



Environmental Education in Maryland Public Schools

The development and implementation of Maryland's
environmental education program

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Maryland Environmental Literacy Curriculum

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INTRODUCTION

On April 22, 2008, Governor Martin O'Malley issued an Executive Order to establish the **Maryland Partnership for Children in Nature (01.01.2008.06)**. Its purpose was to promote outdoor experiential activities and environmental education for Maryland's young people and to build a coalition of ongoing support for these endeavors.

The Executive Order required the formation of the Partnership and established the structure, general procedures and membership. Two workgroups were established - the Community and Public Lands Workgroup and the Environmental Literacy Workgroup. This report summarizes the work of the Environmental Literacy Workgroup as required by Sections 2 and 3 of the Executive Order.

The format of the Executive Order sets the outline for this report. In addition to the requirements of the Executive Order, the report incorporates the Governor's Education Priorities in Science, Technology, Engineering and Mathematics (STEM). The report also is based on the elements of a State Environmental Literacy Plan as suggested by the North American Association of Environmental Education (NAAEE), and other guiding documents, including the Maryland Environmental Literacy Curriculum (draft), the National Science Education Standards, the National Curriculum Standards for Social Studies, the National Climate Change Standards, the National Ocean Literacy Standards, and the draft Education for a Sustainable Future Standards.

Develop & Implement a State Environmental Literacy Plan

- A review of current environmental efforts in Maryland schools, including the environmental education bylaw, the Chesapeake 2000 commitments, and student environmental literacy levels;
- Identification of curriculum necessary to develop environmentally literate students;
- Identification of model outdoor field and Service-Learning experiences that can be integrated into the regular school curriculum;
- Professional development opportunities for in-service teachers, pre-service teachers, and non-formal environmental educators;
- Methods to annually measure and report at the State and local level, progress of public school students toward becoming environmentally literate graduates; and
- A process for revising or updating the environmental literacy plan every five years, or as needed.



Emmitsburg, MD

ELEMENTS OF A STATE ENVIRONMENTAL LITERACY PLAN

The **Environmental Literacy Workgroup** was formed to create a state environmental literacy plan. According to NAAEE Guidelines:

Creation of an environmental literacy plan provides the framework for school systems to expand and improve their environmental education programs.

A state environmental literacy plan:

- Ensures that environmental education activities are aligned with student graduation requirements and help achieve state education goals;
- Ensures that environmental education is fully, efficiently and appropriately integrated into formal education systems;
- Ensures that teacher professional development opportunities in environmental education are aligned with student achievement goals in environmental literacy;
- Ensures consistency, accuracy, and excellence in environmental content knowledge.
- Engages underserved communities through an inclusive process so that all stakeholders are beneficiaries of environmental education in schools;
- Ensures that non-formal environmental education providers, state natural resource agencies, community organizations, and other partners are involved appropriately and effectively in environmental education activities in schools; and
- Serves as a necessary component of a comprehensive state environmental education program. From: Developing A State Environmental Science Literacy Plan; NAAEE; August, 2008.

The Environmental Literacy Workgroup supports the statement made in the Governor's Climate Change Commission report (CC-5, Mitigation Workgroup report, page 109):

The Environmental Literacy Workgroup recommends that the State build upon current educational efforts of school systems and their partners. Professional educators provide leadership in selecting appropriate materials, activities and lessons for students, identifying appropriate pedagogical methods, and accurately aligning activities with state and local education priorities. Professional partners can provide current scientific information, internship and workforce development opportunities, outdoor and indoor activities not able to be done through the regular school program, cutting-edge technology, and technical assistance.





REVIEW OF CURRENT ENVIRONMENTAL EDUCATION EFFORTS

The following sections describe current efforts in curriculum and instruction in environmental education within the PreK-12 education community. Brief summaries of guiding documents and descriptions of the variety of state-level programs and approaches are included. The program elements described below provide a framework upon which local school systems can build, while maintaining the flexibility to implement their programs to capitalize on their unique local environment and local environmental issues.

Overview

The purpose of Maryland's Environmental Education program is to enable students to make informed decisions and to take actions that create and maintain an optimal relationship between themselves and the environment, and to preserve and protect the unique natural resources of Maryland, particularly those of the Chesapeake Bay and its watershed. The Maryland State Department of Education (MSDE) provides leadership and services to twenty-four local education agencies (LEAs) and serves over 880,000 PreK-12 students.

Definition of Environmental Literacy

According to the Governor's Children in Nature Committee Report, 2009:

“Environmentally literate students understand environmental and physical processes and systems, including human systems. They are able to analyze global, social, cultural, political, physical, economic and environmental relationships, and weigh various sides of environmental issues to make responsible decisions as individuals and as members of their community and citizens of the world.”

The goals of Maryland's Environmental Education Program support the Governor's Education Goals and those of the State Board of Education. The K-12 program provides students with the content knowledge they need to make informed decisions about environmental issues, as well as the critical and creative thinking skills they need to investigate, analyze, and act upon issues of importance to them and their community. Students learn these skills throughout their school years through a variety of courses and experiences.

In order to develop a stewardship ethic, students must engage in a variety of indoor and outdoor environmental experiences over an extended period of time. The experiences may include a walk in the woods for younger students, a one-day program on the Chesapeake Bay or in the forest or wetland, multi-day residential experiences, summer and after-school programs, as well as internship opportunities for older students.

Guiding Documents

- **Definition of Environmental Literacy**
- **COMAR – Environmental Education Bylaw**
- **MSDE Environmental Education Goals**
- **Maryland's State Curriculum**
- **Maryland Environmental Literacy Curriculum**
- **Chesapeake Bay 2000 Agreement**
- **NOAA B-WET Grant**
- **Partnership for 21st Century Skills**
- **Children in Nature Plan**
- **National Documents**

An environmentally literate student possesses the knowledge, intellectual skills, attitudes, experiences, motivation to make and act upon responsible environmental decisions as individuals and as members of the community.

– Governor’s Children in Nature Committee Report, 2009



Students may also participate in indoor projects such as developing and implementing an energy conservation plan for their school, creating and maintaining a schoolyard habitat, petitioning for Integrated Pest Management to be used on school grounds, installing rain barrels, or promoting the use of local foods in school cafeterias.

Teacher professional development is a keystone feature of the Environmental Education program. Teachers increase their own content knowledge through graduate courses, workshops, online venues, the State environmental education conference sponsored by the Maryland Association for Outdoor and Environmental Education (MAEOE). Teachers also learn how to teach in the outdoors and how to use student projects as an integrating context for teaching and learning. MSDE emphasizes Issues Investigation as a way to involve students in complex and authentic local, regional or global issues. The State Environmental Education Coordinators approved the use of the Hungerford/Volk Investigating and Evaluating Environmental Issues and Actions model. Teachers learn how to use this instructional model in week-long workshops. *Project Citizen* is a kindred model used in social studies classes. Both models promote the use of authentic investigation and result in the development and implementation of an action plan.

Students live what they learn when they are involved in care and operation of their own school and school grounds. Teaming school-based facilities and maintenance personnel, the school nurse, and the cafeteria staff with administrators, teachers and students capitalize on the expertise of these staff members to teach students about their immediate environment. Students take tours of the heating plant, learn about sanitary and dietary practices in the cafeteria, and explore the use of green cleaners in their building. Students work with these staff members to identify potential no-mow zones, evaluate their school grounds for erosion problems, and develop and implement energy conservation and recycling programs.

Student involvement in caring for their own building and grounds increases their pride in their school. Ultimately, the environmentally literate citizen will be recognized through their personal behaviors in school, home, workplace and the community. While students are becoming involved in their school facility, the adults are hard at work, too. School systems have embraced “green” practices in school construction, maintenance and management. All new school construction in Maryland must meet LEED Silver standards or higher. The use of green cleaners, when appropriate, was legislated in 2009.

Code of Maryland Regulation (COMAR): Environmental Education (EE)

In 1990, Environmental Education was mandated as part of the PreK-12 program through the Code of Maryland Regulation (COMAR 13A.04.17) (Appendix A.). The Maryland State Curriculum incorporates the study of environmental education issues and concepts and delineates standards and objectives that are tied to national standards in environmental education, the sciences, health, and social studies. Environmental education is infused throughout the Maryland State Curriculum in elementary and middle school and through the Core Learning Goals in high school. The North American Association for Environmental Education (NAAEE) guidelines call for ensuring that environmental education activities are aligned with student graduation requirements and help achieve State education goals.

MSDE Environmental Education Goals

The goals provide the framework for statewide program development and implementation and teacher professional development activities.

- Goal 1** Produce high performing, environmentally literate students.
- Goal 2** Provide a meaningful outdoor experience for all students.
- Goal 3** Ensure that highly qualified teachers are prepared to implement effective instructional programs.
- Goal 4** Create schools that model best environmental practices.

Statewide Student Participation

MSDE requires that all facilities used for MSDE-sponsored activities be physically accessible so that all students are able to participate in Environmental Education. A notice that reasonable accommodations for individuals with disabilities will be provided upon request is included in any announcement and/or information about activities. MSDE maintains a list of agency-approved accessible facilities, and has contact information for services such as interpreters for the deaf. Alternative formats for written materials (such as large print) are also available upon request.

Each school may have its own statements and programs, but they are required by federal law, specifically Section 504 of the Rehabilitation Act of 1972, the Americans with Disabilities Act, and IDEA (Individuals with Disabilities Education Act), to provide accessibility to all programs and classes and reasonable accommodations to all students. All school systems have a 504 coordinator/designee in their central office to assure compliance with these regulations.

Maryland State Curriculum

The State Curriculum defines what students should know and be able to do at each grade level in content areas. Environmental topics are infused throughout the curriculum in a number of disciplines including the sciences, social studies, health & physical education, fine arts, and family and consumer science. Standards from other disciplines - Mathematics, and Reading/English Language Arts - are incorporated within instruction as appropriate. Environmental Education provides a rich content for infusion of Technology Education Standards and STEM initiatives. Students in English for Speakers of Other Languages (ESOL) and World Language classes also participate in Environmental Education projects.



Environmental Education concepts are infused within the curriculum, particularly in the sciences and social studies areas of economics, geography and public policy. The State Curriculum for Social Studies and Science are structured to build these concepts over the student's K-12 career. Environmental Science, Goal 6.0 of the State Curriculum in Grades 3-8, includes the study of natural resources and environmental issues. Student service-learning and other classroom projects provide the action component vital to true environmental literacy.

Maryland Environmental Literacy Curriculum

The Maryland Environmental Literacy Curriculum represent the environmental knowledge and skills that students will have upon graduation from a Maryland school system. The standards are addressed through a variety of courses, service-learning, and classroom and outdoor experiences from Grades PreK-12. Strands were developed to reflect the integrative nature of environmental education in both the natural and social sciences.

The standards can be used to enhance existing courses in the sciences, government, economics, health, or can be used as a template for the design of a new course. Backward mapping from these standards would be appropriate in producing the learning outcomes for PreK- 8 students as illustrated in the national standards documents.

Natural processes are studied through the standards relating to the life and Earth/Space sciences. Human systems are investigated through differing geographic, cultural, societal, economic and political views. The interaction of these natural and human systems constitutes the majority of the study, with the concept of sustainability as the equilibrium point - the touchstone of positive human and natural interactions.

Environmental Education provides an exciting context for teaching through issues- and problem-based interdisciplinary instructional models, authentic investigation, and the use of technology in research and communication. The result is the planning, implementation, and evaluation of science-based student actions that positively affect the environment.

Issues-based investigation forms the cornerstone of the program, and is used as a teaching method that allows students to systematically study and evaluate complex environmental issues. By using an issues-based approach, teachers can promote increased student achievement through interdisciplinary, hands-on, student-centered projects, and involve students in the investigation of issues and problems through a variety of on-campus and community or regional experiences. In addition, this type of instruction allows students to be engaged in identifying, planning, and implementing authentic projects that result in a change to the environment. Several indicators can be addressed simultaneously within the context of an issue of local, regional or global concern. Stewardship and action are addressed through the issues-based investigation model.

The Maryland Environmental Literacy Curriculum is based on national standards, including:

- **National Science Education Standards**
- **National Council of Social Studies Standards**
- **North American Association for Environmental Education**
- **Ocean Literacy Standards**
- **Education for Sustainability Standards**

The standards can be viewed at:

www.marylandpublicschools.org/MSDE/programs/environment/tk/els.

Environmental Education also addresses critical thinking; research; use of modeling and technology; and methods of social and scientific investigation through existing Skills and Process Standards.

- **Technology Standards:**
www.marylandpublicschools.org
- **Science Standards:**
mdk12.org/share/vsc/vsc_biology_hs.pdf
mdk12.org/instruction/curriculum/science/index.html
- **Social Studies Standards:**
mdk12.org/instruction/curriculum

Chesapeake Bay 2000 Agreement

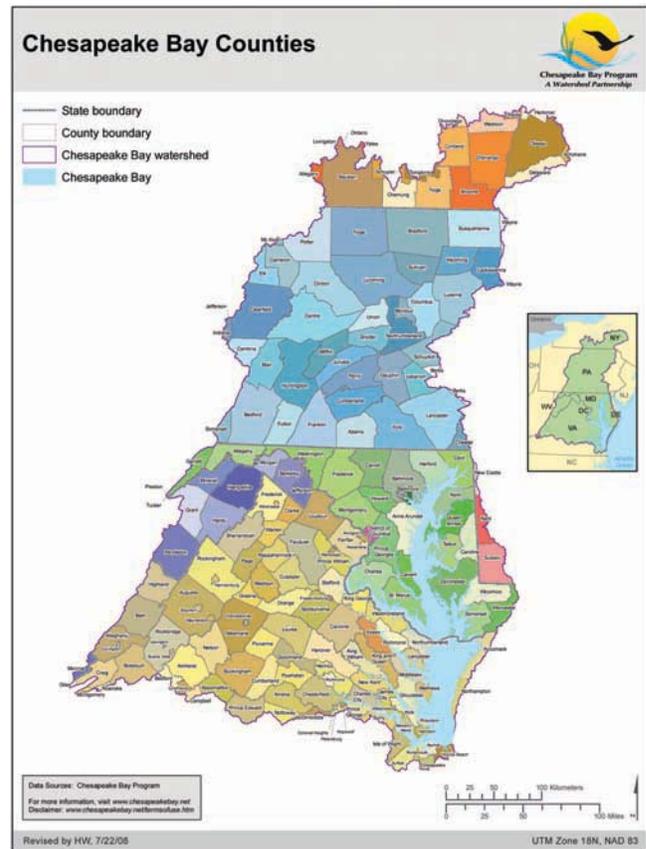
The Stewardship and Community Engagement Provision of the Chesapeake Bay 2000 Agreement, which set education and outreach as a goal, calls for at least one outdoor experience for each student. Specifically, the agreement states that *“Beginning with the class of 2005, (the state will) provide a meaningful Bay or stream outdoor experience for every school student in the watershed before graduation from high school.”* Maryland LEAs have achieved this goal (June 2008), although recent changes in funding will decrease student participation rates during the 2009-2010 school year.

MSDE and the LEA Environmental Education Coordinators have adopted an implementation model that infuses the outdoor experience within the regular curriculum. The grade-level programs, aligned with the curriculum, are designed to accommodate all students. By embedding the experience as part of the program, all students will be able to participate in the experience, it is easier to target appropriate professional development for teachers since they know what to expect from the experience, and it provides an uncomplicated method for reporting the numbers of students served.

NOAA Chesapeake Bay Watershed Education and Training Program

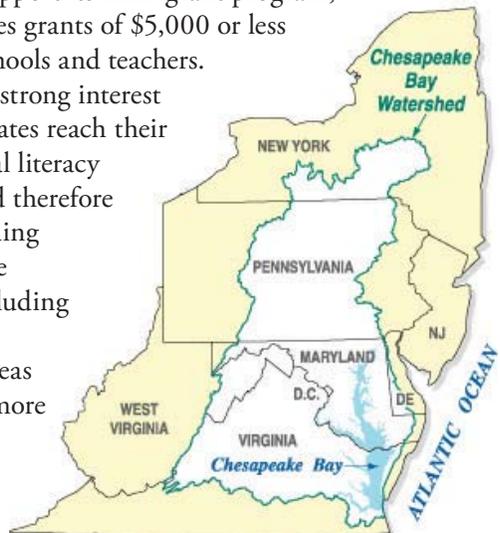
The NOAA Chesapeake Bay Watershed Education and Training Program—popularly known as NOAA B-WET—provides hands-on watershed education to students and teachers to foster stewardship of the Chesapeake Bay. NOAA recognizes that environmentally literate citizens who have the skills and knowledge to make well-informed environmental choices are key to sustaining the nation’s ocean and coastal environments. To meet this challenge, the Chesapeake Bay B-WET Program was established in 2002.

Using the environment to help advance student learning and problem-solving abilities has been shown to increase academic performance, enthusiasm for learning, and environmental stewardship. To foster increased programming of this kind, NOAA B-WET recognizes two main priorities: meaningful watershed educational experiences for students and related professional development for teachers. The Chesapeake Bay B-WET Program supports the commitment of the Chesapeake Bay Program to provide every student in the watershed



with a meaningful bay or stream outdoor experience before graduation from high school. To accomplish this, NOAA has strongly supported grade-level, systemic programs as modeled by MSDE and local school systems.

NOAA B-WET has been instrumental in assisting the state of Maryland to broadly implement environmental literacy programs in the public schools. B-WET also partners with the Chesapeake Bay Trust to provide funding to support its mini-grant program, which provides grants of \$5,000 or less directly to schools and teachers. NOAA has a strong interest in assisting states reach their environmental literacy objectives and therefore provides funding for many state priorities, including underserved geographic areas such as Baltimore and the Eastern Shore.



MSDE's Maryland Eastern Shore Initiative (MESI)

In 2006, the Maryland State Department of Education received a three-year NOAA B-WET grant for its Maryland Eastern Shore Initiative (MESI). Recently the grant was renewed for an additional three years. The program allows MSDE to employ a Program Coordinator to work with the local school system environmental education coordinators on the Eastern Shore. The focus of the program is to provide technical support to these high need areas to develop and incorporate meaningful outdoor experiences within the curriculum, provide teacher training, and build and strengthen partnerships with local organizations to assist in this effort. The project reached 90 teachers and 4,100 students on Maryland's Eastern Shore in its first year.

The MESI Coordinator has been successful in creating a vibrant internship program for high school students through a partnership with the scientists at Oxford Cooperative Lab in Oxford, MD. The program expanded from 15 students in the first year to accommodate 61 students in year 2. An additional 25 students will be served in a new partnership with the University of Maryland Center for Environmental Science, Horn Point Laboratory in 2010. Student research projects proceed under the direction of a scientist who mentors the students throughout the school year, and in many cases, through the summer and following year.

Fifteen students participated in the first year, engaging in research on topics such as:

- The Effect of Marine Noise on Cetacean Behavior
- Spread of White Nose Syndrome in Bats on the U.S. East Coast
- Marine Mammals: To What Extent are Seals Stranding?
- Morphological Differences in Horseshoe Crab Hemocytes
- A Comparative Study of RNA/DNA Ratios in Mummichogs of the Corsica and Magothy Rivers
- Eutrophication/Algal Blooms: Their Effects on the Bay
- Effects of Spartina Grass on Species Diversity in Floating Oyster Cages
- Pharmaceuticals in Waterways: Effects on Aquatic Organisms
- Bleaching of Coral Reef Ecosystems
- Using the Sea Anemone as a Model to Determine Effects of Temperature on Coral Reef Bleaching
- Oyster Cage Depth and Oyster Mortality
- Mycobacteriosis (Fish Handler's Disease) and its Effect on Human Health
- The Effect of Nutria on Wetlands
- Effects of Sea Level Rise
- Egypt Road Project – Wetlands Restoration
- Genetics – Bacterial Pathogen Monitoring Program
- Diamondback Terrapins in Need of Protection
- Sturgeon: Protecting the Largest Fish Native to the Chesapeake
- Bay Grasses
- Protection of the Coral Reef
- Crab Jubilees – Designing Chesapeake Bay Computer Game
- Recreating the Bay Ecosystem in a Classroom Aquarium

Support for the internship program comes from numerous community groups including: NOAA Chesapeake Bay Office, Cooperative Oxford Lab; Chesapeake Bay Maritime Museum; CBNERR – Monie Bay; University of Maryland Center for Environmental Science, Horn Point Laboratory; NorthBay; Delmarva Environmental Education Network; Alliance for Chesapeake Bay; Maryland Department of Natural Resources Police; Washington College; Mid-Shore Environmental Education Network; University of Maryland, Eastern Shore; MD Environmental Service; Talbot County Public Works; MD Dept. of the Environment; Caroline County Department of Planning Codes and Engineering; NASA; Newton Marasco Foundation; CISDE; Timber Grove Equitherapy; Environmental Concern; and Coast Guard Oxford Station.



NOAA B-WET Grant for the Maryland Eastern Shore Initiative (MESI) Goals

- Increase the internal capacity of nine Eastern Shore Local Education Agencies (LEAs) so Environmental Education programs and meaningful watershed experiences become self-sustaining;
- Implement problem- and issue-based instruction, including a meaningful outdoor education action project, within the Maryland State Curriculum for each of the Eastern Shore LEAs;
- Develop capacity for providing a meaningful watershed experience for students in Eastern Shore LEAs by fostering the development and implementation of new K-12 watershed experiences for students in at least one grade level in each LEA; and
- Foster teacher training and student experiences by establishing partnerships between LEAs and informal education and nonprofit organizations; higher education; state-aided institutions; community organizations; and local and county governments and businesses.

MESI Grant Results Year 1

- Eight school systems added 21 grade level meaningful watershed experiences and activities during the 2008-2009 school year.
- More than 860 students were affected by their teachers' Investigation & Exploring Environmental Issues and Actions (IEEIA) training in the 2008-09 school year.
- Washington College is teaming with Talbot Environmental Science & Career Technology Education programs to teach the use of Geographic Information Systems (GIS) to investigate environmental issues.
- Fifteen students engaged in research with Oxford Lab scientists. In 2009-2010, 85 students are engaged in research at 2 scientific sites.
- MSDE provided Issues Investigation training for:
 - Cecil County Public Schools
 - Talbot County Public Schools
 - Dorchester County Schools
 - Cecil County Environmental
 - Queen Anne's County
 - Science Curriculum Workshop
 - Harmful Algal Bloom Workshop
- More than 200 organizations on the Shore became members of DEEN (Delmarva Environmental Education Network) and the Mid-Shore GREENet.



The REINS Program

The MESI Coordinator also developed a program entitled the *REINS Program (Riders in the Environment Improving Native Shorelines)*, which serves students in the mid-shore public schools, and has been awarded funding through the Maryland DNR Aquatic Resources Education Grants Program. The focus of this program is to provide a Meaningful Watershed Educational Experience which includes equitherapy (using horses as part of the program), aquatic studies, and action projects, to engage developmentally disabled students in the investigation of ponds and streams connected to the Choptank River.

The program increases student knowledge of aquatic resources, identifies personal connections to water, and determines actions which are appropriate and helpful to waterways at the study site. The student action plans, which will include a rain garden and native plantings, will enhance the property's natural qualities and protect the aquatic environment next to the farm.

Students participate in Project WET activities, use basic ecological equipment and materials, and learn to identify wetland plants and animals. In addition, students learn to observe life in and around a pond and meadow, and record findings in a naturalist's journal. Because they are learning through equine-assisted strategies, students also begin to comprehend the connection between horses (and other livestock) and the health of their local waterways. The action component of the project gives meaning to the students and helps them understand their role in becoming valuable stewards of the Chesapeake Bay watershed. Students work side by side with experts and with peer mentors to help design a rain garden and native plantings garden. They assist in identifying proper environmental conditions for the placement of plants, and learn to maintain and care for the gardens. In addition, students determine ways to reduce the impact of livestock waste on their local waterways, and determine ways to reduce water pollution which may affect animal health.

The REINS experience is held once each season – fall, winter, spring, and summer – with approximately forty (40) students and 120 adults participating by year's end.



Partnership for 21st Century Skills

The Partnership for 21st Century Skills added Environmental Literacy to its framework in January 2010. The inclusion of environmental literacy as a 21st Century Skill marks the movement of environmental education from a curriculum add-on to a core competency.

Specifically, the desired outcomes for Environmental Literacy are for students to:

- Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as it relates to air, climate, land, food, energy, water and ecosystems;
- Demonstrate knowledge and understanding of society's impact on the natural world (population growth, population development, resource consumption rate, etc);
- Investigate and analyze environmental issues and make accurate conclusions about effective solutions; and
- Take individual and collective action towards addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues).

National Documents

The Maryland Environmental Literacy Curriculum has been aligned with the North American Association for Environmental Education (NAAEE) Standards. These national standards address, in broad categories, include:

- Strand 1** Questioning, Analysis and Interpretation Skills
- Strand 2** Environmental Processes and Systems
- Strand 3** Skills for Understanding and Addressing Environmental Issues
- Strand 4** Personal and Civic Responsibility

The Maryland Environmental Literacy Curriculum were produced using guidance from NAAEE, the National Science Education Standards, Benchmarks for Science Literacy, the Ocean Literacy Standards, the Climate Literacy Standards, and the National Standards for Education for Sustainability.

Children in Nature Plan

Recognizing the urgency in ensuring that Maryland's young people have the opportunity to connect with nature and grow to become informed and responsible stewards of our environment, Governor Martin O'Malley established by Executive Order the Maryland Partnership for Children in Nature by Executive Order in April 2008.

Co-chaired by Maryland Department of Natural Resources Secretary John Griffin and State School Superintendent Dr. Nancy S. Grasmick, the Partnership was charged with developing and implementing an environmental literacy plan as well as a plan to provide youth with structured and unstructured opportunities for play, outdoor recreation, learning and scientific study.

The Children In Nature Plan contains the goals and strategies developed by the 15-member Partnership and 80 work group members to achieve the vision of Governor O'Malley's Executive Order, as well as approaches for developing funding streams and public or private partnerships to implement those strategies. The full text of the Plan can be found at www.dnr.state.md.us/download/cin_exec_summary.pdf.



Governor O'Malley presenting his Executive Order to the Maryland Partnership for Children in Nature





CURRICULUM

IDENTIFICATION OF CURRICULUM NECESSARY TO DEVELOP ENVIRONMENTALLY LITERATE STUDENTS

LEAs are encouraged to provide a variety of indoor and outdoor opportunities for students throughout each year of a student's school experience. These experiences are tailored to align with the curriculum and to be developmentally appropriate for the age group and ability levels of the students. For example, early learners may be taken on a guided nature walk to experience and interact with nature firsthand. Upper elementary and secondary students may participate in a one-day impact experience, such as a trip out on the Bay; and/or a 3-5 day residential experience at an environmental education center. All students have opportunities to participate in summer programs sponsored by LEAs and community partners, and high school students are engaging in research internships with scientists.

Research indicates that a one-time experience is insufficient to instill an environmental ethic. Students must have a variety of different experiences over a sustained period of time. MSDE has identified curriculum and programs that develop environmentally literate students and a stewardship ethic in our students.

The following program elements are discussed in this section:

PreK-12 Education

- Maryland State Curriculum
- High School Core Learning Goals
- Maryland State Environmental Literacy Curriculum
- Issues-Based Instruction
- Career Technology Education and Adult Learning
- Student Service-learning
- Advanced Placement Environmental Science
- Maryland Eastern Shore Initiative
- Science, Technology, Engineering, and Mathematics (STEM) Education
- Student Internship Opportunities

Informal Education Options

- State-Aided Institutions
- State Agencies
- Scientific Institutions
- Nonprofit Organizations
- Zoos, Museums, and Aquaria



The NAAEE *Guidelines Elements of a State Literacy Plan* recommend the identification of specific content standards, content areas, and courses or subjects where instruction takes place. Alignment of PreK-8 content standards and high school Core Learning Goals with the Environmental Literacy Curriculum are presented at www.marylandpublicschools.org/MSDE/programs/environment.

LEA PROGRAMS

All twenty-four school systems offer environmental education integrated within their regular instructional programs. While some environmental topics are covered statewide - the health of the Chesapeake Bay, for example - the local board of education may establish additional requirements. This allows school systems to tailor instruction using locally relevant issues, problems and resources, while being able to take advantage of the facilities and expertise offered by scientific organizations, state agencies, non-formal organizations, higher education facilities, community organizations and businesses in their area.

OUTDOOR & ENVIRONMENTAL EDUCATION CENTERS

School systems work with many colleges, universities, community colleges, local, state and federal agencies, and non-formal education organizations to provide meaningful outdoor experiences for students and professional development for educators. Eight school systems provide student experiences, teacher training, and technical assistance through their own Environmental and Outdoor Education Centers, while other school systems work with partners to provide outdoor environmental activities tailored to meet the curricular needs of the school system or provide opportunities on their school grounds and in their communities.

HIGH SCHOOL CORE LEARNING GOALS

Environmental Science is Goal 6 of the State Science Curriculum. Environmental Issues provides the platform from which the grade-level science and social studies concepts may be integrated. Environmental Education concepts are also embedded within the State Curriculum in life science and earth sciences, social studies (geography, economics, government), health,

family and consumer sciences, and fine and performing arts. environmental topics and examples are used within reading, English/language arts, mathematics, and technology education courses of study. Physics and chemistry can be taught using environmental concepts.

The Maryland Core Learning Goals were developed to define core learning goals in high school biology, government, English and mathematics. Environmental education concepts are embedded within the biology and government goals. All students are required to take these courses to obtain a high school diploma in Maryland. The goals connect with the reform efforts at the national level and adapt the national standards in the sciences and social studies to the framework of curricula in Maryland schools. The learning goals serve as the basis of high school assessment.



High school students have a number of options to access challenging curricula aligned to the Maryland Content Standards, as well as to other appropriate standards.

ENVIRONMENTAL SCIENCE COURSES: Traditional science courses of study in biology, environmental science, ocean science, and/or Advanced Placement Environmental Science

ONLINE COURSES: The Maryland Virtual Learning Opportunities Program (MVLO) includes course options in Environmental Science and Advanced Placement Environmental Science
mdk12online.org/index.html

CAREER TECHNOLOGY OPTIONS: Environmental, Agricultural, and Natural Resources Systems
www.marylandpublicschools.org/MSDE/divisions/careertech/career_technology

MARYLAND STATE ENVIRONMENTAL LITERACY CURRICULUM

The Maryland State Environmental Literacy Curriculum was developed in 2007 to identify and emphasize the infusion of environmental literacy knowledge, skills and processes, within the Maryland State Curriculum and high school Core Learning Goals. MSDE, in cooperation with scientists, professors of science education and environmental science, classroom teachers, and Environmental Education Coordinators developed and reviewed these standards using national environmental, science, social studies, and health standards, taking into consideration the current environmental initiatives in Maryland.

The Maryland State Environmental Literacy Curriculum indicators and objectives are drawn from existing courses of study and represent the knowledge, skills, habits of mind, and attitudes that a student will have upon graduating from a Maryland high school. The most recent draft of standards is available at

www.marylandpublicschools.org/MSDE/programs/environment.

ISSUES-BASED INSTRUCTION

The use of the Maryland State Environmental Literacy Curriculum as a target for instruction has resulted in the evolution of a teaching method that is integrated, multidisciplinary, and hands-on, and involves authentic problem-solving and decision-making using local, state, or national issues.

The Hungerford/Volk model, Investigating and Evaluating Environmental Issues and Actions (IEEIA), is the template for instruction accepted by Environmental Education Coordinators in Maryland. IEEIA is a middle and high school program that promotes environmental citizenship for large numbers of students over long periods of time. The IEEIA program has been shown to develop strong environmental responsibility in students. Evidence gathered over 20 years of work with teachers indicates that students of all ability levels show greater gains in knowledge of responsible citizenship action skills as a result of participating in the program. Students also report taking more actions in their communities. Parents of students in the program observe more voluntary citizenship behaviors on the parts of their children.

The IEEIA model is Standard 1.0 of the Maryland Environmental Literacy Curriculum. The instructional elements in the IEEIA program include Environmental Problem Solving and Developing and Implementing Environmental Action Strategies. The program objectives under Environmental Problem Solving include:

- learn about their interactions with the environment;
- explore the impact of beliefs and values on environmental issues;
- analyze environmental issues;
- identify environmental issues and write research questions;
- access information from print, electronic and human sources;
- compare and evaluate information sources;
- access information using first hand methods of investigation;
- develop and evaluate research instruments;
- systematically collect and record data using surveys, questionnaires and opinionnaires;
- produce and interpret data tables and graphs; and
- draw conclusions, make inferences and formulate recommendations



Students learn major methods of citizenship action, analysis of individual and group actions and methods to create, develop and evaluate action plans.

IEEIA supports many best practices in education such as:

- interdisciplinary integration of subject matter (primarily science, language arts, and social studies);
- collaborative instruction and team teaching;
- emphasis on problem solving and independent projects;
- combinations of independent and cooperative learning;
- student centered and constructivist teaching approaches; and
- authentic learning and authentic assessment.

ENVIRONMENTAL EDUCATION TOOLKIT FOR TEACHERS

The MSDE Environmental Education website provides resources, directories, and tools for teachers to use to implement environmental education into the curriculum. The Environmental Education Toolkit, a feature of the website, is a project developed and implemented by MSDE in partnership with local school system staff. The project provides Maryland educators with additional resources, embedded in the State Curriculum document at the objective level, that will assist them in the instruction of content and skills contained in the Maryland State Curriculum, and enhances student learning in the classroom.

Currently available for most objectives are:

- **Clarifications:** Each clarification explains an indicator or objective to help teachers better understand the skills and concepts.
- **Lesson Plans:** The lesson plans have been juried by Maryland educators and could be used when teaching this concept.
- **Lesson Seeds:** The lesson seeds are ideas for the indicator/objective that can be used to build a lesson. Lesson seeds are not meant to be all-inclusive, nor are they substitutes for instruction.
- **Technology:** This tool suggests ways technology may be used to enhance the teaching of this concept.
- **Resources:** This tool shows resource links to websites that offer instructional resources.
- **Maryland Green School Award Projects:** This resource gives suggested outdoor activities that align with the curriculum and help move the school toward Maryland Green School status

(See Model Programs and www.marylandpublicschools.org/MSDE/programs/environment).



CAREER TECHNOLOGY EDUCATION

The Division of Career Technology and Adult Learning provides leadership to promote quality career preparation and lifelong learning for Marylanders. The division is responsible for administering and supervising all aspects of correctional education, adult education and literacy services, and career and technology education.

Maryland Career Clusters are driven by what students need to know and be able to do in order to be fully prepared for further education and careers in the 21st century global economy. Maryland is a recognized leader in successfully adapting the national Career Cluster framework to the state's economy and educational reform. Maryland business, industry, and labor leaders, under the guidance of MSDE, organized the state's Career Cluster Plan. Career Clusters are organized around ten broad career areas that reflect Maryland's key economic sectors. Opportunities for the infusion of environmental education abound in each of the Clusters.

Technology Education

In Technology Education, *Green Themes* are included in the Center to Advance the Teaching of Technology and Science (CATTS) model course guides.

- **Foundations of Technology (High School):** Students compare alternative energy sources that are currently under research, discuss changing attitudes toward fossil fuels and how those changes affect technology—specifically in cars. They also identify sources of energy used in the U.S., distinguish between fossil fuels and renewable energy, describe how energy production and consumption can impact public lands, and participate in a debate over whether to use public lands as sources of energy.
- **Technology Systems (Grade 8):** Students learn how humans have created technological systems to prevent, eliminate, or lessen threats to life and the environment and to fulfill social needs. Students identify specialized equipment and practices used to improve the production of food, fiber, fuel, and other useful products and in the care of animals. They identify trade offs between agriculture, transportation, and the environment and describe an agricultural system using the systems model.

In another lesson, they explain that the management of waste produced by technological systems is an important societal issue. They also describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. Finally, they explain how decisions to develop and use technologies often put environmental and economic concerns in direct competition with one another.

- **Invention and Innovation (Grade 7):** Students participate in a lesson entitled, *Where Does All the Trash Go?* Students cite examples of the development and use of technology posing ethical problems. They describe how various “waste materials” can be recycled, reused, or remanufactured into new products.
- **Exploring Technology (Grade 6):** Students use the engineering design process to design, construct, and test greenhouse. They explain the scientific basis for the greenhouse effect in the environment and in a contained structure. Students explain that artificial ecosystems are human-made complexes that replicate some aspects of the natural environment.



ENVIRONMENTAL, AGRICULTURE, AND NATURAL RESOURCES CLUSTER

Environmental Resource Management Programs

- Students learn how to analyze, manage, restore and protect natural resources and ecosystems, particularly those of the Chesapeake Bay.
- Students evaluate the effectiveness of current Best Management Practices.
- Students plan and design restoration projects that incorporate best management practices.
- Students identify environmental stress factors and develop methodologies to assess their impacts on the biological organisms of the Chesapeake Bay and its watershed.
- A Natural Resources and Agri-science magnet school is planned for a fall, 2010 opening at North Harford High School, Harford County Public Schools.

Construction and Development

As part of all Construction CTE Programs, students complete instructional units and projects that incorporate safety in the workplace and environmental concerns related to construction. This includes understanding the selection criteria for construction products, including environmental safety and energy conservation. As students progress into more advanced construction-related programs, such as Construction Maintenance or Heating, Ventilation, and Air Conditioning (HVAC), energy usage, efficiency and conservation are addressed.

Certified Professional Horticulture

Through the following units and specific topics addressed within the units students learn about conserving natural resources and encouraging renewed growth.

- Fertilizers
- Integrated Pest Management
- Irrigation systems
- Composting
- Plant diseases and control
- Invasive species
- Watering
- Landscape management
- Irrigation systems



ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

Advanced Placement (AP) Environmental Science gives students an opportunity to take college-level courses and exams while still in high school. Students enjoy the challenge of taking AP courses with enthusiastic classmates and teachers; high school faculty find that AP courses enhance their students' confidence and academic interest as well as their school's reputation; and college faculty report that AP students are far better prepared for serious academic work. AP Environmental Science was first offered in 1998. Since that year, the number of LEAs offering the course grew from 9 to 22. Recent data from the College Board indicates that the number of test takers (assumed to be lower than actual enrollment figures) grew from 224 students to 2629 students.

YEAR	TTL # TEST TAKERS	FEMALE	MALE
2009	3,718	2,142	1,576
2008	2,955	1,683	1,272
2007	2629	1506	1123
2006	2004	1154	850
2005	1717	977	740
2004	1359	787	572
2003	1005	601	404
2002	851	510	341
2001	673	413	260
2000	495	302	193
1999	280	171	109
1998	224	138	86



STEM EDUCATION

The Maryland State Department of Education is committed to promoting Science, Technology, Engineering, and Mathematics (STEM) education by providing a rigorous STEM experience to a broader set of students. Environmental Education contributes to the STEM initiative by arranging internship opportunities for high school students with scientists. In the 2008 - 2009 school year, 15 students in the Maryland Eastern Shore Initiative's POSSE program (Partnership of Scientists and Students For the Environment) participated in these opportunities. In the 2009 - 2010 school year, that number increased to 61 students, and the number of scientists who volunteered to mentor one or more students quadrupled. Career education and internship opportunities in engineering within environmental fields will be a featured part of further program development.

INFORMAL EDUCATION OPTIONS

STATE AGENCIES

State agencies lend their expertise to present indoor and outdoor programs to Maryland students, and technical assistance to MSDE, school systems, and schools.

Maryland Department of the Environment

The Maryland Department of the Environment (MDE) and MSDE and other partners have teamed to develop lesson plans related to climate change effects on Maryland; restoration of mining sites; a Clean Air curriculum; and lead paint poisoning. On the Air: Exploring Air Pollution Sources and Solutions (Clean Air Partners) is an interactive curriculum and kit that engages young people in the exploration of their environment as they study important air pollution topics such as Criteria Air Pollutants; Ozone; the Air Quality Index; Particulate Matter; Our Lungs, Our Air, Our Health; and Exploring Air Pollution Solutions and Climate Change. The lessons can be found at www.cleanairpartners.net/EducationOverview.cfm.

MDE, MSDE, Johns Hopkins University Bloomberg School of Public Health, and Maryland Public Television teamed to produce *Environmental Health Connections* which can be found on MPT's education website at www.thinkport.org/classroom/connections/default.tp. *EnviroHealth Connections* empowers teachers and students to explore the relationships between the environment and human health.

MDE's *Mining In Maryland* program has developed a series of lessons for High School and Middle School students that teach students about the mining industry focusing on reclaiming the land. These lessons can be found at www.mde.state.md.us/Programs/WaterPrograms/MiningInMaryland/outreach/lessonplans.asp.





Where Do We Grow from Here? has been incorporated into the high school American Government course as well as high school Environmental Science. Lessons are added periodically to keep up with the changing issues facing Maryland. Each summer, teachers who participate in the Governor's Academy for American Government are trained in the use of the lessons and materials.

Maryland Public Television Partnership

Maryland Public Television, in conjunction with the Johns Hopkins Bloomberg School of Public Health and MSDE, has produced a collection of interactives and lessons around the theme of Environmental Health. The *Enviromysteries* series consists of three middle level teaching units related to water quality and health, asthma and mold, and risk/benefit analysis. Through intriguing videos and web interactives, supported by clear print and online materials, middle grade teachers can help their students become detectives investigating the connection between where we live and how we feel. The program and partnership will expand through the acquisition of a grant to Maryland Public Television to develop *Changing the Balance: Digital Assets Investigating Climate Change (CtB)*, a bundle of learning objects that look at the ways human activities affect climate change and how climate change affects the biosphere.

In addition to producing these discrete, portable assets, MPT will also create an instructional framework that incorporates these assets in a storyline focused on present-day investigations into these topics. Accompanying teacher materials will assist teachers in using each of the assets in a pedagogically appropriate manner to look at a myriad of climate- and science-related topics. Understanding the impact of human activities on climate was identified in Corporation for Public Broadcasting's (CPB) request for proposals

as a target of difficulty for students and teachers. By extending that concept to look at the effects of climate change on the biosphere, these assets can amplify student's appreciation of climate change, showing that there are enormous environmental consequences of our actions. MPT will build on a decade of experience in digital development to create highly effective products that will be extremely useful to a wide variety of teachers.

A second grant will permit the expansion of the acclaimed Bayville site to include a portal to *Fieldscope*, a data collection project sponsored in partnership with National Geographic. Students will be able to upload their Maryland stream data to *Fieldscope* and then use the state database to investigate local and statewide aquatic issues.

Scientific Institutions & Student Research

LEAs and MSDE are working with scientific organizations to provide teacher professional development and internships as well as student internship opportunities. Programs with the University of Maryland Center for Environmental Science, the Oxford Cooperative Laboratory, NASA Goddard, NOAA, the Johns Hopkins Bloomberg School of Public Health, and the National Science Foundation are among the providers of these high quality experiences. As mentioned under STEM programs, students in the Maryland Eastern Shore Initiative researched White-Nose Bat Syndrome, participated in the Governor's *Oyster Restoration Project*, studied the effect of marine noise on cetacean behavior, and surveyed survival rates of Bay grasses. Students present their results to scientists, community members and the public at a spring Student Summit.

State-Aided Institutions

Under Senate Bill 794, the Maryland State Department of Education provides annual grants to nonprofit organizations that provide enriching educational programs that cannot be replicated in the classroom for Maryland students and teachers. Collectively these programs are known as the State Aided Educational Institutions Program (SAIs). The organizations provide engaging, hands-on, experiential learning opportunities that support the State's education goals and priorities as described in Achievement Matters Most Program Overview. Funds are used to reduce or eliminate fees so all students, especially those who attend Title I schools, are able to participate in the programs.

Each organization receiving SAI funds and any newly-interested nonprofit organizations must complete the application process annually. Programs must provide a variety of documentation to ensure safety and fiscal and programmatic viability. In addition, programs must provide direct services for students and teachers, and address State Department educational priorities. Among the currently (FY11) funded SAIs, fifteen (15) provide students with opportunities to interact with, and gain an appreciation of, nature.

SAI funding helps provide a variety of environmental programs administered by the following organizations:

- Alice Ferguson Foundation, Inc.
- Chesapeake Bay Foundation
- Chesapeake Maritime Museum
- Echo Hill Outdoor School
- Historic Sotterley Foundation
- Living Classrooms Foundation
- Maryland Academy of Science/Maryland Science Center
- Maryland Mathematics, Engineering, Science Achievement (MESA)
- Maryland Zoo in Baltimore
- National Aquarium in Baltimore
- NorthBay Environmental Education Center
- Outward Bound/Parks and People Association
- The Salisbury Zoo Commission
- Sultana Projects, Inc.
- The Ward Museum of Wildfowl Art

A list of the 38 currently funded programs with descriptions along with a sample SAI grant application are available online at www.marylandpublicschools.org.



Governor’s Climate Change Commission Public Education and Outreach

The Maryland Climate Action Plan recommended that the state build upon current educational efforts and action campaigns of state agencies, utilities and nonprofit organizations to combine efforts to reach diverse audiences, as well as to assure the dissemination of scientifically based information. MSDE and MDE co-chaired the Mitigation Workgroup’s Education and Outreach subcommittee of the Governor’s Climate Change Commission.

Summary of Activities

Goal 1: Develop Maryland-specific lessons on climate change, energy conservation, and energy efficiency aligned with the State Curriculum and Core Learning Goals, and integrate into the K-12 curriculum.

Accomplishments

- Identified appropriate Climate Change Literacy resources to use in instruction.
- Expanded the MSDE Environmental Education Climate Change Resource page to include lessons designated for appropriate grade levels.
- Reviewed, aligned and posted a link to Clean Air Partners On the Air lessons.
- Partnered with Maryland Public Television in “Changing the Balance: A Case Study in Climate Change” grant.
- Linked to Maryland-specific lessons developed by Maryland Department of Natural Resources.
- Presented the PreK-12 Climate Change Pledge to Local Superintendents.
- Supported efforts of the Sustainable Chesapeake Program at The Conservation Fund, in partnership with National Geographic, to apply for, and obtain, funding of \$10,000 to produce a map illustrating the issue of climate change in Maryland. MSDE partner with CSSPAR in the development the content and distribution of the map to all school systems.

MSDE Climate Change Education Website

The Maryland State Department of Education Environmental Education website hosts a Climate Change Education resource page and classroom toolkit. Lessons, websites, and unit plans for all appropriate grade levels are included on the site. MSDE incorporated language from the national Climate Literacy Standards into the draft Maryland State Environmental Literacy Curriculum. These standards represent what an environmentally literate Maryland high school graduate will know about climate and climate change, as well as describe the analysis and decision-making skills involved in the investigation of environmental issues.

The Climate Literacy Standards were developed in April, 2007 as a part of a national workshop entitled *Climate Literacy: Using the AAAS project 2061 Science Literacy Research to Develop Weather and Climate Literacy*. Lead agencies included the National Oceanic and Atmospheric Administration (NOAA) Office of Education (U.S. Department of Commerce) and the American Association for the Advancement of Science (AAAS). Sponsors included NASA Goddard Space Flight Center and the U.S. Climate Change Science Program’s Communications Interagency Working Group. Input on the standards was garnered from more than 100 members of the education and climate science communities. The Climate Literacy Standards define climate literacy as (one who) “understands the influence of climate on you and society and your influence on climate.”

Reference: *Climate Literacy: Essential Principles and Fundamental Concepts, 2007, NOAA, AAAS Project 2061.*

Maryland Climate Action Plan’s three major tasks:

- **Climate Change Awareness and Energy Efficiency Education for Maryland Residents and Institutions**
- **Maryland –Specific Climate Change Curricula and Energy Efficiency in Schools**
- **Media Coordination**

Suggested activities including:

- *Clean Air Partners’ On the Air curriculum, which includes a unit on climate change.*
- *Coordination with the EmPOWER Maryland Clean Energy School Program*
- *Develop professional development workshops online and onsite for educators*

Maryland-Specific Lessons

A series of lessons, developed through the Maryland Department of Natural Resources, helps students study coastal hazards and how shoreline changes impact people and the natural environment. The Maryland Coastal Hazards Lessons are grouped into six units: Coastal Hazards, Coastal Processes, Weather, Sea Level Rise, Biological Community, and Human Activities and can be found at shorelines.dnr.state.md.us/k_12.asp.

Clean Air Partners' *On the Air* Lessons

MSDE worked with the Clean Air Partners and MDE to align the Clean Air Partners *On the Air* activities with the Maryland State Curriculum. For more than 10 years, Clean Air Partners has strived to improve public health and the environment by working with businesses, organizations and individuals throughout the region to raise awareness and reduce air pollution through voluntary actions. Clean Air Partners developed *On the Air*, an interactive teaching kit that engages students in the exploration of their environment as they study important air pollution topics such as: Criteria Air Pollutants, the Air Quality Index, Ozone, Particulate Matter, Our Lungs and Health, Community Sources and Solutions, and Climate Change.

The *On the Air* kit includes lessons that are tied to, and cross referenced, to the required curriculum and the state's education standards. The kit includes hands-on activities, labs, and investigations designed to develop critical thinking skills. The lessons come complete with background information, student worksheets, teaching props, and visual aids. The *On the Air* curriculum and kit, developed specifically for sixth grade students in Washington D.C., Virginia and Maryland, are available to public and private schools located within the jurisdictions of the Metropolitan Washington Council of Governments and the Baltimore Metropolitan Council. *On the Air* has been presented to more than 1,400 students in the metropolitan Washington-Baltimore region.

Text courtesy of Clean Air Partners
www.cleanairpartners.net/onTheAir.cfm

MPT: *Changing the Balance: A Case Study in Climate Change*

Maryland Public Television (MPT), in partnership with MSDE, received a grant from the Corporation for Public Broadcasting (CPB) to develop *Changing the Balance: Digital Assets Investigating Climate Change (CtB)*, a bundle of learning objects that look at the ways human activities affect climate change and how climate change affects the biosphere. In addition to producing these discrete, portable assets, MPT will also create an instructional framework that incorporates these assets in a storyline focused on present-day investigations into these topics. Accompanying teacher materials will assist teachers in using each of the assets in a pedagogically appropriate manner to look at a myriad of climate- and science-related topics.

Understanding the impact of human activities on climate was identified in CPB's request for proposals as a target of difficulty for students and teachers. By extending that concept to look at the effects of climate change on the biosphere, these assets can amplify student's appreciation of climate change, showing that there are enormous environmental consequences of our actions. MPT will build on a decade of experience in digital development to create highly effective products that will be extremely useful to a wide variety of teachers. Materials developed through the project will meet middle grade national and state standards in climatology, earth and space science, life science, ecology, and environmental science. MPT expects to complete the project in spring 2010.





A climate-literate person:

- Understands the essential principles and fundamental concepts about the functioning of weather and climate and how they relate to variations in the air, water, land, life and human activities both in time and space;
- Can communicate about the climate and climate change in a meaningful way; and
- Is able to make scientifically informed and responsible decisions regarding the climate.

MPT will produce, within an instructional framework, digital assets such as:

- Flash interactives, including:
 - Students exploring the greenhouse effect of gasses in the atmosphere by experimenting with the levels of radiation emanating from the Sun and being captured and reradiated by the Earth.
 - Animation that allows students to look at the way carbon dioxide and other greenhouse gases behave on a molecular level.
 - Students interacting with graphs from different continents or areas, recording recent rising temperature data in each area or continent.
- A slide show detailing the carbon cycle, following this bio-geochemical sequence by examining carbon reservoirs (plants, biosphere, oceans, and sediment) and how carbon is exchanged among them and the atmosphere.
- An audio podcast of how climate change might affect the spread of vector-borne diseases such as malaria, dengue fever, African sleeping sickness (Trypanosomiasis), yellow fever, and Lyme disease.

Text courtesy of Maryland Public Television

The Governor's Regional Environmental Education Network (GREENet)

The Governor's Regional Environmental Education Network (GREENet) was created in Fall 2008 to serve as a communications tool for formal educators, informal environmental educators, nonprofits, community groups, state agencies, and others interested in and engaged in environmental education.

GREENet is a networking partnership that provides a forum to bring high-quality environmental education opportunities to network participants, teachers, students and to all Maryland's citizens. GREENet committees are dedicated to the open sharing of information and resources, coordination of efforts, and mutual support to encourage environmental knowledge and stewardship. The GREENet program, described in the report of the Governor's Commission on Climate Change, serves as the nucleus for the establishment of the statewide education plan.

The purpose of GREENet is to provide a formal structure through which these diverse stakeholders can accomplish their organizations' goals and objectives while pooling talents, leveraging resources, and sharing knowledge with like-minded partners in a larger, more focused way. The structure is patterned after the organizational framework for *Environmental*, a county-wide committee currently at work in Harford County.

A representative in each of Maryland's jurisdiction was identified as the nucleus for the establishment of a local GREENet group. These nuclear groups identify potential jurisdictional members, issue invitations to meet, and establish and maintain the local GREENet group. The Maryland State Department of Education's



Environmental Education Office provides the organizing framework for the jurisdictional groups and coordinates communication among groups online at <http://mdinformee.ning.com>.

GREENet groups plan activities within their county, with others in their geographic region or with others involved with a similar issue. For example, the Lower Eastern Shore may meet together as a geographic region on a particular issue. Likewise, the counties in the Potomac Watershed could meet together. Fluidity across jurisdictional boundaries allows for flexible groupings as situations warrant.

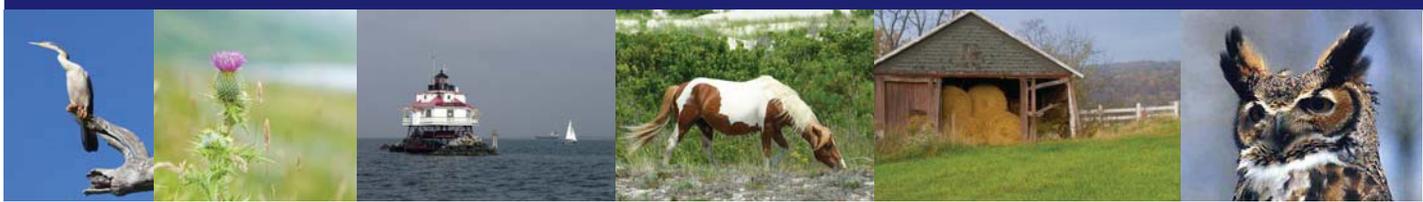
The statewide structure began with the organization of environmental efforts within the PreK-12 community. Invitations will be extended to other forums, such as the faith community, business community, nonprofits and other institutions. Together, representatives of these groups form the nucleus of a statewide Environmental Education system for not only the PreK-12 community, but for all institutions around the State.

GREENet Summary of Activities

- Site developed and posted November 2008.
- Statewide PreK-12 groups formed.
- Representative identified for each county/region.
- More than 200 organizations have joined.

GREENet Next Steps

- Linking GREENet to other networks.
- Recruiting new members & organizations.
- Seek funding to develop an interactive map of schools and environmental education partners.



MODEL PROGRAMS

IDENTIFICATION OF MODEL OUTDOOR FIELD AND SERVICE-LEARNING EXPERIENCES THAT CAN BE INTEGRATED INTO THE REGULAR SCHOOL CURRICULUM

In order to develop environmental literacy, students must be exposed to a variety of experiences as part of the regular curriculum and engage in multiple opportunities throughout their school years. Maryland offers several unique models of programming. Experiences may be sponsored by the local school system, MSDE, an informal education provider or other partner. Programs may be day programs or residential programs lasting from two days to two weeks. Programs are implemented across a grade level, thus providing all students with an experience. Some programs are offered during the school year; other programs are run after school or during the summer.

Because each school setting is unique, a number of possible environmental education models have emerged around the state. In addition, the focus on STEM (Science, Technology, Engineering & Math),

technology literacy, and the environmental challenges unique to Maryland have molded program offering and structures.

Maryland's Model Program lineup includes:

- School System Curricular Programs
- Maryland Green School Award Program
- Outdoor Environmental Education Centers
- Student Service-Learning
- Governor's Regional Environmental Education Network (GREENet)
- District Partnerships and Publications: Feet Wet, Hands Dirty, Volumes I and II (Blurb.com)
- Maryland Summer Centers for Gifted and Talented Students





School System Curricular Programs

The list below summarizes the categories of model programs as identified by Maryland School System Environmental Education Coordinators as of January 2010. Links to specific model programs are available through the MSDE Environmental Education website at www.marylandpublicschools.org/MSDE/programs/environment/meep.htm.

- System-wide Programs that integrate facilities operations and maintenance with curriculum and instruction.
- System-wide Teaching of Environmental Education within the regular curriculum including an annual meaningful outdoor experience
- Residential Experiences at School System Outdoor and Environmental Education Centers
- Integration with STEM (Science, Technology, Engineering Mathematics)
- Integration with Character Education
- Signature and Magnet Programs
- Extended Day Experiences

MARYLAND GREEN SCHOOL AWARD PROGRAM

The Maryland Green School Awards Program, sponsored by the Maryland Association for Environmental and Outdoor Education (MAEOE) (www.maeoe.org) recognizes Maryland public and private PreK–12 schools that:

- Use their school site and curricular instruction to prepare students to understand and act on current and future environmental challenges facing all Marylanders;
- Align instruction with the Maryland State Curriculum;
- Model environmental best management practices in building and landscape design, operations and maintenance; and
- Build and maintain partnerships with the local community to enhance environmental learning and to design and implement projects and programs that result in a healthier environment.

2010 MARYLAND GREEN SCHOOL AWARDS – ANOTHER RECORD BREAKING YEAR

On June 4th, 2010 at Sandy Point State Park, the Maryland Association for Environmental and Outdoor Education (MAEOE) will publicly recognize, honor, and certify the 12th cohort of Maryland Green Schools and Maryland Green Centers. Seventy-seven (77) schools and five (5) centers this will be receiving the award for the first time; nineteen (19) schools will receive the award as a recertification after four or more years; and for the first time in the program's history, four (4) schools, that have maintained their Maryland Green School Status for 16 years will be honored as Model Green Schools.

“Interest and participation in the Maryland Green School Program has hit critical mass. With seventy-six newly certified schools in 2010, the percentage of certified Maryland Green Schools jumps from 10% to 16% of all Maryland schools (public and private). Such significant growth represents a true paradigm shift.” states MAEOE Executive Director, Bronwyn Mitchell.

The schools and centers receiving the 2010 Maryland Green School Award have created a culture of learning at the school and in their community. Using the Maryland Green School framework, which includes teacher training, curricular integration, student-led environmental best management projects, community engagement and celebration; these schools have figured out that “green” learning is more than just a few environmentally friendly projects. Ryan Pleune, the Maryland Green Schools coordinator who has worked in education for ten years explains: “What is clear to me about learning and student achievement is that students especially students who are struggling must feel an urgent need to learn something before they will go through the hard work of learning it. The Maryland Green Schools Program provides a map for schools and their stakeholders to develop a culture of learning that is compelling and creates a desire to learn.”

Since 1999:

- Over 300 public and private schools around the state have been honored as Maryland Green Schools as of 2009. To date, 16% of all Maryland Schools are Certified Maryland Green Schools
- 21 regional and local environmental education and outdoor centers have been recognized as Maryland Green Center.
- 124,500 students in all grade levels have participated in Maryland Green School activities.
- Over 10,450 teachers have been involved in Maryland Green School workshops, activities and school-based project.

Every Maryland school can adopt sustainable operations and be recognized as a Maryland Green School by using an integrated approach to environmental education through the Maryland State Curriculum. Maryland Green Schools also model school-based programs that involve community partnerships and may involve Student Service-Learning. Nature centers and organizations that model environmental best management practices, support environmental education, promote the Maryland Green School model, and provide assistance to potential and existing Maryland Green Schools may apply for recognition as a Maryland Green Center.

Local and national research and several anecdotal reports underscore the important benefits that schools gain through participation in this type of program:

- Increased student achievement in science, social studies, and reading;
- Increased student attendance rates;
- Decreased number of disciplinary referrals;
- Increase in teacher job satisfaction;
- Increase in community participation at the school; and
- Increase in use of school properties as highly visible models of environmental best practices.

MAEOE provides professional development opportunities for educators. *How to Become a Maryland Green School, How to do a Schoolyard Habitat* project and other relevant workshops are provided along with help in planning Maryland Green School activities. Opportunities are posted online at www.maeoe.org.

OUTDOOR ENVIRONMENTAL EDUCATION CENTERS

Many Maryland students, as part of the regular curriculum, enjoy the benefits of participating in environmental education through outdoor environmental education centers. Eight centers are owned and operated by school systems and others are owned by private organizations that have close partnerships with the school system. Students in school systems with these facilities visit the site for 3-5 day overnight stays to experience environmental education in a hands-on, outdoor setting. The centers can also provide residential experiences as well as day programs for students of many age levels.

An outdoor center experience should not be considered to be the entire environmental education program in a school system. Students should learn through regular curriculum experiences, day programs, school-based projects, offsite projects and sites as well as residential centers and summer and after-school programs.

The centers provide a grade-level, systematic outdoor experience for more than 80,000 students each year. The character and program of each center reflects the curriculum of the local school system. Activities are developed that take full advantage of the local environment.

STUDENT SERVICE-LEARNING

In addition to course requirements, Maryland students are required to earn 75 hours of Student Service-Learning credit to graduate from a Maryland high school. Many service-learning projects involve environmental restoration, awareness and/or civic action. The environmentally based Service-Learning projects have been planned in conjunction with the

Environmental Education coordinators in LEAs to design an experience that meets classroom, outdoor experience and Service-Learning requirements as part of the regular curriculum.

Currently, the Maryland Student Service-Learning Office at MSDE reports that their federal Learn and Serve America grant provided funding needed to implement 17 grade-level systematic environmental stewardship projects for 390,000 students in the 2009-2010 school year.

Maryland public school students K-12 carry out a number of environmental service-learning experiences around the state. The Maryland State Department of Education actively works to foster high quality environmental service-learning experiences in a variety of ways.

MSDE awarded 3-year funding to seventeen local school systems in 2009-2010 through the federal Learn and Serve America program. LEAs were required to emphasize environmental service-learning experiences as a stipulation of these subgrants. Many outstanding environmental service-learning projects were initiated or sustained through the six years of the grant program, including examples such as:

- Allegany County students assisting with the Beautify Cumberland project and doing a clean up in partnership with Rocky Gap State Park.
- Anne Arundel County schools engaging in Bay clean up and preservation projects.
- Caroline County student historic mill preservation and restoration project which included cleaning up the grounds at the site.



- Cecil County students working with North Bay on a variety of service-learning environmental projects.
- Carroll County students working on the American Chestnut Tree Restoration Project.
- Talbot County students working on Bay grass restoration projects.

In the summer of 2009, Service-Learning fellows and teachers met to develop appropriate Service-Learning units for Special Education students. Among these units are 4 environmental projects:

- *Going Green, Staying Green*
- *School Wide Recycling Project*
- *GERM- Creating a Healthy Environment*
- *Once Lost and Now Found*

These units are available on the Service-Learning website at www.mdservice-learning.org. The site features and stores examples of high quality service-learning projects which can be replicated throughout the state. Many of these projects have an environmental focus. These projects are presented in a format which shows how they meet all seven Maryland's Best Practices for Service-Learning, including how the project meets existing curricular goals and objectives.

The Sherry Unger Awards

An MSDE-sponsored program named after a long-time Fellow and friend of service-learning who passed away in June 2002. Ms. Unger's enthusiasm for engaging students in meaningful service to their communities was infectious, and she launched exciting new initiatives in her county to strengthen the service-learning program. Awards are given to model projects which have been offered at one of Maryland's public schools.

Each April, the service-learning website highlights three outstanding Sherry Unger Award-Winning environmental service-learning projects to promote school engagement in Maryland's Environmental Education Month and Earth Day activities. The website also provides free downloads of model service-learning projects designed to strongly link to the Maryland State Curriculum, two of which have an environmental focus: *Native Species Restoration*



and *Reducing Energy Consumption*. MSDE invites environmental community-based organizations to present at, and participate in, MSDE meetings and events to promote environmental service-learning projects and provide technical assistance to school systems.

SHERRY UNGER AWARD-WINNING PROGRAMS

- **Let's Beautify Cumberland and Rocky Gap [Allegany]**
- **Historical Chesapeake City [Cecil]**
- **Demonstration BayScape Garden [Baltimore County]**
- **Service-Learning through Environmental Education [Talbot]**
- **Marvelous Meadow Project [St. Mary's]**
- **Chesapeake Connections Environmental Outreach Program [Anne Arundel]**
- **Reforestation Project [St. Mary's]**
- **Trees for the Environment [Carroll]**
- **Rain Garden [Baltimore County]**
- **The Bayscape Garden [Charles]**
- **Wood Duck Nesting Boxes [Queen Anne's]**
- **Bay Grasses in Classes [Harford]**
- **Environmental Clean-up Day [Montgomery]**
- **Collington Square Memorial Garden Gazebo [Baltimore City]**
- **The Wetlands [Charles]**
- **Schoolyard Habitat Genesis [Dorchester]**
- **Bringing Back the Eastern Oyster [Calvert]**
- **Shafer Park Millennium Makeover [Washington]**

GOVERNOR'S REGIONAL ENVIRONMENTAL EDUCATION NETWORK (GREENet)

GREENet is a networking partnership that provides a forum to bring high-quality environmental education opportunities to teachers, students and to all Maryland's citizens. GREENet committees are dedicated to sharing information and resources, coordinating efforts, and providing mutual support to encourage environmental knowledge and stewardship. The GREENet program, described in the report of the Governor's Commission on Climate Change, serves as the nucleus for the establishment of a statewide education plan, encompassing formal education as well as public education.

The purpose of GREENet is to provide a formal structure through which these diverse stakeholders can accomplish their organizations' goals and objectives while pooling talents, leveraging resources, and sharing knowledge with like-minded partners in a larger, more focused way. The structure is patterned after the organizational framework for Environmental Education, the county-wide committee currently at work in Harford County.

Maryland's PreK-12 Environmental Education program is one of many statewide institutions organizing under GREENet. Invitations are extended to other forums, such as the faith community, business community, nonprofits and other institutions. Together, representatives of these groups form the nucleus of a statewide Environmental Education system for not only the PreK-12 community, but for all institutions around the State.

The statewide structure begins with the organization of environmental efforts within the PreK-12 community. A representative in each

jurisdiction serves as the nucleus for the establishment of a GREENet group. These nuclear groups work with the PreK-12 educators to identify potential jurisdictional members, issue invitations to meet, and establish and maintain the GREENet group. The state of Maryland presents this organizing framework for jurisdictional groups and coordinates communication among groups statewide via website <http://mdinformee.ning.com/>.

GREENet groups meet to plan activities within their county, with others in their geographic region or with others involved with a similar issue. For example, groups may arrange themselves by geographic region, such as the Lower Eastern Shore, by watershed, or by common issue.

DISTRICT PARTNERSHIP PROGRAMS AND PUBLICATIONS

Schools and school systems are currently involved in projects with numerous community groups, higher education, local government, state agencies and nonprofit organizations. Some of the most successful partnerships are presented through the publication of three major volumes that feature model programs and best practices.

Conserving and Enhancing the Natural Environment on New and Existing School Sites, (MSDE, 1999) provides models of school facilities and school grounds development maintenance. The guide, available online at www.maeoe.org, includes sections on how to do forest, meadow and wetland projects on school grounds. In addition, *Feet Wet, Hands Dirty: Environmental Projects in Maryland Public Schools*, (MSDE, 2007) and *Feet Wet, Hands Dirty Volume II: Environmental Education Projects in Maryland Middle and High Schools*, (MSDE, 2008) showcase a variety of model environmental projects undertaken by Maryland students as part of their regular curriculum. A preview of the books is available at www.marylandpublicschools.org/MSDE/programs/environment and copies are available from www.blurb.com.



Maryland Summer Centers for Gifted and Talented Students

The Maryland Summer Centers program has been a 42-year commitment at the state level to provide summer educational opportunities to Maryland's gifted and talented students.

The Maryland Summer Centers program, in partnership with public and non-public agencies, provides Maryland's diverse gifted and talented student population with advanced, rigorous, experiential learning opportunities that nurture these students' talents and abilities within unique learning environments.

The interaction of Maryland Summer Centers students with experts, using the tools, techniques, and technology of professionals in a given field is a life-changing experience that inspires students to develop intense interests and possible career pursuits. Students' use of creative and critical thinking and problem-solving to confront real-world challenges results in gratifying personal growth and increased awareness of personal and civic responsibility. While opportunities in many disciplines are offered, the following environmental science programs were offered to students in the summer of 2009.

Funding for the 2010 summer was lost due to budget constraints. However, sponsorship for each center is being sought. For further details go to www.marylandpublicschools.org/summercenters.

Maryland Summer Centers

- **Center for Conservation Research – Harford County Public Schools**
- **Center for Aquatic Research – Calvert County Public Schools**
- **Center for Environmental Science at Horn Point – Wicomico County Schools**
- **Center for History and Science aboard Sultana – Sultana Projects, Inc.**
- **Center for Environmental and Historical Research on the Lower Eastern Shore – Wicomico County Public Schools**
- **Center for the Physics of Solar and Wind Power – Frostburg State University**
- **Center for Environmental Conservation and Historical Preservation – Washington County Public Schools**





SCHOOL FACILITIES & CONSTRUCTION

GREENING SCHOOL FACILITIES & GROUNDS

The Maryland State Department of Education, Division of Business Services, School Facilities Branch is responsible for providing leadership and technical assistance to Maryland's 24 school systems regarding long-range facility planning; capital improvement program development; educational specifications; and the design, construction, and maintenance of school facilities. The School Facilities Branch administers the review and approval of locally funded school construction projects and leases by the State Superintendent of Schools.



The branch is also responsible for developing guidelines and standards for the planning, construction, and maintenance of school facilities. In addition, the branch reviews the facilities sections of each school systems' Bridge to Excellence Master Plan and Annual Update; and assists with the development of capital projects for MSDE.

The School Facilities Branch is a part of the Interagency Committee on Public School Construction (IAC/PSCP), a multi-agency program established under the Board of Public Works to provide State funding for school construction. The IAC includes the State Superintendent of Schools, who serves as Chair; the Secretary of the Maryland Department of General Services; the Secretary of the Maryland Department of Planning; and appointees of both the President of the Maryland Senate and the Speaker of the Maryland House of Delegates.

MSDE facilities planning guidelines are available to school systems in the planning and design of school facilities. Guidelines related to the environment include:

- Indoor Air Quality (IAQ) management plans and technical bulletins, 1987-97
- Science Facilities Design Guidelines, 1994
- Technology Education Facilities Guidelines, 1994
- Conserving and Enhancing the Natural Environment, 1999
- Facilities Guidelines for Fine Arts Programs, 2001
- Classroom Acoustic Guidelines, 2006



Evergreen Elementary School, Maryland's most recent LEED Gold school, is featured on the cover of the 2009 MGBC annual report.

In April 2008, the Maryland High Performance Buildings Act was passed which requires that any new or renovated State building and new State-funded public schools entering design after July 1, 2009 must meet or exceed U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver rating. LEED for Schools criteria include:

- Sustainable sites
- Water Efficiency
- Indoor Environmental Quality
- Energy & Atmosphere
- Innovation & Design Process
- Materials & Resources

School-based Natural Environment Projects

- **Native plantings & gardens**
- **Rain gardens & wetlands**
- **Structures (Seating, work surfaces, wildlife viewing blinds, buildings, storage, amphitheaters)**
- **Habitat Components (Logs, snags, brush piles, water, nesting boxes, feeders)**
- **Courtyards**
- **Forest, meadows, trails**
- **No-mow zones**

Conserving and Enhancing the Natural Environment provides directions for designing and developing schoolyard habitats and outdoor classrooms to be incorporated into the planning, design, construction, and maintenance on new and existing school sites. Policies and guidelines for school indoor and outdoor safety address:

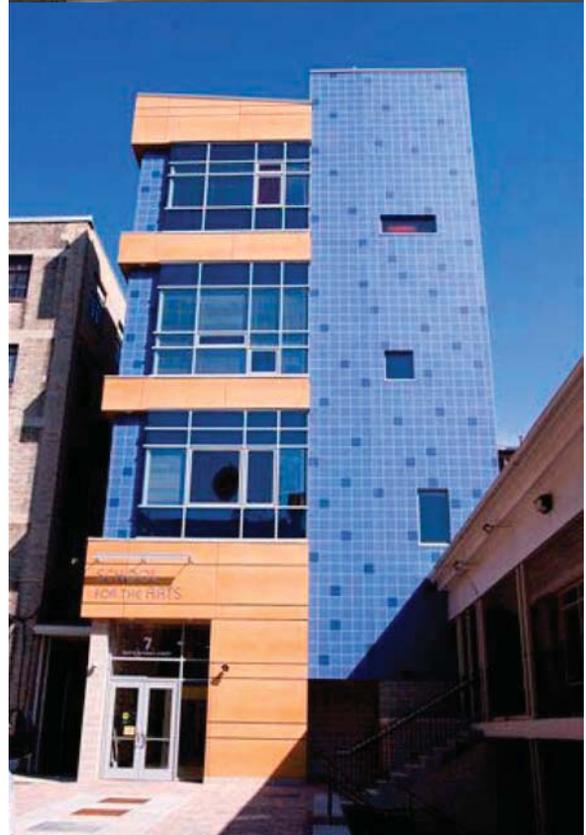
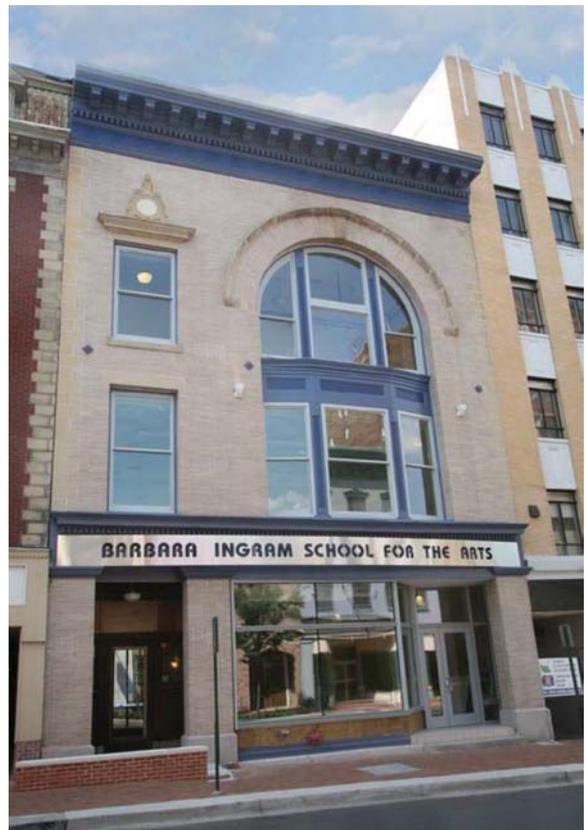
- Indoor air contaminants
- Control methods & investigations
- IAQ management plans
- Integrated Pest Management policy
- Surveys – Lead in water 2004, Mercury in schools 2002, IEQ in portable classrooms 2006
- Technical Bulletins – HVAC, kilns, copiers, welding, carpets, air flow, relative humidity, carbon dioxide, actions during renovations and construction, filters.

Use of these schoolyard habitats and outdoor classrooms is included within the Maryland Association for Environmental and Outdoor Education (MAEOE) guidelines for schools to earn a Maryland Green School Award. High performance building initiatives underway in Maryland public school systems include:

- Human element, behavioral modifications, training
- Conserving natural resources – energy, water
- Improved practices
- Energy procurement strategies
- Preventive maintenance programs
- Alternative energy sources – geothermal
- High performance design with and without LEED certification
- Innovations in policies, programs, regulations, guidelines

Energy Conservation and Efficiency in Our Schools Committee

The Energy Conservation and Efficiency in Our School Committee was formed under the direction of Senator Thomas Middleton and Senator Katherine Klausmeier and the Maryland Energy Administration in 2008. The committee's purpose is to coordinate the EmPOWER Maryland Clean Energy School Program with the instructional program in the school. Partners include the Public Service Commission, MSDE, members of the General Assembly, and the utility companies serving Maryland. A grant program to school systems required that facilities managers work with administrators, teachers and students to develop and implement an action plan to power down their building. Students are taught to do building energy audits, then are assisted in creating an operational energy reduction plan for their school building. Schools in Cecil County, for example, reduced energy consumption by 33% or more in just four months and saved \$1,000,000 in their first year.



Barbara Ingram School for the Arts
Washington County Public Schools
Hagerstown, MD

High Performance Building Initiatives in Maryland Public Schools

Energy Conservation, Alternative Energy Sources, and High Performance Building Practices

Executive Summary

Across Maryland, a culture of innovation in the design and construction of school facilities has taken root under a variety of names: “high performance schools,” “green architecture,” “sustainable design.” There are a variety of high performance initiatives, from energy conservation resulting from behavior changes, through use of alternative sources of energy, to enhanced daylighting. The majority of school systems are actively promoting a culture of conservation and energy awareness among teachers, staff, and the students themselves. Design innovations that have an impact on the environment include the use of materials with recycled content or made from renewable sources, materials that have low levels of “embedded” energy (the energy expended in the production, transportation, and installation of the material), and geothermal ground source heating and cooling systems. In the construction phase, increasing attention is being paid to protecting soils, recycling waste materials, mitigation of downstream and downwind site impacts from stormwater run-off, and sequencing the work to improve the indoor air quality of the building when it is occupied. Thirteen school systems have a total of 43 LEED (Leadership in Energy and Environmental Design) certification school facilities in various stages of planning, design, construction and occupancy, and as a result of the High Performance Building Act of 2008, all new schools are required to achieve a certification of LEED Silver or equivalent (see *Maryland Certified High Performance Schools*).

These innovations reflect a growing national and international recognition of the importance that facilities of all types play in energy consumption and environmental quality. Approximately 40% of the world’s total energy consumption is generated through the construction and operation of buildings, and buildings are heavily implicated as well in the production of greenhouse gases and other forms of pollution. With approximately 125,000,000 square

feet of building space in Maryland being used for schools, any significant improvement in the energy and environmental characteristics of school buildings, including their location and how they are sited, will make contributions in these areas. As public buildings that are prominent in the life of communities, schools can serve as models of good environmental stewardship, not only for the adults who visit them, but especially for the young people whose attitudes are being formed through education and through exposure to the actions of their elders. Moreover, there is increased recognition of the relation between the quality of a school facility and learning: while the teacher is always the most important factor in a child’s education, good schools can support the teacher’s difficult mission by providing facilities that are healthy and inspiring, and in some cases they can serve as teaching tools related to the science, math, environmental, and social studies curricula.

High performance schools are becoming increasingly attractive to local governments because they are more efficient and cost effective than conventional school facilities over the life span of the building. In 2003, it was reported that a premium of between 1.6 and 2.4 percent above conventional costs was required to achieve LEED Silver certification. It is anticipated that

as high performance expectations and expertise permeate the world of developers, architects, and constructors, the cost for high performance facilities will converge with the cost of conventional construction. Concurrently, as energy costs rise, the pay-back period for the energy-related first costs in a LEED school becomes increasingly shortened. For example, while it is now

estimated that the pay-back period for a geothermal ground source heat pump system is approximately seven years, first costs for geothermal systems have dropped so rapidly in the lower Eastern Shore since 2006 that savings are reported to accrue as soon as the

There are currently a total of 43 schools, including three renovation projects, that have attained or are seeking LEED certification: 27 are in various phases of planning, nine are under construction, and seven are completed or occupied.

systems are put into operation. This striking reduction of costs is thought to be entirely attributable to the contractors' increasing familiarity with the system rather than to changes in the technology. Many high performance technologies, including geothermal systems, have become more reliable in the last decade. High performance buildings also achieve significant reductions in water usage, an issue of heightened concern as water supply becomes the major factor that limits new development in some parts of Maryland. Sustainable sites, defined as school sites that reduce vehicle miles traveled (VMT), support neighborhood connectivity, and promote the health of communities and the environment, also reduce both energy consumption and the carbon footprint of the building over their life cycles. Other types of benefits that result from these innovations, including health improvements for building occupants, enhancement of educational achievement for students, and increased productivity and retention of staff, are real but are difficult to translate into financial terms.

The State Role: Policies and Practices

Through the policies and practices of the Interagency Committee on School Construction (IAC) and other agencies, the State of Maryland supports local efforts to achieve high performance schools:

- **The High Performance Buildings Act of 2008** (Chapter 124, Maryland Laws of 2008; Senate Bill 208 / House Bill 376). Passed in the 2008 session of the General Assembly, this legislation requires that all new schools for which the architectural/engineering proposal is issued after July 1, 2009 must achieve a rating of LEED Silver or equivalent from a nationally recognized accreditation entity. The State will pay for 50% of the additional local costs for fiscal years 2010 through 2014; the IAC has determined that the additional local costs will be calculated at 2% of the combined building and site costs of the project. There are currently a total of 43 schools, including three renovation projects, that have attained or are seeking LEED certification: 27 are in various phases of planning, nine are under construction, and seven are completed or occupied.
- **Smart Growth Policies.** Through the high performance certification points that can be achieved for the location of a school and its accessibility by pedestrians and mass transit, the High Performance Buildings Act of 2008 aligns with policy objectives under development by the Governor's Smart Growth



Berry Elementary School
Charles County Public Schools
Waldorf, MD

Sub-Cabinet and by the Maryland Department of Planning. Since increased energy usage is associated with high levels of vehicle miles traveled by bus fleets and by parents who drive children to and from schools, the location of schools and the accessibility of school facilities to neighborhoods for walking, bicycling and transit are factors that affect energy usage over the life cycle of school facilities. Nationwide, the cost of bus transportation is a large element of the operating budget of school districts. Siting schools so that walking, bicycling, and public transit are viable travel options will support active communities, reduce energy consumption levels, lower operational costs for school systems, and improve student health.

Smart Sites. Three public schools have been included in the first round of Smart Site candidates approved by the Smart Growth Sub-Cabinet in the summer of 2009. As Smart Sites, these schools will be targeted to receive coordinated technical assistance from a set of State agencies in order to provide visible evidence of the advantages of smart growth planning. The Hyattsville Elementary School project in Prince George's County is linked with downtown revitalization and neighborhood conservation efforts in the Hyattsville Route One corridor, and will support the locally adopted Gateway Arts District Sector Plan of the Maryland-National Capital Park and Planning Commission. The Calvert Middle School project will provide on-site environmental education resources and will link into a larger plan to develop a compact, pedestrian oriented town center in Prince Frederick. The Germantown Elementary project in Anne Arundel County will address site beautification and improving the walkability of the school site through sidewalks and other infrastructure improvements. All three projects are at early stages of conceptualization.



Calvert Middle School (Projected completion - July 2010)
Calvert County Public Schools
Prince Frederick, MD

Task Force on the Future for Growth and Development. Because of their influence on urban growth patterns, school location and sites have been an important topic of discussion for the Task Force on the Future for Growth and Development, commonly referred to as the 773 Task Force, established in 2007. In the summer and fall of 2009, the Task Force examined, among other issues concerning schools, the potential to build compact schools on small sites in order to support built-up areas within and reduce housing development outside of Priority Funding Areas (PFAs), and whether and how schools should be subject to PFA review in a manner similar to State funding for highways, sewer systems, and other types of infrastructure. Recommendations regarding these issues will be presented to the Governor in early 2010.

Smart Growth, Community Planning and Public School Construction: Models and Guidelines Document. Issued in July 2008 as publication Number 27 of the Maryland Department of Planning series *Managing Maryland's Growth*, this document provides guidance and a model process to assist local jurisdictions in the selection, development, and design of school sites that will concurrently support the educational program while enhancing the quality of community life and protecting the natural environment. The document describes methods for integrating school planning, funding and design with community planning, public health, walkability, energy efficiency, co-location, and transportation choices and costs. The document includes an extensive bibliography of research and reports that demonstrate the linkages between good school planning and environmental, transportation, and health benefits.

- Maryland Green Building Council. The Interagency Committee on School Construction has been represented since 2007 on the Maryland Green Building Council through two of its members, the Secretary of the Department of General Services and the Deputy Secretary of the Maryland Department of Planning, and through its Executive Director. In the annual report, found on the Department of General Services website at www.dgs.maryland.gov, the Council details its efforts to promote the practice of green building in the state.
- Department of General Services Energy Performance Standards. The regulations of the Public School Construction Program (PSCP), which implements the policies of the Interagency Committee, require that all State-funded school construction projects must follow the Department of General Services Procedure Manual for Professional Services standards for energy conservation, life cycle cost analysis, and roofing.
- Conserving and Enhancing the Natural Environment on School Sites. Since 1999, every major new school construction project may include site features that will conserve or enhance the natural environment and contribute to the environmental education program. Such features include bio-retention areas, stormwater management ponds, gardens, wetlands, forest trails, and meadows. These site enhancements are usually connected to the educational program, particularly in the areas of environmental science, biology, social studies, mathematics, and the arts.
- Communication. The PSCP encourages high performance design initiatives through the promulgation of best practices at tri-annual facility planners meetings, publication of this annual report on high performance initiatives in Maryland schools, and its work on legislation to address the financing of sustainable improvements. Through the Designee for the State Superintendent of Schools, the PSCP is linked to the Maryland Association for Environmental and Outdoor Education (MAEOE) Maryland Green Schools Program of the Maryland State Department of Education.
- The High Performance Building Report. The report was issued in January 2010 and can be found at www.MarylandPublicSchools.org/publications.



PROFESSIONAL DEVELOPMENT

Ensure that environmental education professional development opportunities are aligned with student achievement goals.

The North American Association for Environmental Education's (NAAEE) Elements of a State Literacy Plan calls for a description of programs for professional development of teachers that improve their environmental content knowledge, skill in teaching about environmental issues, and field based pedagogical skills. The Division of Instruction at MSDE provides leadership, coordination, and alignment of professional learning opportunities for teachers and manages State and federal legislative requirements to ensure clarity and efficient program alignment for MSDE and local school systems.

Teacher professional development is a keystone feature of the Environmental Education program. Teachers increase their own content knowledge through graduate courses, workshops, the State environmental education conference sponsored by the Maryland Association for Outdoor and Environmental Education (MAEOE) and through on-line venues. Teachers also learn how to teach in the outdoors and how to use student projects as an integrating context for teaching and learning.

This section presents the guidelines for professional development for in-service teachers and discusses opportunities and current trends in pre-service and non-formal environmental educator training.

- The Maryland Teacher and Professional Development Advisory Council
- Environmental Education Endorsement
- Informal Educators Certificate
- Current Opportunities



The Maryland Teacher and Professional Development Advisory Council

Recognizing the importance of teacher professional development in efforts to improve education for all children, the Maryland Teacher and Professional Development Advisory Council was established in 2003. The purpose of this group was to:

- Examine current teacher professional development policies and programs at the state and local levels.
- Set standards as a means of articulating a Maryland-specific, policy-relevant definition of high-quality professional development.
- Offer recommendation for improving professional development to ensure that it meets the new standards

The Council produced three reports to the State Superintendent of Schools, which include:

- The draft standards and recommendations for a public engagement campaign to foster understanding and build consensus around the standards (December 2003).
- A comprehensive review of the professional development program and policies, including key findings and conclusions; and offered recommendations for using the standards as the foundation of statewide system of high-quality professional development (December 2004).
- Development of the final phases of the Maryland Teacher Professional Development Planning Guide, including providing extensive feedback on drafts of the guide and participating in pilot testing.

Currently, the Council is focusing on:

- **evaluating teacher professional development;**
- **finding time for teacher participation in high-quality professional development;**
- **developing college and university courses as professional development;**
- **continuing to examine state and local efforts to use the Maryland Teacher Professional Development Standards to create a statewide system of high-quality professional development; and**
- **identifying challenges associated with implementing the standards.**



The Council grounds their work in a broad definition of what constitutes teacher professional development. Professional development includes activities such as teacher study groups, coaching and mentoring, teacher networks, engagement on school improvement teams and committees that develop curricula and assessments, workshops and other training, conferences and professional meetings, and college and university courses that focus on improving teachers' professional practice.

- Recognize and acknowledge that this broad definition requires that responsibility and accountability for professional development quality be shared by many stakeholders. This principle means that teachers, principals, central office staff, college and university faculty and staff, and staff at MSDE, as well as other stakeholders, must work together.
- Have applied a systems perspective in their thinking about professional development. This means that the members look for evidence of coherence in professional development programs and practices and for the links between professional development and other components of school and district organization and operations.
- Are transparent and inclusive in all of their work. Council members routinely communicate with colleagues and solicit their comments on the work of the Council. They also share and solicit feedback on draft reports and other products.
- Reach solid consensus out of lively discussions and after considering differing viewpoints. The Council members work hard to reach consensus on all of their public reports. One important advantage of the Council's diverse membership is that many different viewpoints and perspectives are reflected in the Council's deliberations.

Environmental Education Endorsement

In February 2009, the Professional Development Teacher Accreditation Board and the Maryland State Board added an endorsement for Environmental Education for certified teachers. This endorsement, available to all PreK-12 teachers, is a valuable addition to a teaching certificate. Currently, teachers can qualify for the endorsement through coursework. MSDE is working with the Educational Testing Service to develop an updated Praxis® exam in Environmental Education, which will serve as an additional avenue for teachers to obtain this endorsement.

MAEOE's Informal Educator's Certificate

Professional Environmental Educator Certification is a voluntary, statewide certification program for professional environmental educators. It was developed by the Maryland Association for Environmental and Outdoor Education (MAEOE) with accreditation from North American Association of Environmental Education (NAAEE), to accomplish the goal of improving environmental education training and materials and increasing their use in the formal and informal education arenas. Applicants demonstrate competency by submitting artifacts, such as lesson plans, and video tapes of teaching techniques. Applicants need at least 2 years of field experience before applying. There are scholarships available for those with demonstrated need. Details of the program are outlined on the MAEOE website at www.maeoe.org/ecertification/index.php.

Maryland State Department of Education (MSDE)

Issues-based instruction, led by MSDE nationally qualified personnel, is offered countywide through after-school, Saturday and summer workshops to a teaching audience identified by LEA Environmental Education Coordinators. MSDE emphasizes Issues Investigation as a way to involve students in complex and authentic local, regional or global issues. The State Environmental Education Coordinators approved the Hungerford/Volk Investigating and Evaluating Environmental Issues and Actions (IEEIA) as a model for issues investigation. Teachers learn how to use this instructional model in week-long workshops. *Project Citizen* is a kindred model used in social studies classes. Both models promote the use of authentic investigation and result in the development and implementation of an action plan.



Professional Environmental Educator Certification

The program is organized around six themes.

- Theme 1: Environmental Literacy**
- Theme 2: Foundations of Environmental Education**
- Theme 3: Professional Responsibilities**
- Theme 4: Planning and Implementing Environmental Education**
- Theme 5: Fostering Learning**
- Theme 6: Assessment and Evaluation**

Local School Systems

Local school systems design professional development experiences to enhance the teaching of the environment through the local curriculum. Outdoor education centers provide leadership in their school systems.

Higher Education

Higher education provides a wide variety of graduate courses that enhance teachers' knowledge and skills in environmentally related areas.

Maryland Department of Natural Resources (MdDNR)

The Maryland Department of Natural Resources offers numerous programs for teachers. The Aquatic Resource Education (ARE) Program is part of the Department of Natural Resources' Watershed Services Unit. Maryland's Aquatic Resource Education Program enables students to develop an appreciation and understanding of aquatic habitats. This is accomplished by providing education materials, training and other opportunities to Maryland educators and youth.

Maryland Association of Environmental and Outdoor Education

The Maryland Association of Environmental and Outdoor Education (MAEOE) annually sponsors the largest environmental state conference in the nation. Teachers both attend and present at this conference. They may also participate in schoolyard habitat training through MAEOE. MAEOE's website provides a central forum for professional development and job opportunities. MAEOE has created a "certificate" program, acknowledging non-formal educators who have undergone extensive training in environmental education.



DNR Aquatic Resource Education (ARE) Program Examples

- *Project Wet*
- *Healthy Water, Healthy People*
- *Storm Drain Stenciling*
- *Raising Horseshoe Crabs & Sturgeon in the Classroom*
- *River of Words*
- *Hooked on Fishing, Not on Drugs*

Other DNR training opportunities:

- *Project Wild*
- *Growing Up Wild*
- *Bay Grasses in Classes*
- *Green Eggs and Sand*



MEASURING PROGRESS

Methods to annually measure and report at the State and local level, progress of public school students toward becoming environmentally literate graduates

The Environmental Literacy Plan calls for methods to annually measure and report at the State and local level, the progress of public school students toward becoming environmentally literate graduates. Existing and proposed methods of student environmental literacy evaluation include:

- An electronic student portfolio of activities spanning PreK-12;
- Number of students participating in Meaningful Watershed Experiences;
- The number of students graduating from environmental programs in higher education and career technology programs;
- Number of student Service-Learning hours spent in environmental activities;
- Number of students participating in approved IEEIA programs; and
- Data from participation in the National Environmental Literacy Assessment.

as a method for documenting a student's level of environmental literacy. The contents of the portfolio are those artifacts that demonstrate that the student has achieved the definition of an environmentally literate citizen, namely one who "possesses the knowledge, intellectual skills, attitudes, experiences and motivation to make and act upon responsible environmental decisions as individuals and as members of their community" (Children in Nature Plan, MD Governor's Office, 2009).

Measurement of Student Environmental Literacy Levels

Workgroup participants agree that measuring environmental literacy in a written test format is inadequate and is not a true measure of environmental literacy. Instead, the use of a digital portfolio is proposed



The pilot program, started in spring 2010, involves high school students enrolled in AP Environmental Science courses in Talbot County, Maryland, and students from Dorchester and Talbot counties who are involved in an MSDE-sponsored internship program pairing high school students with scientists. Students in these pilot programs will present a portfolio as part of an annual Student Summit. The portfolio will replace the science fair-like display board the students currently produce. Students may also opt to enter the Project Citizen competition.

The audience for the presentation will consist of scientists, interested community members, school system personnel and parents. The pilot portfolios will serve as a model for other teachers to examine and experiment with. Eventually, the portfolio project will be extended to middle school, then elementary school, creating a Grades 3-12 record of a student's interaction with the environment and study of environmental issues.

Because this portfolio is ultimately to be used as a summative rather than formative assessment, specific portfolio artifacts are not required at the state level. Rather, it is the categories of artifacts that are required, and it is the responsibility of the teacher to design the specific classroom assignments that enable students to demonstrate the level of mastery in each category (Appendix C). While the teacher may require that certain individual assignments are posted to the portfolio, it is the responsibility of each student to choose the artifact that most clearly demonstrates the required element, explaining how and why that particular artifact demonstrates an aspect of environmental literacy.

Tools for Creating the Portfolio

Several variables must be considered when setting up a portfolio, including where it is to be housed, student fees, security, and accessibility for all students. Desire2Learn was chosen as the e-portfolio website for its security and ease of use.

Components of the Portfolio

- A. **Letter to the Reader:** Students summarize and reflect on the total portfolio to demonstrate the student's level of environmental literacy.
- B. **Table of Contents**
- C. **Category Artifacts:** Students choose one or more artifacts in each category for inclusion in the portfolio, along with a reflection piece.

Category: Issues Investigation & Civic Participation

1. **Artifacts showing steps of the IEEIA (issues investigation) model and reflection on personal strengths and weaknesses after experiencing the process.**
2. **Final reflection on how the artifact collection demonstrates progress in mastering issues investigation skills, and how attainment of these skills demonstrates environmental literacy.**

Category: Experiences in the Environment

1. **List of outdoor or environmental experiences the student had within each category (School-based, Personal, Virtual).**
2. **Reflection on which experience most affected the student and why.**
3. **Reflection explaining why that experience was chosen and how it demonstrates the student's attitude towards the environment and motivation to act.**

Category: Interrelationships Within and Among Human and Natural Systems

1. **At least 1 artifact that shows systems thinking.**
2. **At least 1 artifact that demonstrates use of science knowledge and skills and processes.**
3. **At least 1 artifact that demonstrates use of social studies knowledge and skills and processes.**
4. **Reflections for each item explaining why that artifact was chosen and how it demonstrates achievement of the Interrelationships category.**



The per student fee is paid by a grant through MSDE's Technology Education Office. In Talbot County, each student is assigned a laptop from the One-to-One Laptop Initiative and has access to software such as PowerPoint, word processing, and photo and video processing programs which provides ready access to the website and portfolio creation tools they need to develop a portfolio. Additional tools that must be shared among students include digital cameras, video cameras, and scanners, and students may also use their own cell phone's camera or video application.

Documentation, Assessment and Performance of Understanding

Maryland's definition of an environmentally literate citizen, is one who "possesses the knowledge, intellectual skills, attitudes, experiences and motivation to make and act upon responsible environmental decisions as individuals and as members of their community" (*Children in Nature Plan*, MD Governor's Office, 2009). To demonstrate environmental literacy, the student must collect artifacts that demonstrate these characteristics - content knowledge and skills and processes inherent in various content areas, and issues investigation skills. In addition, students must select artifacts that indicate their attitude toward the environment, their ability to make decisions based on data and other forms of information, and present documentation of experiences and actions they have taken.

Student artifacts may consist of a variety of products - a list of activities, classwork, favorite websites, videos and photos, posters, photos of science fair displays, podcasts, or a collection of audio or visual presentations. The portfolio is, however, more than a scrapbook. The core of the portfolio is the reflection piece. Each artifact must be accompanied by a reflection in which the student explains why a particular artifact was chosen for inclusion in the portfolio and how that particular artifact demonstrates an aspect of environmental literacy. The reflection pieces must be structured so that students will give evidence of their knowledge, skills, attitude and motivation to act. The scoring is done on the quality of the reflection itself and not the content of the reflection. A summary of student requirements is included as **Appendix C**.

While classroom teachers may use rubrics or traditional grading methods to evaluate student class work and projects, the overall portfolio will be evaluated using a standard rubric. The content of this rubric addresses the elements included in the definition of an environmentally literate student. The sciences and social studies are included as the major content areas, although students are free to add artifacts from other classes or experiences. The specific concepts and skills and processes covered in these two areas are based on the Maryland State Curriculum documents as well as the Maryland Environmental Literacy Curriculum.

It is possible for a student to choose an artifact that addresses multiple criteria. For example, a student engaged in a Student Service-Learning project may include the experience in Experiences in the Environment, a sample of the research done on the issue prompting the project (Content, Skills and Processes), a video of an interview with a community member who benefited from the project (Community Impact, Attitude), and a reflection on the impact of the work (Content, Motivation and Attitude). The rubric is included as **Appendix D**.

Students Participating in Meaningful Watershed Experiences

Local Education Agencies (LEAs) annually submit to MSDE information summarizing student participation in environmental experiences as a part of the regular curriculum. The reported numbers are computed using projects in which all students in the entire grade level participate. Some of these experiences are also part of the Student Service-learning requirement. To avoid duplication in counting student experiences, only Service-learning numbers are reported to the Chesapeake Bay Program. This is because the nature of each student's activity and hours of participation are documented as part of the Service-learning graduation requirement and thus are reliable.

Students may have other experiences along with the regular curriculum or Student Service-learning experience. Individual teachers may engage students in projects, take them on a field trip or involve them in after-school clubs and activities. Schools may host a school-wide activity or week of activities, such as those commonly done during Environmental Education Month, Earth Day or International Walk-to-School

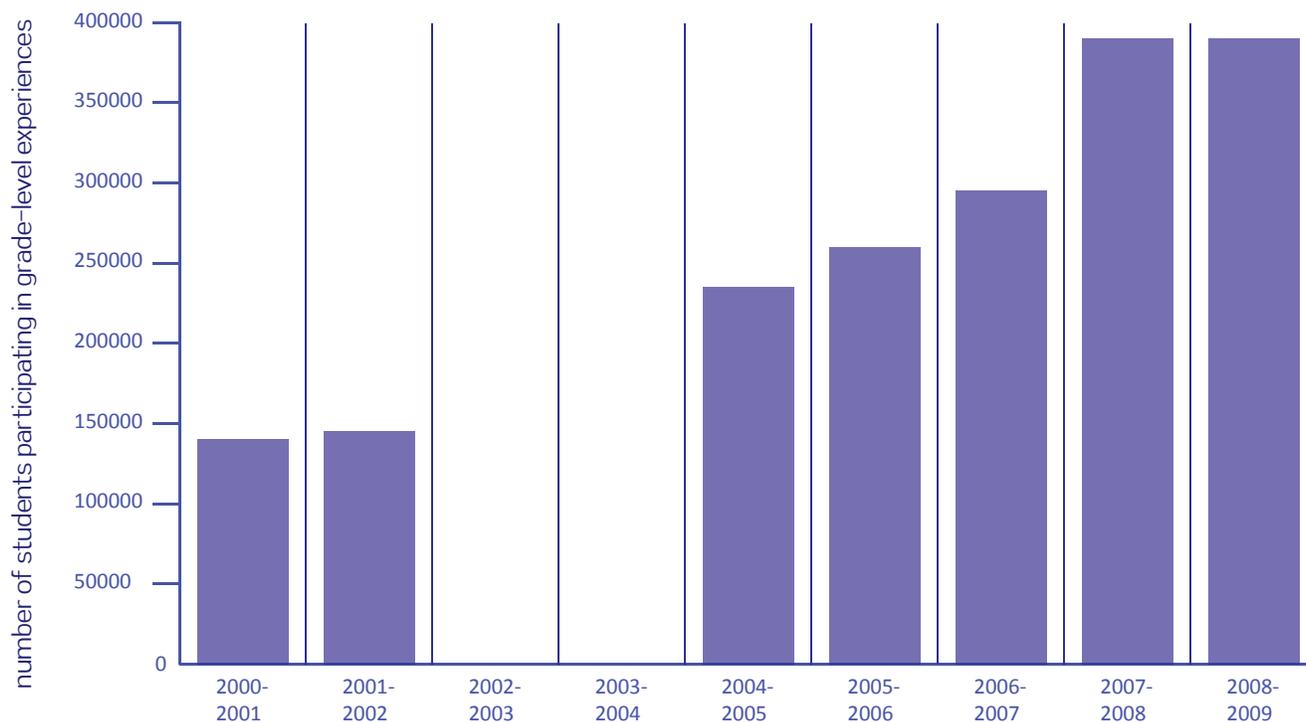
Day. Other students may participate through MSDE's State-Aided Institution program. The graph below documents the change in the number of students participating in grade-level experiences reported by LEAs since 2001.

Student Service-learning Hours Spent in Environmental Activities

A detailed description of the Maryland Student Service-learning program can be found under the Model Programs section. In 2008-2009 school year, approximately 85,000 students participated in a student service-learning project based on the environment.

Students Participating in Approved IEEIA Programs

The Hungerford/Volk model Investigating and Evaluating Environmental Issues and Actions (IEEIA) is the template for instruction accepted by Environmental Education Coordinators in Maryland and is Standard 1.0 of the Maryland Environmental Literacy Curriculum. IEEIA is a middle and high school program that promotes environmental citizenship for large numbers of students over long periods of time.



The IEEIA program has been shown to develop strong environmental responsibility in students. Evidence gathered over 20 years of work with teachers indicates that students of all ability levels show greater gains in knowledge of responsible citizenship action skills as a result of participating in the program. Students also report taking more actions in their communities. Parents of students in the program observe more voluntary citizenship behaviors on the part of their children.

Systematic professional development in IEEIA has begun on Maryland's Eastern Shore as part of MSDE's Maryland Eastern Shore Initiative (MESI). MSDE's MESI Coordinator is a nationally recognized trainer in the use of the model. She has led Maryland's team in increasing the number of certified trainers to broaden opportunities for teacher participation. Every biology student, about 460 students, in Talbot County's high schools completed a guided issue investigation as a course requirement. An additional 300+ middle school students in Talbot and Dorchester counties and all Cecil County high schools are using this investigative method as well.

Participation in the National Environmental Literacy Assessment

Maryland has participated in, and continues to participate in, a number of studies that measure the impact of environmental education on student achievement, school climate, and teacher satisfaction. Additional studies have focused on student acquisition and retention of content knowledge and the development of field skills, critical thinking processes, as well as the affective domains of learning (attitude towards the environment and stewardship ethic).

MSDE and selected Maryland public schools are participating in a national study, the National Environmental Literacy Assessment, to determine effective methods of measuring environmental literacy. The program is a three-year study involving the U.S. Environmental Protection Agency (EPA) Office of Environmental Education, the National Oceanographic and Atmospheric Administration (NOAA) Office of Education, and the North American Association for Environmental Education (NAAEE) to determine a baseline for middle school students' understanding of the environment.

In the study's first year during Spring 2007, researchers conducted an environmental literacy survey of sixth and eighth grade students in 48 randomly selected middle schools across the U.S. to establish a baseline of current environmental literacy. In Year 2, (2008-2009), data on student environmental literacy was gathered from programs, schools, and classes that currently incorporate Environmental Education within instruction. The environmental literacy of these students will be compared to the randomly selected group in Year 1.

Relationships will then be explored between program characteristics and environmental literacy to measure the relative effectiveness of various environmental programming models. Maryland has submitted applications to include several of its individual school programs and program models to be included as part of the study. During the third year of the study, the data will be made available to other researchers so that additional questions can be asked and answered.







NEXT STEPS

Currently, COMAR requires LEAs to report every 5 years their compliance with the Environmental Education Regulation. The existing mechanisms for reporting includes a measure to combine reporting for three programs in order to help reduce the burden on school systems. The first cycle of coordinated reporting began in January 2010 and includes the following:

- The current Environmental Education regulation, which requires school systems to certify their compliance;
- Curriculum documents; and
- Master Plans, which are updated annually.

The Chesapeake Bay Program (NOAA) requests data on the number of students participating annually in a meaningful watershed experience. The MSDE Student Service-Learning Coordinator collects data on, and reports annually the number of students engaged in environmentally related Service-Learning projects.

MSDE works with local school systems to develop a strategic plan for implementing Environmental Education goals. The formal education items recommended in the *Children in Nature Plan* were incorporated into this strategic framework. The document presents an overall workplan based on the goals for education set by the Governor, the Maryland State Board of Education and the MSDE Division of Curriculum and Instruction.

The PreK-12 Strategic Plan will be reviewed and revised on an ongoing basis. The National Research Council has begun to develop national Common Core Standards in Science. The outcome of this work, expected to take up to two years, will be incorporated into the Environmental Education program.

MSDE Environmental Education Priorities

MSDE's Environmental Education Office has set the following priorities for program development:

- Adopt the Maryland State Environmental Literacy Curriculum.
- Expand the number of MSDE Environmental Education Specialists to assure serving high-need areas.
- Align Environmental Education programming with the Governor's Seven Education Priorities, including STEM connections and expansion of internships for students.
- Provide a meaningful outdoor experience for every child, every year.
- Institute teacher training programs in Issues Investigation, addressing the knowledge and skills needed to effectively teach environmental science and incorporate meaningful experiences within the regular curriculum.
- Promote partnerships with higher education, Student Service-Learning, state agencies, resource professionals, and non-formal education agencies.

APPENDICES

Appendix A: COMAR 13A.04.17 Environmental Education By-Law

Appendix B: Maryland Environmental Literacy Curriculum

Appendix C: Electronic (E)-Portfolio Checklist

Appendix D: Electronic (E)-Portfolio Rubric for Environmental Literacy

Appendix E: MSDE Environmental Education Strategic Plan 2008-2010

APPENDIX A. COMAR 13A.04.17 Environmental Education ByLaw

- .01 Program Each local school system shall provide a comprehensive, multidisciplinary program of environmental education within current curricular offerings at least once in the early, middle and high school learning years.
- .02 Purpose The purpose of this environmental education program is to enable students to make decisions and take actions that create and maintain an optimal relationship between themselves and the environment, and to preserve and protect the unique natural resources of Maryland, particularly those of the Chesapeake Bay and its watershed.
- .03 Goals The following environmental education goals and subgoals should be incorporated in local school system curricular offerings:
- A. Understand and value the diversity and interdependence of the biological and physical environment, which includes to:
 - (1) Observe and investigate the biological and physical environment,
 - (2) Understand that plants and animals that use the environment to satisfy their needs are linked the biological and physical components of their environment,
 - (3) Understand that people have a powerful impact on and responsibility for environmental conditions,
 - (4) Recognize that as human population increases, its impact on the environment becomes more pronounced;
 - B. Understand and value the interdependence between the environment and our health, economy, and culture, which includes to:
 - (1) Participate in activities that demonstrate the relationship between personal health and the quality of the environment
 - (2) Recognize that a viable economy is dependent on responsible use of natural resources
 - (3) Understand the impact of interaction of culture and technology on the use and alteration of the environment,
 - C. Understand and value how aesthetic experiences provide insight and enrich interactions with the environment, which includes to:
 - (1) Develop an understanding of the aesthetic qualities that exist in the environment;
 - (2) Develop skills and sensitivities to apply aesthetic criteria to environmental concerns;
 - (3) Develop the ability to formulate, apply, and communicate personal aesthetic criteria for assessing environmental issues,.

APPENDIX A. COMAR 13A.04.17 Environmental Education ByLaw

- D. Develop and apply their knowledge and skills to protect and sustain environmental quality, which includes to:
 - (1) Understand how individual decisions and actions have an impact on the environment
 - (2) Apply knowledge of environmental concepts to patterns of personal behavior and choice,
 - (3) Apply responsible decision-making to home-related activities impacting the environment,
 - (4) Explore and evaluate careers in the environmental field;
- E. Develop and apply knowledge and skills at the community level for cooperative action to protect and sustain the environment, which includes to:
 - (1) Understand how cooperation among communities (including citizens, businesses, interest group, governmental agencies, and others) is essential to maintain and improve the environment;
 - (2) Work with others in groups and organizations to maintain and improve the environment.

.04 Certification Procedures

By September 1, 1990, and each five years after, each local school superintendent of schools shall certify to the State Superintendent of Schools that the comprehensive programs of environmental education meets, at a minimum, the requirements set forth in Regulations .01 and .03. This certification shall describe how the regulations are being met at each learning level in accordance with reporting standards developed by the Department of Education.

APPENDIX B: Maryland Environmental Literacy Curriculum

Standard 1.0 ENVIRONMENTAL ISSUES

The student will investigate and analyze environmental issues ranging from local to global perspectives and develop and implement a local action project that protects, sustains, or enhances the natural environment.

Standard 2.0: Interactions of Earth's Systems

The student will analyze and apply the properties of systems thinking and modeling to the study of Earth's systems.

Standard 3.0: Flow of Matter and Energy

The student will analyze and explain the movement of matter and energy through interactions of Earth's systems (biosphere, geosphere, hydrosphere, atmosphere, and cryosphere) and the influence of this movement on weather patterns, climatic zones, and the distribution of life.

Standard 4.0: Populations, Communities and Ecosystems

The student will use physical, chemical, biological, and ecological concepts to analyze and explain the interdependence of humans and organisms in populations, communities and ecosystems.

Standard 5.0: Humans and Natural Resources

The student will use concepts from chemistry, physics, biology, and ecology to analyze and interpret both positive and negative impacts of human activities on Earth's natural systems and resources.

Standard 6.0: Environment and Health

The student will use concepts from science, social studies and health to analyze and interpret both positive and negative impacts of natural events and human activities on human health.

Standard 7.0: Environment & Society

The student will analyze how the interactions of heredity, experience, learning and culture influence social decisions and social change.

Standard 8.0: Sustainability

The student will make decisions that demonstrate understanding of natural communities and the ecological, economic, political, and social systems of human communities, and examine how their personal and collective actions affect the sustainability of these interrelated systems.

The full text of the standards, indicators and objectives can be found at www.marylandpublicschools.org/MSDE/programs/environment/tk/els

APPENDIX C: Electronic (E)-Portfolio Checklist

Name	Type of Item
Category	Subcategory
Date Added to Portfolio	MD Environmental Literacy Standard
Required Documentation	Other

Interrelationships Among and Within Human and Natural Systems Standards 1, 2, 3, 4, 5, 6, 7, 8
Scientific knowledge, skills and processes

- At least one artifact produced and selected by the student
- At least one reflection per artifact

Interrelationships Among and Within Human and Natural Systems Standards 1, 4, 5, 6, 7, 8
Social Studies knowledge, skills and processes

- At least one artifact produced and selected by the student
- At least one reflection per artifact

Interrelationships Among and Within Human and Natural Systems Standards 1, 2
Systems Thinking

- At least one artifact produced and selected by the student
- At least one reflection per artifact

Issues Investigation & Civic Participation Standards 1, 7
Attitude towards the Environment or Environmental Issue

- At least one artifact produced and selected by the student
- At least one reflection per artifact

Decision-Making and Motivation to Act Standards 1, 7, 8

- At least one artifact produced and selected by the student
- At least one reflection per artifact

Experiences in the Environment Standards 1, 5, 6, 7, 8
Attitude towards the Environment or Environmental Issue

- At least one artifact produced and selected by the student
- At least one reflection per artifact

APPENDIX D: Electronic (E)–Portfolio Rubric for Environmental Literacy

Category	Criteria				Points
	1	2	3	4	
Issues Investigation & Civic Participation Among & Within Natural & Human Systems	Scientific knowledge, skills and processes	Artifact demonstrates scientific knowledge, scientific skills and processes.	Multiple artifacts demonstrate scientific knowledge and scientific skills and processes.	Artifacts from a variety of science disciplines demonstrate scientific knowledge and scientific skills and processes.	4
Issues Investigation & Civic Participation Among & Within Natural & Human Systems	Social studies knowledge, skills and processes	Artifact demonstrates social studies knowledge and Social Studies skills and processes.	Multiple artifacts demonstrate Social Studies knowledge and skills and processes.	Artifacts from multiple social studies disciplines demonstrate knowledge and skills and processes.	
Issues Investigation & Civic Participation	Attitude towards the environment or an environmental issue	Artifact describes various student attitudes toward the environment, but does not include a personal perspective.	Artifact demonstrates student attitude towards the environment or issue and includes a personal perspective.	Multiple artifacts demonstrate student attitudes towards the environment or issue, cites data upon which a position is based, and includes a personal perspective.	
Issues Investigation & Civic Participation	Decision-making & motivation to act	Artifact does not clearly demonstrate motivation and ability to make responsible environmental decisions; no evidence that decisions were acted upon, or the item is incomplete or missing.	Artifact demonstrates motivation and ability to make responsible environmental decisions and provides evidence that decision was acted upon.	Multiple artifacts demonstrate motivation and ability to make responsible environmental decisions and provide evidence that the student was involved in multiple projects or a long-term project.	

APPENDIX D: Electronic (E)-Portfolio Rubric for Environmental Literacy

Category	Criteria				Points
	1	2	3	4	
Experiences in the Environment	Artifact does not clearly document personal experiences in the environment, or the item is incomplete or missing.	Artifact documents an experience in the environment, but does not include personal experiences.	Artifact documents personal experiences in the environment.	Multiple artifacts document personal experiences in the environment and includes statements regarding future participation.	
Portfolio Summary and Reflections	<p>The student lists the work contained in the portfolio or the work is incomplete or missing. Reflections lack insight or relevance to the topic or are incomplete or missing.</p> <p>Summary of the work in the portfolio and reflection on how the contents of the portfolio demonstrate that the student is environmentally literate</p>	<p>The student completes all requirements and lists the work in the portfolio. Selections are somewhat relevant to the topic. Some reflections show insight into the topic, but are inadequate in content or rarely demonstrate environmental literacy.</p>	<p>The student completes all requirements and summarizes the work in the portfolio. All selections are relevant to the topic. Most reflections show insight into the topic and adequately demonstrate that the student is environmentally literate.</p>	<p>The student completes all requirements and comprehensively summarizes the work in the portfolio. All selections are relevant to the topic. All reflections show significant insight into the topic and clearly demonstrate environmental literacy.</p>	
					TOTAL

APPENDIX E: MSDE Environmental Education Strategic Plan

The chart that follows outlines the strategic plan for the development and implementation of the PreK-12 Environmental Education program. The plan is based upon the Governor's Goals for Education, MSDE Environmental Education Goals, and an informal Student *Education Bill of Rights*. The strategies integrate these diverse elements as well as build upon existing programs. The plan will be updated as progress is made.

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Improve STEM education and expand STEM curricula to include environmental literacy.
MSDE Environmental Education Goals	Goal 1: Produce high performing, environmentally literate students.
Student Environmental Literacy Bill of Rights	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Quality
Criteria	<ul style="list-style-type: none"> • Programs are aligned with the Governor’s Seven Education Priorities. • Programs are aligned with, and enhance, existing LEA programs.
Strategy	<ul style="list-style-type: none"> • Strengthen the correlation between STEM education and environmental education • Promote the use of GIS mapping; satellite imagery; live data and remote sensing; and other emerging technologies with EE instruction • Ensure that students have high quality, rigorous experiences with service providers who are highly trained in science(s) and issues investigation • Increase rigor of existing non-formal programs to meet needs of students, especially high school students • Include Children in Nature activities within existing education initiatives such as the Climate Change Commission, Energy Conservation in Schools Program, and Farm to School program
Activity	<ul style="list-style-type: none"> • Align environmental literacy activities to existing environmental activities addressed in the Governor’s Climate Change Commission report, the Farm to School Initiative, MSDE school construction and facilities, transportation activities, and related activities in other State agencies • Meet with potential partners to establish internship programs • Work with the State Curriculum update team to incorporate MD-based issues into the State Curriculum and align the State Curriculum to the State Environmental Literacy Curriculum • Design plan to present to State Board. Priority is given to approval of the State Environmental Literacy Curriculum
Project Status	<p>Completed</p> <ul style="list-style-type: none"> • Partnerships established: Oxford Lab in; Expanding to Horn Point in 2010. (95 students; 17 scientists in 2009-2010 school year) • State Curriculum realignment every 5 years; 2010 is the next year to revise. • MD Environmental Literacy Curriculum to be sent to State Board of Education, Spring 2010

APPENDIX E: MSDE Environmental Education Strategic Plan 2008-2010

Governor's Education Priorities	Step up career and technology education.
MSDE Environmental Education Goals	Goal 1: Produce high performing, environmentally literate students.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Development
Criteria	<ul style="list-style-type: none"> • Program content and activities are mutually developed between the LEA and its partner(s) • Long and short-term goals are set for Environmental Literacy by MSDE and LEA representatives
Strategy	<ul style="list-style-type: none"> • Expand the number and diversity of environmentally-related STEM internships and opportunities for teachers and students through partnerships with higher education, laboratories, state agencies, and business/industry • Expand environmentally - based Career Technology programs to all LEAs as appropriate • Promote the use of GIS mapping; satellite imagery; live data and remote sensing; and other emerging technologies with EE instruction • Obtain a state license in GIS software and technology for schools systems and provide teacher professional development opportunities directly tying use of GIS to environmental issues
Project Status	<ul style="list-style-type: none"> • Partnerships established: Oxford Lab in 2009 (15 students; 7 scientists). • Expanding to Horn Point in 2010. (95 students; 17 scientists in 2009-2010 school year) • Career Technology programs published in CTE course book and available. • In negotiations with ESRI for statewide license.

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Benchmark student performance against international standards.
MSDE Environmental Education Goals	Goal 1: Produce high performing, environmentally literate students.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Assessment
Criteria	<ul style="list-style-type: none"> Assessment of environmental literacy is based on diverse experiences over the course of a students’ education. Environmental Literacy is not defined by a test score or single course or experience.
Strategy	<ul style="list-style-type: none"> Require for graduation that all students take and pass a designated course of study on environmental literacy Use alternative assessment methods to measure environmental literacy (Develop) Methods to annually measure and report at the State and local level, progress of public school students toward becoming environmentally-literate graduates
Activity	<ul style="list-style-type: none"> Identify alternative evaluation methods Apply for MD participation in National Environmental Literacy Assessment. Meet with MSDE IT to develop existing tracking and portfolio systems Develop and pilot an on-line portfolio system for students through existing on-line tools
Project Status	<p>Methods identified to include:</p> <ul style="list-style-type: none"> Digital portfolio template developed and piloted in high schools in Talbot County (Spring 2010 pilot) Number of students participating in Meaningful Watershed Experiences The number of students graduating from environmental programs in higher education and career technology programs Number of student service learning hours spent in environmental activities; Number of students participating in approved IEEIA programs Data from participation in the National Environmental Literacy Assessment MD accepted in NELA

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Benchmark student performance against international standards.
MSDE Environmental Education Goals	Goal 1: Produce high performing, environmentally literate students.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Affordability
Criteria	<ul style="list-style-type: none"> • Appropriate programs, those geared to local issues and environment, will be accessible and affordable to Maryland teachers and students.
Strategy	<ul style="list-style-type: none"> • Provide funding and more flexible funding to LEAs or schools for school-based projects, field projects, field experiences non-Bay related projects, substitute teachers, transportation, student and teacher internship stipends, and activities that encompass a broader view of the Governor’s education and environmental priorities, such as climate change, energy, transportation, STEM • Restore the MSDE Environmental Education grant program to provide funding for school systems to sustainably implement their environmental programs
Activity	<ul style="list-style-type: none"> • Seek flexible funding for school systems’ programs • Restore the MSDE Environmental Education grant program to provide funding for school systems to sustainably implement and evaluate their environmental programs
Project Status	<ul style="list-style-type: none"> • No funding available at this time

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Governor’s Education Priority: Improve STEM education and expand STEM curricula to include environmental literacy.
MSDE Environmental Education Goals	Goal 2: Provide at least one meaningful watershed experience for every student in elementary, middle, and high school. Chesapeake Bay 2000 Goal: Provide at least one meaningful watershed experience for every student before they graduate. Environmental Literacy Plan: Provide an annual meaningful outdoor experience for every student every year.
Student Environmental Literacy Bill of Rights	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Quality
Criteria	The program: <ul style="list-style-type: none"> • Reflects local, state, regional, or global environmental issues; • Reflects the unique human and natural resources and issues of the school’s geographic area • Grows within the ability of the school system to manage • Focuses professional development • Involves the community • Involves students in choosing issues • Activities reflect best practices in education • Activities and programs meet the definition of a “meaningful outdoor experience” as defined in the Chesapeake Bay 2000 Stewardship & Community Engagement Committee document
Strategy	<ul style="list-style-type: none"> • Increase rigor of existing non-formal programs to meet needs of students, especially high school students • Seek funding for LEAs for school-based projects, field projects, day-long & residential field experiences, non-Bay related projects, substitute teachers, transportation and activities that encompass a broader view of the Governor’s education and environmental priorities, such as climate change, energy, transportation, STEM
Activity	<ul style="list-style-type: none"> • Provide an easily accessible database of examples of model outdoor experiences for educators • LEAs design the outdoor experiences and activities to align with existing content standards at each grade level • Develop criteria for qualifications and certification requirement for informal educators who work with K-12 students • Restore the MSDE Environmental Education grant program to provide funding for school systems to sustainably implement their environmental programs
Project Status	<ul style="list-style-type: none"> • Model programs in K-12 are posted on the MSDE EE website • Examples of projects tied to the State Curriculum are available on MSDE EE website • Exploring possible database development through iMap, NatureFinder- or other existing venue; iPhone app produced; awaiting funding to publish • Planning in progress with NOAA Chesapeake Bay Program to develop the Environmental Science Training Center for informal and formal educators. • No funding available at this time

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Governor’s Education Priority: Improve STEM education and expand STEM curricula to include environmental literacy.
MSDE Environmental Education Goals	Goal 2: Provide at least one meaningful watershed experience for every student in elementary, middle, and high school. Chesapeake Bay 2000 Goal: Provide at least one meaningful watershed experience for every student before they graduate. Environmental Literacy Plan: Provide an annual meaningful outdoor experience for every student every year.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Development
Criteria	<ul style="list-style-type: none"> • Each LEA designs the outdoor experiences to align with existing content standards
Strategy	<ul style="list-style-type: none"> • Revitalize the residential and day environmental education programs for students on the Eastern Shore at University of Maryland Center for Environmental Science by providing funding for additional staff, materials and equipment in the education department • Expand the number of outdoor education centers, especially on the Eastern Shore and Western Maryland • Include Environmental Education in the Master Plan
Activity	<ul style="list-style-type: none"> • MSDE will train teachers in issues-based investigation methods • Assist LEAs in identifying appropriate programs offered by partners • Obtain a state license in GIS software and technology for schools systems and provide teacher professional development opportunities directly tying use of GIS to environmental issues
Project Status	<ul style="list-style-type: none"> • Seeking partners for Allegany County for an outdoor education center site

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor’s Education Priorities	Governor’s Education Priority: Improve STEM education and expand STEM curricula to include environmental literacy.
MSDE Environmental Education Goals	Goal 2: Provide at least one meaningful watershed experience for every student in elementary, middle, and high school. Chesapeake Bay 2000 Goal: Provide at least one meaningful watershed experience for every student before they graduate. Environmental Literacy Plan: Provide an annual meaningful outdoor experience for every student every year.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Assessment
Criteria	<ul style="list-style-type: none"> An LEA’s method(s) of student environmental literacy reflects the definition of “Environmental Literacy” stated in the Children in Nature Plan
Strategy	<ul style="list-style-type: none"> Each LEA designs their method(s) of student environmental literacy to conform with the definition of Environmental Literacy stated in the Children in Nature Plan
Activity	<ul style="list-style-type: none"> Identify and collect current efforts in LEAs MSDE assists LEA Environmental Education Coordinators in developing and sharing plans online and through statewide or regional meetings
Project Status	<ul style="list-style-type: none"> Chart collected from all LEAs identify current efforts EE in Maryland document to be published through MSDE- April 2010

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Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves an engaging educational experience that provides opportunities for learning and for the future, including the acquisition of 21st Century Skills required for the global workforce.
Areas of Consideration	Program Affordability
Criteria	<ul style="list-style-type: none"> All students will have equitable access to a variety of school-based or community-based activities and day, residential, summer, and other types of fee-based environmental programs
Strategy	<ul style="list-style-type: none"> Seek funding to implement the Children in Nature Plan
Activity	<ul style="list-style-type: none"> Expand the Governor’s Regional Environmental Education Network (GREENet) to coordinate environmental education efforts across the state Restore funding to the Maryland Summer Centers for Gifted & Talented Students, MSDE’s Environmental Education Office, and State-Aided Institutions, including NorthBay Actively support increased funding for the NOAA Bay Watershed and Education Training grant program (B-WET)
Project Status	<ul style="list-style-type: none"> Mid-Shore and DEEN networks expanded Funding eliminated. Alternate funding sources are being sought B-WET funding increased; EPA funding restored

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Governor’s Education Priorities	Teacher recruitment and retention
MSDE Environmental Education Goals	Goal 3: Ensure that teachers are prepared to implement effective instructional programs.
Student Environmental Literacy <i>Bill of Rights</i>	Each student deserves to have highly qualified and effective teachers who have the necessary support in terms of resources, professional development, planning time, and leadership.
Areas of Consideration	Program Quality
Criteria	<p>Professional Development experiences assist teachers in meeting the NCLB definition of “Highly Qualified Teacher”</p> <p>Programs & activities are based upon, and aligned with, the Maryland Teacher Professional Development Standards</p> <p>Teachers will have the content knowledge and skills to implement effective indoor and outdoor environmental programs</p>
Strategy	<ul style="list-style-type: none"> • Provide professional development for teachers in content and in Issues Investigation • Provide funding for regional State Environmental Education Specialists at MSDE • Work with professional development providers to ensure they meet Maryland Teacher Professional Development guidelines and meet State Learning Standards • Expand the number and diversity of environmentally-related STEM internships for teachers and students through partnerships • Gather school-based DNR education and outreach programs under one department • Build educator knowledge about climate change issues as they directly impact Maryland (Climate Change Commission) • Require all non-formal educators who work directly with teachers and students to take courses in environmental education and pedagogy

APPENDIX E: MSDE Environmental Education Strategic Plan 2008–2010

Governor's Education Priorities	Teacher recruitment and retention
Areas of Consideration	Program Quality (cont'd.)
Activity	<ul style="list-style-type: none"> • Develop a teacher endorsement in Environmental Education • MSDE regional coordinators provide direct services (content, pedagogy, and technical assistance) to school systems, teachers, students and schools • Promote and train educators to use the Investigating and Evaluating Environmental Issues and Actions (IEEIA) model through nationally-certified trainers • Pending funding, MSDE and LEAS organize 4 regional Governor's Academy for Environmental Education. This 2 week academy will focus on content presented by experts, field study skills, teaching of the issues investigation model and pedagogy • Train high school teachers in climate change content, Maryland Government Public Policy and use of technology in instruction • Refer to Professional Standards Teacher Education Board • Identify one organization to house all environmental opportunities for teachers • Request qualifications of informal educators working with students as an evaluation component of State Aided Institutions • MSDE staff will critique proposed Continuing Professional Development credit courses to assure compliance with Maryland Teacher Professional Development guidelines before renewal or granting of credits
Project Status	<ul style="list-style-type: none"> • One EE Coordinator hired to assist Eastern Shore through NOAA B-WET grant through 2013 • Talbot, Somerset, Cecil, Dorchester teachers have received training through MSDE. Additional training sessions are in planning stages with other LEA EE Coordinators • Planning in progress with NOAA Chesapeake Bay Program to develop the Environmental Science Training Center for informal and formal educators. • No funding available for academies • Grant application in partnership with MDE for climate change education. Pending • Produced 5 high school lessons plans on impacts of climate change on Maryland's environment, health, economics; careers attached to climate change issues; 1 on disease/health pending grant funding; grant obtained • Teacher endorsement in Environmental Education approved by State Board of Education, February 2009 • NOAA Bay Backpack released spring 2010 to house professional development activities, calendar of events and other information • Planning in progress with NOAA Chesapeake Bay Program to develop the Environmental Science Training Center for informal and formal educators • Proposals for courses are being reviewed as they come up for credit renewal every 5 years for compliance with State Professional Development Standards • Work with other state agencies to gather environmental outreach programs under the agency's education office

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Governor’s Education Priorities	Government by Example
MSDE Environmental Education Goals	Goal 4: Create schools that model best environmental practices.
Student Environmental Literacy <i>Bill of Rights</i>	Each student has a right to a healthy indoor and outdoor school and community environment.
Areas of Consideration	Both indoor and outdoor environments and practices are considered.
Criteria	<ul style="list-style-type: none"> • School construction, renovation and maintenance practices and procedures reflect best practices as defined by LEED standards
Strategy	<ul style="list-style-type: none"> • Schools will involve facilities management, building maintenance, administrators, parents, teachers and students in instituting and monitoring healthy school sites in accordance with the State Curriculum • Provide funding for school-based student projects aligned with the curriculum and for joint projects between facilities and students • Train facilities staff members in HealthySEAT or Tools for Schools
Activity	<ul style="list-style-type: none"> • Support legislation and MSDE policies that reflect appropriate “green practices”. • Team with School Construction and Facilities to promote instruction using green practices. • Team with Maryland Boards of Education, MAEOE, and Bay Trust to require sign-off by maintenance and facilities personnel
Project Status	<ul style="list-style-type: none"> • LEED Silver status for all new buildings passed 2009 and other legislation supported • MAEOE required maintenance sign-off on Green School applications, April 2010 • MSDE Divisions of Instruction and School Construction to co-plan school-based projects • Partnerships with Maryland Energy Administration and EPA to upgrade facilities efficiency • Obtain grants for project • Co-development of projects between facilities and instruction • Model programs posted on MSDE EE website • School facilities personnel trained in HealthySEAT (MDE)

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