities, commitment of personnel and institutional resources, clearly defined management structures, assigned responsibilities (bold text), and feedback mechanisms. A Management Team comprised of PAEP Executive Director, PAEP Education Director, PAEP Director of Administration, TAP Consulting Independent Program Evaluator, the SDP Office of Comprehensive Arts Education Director, and SDP Evaluation Support Personnel will meet with key project stakeholder groups on at least a quarterly basis affording timely feedback for continuous program improvement.

PAEP = Philadelphia Arts in Education Partnership
SDP= School District of Philadelphia
TAP/IPE= Independent Program Evaluator
CAE = School District of Philadelphia Office of Comprehensive Arts Education
ORE = School District of Philadelphia Office of Research and Evaluation

Arts Link Management Plan Timeline of Activities – Year I 2010-11

Sept.	1. **ORE** selects schools matching criteria; **Management Team** meets to review and address program implementation, and evaluation activities #1.
	2. **PAEP/CAE** notify schools of opportunity; ORE obtains list of interested schools.
	*****3**. ORE** randomly selects 6 schools as control group; 4 schools as intervention group. Schools notified.
	4. **PAEP Executive Director** solicits teaching artists for participation in Arts Link program; identified and matched to intervention schools.
	5**. PAEP Education Director** hires Program Manager.
	6. **Program Manager** identifies team of performing visiting artists to work in Arts Link project. (beginning year 2 of program)
	*7**. Program Manager** builds 2, 3, 4 and 5th grade Arts Link project teams, notifies.
Oct.	*****1. **Consultants** design Professional Development sessions and workshop content.
	*2. **Program Manager** disseminates professional development plan and calendar.
Nov.	*1. **Consultants** deliver Professional Development sessions #1 and #2 (6hrs) for art specialists. (Leadership roles, Project Management- Teaching/Learning Teams, and Collaboration)
	*2. **PAEP Director of Administration** oversees set-up, and content of Arts Link Web site and data bases.
Dec	*****1**. Consultants** deliver Professional Development sessions #3 for arts specialists and #4 for arts specialists & teaching artists. (Collaboration, & Problem Solving) (6hrs.)

	2. **Management Team** meets to review and address identified issues, problems, professional development implementation, and evaluation activities. #1
Jan	*1. **Consultants** deliver Professional Development Session #5 (3hrs.) for art specialists and teaching artists (Arts Integration Methodology) and #6 (3hrs.) grade level classroom teachers join arts specialists and teaching artists.(Elements of Collaboration), (Mathematics and Science Curriculum review)
Feb	*1**. Consultants** deliver Professional Development sessions #7 and #8 for full Teaching/Learning Teams complement. (6hrs.) Review of Grade Level Mathematics and Science Curriculum, Arts-integrated Thematic Approach, Differentiated Instruction Approaches, Project Curriculum Design.
Mar	*1. **Consultants** deliver Professional Development Sessions #9 and #10 for Teaching/Learning Team (6hrs.); Sequential Lesson Planning, Student Assessment Strategies, Finalization of 15 session Arts-integrated Pilot Project Curriculum - Mathematics.
	2**. Management Team** meets to review and address identified issues, problems, program implementation, and evaluation activities #2.
Apr	1. **Teaching/Learning Teams** refine grade level, 15-session pilot project curricula for implementation in May-June.
	2. **Program Manager** prepares of Arts-integrated pilot project implementation school schedules; disseminates to Consultants for observation purposes.
May	1. **Teaching/Learning Teams** begin implementation of pilot arts-integrated mathematics focused 15 session projects in four schools across four grade levels.
	2. **Project Manager, Consultants** visit schools, observe implementation of lessons; meet with teaching/learning teams in-school.
	***4. **Program Manager, PAEP Education Director, PAEP Director of Administration, CAE Director** begin planning and production of materials for Year I June report-out conference.
June	*1. **Teaching/Learning Teams** complete 15 session pilot projects; possible student exhibition of work at individual school sites.
	***2. **Consultants** make last school visit and report out to Leadership Team.
	3. **Management Team** reviews Consultant and Teacher project reports. #3
	***4. Program Manager, PAEP Education Director, PAEP Director of Administration, CAE Director** produce Year I report-out conference; Program successes, challenges, improvements.
	5. **Management Team** meets to address identified issues, problems, program implementation, and evaluation activities #4.
July	***1. Program Manager** reviews curricula produced from pilot programs; Administrator posts on Web site.
	***3. PAEP and SDP** review assessment results for program improvement.
Arts Link Management Plan Timeline of Activities – Year II, III, IV 2011-14	
1). In years II, III, IV Science and Mathematics are focus of all arts-integrated school projects 2). visiting artists may be included in delivery of projects for up to 10 additional sessions. 3). Teachers engage in summer professional development; add monthly in-school peer to peer meetings.	
Aug	1. **Consultants** deliver 3-day professional development for Teaching/Learning teams; teams design and plan theme based, arts-integrated curriculum, lessons, assessments, and prepare timeline for implementation.

Sept	1**. Program Manager and Management Team** review objectives and timelines with school teaching/learning teams. #1
	2**. Program Manager** prepares timelines and calendar of all project activities and disseminates to all Arts Link participants.
	3. **Teaching/Learning Teams Peer to Peer** meetings #1; 2hrs. in-school meeting.
	4. **Management Team** meets to review and address identified issues, problems, program implementation, and evaluation activities. #1
Oct	***1. Program Manager** prepares and disseminates observation schedule for consultant school visits.
	*2. **Teaching/Learning Teams begin implementation** of grade level arts-integrated projects.
	3. **Teaching/Learning Teams Peer to Peer** meetings #2; 2hrs. in-school meeting.
Nov	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #3; 2hrs. in-school meeting.
Dec.	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #4; 2hrs. in-school meeting.
	*3. **Consultants** make classroom observations and attend peer to peer meeting.
	4. **Management Team** meets to review program implementation and evaluation. #2
Jan.	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #5; 2hrs. in-school meeting.
	*3. **Program Manager** collects teaching/learning team reports & reviews with Management Team for ongoing project progress.#2
Feb.	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #6; 2hrs. in-school meeting.
	*3. **Consultants** make classroom observations and attend peer to peer meeting.
Mar.	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #7; 2hrs. in-school meeting.
Apr.	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #8; 2hrs. in-school meeting.
	*3. **Consultants** make classroom observations and attend peer to peer meeting.
	*4. **Management Team** reviews project progress reports. #3
	*5. **Program Manager, Education Director,** begin planning and production of materials for annual conference.
May	1. **Teaching/Learning Teams continue implementation** of arts-integrated projects.
	2. **Teaching/Learning Team Peer to Peer** Meetings #9; 2hrs. in-school meeting.
	*3. **Consultants** make classroom observations and attend peer to peer meeting.
	3. **Management Team** reviews project reports. #4
	*4. **Teaching/Learning Teams** conclude each project year with student performances and exhibitions at school sites.
Jun.	***1. Management Team, Program Manager**, **Consultants** produce annual conferences including report-out session for teaching/learning teams, student exhibition of work and possible student productions.
	2. **Management Team** meets to work with **TAP** program evaluator #5.
July	***1. Program Manager** reviews curricula; Program administrator posts on Web sites.
	*2. **Management Team** reviews assessment results for program improvement.

Arts Link Program – Year IV (2014) The following activities occur in July:	
July	***1. **Program Manager** reviews curricula and posts on Web sites.
	*2. **Management Team** reviews assessment results for final report.
	3. **Management Team** writes program report for dissemination to field.

Personnel

PAEP and SDP will partner to design and deliver this arts-in-education program and will ensure that project personnel reflect diversity. PAEP personnel will devote a significant amount of time in Year I to the Arts Link program. This will insure that program content, systems, infrastructure, and protocols are well-established in order to move the program forward.

Management Team

(PAEP) Executive Director/CEO, Pearl Schaeffer: Oversight, coordination, and annual performance review of program personnel. 20% of full-time position.

(PAEP) Education Director, Raye Cohen: Oversight, and coordination of Program Consultants; Program Manager and participation in program content design and implementation; Liaison between PAEP and SDP. 40% year 1; 35% years 2–4 of full-time position.

(*PAEP) Director of Administration,* Megan Borderieux: Data resources management, records reporting, financial management support, program oversight support. 45% year 1; 25% years 2-4 of full-time position.

(SDP) Director, Dr. Dennis Creedon: Program oversight and liaison with SDP. 15% of full-time position in –kind to the program.

SDP Evaluation Support Personnel, TBA, Student Data reporting 10% of full-time position.

TAP Consulting, Independent Program Evaluator, Dr.Evan Leach, Evaluation and reporting. 15% of full time position.

Additional Program Personnel

Program Manager, (to be hired): Clerical support; data resources management. 50% of full-time

Program Consultants- (Additional program consultants will be identified as needed)

Curriculum Design & Development Consultant/Instructor*,* Dr. Catherine Richmond-Cullen: responsible for content of professional development course topics; professional development lead instructor; mentor supervisor.

Arts Education Lead Consultant, Dr. Barbara Suplee: responsible for review of curricula developed through Arts Link; professional development instructor.

Procedures for Program Improvement Adequacy of Resources

Philadelphia Arts in Education Partnership

PAEP is a non-profit, 501(C)(3) organization supporting the arts as integral to all children's education. The resources of PAEP will be placed at the disposal of this initiative. Senior administration will monitor, manage, and document project finances, and have an independent audit conducted each year of the grant program. PAEP works with more than 82 arts institutions, institutions of higher learning, school districts and teaching artists. PAEP designs, and delivers professional development courses, workshops, and conferences to increase teacher and artist capacity for integrating the arts into curriculum; designs and implements long term artist residencies in schools and community sites; engages in research and assessment of arts programs; and is the regional partner for the PA Council on the Arts - Arts Education Division, vetting artists for teaching in the schools, and managing regional arts residencies.

The School District of Philadelphia

The School District of Philadelphia will make available channels of communication to the Regional Superintendents, principals, and teachers to facilitate implementation of this initiative. The SDP will also make available infrastructure supports such as student data management systems. Responsibility for senior supervision and leadership of the project within the SDP will be lodged in the Office of Comprehensive Arts Education (CAE). The mission of

the CAE is to provide leadership and support for art, music, theater, and dance education programs.

***C**onsultation and Coordination*

The PAEP and the SDP affirm that, per Section 5551(f) (1) of the *ESEA* they shall (if a grant is awarded) to the extent practicable, manage this project in coordination with the appropriate activities of relevant public or private cultural agencies, institutions, and organizations (e.g.: museums, arts education associations [including the Pennsylvania Council on the Arts, with whom contact has already been established], libraries, and theaters).

EVALUATION

The evaluation will be conducted by Evan Leach, Ph.D., an Associate Professor of Management at West Chester University and president of TAP Consulting, Inc. He holds a doctorate in Organizational Behavior from Yale University. Dr. Leach has extensive experience and expertise in all aspects of program evaluation, including evaluation design, instrument design, data collection management, and qualitative and quantitative data analyses, and as an external evaluator, he can bring objectivity to the interpretation of multiple data sources. The School District of Philadelphia will lend the services of the Office of Research and Evaluation to extract a wide array of student and school-level data maintained in School District databases for use by Dr. Leach.

Evaluation Design and Data Collection

The design proposed for the Arts Link project evaluation is generally known as a matched randomized pretest-posttest control group design (Campbell & Stanley, 1963). Technically, we will be implementing a matched randomized control group design with multiple posttests. A graphical representation of the design is presented below:

	Year 1		Year 2		Year 3		Year 4	
	Fall	Spring	Spring	Spring	Spring			
RA	O_1	X	O_2	X	O_3	X	O_4	X	O_5
	---	---	---	---	---	---	---	---	---
	O_1		O_2		O_3		O_4		O_5

In fall of year 1, a survey will be administered to all 2nd, 3rd,4th, and 5th grade classroom teachers and arts specialists in both the intervention and control sites. Prior year reading achievement and other data (e.g., excused absence, suspension, limited English language status,

race/ethnicity, free lunch status or other SES measure, special education status, and/or mobility) of the students of these teachers will be extracted from the School District database. This will constitute the baseline data.

As the intervention will be spread out over four years, the follow-up survey will be administered to classroom teachers, art specialists, and teaching artists in the grade level receiving the intervention in the experimental sites. Similarly, student achievement scores in mathematics and science and other student level data will be extracted from the District database only for students of those teachers in the grade level that are receiving the intervention.

Matched Random Assignment

The matched randomization will occur at the school level, matching on these criteria: a) neighborhood elementary schools in the School District of Philadelphia with at least two grades 2, grade 3, grade 4 and grade 5 classrooms, b) employ an art specialist, and c) are school-improvement status schools.

Schools meeting these criteria will be informed of the grant opportunity and prompted to apply to participate in the proposed program.

Participating schools will be informed that 10 schools will be selected by random lottery into the intervention group (n=4) and the control group (n=6) by the program evaluator. We will over sample the control group in anticipation of possible attrition of schools in the course of the project. Letters will be sent out to the principals of the selected 10 schools, describing the Arts Link program and the evaluation activities of the project.

Measures

Degree of Arts Integration The fidelity of implementation of the Arts Link program will be captured through triangulation of written responses to related survey items from three groups of

individuals: (a) classroom teachers from participating schools, (b) arts specialists from participating schools, and (c) mentors or teaching artists from participating arts institutions. Triangulation of information from multiple sources will increase the sensitivity and accuracy of this implementation measure. Specific items on arts-integration will be drawn from previous research (Anderson & Ingram, 2003; Freeman, Seashore & Werner, 2003; Ingram & Riedel, 2003; Leach, 2004).

Classroom Teacher Skills Acquisition An interim outcome measure for this project is classroom teachers' acquisition of pedagogical skills related to the delivery of arts-integrated curricula. In addition, teachers are expected to gain enhanced efficacy in their ability to develop arts-integrated curricula. Finally, teachers are expected to develop skills in partnership (teaching/learning teams) management associated with their collaboration with the art specialist and teaching artist. These measures will be captured at the teacher level, through classroom teachers' written response to related survey items modified from an existing Teacher Survey of the School District of Philadelphia.

Student Attitudes towards School Another interim outcome measure for this project is students' improved attitudes toward school. It is believed that this will result in enhanced pro-social behavior. This measure will be captured at the student level, by tracking changes in students' excused absences and number of suspensions in both the intervention and control sites. It is also believed that enhanced attitudes towards school will result in improved student academic behavior. This will be measured through a student survey which tracks homework completion rates, level of parental/guardian involvement in assignments, and study time.

Response to the Arts The degree and nature of students' response to the arts will be measured through classroom teachers' written response to related survey items and through the various

assessment strategies used by the classroom teachers in assessing their students. These will include but not limited to the following: process portfolio, journaling, peer critiques, teacher critiques, self-reflection and assessment, and final student productions and exhibitions.

Student Achievement Individual student achievement will be measured by student's performance on the mathematics and science (grades 3, 4, 5) tests of the state standardized assessment, i.e., the Pennsylvania System of School Assessment (PSSA). PSSA is a criterion-referenced test that is administered each spring to 3rd through 8th grade students at the School District of Philadelphia. Both scaled scores and performance levels will be used. In addition, a content test in mathematics and science competencies will be designed for each participating grade level. Students in both the experimental and control groups will take the appropriate test during the spring of each for the 4 years for the grant period. Comparisons in PSSA and Content Exam scores will be made between students in the experimental and control groups for each of the participating grade levels.

Monitoring & Reporting: Performance Feedback & Periodic Progress Assessment

Issues and problems encountered at the intervention and control sites will be discussed and resolved among the Management Team members and the evaluator through quarterly formative project evaluation meetings each year of the project. The evaluator will facilitate, document, and follow-up on issues identified during each meeting. Furthermore, the evaluator will prepare an *interim memo* or *draft report* at the end of each year of the project, providing documentation and accountability information about the project. A summative *final report* will be produced after the completion of the project, detailing the overall impact of the study. The report will be made available on the PAEP Arts Link web site and disseminated at local, regional, and national conferences. These evaluation efforts, by systematically documenting and

monitoring of the program and the proposed evaluation of the Arts Link program will refine and affirm effectiveness of program implementation strategies, and thus *guide and facilitate successful replication* of the Arts Link program at other suitable sites.

Objectives and Performance Indicators: Evan Leach, Ph.D. will evaluate the success of the Arts Link program using the evaluation chart below, which provides the major project objectives, corresponding performance indicators (criteria for success), evaluation methods and timelines.

Implementation Objectives	Performance Indicators	Eval. Methods & Timelines
Selection of Schools	• List of eligible schools matched on specific set of criteria. • List of schools applying to participate in the Arts Link program. • Random assignment of 10 schools to the intervention or the control group. Notification to schools**.**	Eval Methods: Evaluator will conduct the random assignment and receive copies of all correspondences sent to the schools. Timeline: All must occur before October 31st of year 1 of the project, before the delivery of the Arts Link project.
Delivery of the Arts Link program	Formation of teaching/learning teams in intervention schools and their participation in the following professional development (PD) activities: Year 1: • Arts Specialists receive 30 hours of PD • Master Teaching Artists receive 21 hours of PD • Classroom Teachers receive 15 hours of PD Years 2, 3 and 4: • All participants receive 18 hours of PD in the summer (August) • All participants receive 18 hours of "In School" PD (Sept.- May)	Eval Methods: Signup sheets from PD sessions and summaries of bimonthly meetings and after school meetings from teaching/learning teams. Timeline: • Year 1: 2,3,4,5 grade teaching/learning teams. • Year 2: 2,3,4,5 grade teaching/learning teams. • Year 3: 2,3,4,5 grade teaching/learning teams.

Implementation Objectives	Performance Indicators	Eval. Methods & Timelines
Delivery of arts-integrated instruction in mathematics and science curriculum.	• Frequency and nature of arts integration in mathematics and science curriculum in participating schools.	Eval Methods: Evaluator will administer a survey to members of teaching/learning teams. Timeline: • Year 1: fall, collect baseline information from grades 2-5 in both experimental sites. • Year 2, 3&4: spring. Collect repeated measures from teaching/learning teams in intervention group and teachers in control group.
Outcome Objectives	**Performance Indicators**	**Eval. Methods & Timelines**
Interim Outcome Teacher Skill Acquisition	At least 10% increase in the number of classroom teachers reporting that they often or always use specific skills relating to the delivery of arts integration curricula, the design of arts-integrated curricula and partnership (teaching/learning teams) management associated with their collaboration with the Arts Specialist and Teaching Artist, in the intervention group over time and as compared to the control group.	Data will be collected through a teacher survey that will be administered to teachers in the intervention and control sites in fall of year 1, and in spring of each year of the project.
Improvement in students' attitudes towards school in the intervention group over time and as compared to the control group.	At least 5% decrease in the number of students with excused absences in the intervention group over time and as compared to the control group. At least 5% decrease in the number of suspensions in the intervention group over time and as compared to the control group. At least 10% improved student academic behavior as indicated by improved homework completion rates, enhanced parental/guardian involvement in assignments, and increased study time.	Student level data on excused absence and suspension will be collected through district database for students of teachers in the intervention and control sites. Student academic behavior will be measured through a student survey which tracks homework completion rates, level of parental/guardian involvement in assignments, and average weekly study time.

Outcome Objectives	Performance Indicators	Eval. Methods & Timelines
Long Term Outcome Improvement in student academic performance in mathematics and science over time as compared to the control group.	Statistically significant increase in student achievement in PSSA mathematics and science scaled score in the intervention group over time and as compared to the control group. Statistically significant increase in student performance in the mathematics and science content tests in the intervention group over time and as compared to the control group.	Data will come from surveys and district record. Panel data analysis will be conducted to examine the relationship between the degree of teachers' integration of arts and student achievement in reading while controlling for other student level variables, including race/ethnicity and SES. Within each grade, repeated measures analysis of variance will be conducted to determine if there are significant effects between the intervention and control groups, significant effects of time within each group, and if there are interactions between group and time.
Improvement in students' skills in creating, performing and responding to the arts in the intervention group over time and as compared to the control group.	At least 20% increase in teachers' report of the number of student artifacts and performances produced in their classrooms in the intervention group over time and as compared to the control group. Quality of student artifacts will be documented through student productions and exhibitions.	Data will be collected through a teacher survey that will be administered in fall of year 1, and in spring of each year of the project. Anecdotal evidence on quality will be collected by participating teachers in their classroom assessment of student work.