



## 2012-2013 District Nominee Presentation Form

### **PART I - ELIGIBILITY CERTIFICATION**

---

#### **District's Certifications**

The signatures of the district superintendent (or equivalent) on the next page certifies that each of the statements below concerning the district's eligibility and compliance with the following requirements is true and correct to the best of the superintendent's knowledge.

1. The district has been evaluated and selected from among districts within the Nominating Authority's jurisdiction, based on high achievement in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental and sustainability education.
2. The district is providing the U.S. Department of Education Office of Civil Rights (OCR) access to information necessary to investigate a civil rights complaint or to conduct a district wide compliance review.
3. OCR has not issued a violation letter of findings to the school district concluding that the nominated school district as a whole has violated one or more of the civil rights statutes. A violation letter of findings will not be considered outstanding if OCR has accepted a corrective action plan to remedy the violation.
4. The U.S. Department of Justice does not have a pending suit alleging that the school district has violated one or more of the civil rights statutes or the Constitution's equal protection clause.
5. There are no findings of violations of the Individuals with Disabilities Education Act in a U.S. Department of Education monitoring report that apply to the school district in question; or if there are such findings, the state or school district has corrected, or agreed to correct, the findings.
6. The district meets all applicable federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.



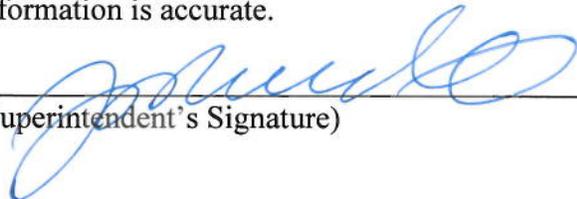
U.S. Department of Education Green Ribbon Schools 2013 – District Award

---

Name of Superintendent\* Dr. Joshua Starr  
(Specify: Ms., Miss, Mrs., Dr., Mr., Other)

District Name\* Montgomery County Public Schools Tel. (301) 279-3383

I have reviewed the information in this application and certify that to the best of my knowledge all information is accurate.

 \_\_\_\_\_ Date 2.7.2013  
(Superintendent's Signature)

**PART II – SUMMARY OF ACHIEVEMENTS**

---

**Instructions to District Superintendent**

Provide a concise and coherent "snapshot" that describes how your district is representative of your jurisdiction's highest achieving green school efforts in approximately 1000 words. Summarize your strengths and accomplishments. Focus on what makes your district worthy of the U.S. Department of Education Green Ribbon School District Award.

**PART III – DOCUMENTATION OF STATE EVALUATION OF DISTRICT NOMINEE**

---

**Instructions to Nominating Authority**

The Nominating Authority must document the district's high achievement in each of the three ED-GRS Pillars and nine Elements. Please attach documentation in each Pillar and Element. This may be the Authority's application based on the Framework and sample application or a committee's written evaluation of a school in each Pillar and Element.

**Nominating Authority's Certifications**

The signature by the Nominating Authority on this page certifies that each of the statements below concerning the district's eligibility and compliance with the following requirements is true and correct to the best of the Authority's knowledge.

1. The district is one of those overseen by the Nominating Authority which is highest achieving in the three ED-GRS Pillars: 1) reduced environmental impact and costs; 2) improved health and wellness; and 3) effective environmental and sustainability education.



2. The district meets all applicable federal civil rights and federal, state, local and tribal health, environmental and safety requirements in law, regulations and policy and is willing to undergo EPA on-site verification.

Name of Nominating Agency

Maryland State Department of Education

Name of Nominating Authority

Dr. Lillian M. Lowery, State Superintendent of Schools  
(Specify: Ms., Miss, Mrs., Dr., Mr., Other)

I have reviewed the information in this application and certify to the best of my knowledge that the district meets the provisions above.

Lillian M. Lowery Date 2/14/2013  
(Nominating Authority's Signature)

The nomination package, including the signed certifications and documentation of evaluation in the three Pillars should be converted to a PDF file and emailed to [green.ribbon.schools@ed.gov](mailto:green.ribbon.schools@ed.gov) according to the instructions in the Nominee Submission Procedure.

OMB Control Number: 1860-0509  
Expiration Date: February 28, 2015

### Public Burden Statement

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless such collection displays a valid OMB control number. The valid OMB control number for this information collection is 1860-0509. Public reporting burden for this collection of information is estimated to average 37 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The obligation to respond to this collection is required to obtain or retain benefit P.L. 107-110, Sec. 501, Innovative Programs and Parental Choice Provisions. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the U.S. Department of Education, 400 Maryland Ave., SW, Washington, DC 20202-4536 or email [ICDocketMgr@ed.gov](mailto:ICDocketMgr@ed.gov) and reference the OMB Control Number 1860-0509. Note: Please do not return the completed ED-Green Ribbon Schools application to this address.

## **Green Ribbon Schools—2012-2013 District Nominee Presentation Form**

### **PART II – SUMMARY OF ACHIEVEMENTS**

Montgomery County Public Schools (MCPS) has a demonstrated commitment to innovation in sustainability, environmental responsibility, and environmental education. MCPS is a leader in green and healthy schools initiatives and integrates environmental literacy into the curriculum and instructional programs at all grade levels. From the early beginnings of energy conservation programs, MCPS actively pursued energy management through a dedicated team of professionals and consistent investment. Engaged students, staff, local partners, and community members develop and enhance sustainability and environmental stewardship at MCPS through a variety of venues and initiatives. MCPS has embraced a culture of sustainability that deeply permeates the schools and organization.

The following is a summary of performance measures, initiatives, and achievements that span the broad range of the Green Ribbon Schools criteria:

#### *Pillar 1*

- For FY12, the MCPS Energy Performance Index (EPI) (BTUs/SF/year) is less than half of the 1978 EPI; 30 percent less than in 1989; and 20 percent less than in 2003. The FY12 MCPS EPI is 52 kBTUs/SF, see Figure A in the application appendix.
- Students and staff in all 201 schools through the School Energy and Recycling Team (SERT) program are actively taking responsibility for reducing energy and water consumption, and solid waste. Students engage in an array of SERT activities that provide productive outlets for enthusiasm and creativity to reduce environmental impacts.
  - Energy consumption reductions exceed 10 percent per year (FY08-FY12 over FY03 baseline)
  - Water consumption is 20 percent lower (FY11-12 over FY08 baseline)
  - Average recycling rate exceeds 60 percent (FY09-FY12)
- Ten schools are certified as Gold under the USGBC LEED program and have EPIs of approximately 35 to 45 kBTUs/SF/year.
- Geo-exchange systems provide heating/cooling in 16 schools
  - Six more systems are under construction
  - 30 percent energy efficiency improvement
- MCPS partners with a solar power provider to host production-sized solar PV systems that provide between 20 to 40 percent of the power requirements of eight schools during peak production hours. Solar power production information is provided through a user-friendly website for teachers and students to analyze.
- Overhead fluorescent lighting through low mercury T-8 lamps and electronic ballasts reduces lighting costs by 35 percent.

- MCPS is one of the first public schools systems to be a MS4 stormwater discharge co-permittee and formally reports its pollution prevention and stormwater management activities through the Montgomery County annual MS4 report to the State.
- Since 2008, MCPS has incorporated Environmental Site Design features into all of its new construction projects. These features include infiltration trenches, bio-retention ponds, and vegetative roofs.
- MCPS partners with the Maryland Cooperative Extension Service, the Audubon Naturalist Society, and the Montgomery County Master Gardeners to support school-initiated gardening. Gardening resources are available to schools on the MCPS web site.
- MCPS partners with the local parks department to host community gardens on MCPS property.
- All buses use ultra-low sulfur fuel
  - operate under no-idling policy
  - 94 percent of route buses are equipped with Exhaust Gas Recirculation or Diesel Particulate Filter systems.

*Pillar 2*

- Green Seal Standards are used to select cleaning products for the Healthy High Performance Cleaning Program.
- A dedicated air quality team of professionals provides pro-active and reactive services based on US EPA guidelines to ensure healthy school air quality.
- Since the 1990s, new school construction has installed dedicated ventilation systems for healthy clean air with energy recovery and proper dehumidification.
- New classrooms are designed for daylight harvesting through windows or clear stories.
- Low or no-VOC materials are required in all construction.
- Pesticide use is minimized through a strictly regulated Integrated Pest Management program.
- Drinking water has been tested for lead in all drinking fountains.
- Each classroom with direct contact with the ground is tested for radon.
- The MCPS school nutritional program is recognized by the U.S. Department of Agriculture:
  - all 132 elementary schools received the Healthier US School Challenge Award
  - 56 schools received the award at the Silver level

*Pillar 3:*

For over fifty years, MCPS has assumed a leadership role at the state level in supporting and promoting environmental education in schools. MCPS administrators and teachers were among the principal founders of the Maryland Association of Environmental and Outdoor Education—with thousands of members statewide, including lead environmental educators in MCPS, this organization has the goal of building a citizenry that understands, and is responsibly engaged in, advancing sustainability to address human needs and to conserve the Earth's natural resources. The MCPS Associate Superintendent of Curriculum and Instructional Programs and the Supervisor of Outdoor Environmental Education Programs are current members of the leadership team and steering committee, respectively, for the Maryland Governor's Partnership for Children in Nature. The Partnership's goal is to improve and expand opportunities for children to learn about, play in, and experience the natural world. It is co-chaired by the Superintendent of the Maryland State Department of Education and by the Secretary of the Department of Natural Resources. These MCPS undertakings are evidence of the district's deep commitment to sustainability and environmental education.

Highlights of Effective Sustainability and Environmental Education in MCPS:

- An Environmental Literacy Plan, a living document, is continually reviewed, monitored, and improved to ensure that students meet the state graduation requirement in environmental literacy.
- Curriculum 2.0, a new integrated curriculum, incorporates environmental education topics at every grade level as a context for trans-disciplinary teaching.
- A systemic residential outdoor environmental education program for every Grade 6 student (10,000) focuses on the environmental science and stewardship of the local watershed.
- Secondary School Project Based Learning units use environmental issues/topics as a context and integrate science and STEM learning.
- Myriad high school curriculum offerings and career pathways in regular, honors, and advanced placement levels focus on environmental studies, including biology, government, ecology, U.S. history, environmental science, and horticulture.
- An approved school garden process with resources to create edible and native gardens help teachers use gardens as classrooms for teaching across the curriculum.
- An established professional development program in the content and methodology of environmental education integrates STEM teaching.
- A “green culture” is embedded through the informal and formal curricula: daily attention to resource conservation via the SERT program and incorporation of environmental stewardship through the formal curriculum.

**Montgomery County Public Schools Application**  
**Maryland Public School District Sustainability Award 2013**  
**Submitted to the Maryland State Department of Education**

January 17, 2013

***I. Green Schools Program Participation***

*Provide a summary describing how schools in your district participate in a local, state or national program which asks your schools to benchmark progress in some fashion in any or all of the Pillars. Include certification, awards received, and/or environmental grants. (2500 word maximum)*

Montgomery County Public Schools, Maryland, (MCPS) promotes and participates in numerous green programs internally, locally, statewide, and nationwide. District-wide dedication to sustainability in education and operations provides a pathway for internal and external green programs that supports a balance amongst the current environmental, economic, and social challenges. While focusing on maintaining a sustainable future, we are building the capacity of our students and staff in making informed decisions based on the understanding of the connections between our actions and the environment, economy, and social structures of society. Supporting this focus, green programs also provide opportunities for achievement in certifications, benefits from recognition and awards, and environmental grants while benchmarking and analyzing the efficacy of our sustainability-based initiatives.

In collaboration and participation with the following green programs, MCPS is reducing costs and environmental impacts, improving the school environment while benefitting the health and well-being of our students, staff, and community, and providing environmental and sustainability education in an engaging and inspiring venues.

**A. Internal Programs**

The **School Energy and Recycling Team (SERT) program** mission is to reduce resource consumption, reduce the greenhouse gas emissions, and increase recycling rates system-wide through:

- training and education
- incentives, recognition, and award programs for conservation
- accessible energy and recycling data
- individual school programs for energy and environmental investigation-based learning opportunities
- conservation operations and procedures

Professional development training is offered to operational and educational staff through an automated, on-line professional development system at multiple locations throughout the year. Lessons and classroom resources include: 3 Green Things, Read-Alouds, Energy and Recycling Chain Assemblies, and activities that can be found on the SERT-Green Schools Website: [www.greenschoolsfocus.org](http://www.greenschoolsfocus.org). In an effort to promote environmental stewardship and a

sustainable future, SERT reaches all schools, is aligned with curriculum, has scalable activities, classroom resources, and provides training to staff and students. SERT is a certified Green Center through the MAEOE Green Schools Program. SERT staff provides resources and outreach to all schools in celebration of environmentally themed days and events which include: Earth Day Network, Earth Hour, National Recycles Day, and Arbor Day. SERT provides awards and incentives for on-going, active participation in the program.

The **Outdoor Environmental Education Program (OEEP)** mission is to provide outdoor learning experiences through the MCPS curriculum that increase students' content and process knowledge, nurture awareness, appreciation, and stewardship for the natural environment; and build the capacity of MCPS educators to teach environmental education using the outdoors as a classroom.

OEEP instruction programs include a residential program for sixth graders. While in residence, students study various aspects of the local environment as they participate in outdoor investigations that are directly connected to the grade six curriculum and the MSDE environmental education standards. Day programs include outdoor environmental investigations and explorations at an OEEP site. Each program is directly linked to the school curriculum at each grade level with a focus on Science Technology Engineering & Mathematics (**STEM**) relationships. OEEP provides many different professional development opportunities to help prepare teachers to deliver environmental education lessons outdoors. OEEP is a certified Green Center through the MAEOE Green Schools Program.

<http://www.montgomeryschoolsmd.org/curriculum/outdoored/staff/courses.aspx>

**Student Service Learning (SSL)** believes that service learning addresses recognized community needs and is connected to curriculum goals. Quality service learning provides the student with knowledge, skills, attitudes, and career exploration opportunities that lead to effective citizenship in an increasingly diverse and interconnected world. SSL is a Maryland State graduation requirement. OEEP and SERT are registered as SSL approved organizations where students learn citizenship and stewardship while volunteering.

The **Science Technology Engineering & Mathematics (STEM)** mission is that all students achieve full science, technology, engineering, and math (STEM) literacy through seamlessly integrated instruction that is project/problem and standards-based.

## **B. External Programs**

The **Maryland Association of Environmental and Outdoor Educators (MAEOE), Green Schools Program** is a holistic, integrated approach to authentic learning that incorporates local environmental issue investigation and professional development with environmental best management practices and community stewardship. Currently, 50 schools have certified with the MAEOE Green Schools through their certification process. This green program is aligned with the three pillars of the ED-GRS. MAEOE has developed and published a matrix demonstrating the alignment of the MAEOE Maryland Green School Program and the National Green Ribbon Schools (ED-GRS).

[http://www.maeoe.org/greenschools/application/MDGS\\_National\\_Green\\_Ribbon\\_Preassessment.pdf](http://www.maeoe.org/greenschools/application/MDGS_National_Green_Ribbon_Preassessment.pdf)

The Lathrop E. Smith Environmental Center, the home to the OEEP, and the SERT program are certified Green Centers through MAEOE that assist schools working toward certification as a Maryland Green School. Centers educate staff and community members about the program while providing professional development, educational resources, and support community environmental learning and partnerships.

**Audubon Naturalist Society, GreenKids Program (GKP):** GreenKids is a grant-funded educational outreach program of the Audubon Naturalist Society. MCPS currently has a partnership agreement with GKP for resources and field experiences to foster watershed stewardship and environmental literacy, while meeting established curriculum goals and providing staff training. GKP also provides stipends, field trip subsidies, funding for infrastructure projects, assistance with community partnership opportunities, and guidance in applying for the MAEOE Green School Certification. GKS works with ten MCPS schools per year. Over the past four years, GKS has assisted over 40 MCPS schools to become more sustainable, environmental aware and enthusiastic, and equipped with environmental literacy. <http://www.audubonnaturalist.org/index.php/greenkids-home>

The **United States Department of Environmental Protection (USEPA)** is an agency of the U.S. Federal Government with the mission to protect human health and the environment. MCPS is using the USEPA Energy Star Portfolio Manager to as a benchmarking tool for energy performance. The modeling information for MCPS schools has been entered into the Energy Star Portfolio Manager along with fiscal year 2012 utility billing data. Additional data and revisions are required before final results are available. However, the preliminary indications are that a substantial percentage of MCPS schools will exceed the Energy Star rating of 75 percent, the threshold for Energy Star certification.

The **United States Green Building Council (USGBC)** is a nonprofit organization committed to a sustainable future for our nation through cost-efficient and energy-saving green buildings. The USGBC developed a market-driven green building rating system, Leadership in Energy and Environmental Design (LEED), containing prerequisites and credits in five categories: Sustainable Site Planning, Improving Energy Efficiency, Conserving Materials and Resources, Embracing Indoor Environmental Quality, and Safeguarding Water. There are four rating levels, and LEED for Schools is the recognized third-party standard for high performance schools that are healthy for students, comfortable for teachers, and cost effective, aligning with the three pillars of the ED-GRS program. LEED for Schools rating system focuses on classroom acoustics, master planning, mold prevention, environmental site assessment and issues important to school buildings. County regulation requires County-built and/or funded buildings in excess of 10,000 square feet in size to meet Energy Efficiency and Environmental Design requirements aligned with LEED.

In further support of sustainable design standards and education, students, staff, and community have opportunities for training and education.

Green School resources through the USGBC are available to all schools. <http://www.centerforgreenschools.org/main-nav/k-12/what.aspx>

**C. Grants:**

Montgomery County  
Educational Foundation:

Forest Knolls ES	Hot Off the Press, Our Environment is Under Stress (environment/citizenship)
Maryvale ES	Terrarium Ecosystems (environment)
Mill Creek Towne ES	Christo and Jean-Claude Recycling & Probability Cylinders (waste reduction/math/environmentalism)

U.S.- Environmental  
Protection Agency and the  
Department of  
Transportation:

\$1,000,000 grant to retrofit school busses with emission reduction devices

U.S. – Department of  
Energy

\$1,623,000 America Recovery and Reinvestment Act (ARRA) grant to improve the energy efficiency through replacing 50 year old windows and lighting at Carver Educational Services Center.

Montgomery County:

RainScapes for Schools: Provides materials and funding for curriculum based storm water management oriented projects implementing techniques where students strengthen their connection to nature and learn about water quality, ecology, wildlife habitat, and horticulture. (numerous schools have participated)

State of Maryland:

TREE-MENDOUS: provides high-quality native trees and shrubs on public lands. (numerous schools have participated)

Audubon Naturalist Society  
–GreenKids Program:

Grants for infrastructure projects and lead teacher stipends at the following schools (numerous schools have participated)

Maryland Energy  
Administration:

2007 Annual Best Energy Conservation Program in the state (\$3,000)

**Certifications and Awards:**

Environmental:

U.S. Department of  
Education:

Green Ribbon School, Francis Scott Key Middle School, 2012

U.S. Environmental

Indoor Air Quality Tools for Schools Award for Excellence, 2002

Protection Agency:	Recognition for “ongoing proactive approach,” 2006 Annual National Healthy School Day, 2012 Rosemont Elementary School
U.S. Department of Agriculture:	Honored 56 elementary schools receiving the HealthierUS School Challenge Silver Incentive Award. This prestigious award acknowledges excellence in nutrition and physical activity. The elementary schools were recognized for the nutritional quality of their school menus, the level of physical activity in the school day, nutrition education and student participation. 56 Schools List: <a href="http://www.montgomeryschoolsmd.org/uploadedFiles/bulletin2009/2012-2013/2012-09-18/USDE%20recipients.pdf">http://www.montgomeryschoolsmd.org/uploadedFiles/bulletin2009/2012-2013/2012-09-18/USDE%20recipients.pdf</a>
Maryland State Department of Education:	Listed as “Model Environmental Education Programs” SERT program: School system-wide programs that integrate facilities operations and maintenance with curriculum and instruction. <a href="http://www.greenschoolsfocus.org">www.greenschoolsfocus.org</a> Poolesville High School: Signature and Magnet Programs Global Ecology Studies Program <a href="http://www.montgomeryschoolsmd.org/schools/poolesvillehs/magnet/globalecology/">http://www.montgomeryschoolsmd.org/schools/poolesvillehs/magnet/globalecology/</a>
Maryland Green Centers:	Lathrop E. Smith Environmental Education Center School Energy and Recycling Team (SERT) Program
Maryland Green Schools:	50 MCPS are certified MAEOE Green Schools
Environmental Awards (City of Gaithersburg):	Brown Station Elementary School (8 years) Watkins Mill High School AP Env. Science (2 years) Lakelands Park Middle School Gaithersburg Middle School
Maryland Energy Administration (MEA):	MEA Award for Superior Energy Savings – Schools
Philips & CN Robinson:	Alto Leadership Award 2007 – leadership in energy savings in lighting
Veolia Environmental Services & CN Robinson:	2008 Annual Environmental Recycling Award – leadership in light tube recycling
CNR and Philips Lighting:	Energy-Efficient Lighting Award Alto Recycling Award

Chesapeake Bay Trust: 2012 Educator of the year awarded to Erol Miller, science teacher, Northwood High School

2011 Honorable Arthur Dorman Scholarship – Senior at Paint Branch High School

LEED Gold Certified Schools: Great Seneca Creek Elementary School  
Francis Scott Key Middle School  
William B. Gibbs Elementary School  
Cabin John Middle School  
Cashell Elementary School  
Carderock Springs Elementary School  
Cresthaven Elementary School  
Farmland Elementary School  
Cannon Road Elementary School  
Seven Locks Elementary School  
4 schools complete and awaiting certification  
16 schools LEED registered (in design or construction)

Green Cleaning Award: MCPS receives 2009 Grand Award, created in conjunction with the Green Cleaning Network and Healthy Schools Campaign recognizing institutions for their healthy and sustainable approaches to cleaning to protect health without harming the environment.

Clean Air Partners: Student from Cabin John MS wins slogan contest award

## ***II. Pillar 1: Reduced Environmental Impact and Costs***

*Provide a summary describing how your district is reducing environmental impact and costs associated with energy use, greenhouse gas emissions, water use, water quality, stormwater runoff, ecologically beneficial uses of the grounds, solid waste, paper use, hazardous waste, and transportation. (2500 word maximum)*

### **A. Energy Use - Environmental impact (greenhouse gas emissions) and cost reductions**

Even with an increase in air conditioning, computers, and ventilation rates, MCPS' FY12 Energy Performance Index (EPI - BTUs/SF/year) is less than half of its 1978 EPI; 30 percent less than in 1989; and 20 percent less than in 2003, see Figure A.

#### **1. Energy Efficient Operations - School-based Energy Conservation Teams and Energy Management Automated Operations**

MCPS has long maintained a program of behavioral education to reduce energy use by facility users. The School Energy and Recycling Team (SERT) program continually promotes and rewards a culture of conservation in the school system. SERT communicates with the schools through group training and professional development events, newsletters, investigation-based activities, informational flyers, e-mail, websites, a telephone hotline, and, most importantly, systematic school visits. Each school is provided with a report of their quarterly energy performance as measured against a baseline at the SERT web site: <http://montgomeryschoolsmd.org/departments/facilities/greenschoolsfocus/data.shtm>.

School teams that reduce energy consumption below their baseline receive financial awards. SERT provides support and recognition to students and schools participating in annual competitions including awareness campaigns, poster contests, and digital arts contests. This program produces \$1.5 to \$2.5 million per year in utility savings with an average reduction in energy consumption of 10 to 15 percent below the 2003 baseline.

Reducing water usage - Water consumption is monitored and SERT facilitators conduct quarterly inspections and refer water conservation opportunities to the school staff or the Division of Maintenance as needed. Water conservation has been integrated into the elementary curriculum. In addition, water-efficient devices are standard on all new construction projects. Many schools also have been retrofitted with low flow devices. Since 2010, SERT focused on water conservation at high schools because they are the largest per capita user of water and use large amounts for irrigation. For the past three years, SERT has achieved a 20 percent reduction in high school water use.

MCPS operates energy management systems to schedule and optimize the operation of the HVAC systems at almost all schools. Setpoints are set back during unoccupied periods. These systems also employ optimum start-stop, demand-based ventilation, and other energy efficient control strategies to achieve energy efficient operations.

Since 2007, the Automated Energy Management Unit, in collaboration with the SERT unit and the Energy Program Manager, developed a Peak Load Management (PLM) program. The PLM program minimizes demand during summer weekdays when schools are not in session. PLM focuses on the hour that is historically the most likely to have the peak system demand, 4 p.m. to 5 p.m. The eight weeks of PLM implementation are when 90–100 percent of the peak load occurs on the PJM system, the electric grid for the mid-Atlantic region. During the five years of PLM, the program reduced demand on the vast majority of the PJM peak load days. This has allowed MCPS to avoid between \$1-2 million per year in PJM capacity charges and to reduce peak electric demand on the PJM system.

## **2. Existing buildings - Energy Retrofit Program**

To address energy efficiency in existing buildings, MCPS has administered an energy retrofit program since the 1980s. In the 1980s, the primary focus of the energy retrofit program was to install energy management systems to schedule and control the HVAC systems. In the 1990s, the energy retrofit program expanded to include lighting retrofits. The vast majority of MCPS schools have been retrofitted with T-8 lamps and electronic ballasts. In addition, mercury vapor fixtures have largely been replaced with metal halide fixtures, incandescent fixtures were changed to compact fluorescent, and incandescent exit signs were changed to LED signs. During the 1990s, MCPS received over \$2 million of utility company rebates to help finance the energy retrofit program.

A second generation of lighting retrofits occurred in 2006 and 2007 that primarily focused on replacing 32 watt T-8 lamps with 25 watt T-8 lamps. These higher efficiency lamps have substantially longer life and reduced energy consumption by 25 percent without a noticeable reduction in illumination. Financing was provided by the Maryland Energy Administration and has allowed MCPS to make the 25 watt T-8 lamp its standard lamp for four foot fluorescent fixtures. After the two lighting retrofit initiatives, the lighting systems are approximately 40 to 50 percent more energy efficient, contributing to the overall MCPS energy performance in the middle 50s kBTU/SF per year, which is a 30 percent overall improvement since 1989.

Another energy conservation opportunity was the unreliable electro-mechanical time-clocks that operated all exterior lighting for schools. These clocks waste energy as pins become loose, power failures cause loss of time, and the clocks do not compensate for monthly changes in sunrise/sunset times. As a result, lights were frequently on when not needed, resulting in a waste of a substantial amount of energy. In 2006–2007, MCPS installed digital astronomical time-clocks designed for exterior lighting in all schools. These electronic clocks have digital accuracy, daily sunrise/sunset adjustments, seven-day capacitor backup for power outages, and are programmable through a laptop.

The most recent retrofit initiative is to develop a program for the use of LED technology. The retrofit of auditorium and parking lot lighting is the best current school application of the LED technology. As a pilot, two auditoriums and two parking lots currently are in the process of being retrofitted with LED light fixtures.

With over 400 portable classrooms, the energy equivalent of six elementary schools, MCPS needed a means to schedule the HVAC units. A first-of-its-kind application was developed by MCPS using the Carrier's "Broadcast Energy Savings" (BES) technology. MCPS and Carrier jointly developed the approach in which an Internet interface allows MCPS to control the HVAC schedules and thermostat setpoints at all portables. This project has large savings because the control of portable classrooms was originally through manual thermostats and ran 24-7. The use of conventional seven-day programmable thermostats is impractical because of the inability to verify programs at more than 400 locations and the inability of seven-day programmable thermostats to schedule holidays, breaks, and summer closings. The BES interface supports a 24-hour override to a setback temperature, or "snow day" command, allowing MCPS to shut down portables and save energy opportunistically. This system makes it feasible to efficiently control large numbers of portable classrooms with a payback of under a year. Since the deployment of this control network, MCPS is shifting to green portable classrooms that have HVAC controls that "learn" schedules through occupancy sensors and include many other energy efficient and sustainable features.

Computer energy efficiency - MCPS was an earlier adopter of LCD monitors to capture the energy improvements by removing CRT-type monitors. Because of the vast number of monitors through 200 schools and the central office, MCPS achieved a substantial reduction in energy usage. MCPS also uses a networked-based scheduling system to automatically turn off school and office computers after normal hours of use.

### **3. New building design and construction energy efficiency and sustainability standards**

Since the 1980s, MCPS has systematically incorporated planned energy efficiency into its new school construction program. This included prescriptive energy efficiency measures for building envelope, lighting systems, mechanical systems, and energy management control systems. In addition, MCPS required designers to perform energy modeling and to meet energy budgets for all new and modernized buildings. MCPS actively pursued utility rebates, which provided significant funding to assist with the premium cost of energy efficient technology. Energy performance of newly-opened schools has been consistently measured to provide feedback to construction managers and stakeholders. Energy performance of new and modernized buildings has steadily improved since the 1980s and has contributed to the overall EPI of the entire MCPS portfolio of buildings, now in the middle 50s kBTU/SF. This represents a 30 percent improvement in energy efficiency since 1989.

Since 2006, MCPS has incorporated the multifaceted Leadership in Energy and Environmental Design (LEED) criteria system into its new building design and construction programs. MCPS led the way in the State of Maryland with the first certified LEED Gold elementary school, Great Seneca Creek, and the first Gold middle school, Francis Scott Key. Since 2006, MCPS has received LEED Gold certification for ten schools. Another four schools are operating and expected to receive their final LEED certification shortly. All new and modernized school projects are registered in the LEED Program. Recently built schools achieve superior energy and environmental sustainability with EPIs between 35 and 45 kBTU/SF.

For a list of LEED schools and opening dates, see Table 1.

Since 2001, MCPS has been installing and operating geo-exchange systems to provide heating and cooling energy. These systems are a significant part of the improved energy performance in our new and modernized schools. MCPS currently operates 17 geo-exchange systems, see Table 2. Another six schools, equipped with geo-exchange systems, are under construction. The geo-exchange systems use ground sourced energy through a hydronic heat pump system to achieve substantial efficiency improvements.

Other energy efficient technologies that have become standard in MCPS new and modernized buildings include LED parking lot lighting, electronic ballasts coupled with low wattage T-8 lamps, daylight harvesting, demand-based ventilation, and variable refrigerate flow AC systems for office areas.

Stormwater Management in New Construction - MCPS has incorporated state-of-the-art stormwater management into its new and modernized schools. Using Environmental Site Design and Low Impact Design techniques, school sites are designed to control stormwater and to recharge aquifers. To the maximum extent practicable, non-structural features, such as bio-infiltration sways, bio-retention ponds, and rain gardens are incorporated into the site design to keep rain water from being discharged from the site beyond the amount and rate that would occur in an undeveloped site. MCPS has 194,000 SF of vegetative roofs and is in the process of constructing an additional 458,000 SF of vegetative roofs.

#### **4. Renewable Energy**

MCPS has been a leader in supporting the use of renewable energy through the purchase of renewable energy credits (RECs), the hosting of production-scale solar PV at eight schools, and the installation of 23 geo-exchange systems, see above section. MCPS purchases wind RECs to offset emissions for 20 percent of its electricity requirements. MCPS hosts 1.6 MW of solar PV installed at eight schools. These systems, 80 to 319 KW each, generate between 20 and 40 percent of the electric requirements of the host school during peak generating hours.

#### **B. Solid Waste - Recycling – Reuse, reduce, recycle**

Dedicated recycling staff, within the SERT program, work with school-based teams, support the recycling needs of school staff and students, conduct school recycling assessments, provide necessary recycling infrastructure and classroom resources, conduct classroom presentations, and manage recycling hauling services. MCPS currently recycles over 20 items, including paper, bottles and cans, office supplies, electronics, automotive parts and fluids, and metal and construction debris. Recycling services and support have grown significantly over the past 10 years, and have increased the MCPS recycling rate from 15 percent in 2001 to 67 percent in 2011. SERT provides monthly recycling reports for schools to monitor their progress through an interactive website: [www.greenschoolsfocus.org](http://www.greenschoolsfocus.org). Recycling is incentivized based on realized savings achieved through a reduction in solid waste tipping fees. Schools that exceed pre-set benchmarks are eligible to receive annual recycling rewards in recognition of their significant efforts to recycle responsibly.

For the past several years, MCPS has implemented a paper reduction initiative. Efforts include shifting the vast majority of documents and publications to electronic form, and eliminating or minimizing hardcopies and paper forms from MCPS processes where possible. The superintendent of schools has also communicated to directors that all printers and copiers should be configured to have the duplex setting as the default. The results are that MCPS used 19 percent less paper per student in FY11 compared with FY 2008.

For the past several years, MCPS implemented Green Procurement strategies, including steadily increasing the amount of recycled content, e.g., office paper contains 30 percent post-consumer content/responsible forestry, requiring green packaging, volume purchasing, Energy Star, and Green Seal certified. For the past five years, MCPS has refurbished over 10,000 desktop computers per summer to reduce the number of new computers needed.

### **C. Stormwater Management**

MCPS is one of the first school districts in the country to become a MS4 co-permittee, see: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/npdes.asp> .

MCPS has formal agreements with Montgomery County Government (MCG) regarding stormwater management roles and responsibilities, including the maintenance of existing stormwater management facilities. MCPS reports annually to MCG in compliance with the agreements and in support of the MS4 permit. In the 2011 MCG report, <http://www6.montgomerycountymd.gov/content/dep/downloads/npdes/NPDESrpt2011.pdf> see pages III-30–35 for the MCPS annual report. This report details MCPS inter-agency SWM coordination, Fats, Oils, and Grease program participation, structural and nonstructural SWM facility maintenance, pollution prevention training, Spill Prevention Control and Countermeasure Plans, industrial facility compliance activities, a listing of SWM measures in facility projects, and integrated pest management. Also, see above Section II.A.3 for a description of the use of environmental site design in new construction.

### **D. Ecologically beneficial use of grounds**

MCPS, through the Outdoor Environmental Education Programs (OEEP) staff, encourages and facilitates individual school communities to take the initiative to develop various types of gardens. A substantial number of schools have created and enjoy school yard gardens. MCPS partners with the Maryland Cooperative Extension Service, Audubon Society, and Montgomery County Master Gardeners to support school garden initiatives. A workgroup comprised of MCPS OEEP staff and representatives from these partners developed resources on how to develop, maintain, and use a garden for educational experiences. These resources include templates for various types of gardens, including rainscapes, butterfly, senses, habitat, and edible (vegetable). For more information, please see:

<http://www.montgomeryschoolsmd.org/curriculum/outdoored/outreach/garden-how-to.aspx> and <http://www.montgomeryschoolsmd.org/curriculum/outdoored/outreach/container.aspx>.

MCPS athletic fields are also extensively used for community use in improving the fitness of our community.

**E. Hazardous Waste**

The typical hazardous waste that MCPS handles is facility-related components, bodily fluids biohazards, and science lab waste. School staff who potentially may handle these types of waste are trained in the appropriate procedure for hazardous waste handling and disposal, ensuring the appropriate safeguards, reporting, and the use of a licensed hazardous waste disposal/recycling company.

**F. Transportation**

All MCPS buses use ultra low sulfur diesel. In addition, 94 percent of all route buses have either an Exhaust Gas Recirculation (EGR) or a Diesel Particulate Filter (DPF) system installed on them. MCPS is including these systems on any new buses that it purchases. MCPS has purchased hybrid vehicles for its pool fleet for the past eight years. MCPS has a very strict rule about bus idling - buses are not permitted to idle for more than five minutes. Delivery vehicles and maintenance equipment/trucks are prohibited from idling at, or near, loading dock areas and air intakes.

Students and staff are encouraged to walk or bike to school when it is reasonably safe. MCPS participates in Walk to School Day with many schools having special festivities and activities. All schools are equipped with bicycle racks.

### ***III. Pillar 2: Improve the Health and Wellness of Students and Staff***

*Provide a summary describing how your district is improving the health and wellness of students and staff with a focus on the areas of pesticide use, hazardous contaminants, chemical management, asthma management, building moisture control, airborne contaminants, ventilation systems, indoor environmental quality, nutrition, physical activity, and outdoor education. (2500 word maximum)*

MCPS is committed to providing a healthy environment that is conducive to student learning, employee productivity, and supporting and improving wellness.

#### **A. Green cleaning**

MCPS, through its Division of School Plant Operations, has developed a Healthy, High Performance (Green) Cleaning (HHPC) Program. In 2009, MCPS received the Green Cleaning Award for Schools and Universities, sponsored by *American School and University* magazine, The Green Cleaning Network, and Healthy Schools Campaign.

MCPS utilizes custodial equipment that is certified by the Carpet and Rug Institute to possess certain environmental performance benefits, including improved indoor air quality and noise reduction. Building service employees are required to receive training in green cleaning principles and processes. The HHPC plan includes green cleaning standards for purchase and use of green products, systematic cleaning processes, green cleaning practices, grounds care training, mechanical system operational requirements, and accountability systems.

MCPS screens chemicals for use in the school system using standards set forth by the Green Seal Organization. MCPS environmental professionals review material safety data sheet information and evaluate the chemical, based on toxicity, flammability, volatility (VOC content), and reactivity. MCPS has referenced Green Seal Standards for adhesives, degreasers, cleaners, floor-care products, and paints. In the selection of low-emitting products and materials, MCPS also references standards published by the GREENGUARD Environmental Institute.

#### **B. Indoor Air Quality Program**

MCPS created an Indoor Air Quality/Environmental Safety Unit with dedicated, qualified, and trained staff to achieve, maintain, and where necessary, to restore the indoor environment to support a safe and healthy school and office environment. The major components of the Indoor Air Quality (IAQ) Program are a response program, a proactive program, and a departmental resource for safety and health issues.

The response program is designed to address immediate environmental concerns in our facilities. Typically, this program addresses occupant-generated complaints and environmental incidents on school premises. The proactive program addresses environmental issues in a front-door to back-door approach, before complaints are initiated. This is accomplished through an IAQ Preventive Maintenance Team using an environmental-based preventative maintenance approach to improve and optimize building conditions, operation, and maintenance. A key document produced by this program is the Building Maintenance Plan (BMP) which identifies the

important tasks for maintaining the facility and systems by the building and maintenance staff. Finally, the unit serves as a resource for environmental expertise for departmental activities. The unit assists the development and implementation of procedures which provides for environmental safety and health in the operation of facilities and Department of Facilities Management activities. In 2001, MCPS received EPA's IAQ Schools for Tools Award for its comprehensive and proactive indoor air quality management program.

### **C. Integrated Pest Management**

The Integrated Pest Management (IPM) Program uses regular inspections to prevent pest damage. IPM staff identifies and correct conditions that encourage pests by reducing food, water, and shelter for pests, and by eliminating unnecessary pesticide applications. This integrated approach results in the most economical long-term solution with the least possible hazard to people, property, and the environment.

### **D. Hazardous contaminants – Lead in water testing, radon testing**

A written hazard communication (Right-to-Know) Program, in accordance with OSHA/MOSH safety and health regulations, is followed. This program maintains lists of hazardous chemicals (CILs) for each school, MSDSs for each chemical product used and/or stored in each school, proper disposal and clean up procedures, proper storage of chemicals, proper personal protective equipment to be used, contact names for emergencies, and questions regarding each chemical product, and other safety information. The "Hazard Communications/Hazardous Materials" Program is overseen and managed by the MCPS Safety Director, Systemwide Safety Programs, Department of Facilities Management.

Potential hazardous waste categories are identified, school staff is trained that when hazardous waste is to be disposed that they need to follow the appropriate procedures, ensuring that hazardous waste is transferred to a licensed hazardous waste disposal/recycling company. Within the MCPS Bloodborne Pathogens Exposure Control Plan, each school has a biohazard waste container and sharps container within each school health room. Biohazard waste generated at the school is disposed of in these designated biohazard waste containers. When these containers are full, a licensed biohazard waste disposal company is contacted for pick-up of biohazard waste, and new biohazard bags, boxes, and/or sharps containers are delivered to replace the filled containers/bags. The amount of biohazard waste is monitored by the disposal company and by the MCPS Safety Director, Systemwide Safety Programs, Department of Facilities Management.

In 2004, MCPS implemented a comprehensive testing program to detect elevated levels of lead in drinking water at schools. At that time, a remediation plan was instituted for those facilities where elevated lead levels were found. Currently, MCPS assesses water quality at locations with potential sources of drinking water not previously included in the program, e.g., additions, modernizations, and new construction. Additionally, MCPS continues to institute the Environmental Protection Agency's (EPA) recommendations regarding the routine flushing of all drinking water outlets in order to reduce occupants' exposure to lead in drinking water.

Following EPA guidelines, MCPS has a comprehensive radon testing program in which each occupied classroom/space in direct contact with the ground is tested for radon. If tests have positive results, appropriate remediation is preformed.

#### **E. Chemical Management**

MCPS, through the Science and Technology Program, has a hazardous waste reduction program that eliminates science chemicals no longer in use. All science teachers are trained in the safeguards for handling and storing chemicals used in the educational program. These chemicals are also included in the hazard communication (Right-to-Know) program. (See Section III.D.)

The school has eliminated mercury and mercury-containing compounds for instructional use, in accordance with Maryland State Department of Education (MSDE) regulations. MCPS has eliminated mercury-containing thermometers, chemical compounds, art chemicals, and elemental mercury.

#### **F. Asthma Management**

MCPS follows many of the action steps outlined in the National Asthma Education and Prevention Program's Asthma Friendly Schools Guidelines, including: reducing asthma triggers through proactive preventive maintenance activities; reducing asthma triggers through the Integrative Pest Management (IPM) Program; fully funded and implemented Indoor Air Quality Program, see above; efficient indoor air quality investigation process using on-line IAQ complaint forms; established screening process to review chemicals and building materials; written "IAQ in Construction Guidelines" to prevent exposure to asthma triggers; dedicated funding for carpet-to-vinyl floor tile replacement program; enforcing No-Smoking Policy on school property; and trained nursing staff on site for each school facility.

#### **G. Building Moisture Control – Mold Prevention**

Each year at the commencement of air conditioning season, principals and building service staff are provided procedures and user-friendly flyers regarding how to proactively prevent elevated moisture and mold. These procedures focus on only using air conditioning in occupied areas, the proper thermostat setpoint, the danger of condensation by turning thermostats below the dew point, keeping doors and windows closed, and turning off unneeded exhaust fans. Staff also is instructed to contact the IAQ staff should there be moisture that cannot be eliminated. The IAQ Program has dedicated staff to respond, investigate, and take appropriate action in response to moisture and/or mold complaints, see Section III.B.

MCPS follows EPA guidelines in removing mold and moldy materials arising from various sources of moisture. When indoor visible mold is discovered, professionally-trained personnel use the appropriate personal protective equipment and containment methods to remove the mold in a safe manner. After the mold has been removed and the area disinfected, the source of the moisture is eliminated. All complaints, investigations, and follow up action are documented.

## **H. Airborne Contaminants – Indoor Air Quality**

MCPS prohibits smoking in schools and on school property. No smoking policy includes "no smoking" in MCPS/county vehicles, also. MCPS enforces a no idling policy for vehicles, including buses, delivery vehicles, and maintenance vehicles. Building service staff perform filter changes and inspect equipment to ensure clean and proper operations. If airborne contaminants are discovered, the IAQ staff responds, investigates, and takes the appropriate steps to eliminate the source of airborne contaminants to make the area safe for occupancy.

## **I. Ventilation Systems**

MCPS uses the standard minimum outdoor ventilation rates set forth in ASHRAE Standard 62 as guidance in conducting IAQ evaluations, improving existing spaces, and maintaining good indoor environmental conditions. All new mechanical systems separate the ventilation systems from the temperature control system through the use of energy recovery systems. By separating the ventilation system from the temperature control system, dehumidification can more effectively be controlled for the large amount of outdoor air that is necessary for classroom ventilation. This is especially true during high humidity days when the dry bulb temperature is below 75 F. Where the mechanical system is being replaced in existing facilities and sufficient space for dedicated ductwork does not exist, face and bypass damper systems are used to provide code required ventilation with proper moisture control.

Through the energy management system, fans and damper operation for major air handling systems are monitored and failures cause alarms. Air intake dampers are open during building occupied modes; closed during unoccupied modes. Dampers are opened to positions correlating to minimum outdoor air requirements via both existing pneumatic controls and installed direct digital controls, depending on the age of the building.

## **J. New building design and construction standards that address student and staff wellness and health**

MCPS Division of Construction implements facility design standards that exceed the US Green Building Council's LEED for Schools 2007 rating system. Architects provide natural daylight in every regular classroom and as many of the other core instructional areas as possible. In addition to windows, daylight is introduced through clear story spaces and light tubes. Daylight is bounced deeper into the building with use of interior light louvers. Exterior light shelves prevent glare and overheating. Projects now in construction include automatic controls for daylight harvesting.

Contractors are required to use low- or no-VOC materials for paint, flooring, adhesives/sealants, and composite wood and agrifiber products. All projects follow SMACNA guidelines for reducing pollutants during construction and all projects (LEED or otherwise) are flushed out prior to occupancy. In addition, the school system requires indoor air quality testing for modernization projects. MCPS Division of Procurement requires all new classroom furniture to be GreenGuard certified for Schools and Healthcare.

Contractors on school projects are required to submit documentation on all products, including percentage of recycled materials and whether the product is locally manufactured. MCPS regularly attains the maximum percentage credits for recycled and regional materials. Construction waste is recycled, with over 75 percent of waste diverted from landfill. Re-use of existing building is always one of the options analyzed in early project feasibility studies.

Since 2006, MCPS has incorporated the LEED criteria system into its new building design and construction programs. A substantial part of the LEED criteria addresses the design, construction, and operation of the building for the health and wellness of the occupants. Since 2006, MCPS has received LEED Gold certification for ten schools. Another four schools are operating and expected to shortly receive their final LEED certification. All new and modernized school projects are registered with LEED.

### **K. Nutrition**

All 132 MCPS elementary schools are recipients of the USDA's Healthier US School Challenge Award at the Bronze level; 56 elementary schools are recipients of the Healthier US School Challenge at the Silver level. All MCPS schools are Team Nutrition Schools. Nutrition education is provided in homerooms, physical education, and through the cafeteria, using the MyPlate Program and the MCPS health curriculum. This instruction has been supplemented with the Salad Science Program in Grades 1 and 3, healthy eating presentations from officers of the US Public Health Service in Grades 2 and 3, nutrition research projects in Grade 2, and yearly trips to the Montgomery County Agricultural Farm Park in Grade 4. New on the menu are a rainbow of colors of fruits and vegetables with more choices; many schools have salad bars as a part of the reimbursable meal, and entrée salads are available in elementary schools. Whole grain is used in 75% of the grain-containing menu items, milk is offered fat-free and 1% low fat, saturated fat is limited to less than 10% of calories and all foods are trans-fat free. Recipes have been reformulated to provide a reduction in sodium content. Students are required to select 1/2 cup of fruit or vegetable with each lunch. All menus meet or exceed the guidelines of the United States Department of Agriculture (USDA). MCPS celebrates Maryland Home Grown School Lunch Week by featuring locally grown fruits and vegetables. Apples, melons, celery, green beans, zucchini, cherry tomatoes, cucumbers, and corn are some of the Maryland agricultural products served in the cafeteria. Maryland agriculture is also promoted through classroom programs and interaction between students and local farmers. Students learn about where their food comes from, how it's produced, and the benefits of a healthy diet. The Division of Food and Nutrition Services has a wellness specialist who works with students to help make the connection between food items, their origin, their benefit, and subsequently, the connection to items that are served in the cafeteria.

### **L. Physical Activity and Outdoor Education**

MCPS believes that the general good health of students is fundamental for the fulfillment of its mission. With the knowledge that good health must include physical activity and time outdoors, opportunities for both occur at every grade level through the K-12 curriculum and the daily schedule for Grades K-8 students. Curriculum 2.0, the integrated elementary curriculum, and various parts of the secondary school curriculum promote the use of the outdoors as another

classroom for instruction in other subject areas. For example, 20 percent of MCPS K–12 students participate in outdoor field investigations every year through the MCPS Outdoor Environmental Education Program, including the Grade 6 program where every student participates in a residential, three-day program of outdoor environmental education. Physical education (P.E.) classes provide direct instruction in athletics. Elementary students participate in P.E. classes one hour per week; middle school students receive one hour of instruction in P.E. three of four marking periods; and high school students must pass two semesters of P.E. With instruction occurring in many outdoor sports, over 50 percent of P.E. occurs outside. Extra-curricular sports involve thousands of students annually: middle schools have intramural programs, while both middle school and high schools conduct interscholastic athletics programs. Individual schools choose from multiple voluntary programs for physical activity according to their needs and desires, including: Jump Rope for Heart, Fuel up to Play 60, and Hoops for Heart. Other examples include fitness nights for the family and community, fundraising walks for breast cancer, and runs for the homeless. Many schools have before and after school activities that include running clubs and fitness-related clubs and classes at the elementary and middle school levels. Finally, but importantly, all students in Grades K–8 have daily recess periods, where outdoor, game, and science equipment are readily available for games, exercise, and exploration of the natural world. Please see Pillar III for additional discussion on Outdoor Education.

#### ***IV. Pillar 3: Effective Environmental and Sustainability Education***

***Provide a summary describing how your district ensures effective environmental and sustainability education including: an environmental or sustainability literacy requirement; integration of environmental and sustainability concepts throughout the curriculum and assessments; teacher professional development in environmental and sustainability education; AP Environmental Science course offerings; use of sustainability and the environment as a context for learning science, technology, engineering, mathematics, green technologies, and career pathways; civic/community engagement projects integrating environment and sustainability topics; and students' meaningful outdoor learning experiences. (2500 word maximum)***

A commitment to educate students about the natural world and their place in it has been part of the culture of MCPS for a very long time. As far back as 1963, MCPS initiated a residential outdoor environmental education program for every Grade 6 student. The program has evolved into a program that serves over 24,000 students annually, while still maintaining a meaningful residential outdoor experience for all middle school students. With a highly diverse population and many disadvantaged students, the school system provides every student the opportunity to learn about the environment in the classroom and in the outdoors. The goal is to graduate environmentally literate citizens.

##### **A. Curriculum and Assessment**

MCPS has a K-12 Environmental Literacy Plan that ensures that environmental education occurs as a series of learning progressions from Kindergarten through Grade 12 and involves several content areas. All of the Maryland Environmental Literacy Curriculum standards are addressed in spiral fashion as students advance in knowledge and skill level. Graduation in the state of Maryland requires that students successfully complete a high school program that teaches all eight environmental education standards. The foundation for these MCPS high school courses is set through the elementary and middle school environmental education curriculum.

##### **1. Elementary Schools**

The newly developed Elementary Integrated Curriculum integrates environmental and sustainability education at every grade level. Students are engaged in learning through the use of environmental issues as a context for learning. Examples of topics include: the use and type of lighting, water conservation, and recycling. In addition to the life science and ecology concepts, students learn geographic concepts to understand interactions between the physical and human characteristics of the environment. Social studies concepts include:

- People adapt to and modify the environment when they settle in a region
  - The movement of people and goods changes the environment of a region
  - Individuals and groups make choices that affect the environment

The integration of environmental education in core content areas ensures that students receive robust, relevant, and engaging instruction across all subjects in the early grades. Authentic

environmental issues help students develop critical and creative thinking skills that will prepare them for their future.

## **2. Secondary Schools**

When students enter middle school, they are prepared to build on their firm foundation of basic environmental education. In the science classroom, learning at Grade 6 is focused on four project-based learning (PBL) units, three of which are environmental - Going Green, Butterfly Habitat, and Alternative Energy. Aligned with these PBL units is the Grade 6 residential outdoor education program, which takes students outside to do field investigations in their local watershed. Grade 7 includes a PBL unit on hydroponics, while Grade 8 targets natural and human-induced changes to global conditions in a unit on Solar Energy and Fluid Circulation. Environmental education concepts are also included in middle school social studies as students learn geographic concepts to understand interactions between the physical and human characteristics of the environment. These concepts include:

- How geography influences the development of culture
- Why humans modify the environment and consequences of those modifications
- Trade-offs between environmental protection and economic growth
- How settlement patterns affect the environment

Middle school students engage in a variety of tasks as they explore environmental issues. The use of modern case studies and PBL provides opportunities for critical thinking, evaluation and analysis, and judgment about complex problems.

All high school students take Biology and National, State, and Local Government (NSL); together, these two classes provide instruction in all eight environmental education standards. While Biology teaches to seven of the eight EL standards, standard 1 - issue investigation and action - is addressed in social studies. In NSL, students write advocacy letters about an environmental issue of their choosing. Students also investigate smart growth issues affecting Maryland. All students also take a Modern World History course that addresses issues of globalization related to limited resources and limits of technology for sustainability. In addition to required courses, students also may enroll in several Advanced Placement courses that address the environmental literacy standards. AP Human Geography is increasing in popularity and students taking the course are achieving at high levels. In fact, the gain in percentage of students achieving an AP score of 3 or greater between 2010 and 2012 was 17 percent. AP Environmental Science has also experienced an increase in enrollment and in the percentage of students who scored a 3 or better on the AP exam. The enrollment of students in both of these courses in MCPS is significantly higher than at the national and the state level, see Tables 3 and 4.

## **3. A STEM Focus**

MCPS has lead teachers in every school - elementary through high school - who encourage and support STEM learning. Each MCPS elementary school has a lead science teacher who participated in a Howard Hughes Medical Institute-funded lead science teacher project. This three-year project focused on shifting science instruction to an inquiry based model that

integrates STEM concepts. The secondary school “Science/Technology/Engineering content specialists have received professional development focused on STEM teaching, especially as part of project-based learning. Additionally, every principal and a group of teachers from each school have participated in the MSDE Educator Effectiveness Academies (2011, 2012): one person from each school’s team attended the STEM sessions and, in a “trainer of trainers” model, trained the rest of the school staff on how to integrate STEM concepts and practices into all curriculum areas. Moreover, every school has a STEM professional learning community which meets regularly to discuss STEM programming in their school. Throughout the MCPS curriculum, environmental connections are made to various STEM topics related to the interaction of humans, plants, and animals with the environment.

#### **4. Career Pathways**

Planning and preparing for college and career readiness starts in Kindergarten in MCPS and continues through Grade 12. In 2011, MCPS received funds from the US Department of Education to develop and pilot-test the nation’s first integrated elementary curriculum (Elementary Integrated Curriculum, also known as Curriculum 2.0) moving teaching and learning away from mastery of facts to the development of creative and critical thinking skills. The nature of the elementary integrated curriculum lends itself to highlighting careers in fields related to environment/sustainability. The thinking and academic skills framework applied to elementary curriculum builds in college and career readiness skills such as fluency, collaboration, analysis, communication, metacognition, and originality. In the middle years, students explore environmental careers as they work to develop solutions to authentic environmental problems in their PBL units. MCPS offers many career pathways for high school students, including: Horticulture, Construction, Health Sciences, and Bio Sciences. These programs integrate environmental and sustainability concepts to ensure that students learn the most current practices and innovations in the discipline. In addition to the career pathways, several high schools have special programs in environmental studies, including the well-known magnet program, Poolesville High School Global Ecology, in which students are immersed in the environmental studies and have the opportunity to work with scientists.

#### **B. Student stewardship**

MCPS students grow up in a "green" culture and practice environmentally positive behaviors daily. With the School Energy and Recycling Team (SERT) helping to develop sustainable behaviors in students, and the formal learning through the MCPS curriculum, students are moved toward stewardship of the environment. Student-led SERT teams exist in every school; environmental clubs abound. The SERT teams monitor how well students and staff are doing in regard to recycling and energy conservation. They check for the correct use of recycling bins in every classroom, and unnecessary lighting and energy usage. In middle school, all Grade 6 students participate in an environmental student service learning project that focuses on improving the local watershed. Projects are various and may include: removal of invasive plants, planting of native plants, mulching to help the absorption of water, litter removal, and mulching to keep people on trails instead of crushing native plants in the woods. In Grade 8, students select their own SSL project; about 1/3 choose an environmental topic. As stated earlier, in NSL students investigate an environmental issue of their choosing and compose an

advocacy letter. Students enrolled in environmental science and horticulture are involved in reforestation projects and invasive plant removal in several areas of the county. These are just a few of the examples of how the informal and formal curricula work together seamlessly in MCPS to keep the environment in focus in the minds and actions of students.

### **C. Outdoor Lessons**

The Maryland Partnership for Children in Nature recommends that every student have an outdoor learning experience every year. MCPS is working toward that goal. In addition to the systemic Grade 6 residential outdoor environmental education program, which serves 10,000 students, MCPS' Outdoor Environmental Education Programs coordinates outdoor investigations for another 14,000 students annually; that is 16 percent of the total student population. The Elementary Integrated Curriculum provides several lesson seeds at various grade levels that include student outings for exploration, observation, and data collection. School garden programs are growing as MCPS works to support novice gardeners and educators who want to utilize a garden as an instructional tool.

<http://www.montgomeryschoolsmd.org/curriculum/outdoored/outreach/garden.aspx> .

The outdoors is frequently the laboratory of choice for Environmental Science and Horticulture. Physical education uses the outdoors as its dominant classroom, while recess provides unstructured outdoor play every day of the year in which the weather cooperates.

### **D. Professional Development**

Teacher professional development in environmental and sustainability education is provided in several ways. The Science/Technology/Engineering (STE) office facilitates professional development sessions that help teachers to effectively teach the environmental project-based learning units found in middle and high school. STE creates power points, taped webinars, and videos for teachers to use for just-in-time professional development and review. MCPS' Outdoor Environmental Education Programs offers several teacher courses and workshops and over 500 teachers participate annually. Examples of those courses include: An Introduction to Bay Ecology; Techniques in Teaching Outdoor Environmental Education; Advanced Topics in Environmental Education; Schoolyard Habitats; Container Gardening; and several workshops geared to support specific environmental field investigations. OEEP staff also provides individual and small group coaching on environmental lessons and videos of lessons being delivered in the field. In addition to MCPS' role in professional development, we have partners who help MCPS reach more teachers. One such partner is Audubon GreenKids—a program that works intensely with ten schools over a two-year period to infuse environmental teaching and learning by co-teaching special environmental lessons on the school site. MCPS recognizes the importance of professional development in building the capacity of teachers to deliver environmental and sustainability education.

## GRS 2013 Point Allocation: MCPS

<u>Application Narrative Sections</u>	<u>Points</u>
<p>Green school program participation            Internal: SERT, OEEP, SSL            External: MAEOE Green Schools, 50 schools certified            OEEP and SERT are certified Green Centers providing PD for staff along with educational resources            Audubon Naturalist Society: GreenKids            EPA: Energy Star Portfolio Manager            US Green Building Council: LEED participation, built into county regs</p> <p>Grants:            Mont. Co. Educational Foundation, EPA (retrofit buses), US Dept of Energy (improve energy efficiency at CESC), State of MD (TREE-MENDOUS), Audubon (GreenKids), MD Energy Admin (Energy Conservation Program)</p> <p>Awards:            GRS, FSK MS (2012), EPA, IAQ Tools (2002), MSDE Model EE Program, MD Green Centers and Green Schools, MEA award for superior energy savings, recycling and energy efficiency awards (private), Env Ed award to Erol Miller (CBT), LEED Gold Schools (10), 4 awaiting certification, 16 registered in design or construction            Green Cleaning Award</p>	10 points
<p>Pillar I: Reduce environmental impact and costs.            SERT program            Incentivized behavior strategies for students and staff to reduce energy and water consumption            Extensive web site with videos, contests, teaching resources, support, and professional development            Savings in utility costs between \$, 1.5-2.5 million, 10-15% below 2003 baseline            Focus on HS water conservation (irrigation) with 20% reduction since 2010            Energy management system for HVAC with setbacks, Peak Load Management system to minimize demand;            Energy retrofit program, T-8 lamps (reduced 32 W to 25W); installed digital astronomical time clocks for exterior lighting in all schools (programmable through laptop), LED pilot in two auditoriums and parking lots            Portable classroom HVAC scheduler for all 400 portables, allows central scheduling and thermostat set-points; currently shifting to smart thermostats that learn schedules through occupancy sensors            Automatic shut down of computers at end of workday and weekends from central location            New building design and construction, LEED certified, pursued utility rebates; installing geo-exchange since 2001, 17 in operation with 6 under construction            Water conservation measures to control storm water runoff, vegetative roofs            Renewable energy: purchase of renewable energy credits, solar PV at 8 schools, 23 geoexchange systems            Solid waste recycling: increased rate from 15% in 2001 to 67% in 2011, monthly recycling</p>	28 points  Data needed on #/% of school gardens

<p>reports on web site, incentivized through rewards for schools</p> <p>Paper reduction initiative: duplex printing as default setting, used 19% less paper between 2008 and 2011</p> <p>Green Procurement Strategies: office paper, Green Seal, volume purchasing</p> <p>Computer refurbishing: 10,000 desktops each summer</p> <p>Stormwater Management: MS4 permit with Montgomery County Government, <a href="http://www6.montgomerycountymd.gov/content/dep/downloads/npdes/NPDESrpt2011.pdf">http://www6.montgomerycountymd.gov/content/dep/downloads/npdes/NPDESrpt2011.pdf</a></p> <p>Ecologically beneficial use of grounds: garden construction encouraged, partnering with Audubon, Extension Service, Master Gardeners</p> <p>Hazardous waste: PD for staff, hazardous waste contractor</p> <p>Transportation: low sulfur diesel, 94% of buses have Diesel filter or exhaust gas recirculating, 5 minute idle zones at schools, hybrid vehicle fleet purchase, walk to school day</p>	
<p>Pillar II: Improve the health and wellness of students and staff.</p> <p>Green Cleaning: Healthy, High Performance Cleaning Program in place, Green Cleaning Award for Schools and Universities (2009); employee training in green cleaning principles and processes; Green Seal Organization screening process for chemicals</p> <p>Indoor Air Quality: dedicated staff in the Indoor Air Quality/Environmental Safety Unit, proactive and response program; building maintenance plan in place</p> <p>Integrated pest management program in place; Hazardous communications/ Hazardous Materials program overseen by Safety Manager (system-wide); hazardous waste disposal contractor system-wide; Lead in drinking water testing program in place with routine flushing of drinking fountains; radon testing program in place</p> <p>Chemical management: eliminates no longer used science chemicals, eliminated mercury and mercury containing compounds from instructional use</p> <p>Asthma management: asthma triggers reduced through preventive maintenance, IAQ in construction guidelines in place, no smoking policy enforced</p> <p>Moisture control and mold prevention: flyers delivered to proactively prevent elevated moisture and mold, EPA guidelines in place for removing mold</p> <p>Airborne contaminants: no smoking, no idling policies, equipment inspections and filter changes regularly, IAQ staff responds to issues</p> <p>Ventilation systems: ASHRAE Standard 62 for evaluations and maintenance</p> <p>New Buildings: facility design standards that exceed LEED for Schools 2007, daylight harvesting, low-VOC materials; contractors required to submit documentation on % recycled materials, locally manufactured, construction waste recycled (75%); LEED Gold certification for 10 schools since 2006</p> <p>Nutrition: Focus on Grades 1-4 with extensive connections to sustainable agriculture, e.g., MD Home Grown School Lunch Week; wellness specialist in Food and Nutrition Services works with students to make positive food choices</p> <p>Physical activity and Outdoor Education: physical activity and time outdoors provided K-12, Curriculum 2.0 promotes the use of the outdoors for instructional activities, 20% of student participate in outdoor field investigations each year, Grade 6 at Smith Center residential EE program, Jump Rope for Heart, Fuel to Play 60, Hoops for Heart (more discussion in Pillar 3)</p>	30 points
<p>Pillar III: Provide effective environmental and sustainability education, incorporating STEM, civic skills and green career pathways.</p> <p>1963 initiated program of outdoor education for Grade 6 students, serves 24,000 students</p>	27 points

<p>annually</p> <p>Curriculum and Assessment: all eight MD e-lit standards addressed in spiral manner, graduation requirement in MD for e-lit, program prepares students to meet the requirement in high school</p> <p>ES: Environment is context for learning in science and social studies</p> <p>Secondary: Gr. 6 PBL units, Going Green, Butterfly Habitat, and Alternative Energy; Gr. 7 PBL: Hydroponics, Solar Energy, Fluid Circulation; four social studies units</p> <p>High School: Biology and National, State and Local Government courses address all eight E-Lit standards</p> <p>STEM Focus: lead science teachers in all elementary schools who participated in HHMI science teacher project (professional development in content and pedagogy), every school has a STEM professional learning community</p> <p>Curriculum 2.0, integrated elementary curriculum funded by grant from USED, builds in college and career readiness, such as fluency, collaboration, communication, metacognition</p> <p>High School career pathways in include Horticulture, Construction, Health Science and Bio Sciences, special program in Environmental Studies at Poolesville Global Ecology program</p> <p>Student Stewardship: Gr. 6 environmental service learning, Gr. 8 students select their own SSL project (1/3 are environmental in their focus); environmental science and horticulture students are involved in reforestation efforts and invasive species removal</p> <p>Outdoor Lessons: 16% of the student population participates in outdoor education annually; school gardening programs are expanding in the school system</p> <p>Professional Development: STE Office facilitates PD for teachers in project-based learning; OEEP offers teacher courses and workshops to over 500 teachers annually; OEEP staff provides individual and small group coaching and mentoring on environmental lessons; nonformal EE providers collaborate with OEEP staff to provide field experiences for students, e.g., Audubon GreenKids</p>	
<p>Total</p>	<p>95 points</p>