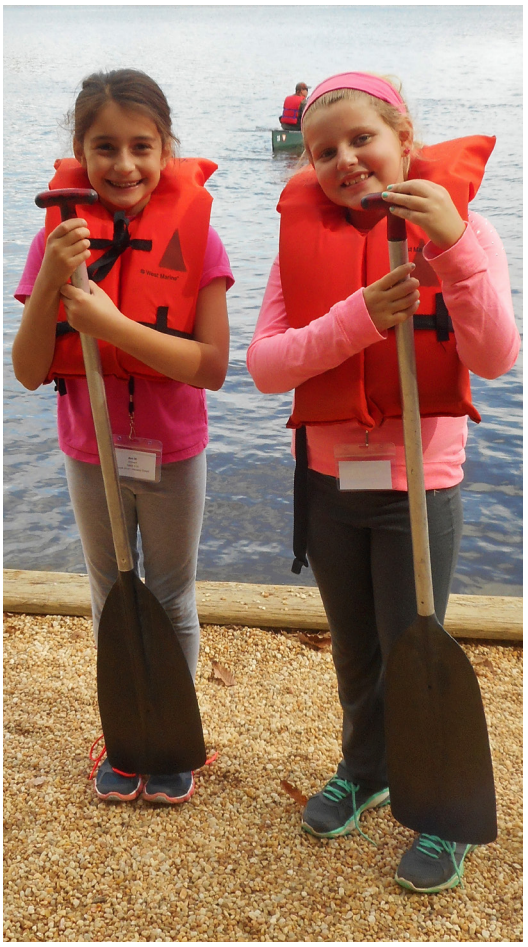
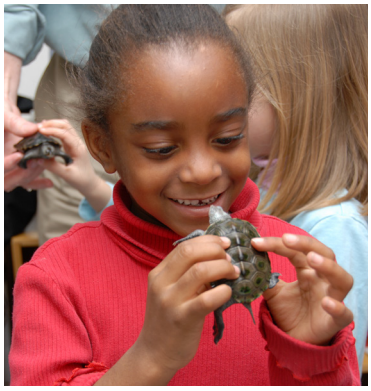
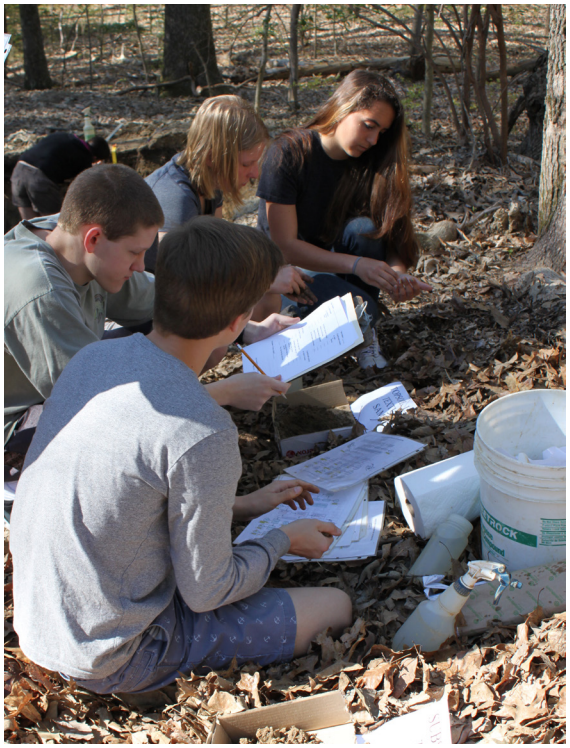
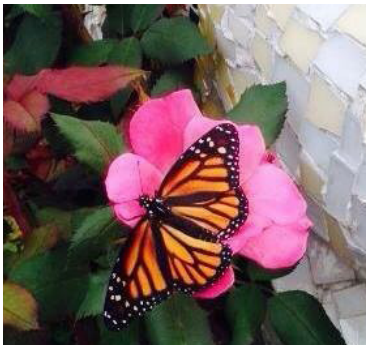
Anne Arundel County Public Schools

# Environmental Literacy and Outdoor Education

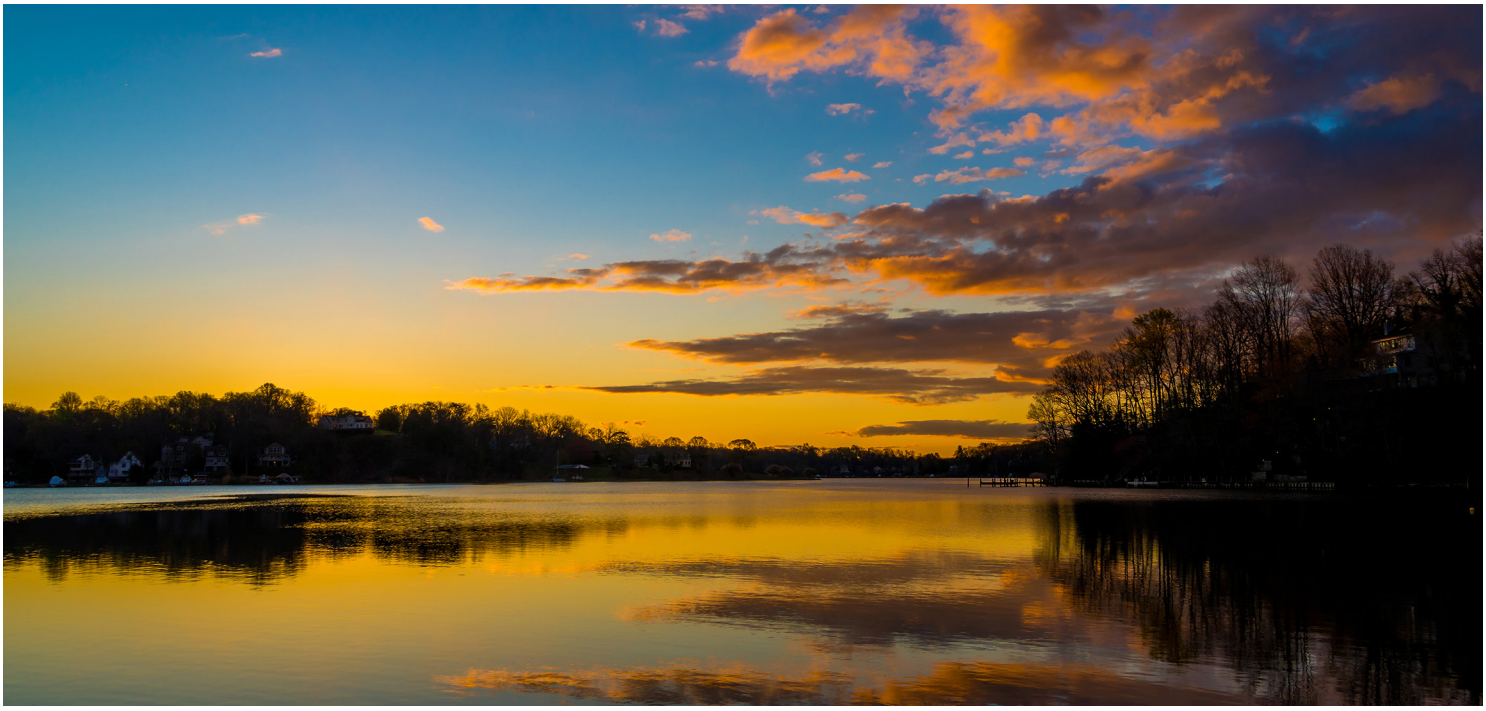




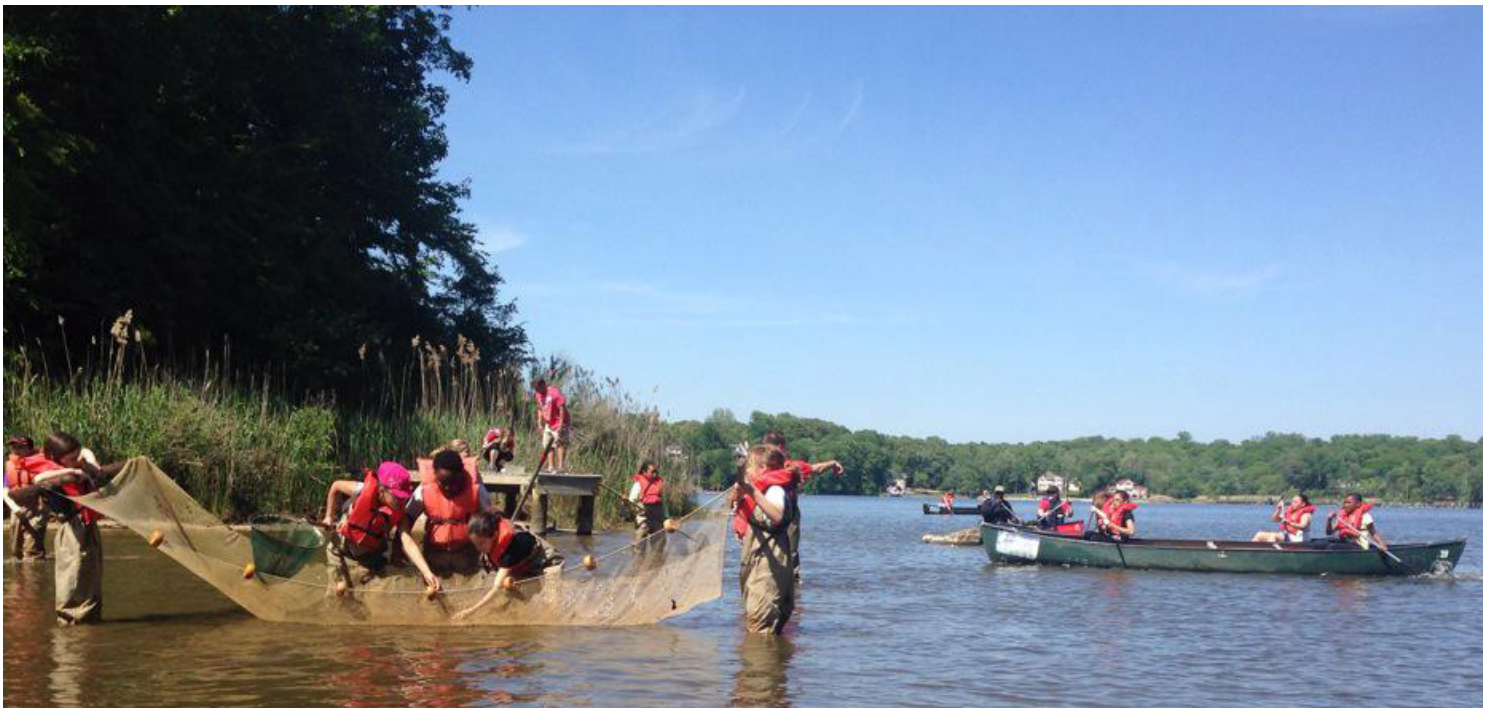




*Our Mission: To empower students of all ages through authentic hands-on outdoor experiences with the environmental knowledge, skills, and motivation to make and act upon responsible environmental decisions.*



# Table of Contents



# Introduction

Anne Arundel County is Maryland's fifth largest school district, serving over 80,000 students and 10,000 employees. Rich in history, diversity and landscapes, Anne Arundel is an amazing place for our students to interact with and learn about the environment. Located on the shores of North America's largest estuary, the Chesapeake Bay, Anne Arundel County gives students the opportunity to connect with over 533 miles of shoreline and 12 major river systems.

Through the Environmental Literacy and Outdoor Education curriculum and programs, students participate in environmental and outdoor lessons on a variety of topics relating to the Chesapeake Bay and its surroundings. While developing a positive environmental ethic and sense of stewardship, students learn the meaning of respecting each other as well as respecting the environment. By the end of their school career, students have experienced and connected with their local environment, gained knowledge about the human impact on our planet, and acquired the skills to be able to make and act upon responsible environmental decisions.

With the guidance of the Maryland State Environmental Literacy Graduation Requirement and Standards (COMAR Regulations 13A.03.02 & 13A.04.17) as well as the Environmental Literacy requirement of the Chesapeake Bay Agreement, AACPS has expanded and integrated its environmental curriculum and programming system-wide, providing environmental literacy experiences and learning for students at all grade levels.

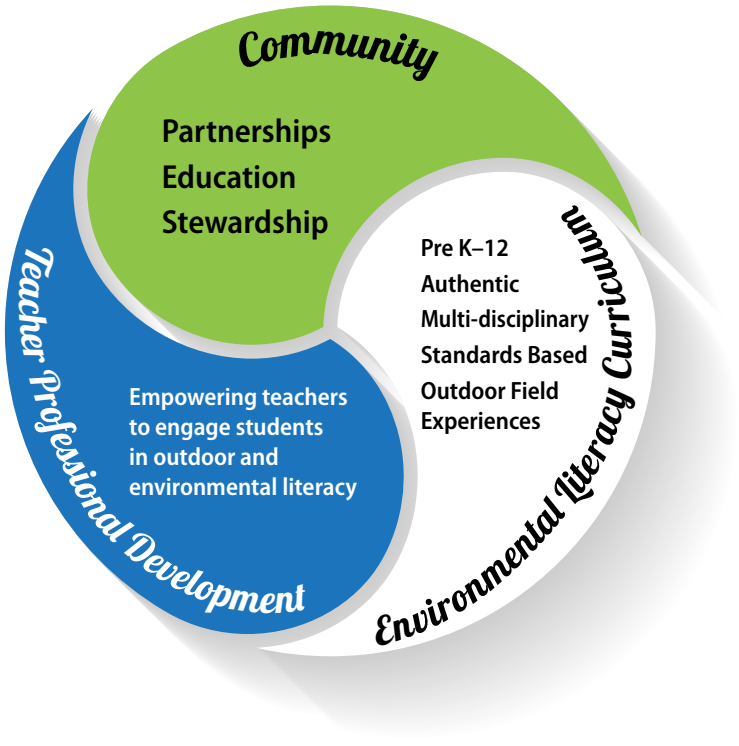
The Environmental Literacy and Outdoor Education Office has unique collaborative relationships with other AACPS curricular offices including Language Arts, Math, Science, Social Studies, STEM and other content areas. Our partnerships allow us to integrate Maryland's Environmental Literacy standards with the most up-to-date standards in other content areas including Common Core, Next Generation Science Standards and Social Studies C3. This collaboration has enabled us to develop a truly interdisciplinary environmental literacy program.

Outdoor field experiences are essential for authentic environmental investigation and for developing environmental awareness and a sense of responsibility for the natural world. Through our environmental literacy curriculum, students participate in outdoor learning throughout elementary, middle and high school on school grounds, at our outdoor education centers and in the community.

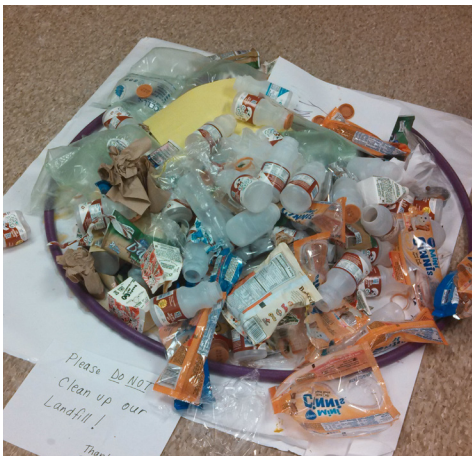
From the beginning to the end of their AACPS experience, students investigate and take action on local and global environmental issues through authentic, hands-on, project- and problem-based learning. In this way, they become environmentally literate citizens who are prepared for success in college, career and community life.

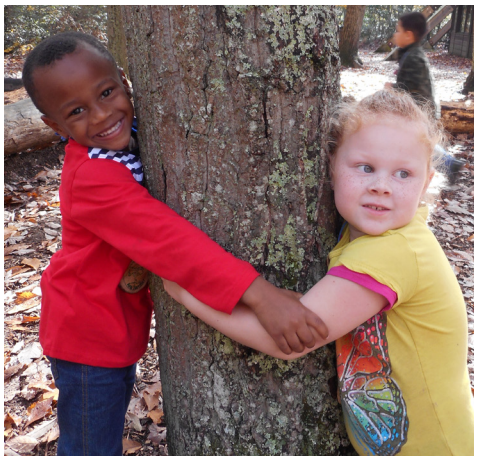
# Our Goals

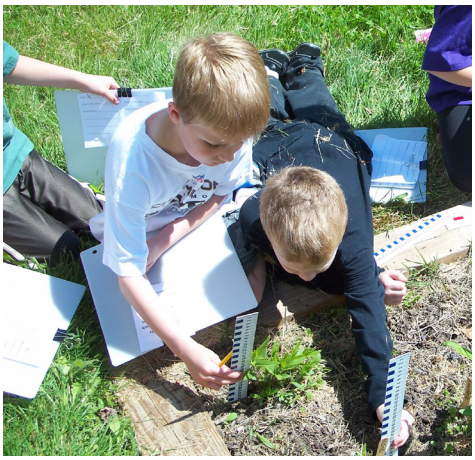
1. Prepare students for college, career and community life with a prekindergarten through high school environmental literacy curriculum and programming that aligns the MSDE Environmental Literacy standards with up-to-date standards in other core content areas. The environmental literacy curriculum and program includes:
   - Classroom learning integrated with outdoor learning on school grounds, at our outdoor education centers and in the community
   - Environmental issue investigation
   - Student environmental action
   - Assessment
2. Empower teachers to use the environment and outdoors as a context for learning
3. Serve as a community resource for educating and building stewardship among the citizens of Anne Arundel County in support of the Chesapeake Bay Watershed Agreement.



# Curriculum and Programming Highlights





## Prekindergarten
### *What's the Trouble with Trash?*

Prekindergarten students learn about the problems associated with trash and litter. A variety of classroom and outdoor activities make learning fun. Students enjoy creating a model landfill in the classroom, sorting materials for recycling, singing and moving to "green" songs, and exploring how litter travels.

The interdisciplinary lessons include standards in language arts (listening, speaking, reading and writing), math, science, social studies, environmental literacy, music and fine arts. Students acquire knowledge and skills by creating models, sorting, tallying, graphing, classifying, sequencing, using thinking maps, participating in interactive read alouds, singing and more. Students learn to recycle at school and home to help address the "trouble with trash."

## Kindergarten
### *Why are Trees Terrific?*

*Camp Woodlands Field Experience*

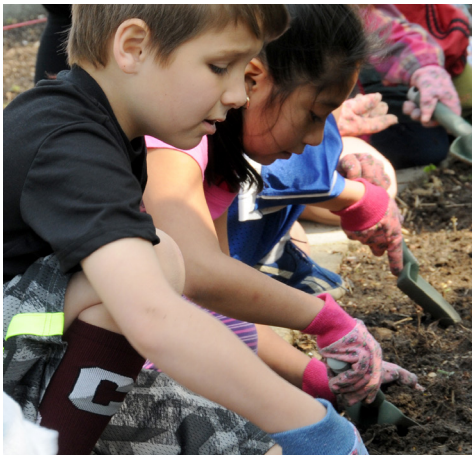
Students begin this unit with a full day of tree investigation at school including outdoor exploration, model-making, discussion, songs, games, books and video. Students then participate in a one-day field experience at Camp Woodlands in Annapolis. Through hands-on activities, movement and music, students investigate the life cycle of a tree, learn about forest ecology, and discover that trees protect water quality. The day after the field experience is used for reflection and communication with more songs, games, math activities, discussion, writing and drawing. In spring, kindergarteners investigate deforestation and habitat loss. They take action to address these issues by planting and caring for trees on their school grounds. Students also learn and share that reducing, reusing and recycling paper, cardboard and wood will help conserve trees.

Supervision and instruction at Camp Woodlands are provided by Environmental Literacy and Outdoor Education staff and by volunteers recruited by classroom teachers. Students bring lunch to enjoy outdoors, weather permitting. Camp Woodlands is a 34-acre site owned by the Girl Scouts of Central Maryland. It includes forest, stream, meadow and wetland habitats and is located on Broad Creek, an estuary of the South River.

## Grade 1
### *How Can We Help Monarch Butterflies?*

First graders kick off their school year with ten full days of instruction devoted to multidisciplinary Monarch discovery. Students bring Monarch caterpillars into the classroom from schoolyard gardens and observe the life cycle, adaptations and behaviors. These activities bring the Next Generation Science Standards and environmental literacy standards to life. Students also learn map skills and other social studies content while exploring the epic North American migration of the Monarch butterfly and the impact of human activity on Monarch populations throughout their range.

Math, reading, and writing all build on the Monarch theme. Students contribute to Monarch research and conservation efforts by tagging the adult Monarch butterflies before releasing them. When spring comes, students maintain their schoolyard gardens in preparation for new Monarch visitors making the journey north.

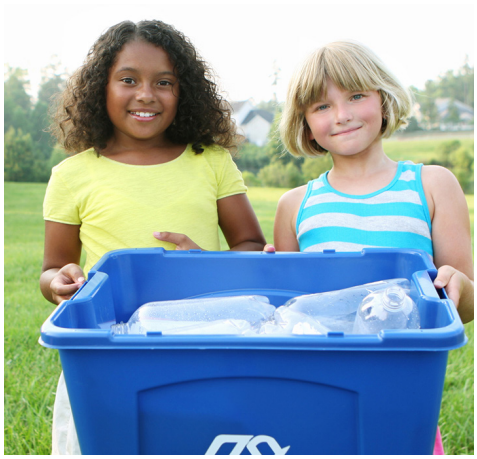


## Grade 2

### *How Can We Improve Wildlife Habitats?*

Second grade students complete a unit of study entitled "We are Environmental Stewards." Nineteen full days of instruction focus on exploration questions about environmental stewards who have changed the world, how environmental stewards communicate, what habitats are part of the environment locally and globally, and how humans have had an impact on these habitats. Students begin to explore the environment and habitats in the schoolyard then work in small groups to conduct habitat research with books and online texts and video resources.

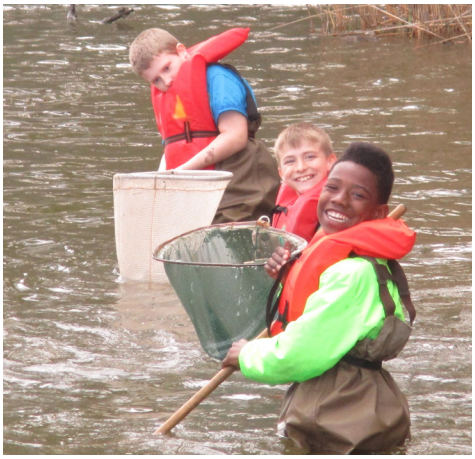
Groups share what they have learned with the class. Students then focus on the specific environmental issue of invasive plants. They take action by growing native plants from seed in the classroom and planting them at home to improve habitat there.



## Grade 3

### *How Can We Take Action on an Environmental Issue?*

Students apply 21st Century Skills that they acquire throughout the year–Communication, Collaboration, Critical Thinking and Creativity–in a cross-disciplinary unit. As a class, they investigate an environmental issue and take action. Students investigate a variety of environmental issues such energy use or waste. They conduct background research and data collection on the issues and choose one issue to address as a class. Students propose a variety of solutions and evaluate the feasibility of each solution before pursuing one. This unit combines environmental literacy, science, social studies and math standards.



## Grade 4

### *How Have Humans Affected the Chesapeake Bay and its Watershed?*

*Arlington Echo Field Experience*

Students investigate the human impact on climate, land, water and living things in the Chesapeake Bay and its watershed. Through project-based learning in their science curriculum and an outdoor field experience at Arlington Echo, students learn and share with others how they can make a difference. Every fourth grade class visits Arlington Echo Outdoor Education Center in Millersville, MD, for a one-day or overnight field experience. Student learning at Arlington Echo is aligned to topics in the science curriculum based on the timing of the field experience in the school year. Through hands-on activities, students investigate the human impact on the climate, land, water and living things in the Chesapeake Bay and its watershed.

Supervision and instruction are provided by Environmental Literacy and Outdoor Education staff and volunteers recruited by classroom teachers. Students enjoy family-style meals in the dining hall. Climate controlled cabins with bunk beds and bathroom facilities provide overnight accommodations. Arlington Echo is a 24-acre outdoor education site owned by AACPS. It includes forest, stream and wetland habitats and is located on the Severn River.

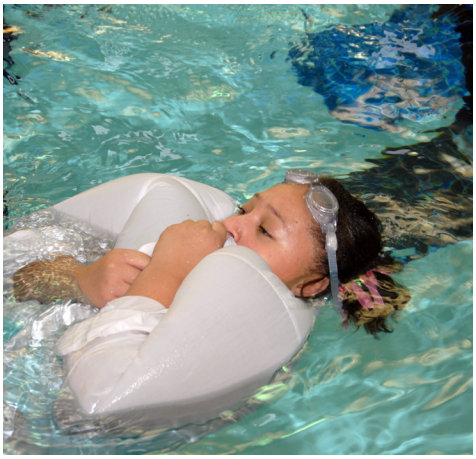
too young?

## Grade 5

### *How Do State and Local Laws Address Environmental Issues?*

At the end of the year in Social Studies, having studied the U.S. Constitution and its history, students act as responsible citizens and promote the common good by investigating and taking action on local environmental issues. In keeping with the government and law theme of Social Studies, the environmental issues selected are the subject of state or local laws or laws in nearby jurisdictions. Good citizenship and environmental action require an informed populace, so students begin their project with research, using text and video resources. Students educate one another about various issues then use the democratic process of voting to select an issue for further investigation by the class. Students survey family or community members about the issue and develop an action plan to address the issue.

Action may include informing people about a law or issue and how they can help, persuading people to change their behavior to help solve the problem, creating items to help people change their behavior (e.g., reusable grocery bags, car mirror hangers to remind people to take reusable bags into stores, etc.) or persuading lawmakers to improve a law or create a law. Students are encouraged to think of creative ways to communicate such as writing for the local newspaper or school publications, writing letters, producing public service announcements, or creating items such as door hangers, kitchen magnets, bumper stickers, tee-shirts, picture books, or reusable bags.



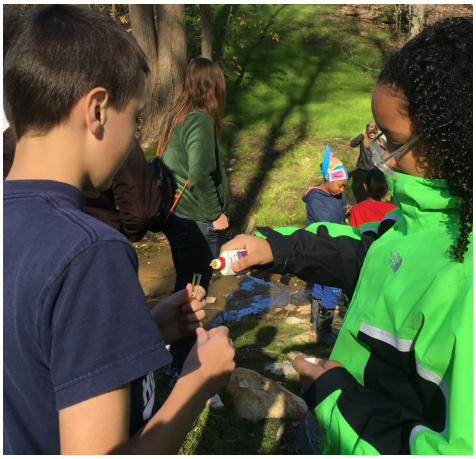
## Grade 5

### *Drownproofing*

*Drownproofing Field Experience*

Since 1979, the fifth grade Drownproofing Program, has been teaching AACPS students how to be safe in our county's extensive aquatic environments. The Drownproofing Program is a comprehensive aquatic safety program for AACPS fifth graders. Students learn personal water safety skills through classroom and pool instruction. Water safety readiness lessons are taught at school by classroom teachers; these lessons are aligned with the language arts and physical education curriculum. Each student receives instruction at either the Arundel Olympic Swim Center in Annapolis or the pool at Arlington Echo Outdoor Education Center. Each student receives four hours of instruction from certified aquatic safety instructors.

Lessons focus on personal water safety, use of personal flotation devices (PFDs), safe rescues of others, cold water survival techniques, hypothermia and ice safety.



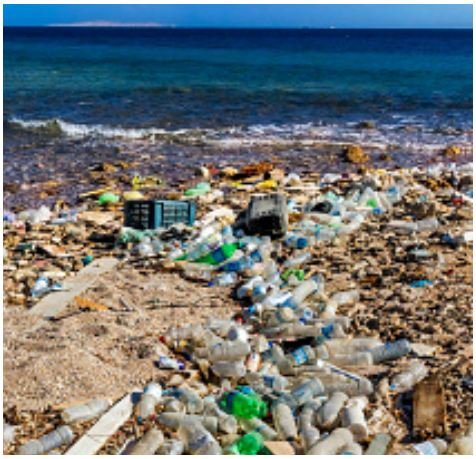
## Grade 6

### *How Do We Care for the Chesapeake Bay as a System?*

*Chesapeake Connections Field Experience*

Sixth graders investigate the human impact on the Chesapeake Bay system through water quality and its effects on the estuary. Each middle school focuses on one of following topics related to water quality and the Bay: water quality monitoring, submerged aquatic vegetation, oysters, riparian forest buffers or storm water restoration. Investigations address the ecology, history, policy and economics of Chesapeake Bay issues.

Students learn in the classroom, through field experiences and restoration projects. Environmental Literacy and Outdoor Education staff prepare students for environmental action through classroom instruction then lead students in outdoor restoration projects.



## Grade 7

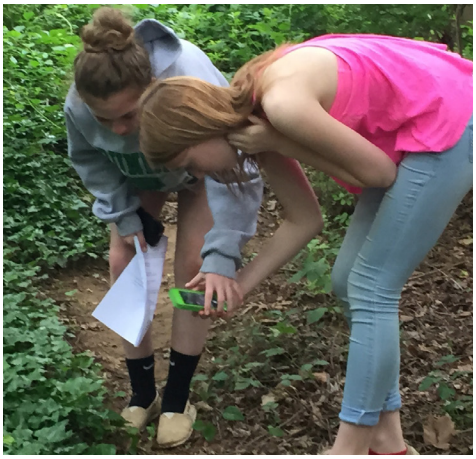
### *How Do Plastics Affect the Environment?*

Students examine the many products we use, such as plastics, that are the result of the synthesis of natural resources via chemical reactions. Students consider the benefits and the impact of these synthetic products on society and the environment. Students investigate how plastics affect the environment and design and construct environmentally friendly alternatives.

## Grade 8

### *How are Humans Affecting Global Climate?*

Students investigate the causes and effects of environmental change. Students work in cooperative groups to research one of the ways humans affect the natural change process. Students learn about global issues such as climate change and invasive species.

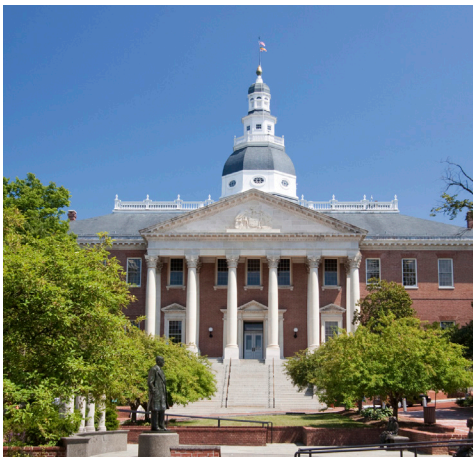


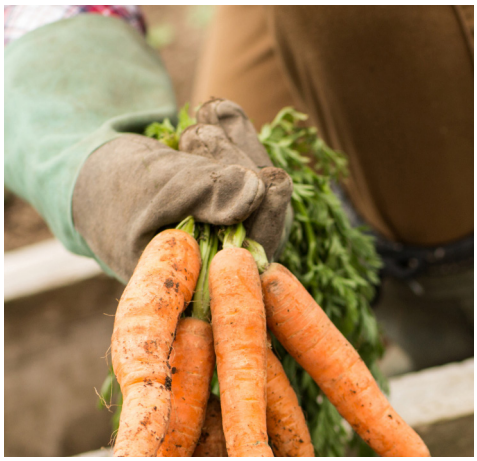
## Biology

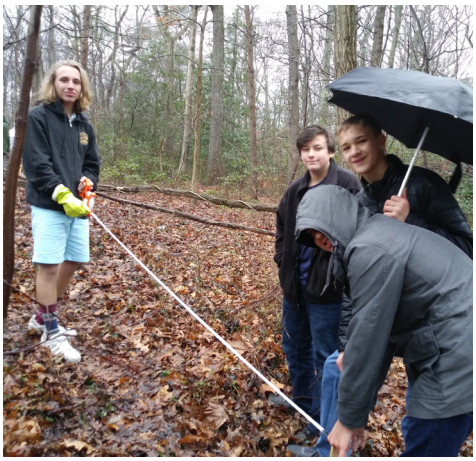
### *How Have Human Activities Affected Biodiversity?*

Students analyze manmade and human features in the environment on school grounds and determine if these features affect the local watershed, specifically the biodiversity of the trees, invertebrates, land animals, and birds. Students conduct a Bioblitz on school grounds using the MapplerK2 smart phone app and upload biodiversity data to a map using the GPS function on their phones. They inventory birds, trees, land animals or invertebrates as a class, and compare the biodiversity data on their school grounds with other schools in the county.

Students assess the amount of impervious surface at their school and use that information to look for relationships between biodiversity and overall impervious surface at high schools in the county. Data are collected every year, and students analyze annual trends in biodiversity as they relate to human induced changes on their school grounds, e.g., addition of parking lots, or building construction.







## Government

### *How should federal, state, and local governments collaborate to create policies to protect ecosystems like the Chesapeake Bay?*

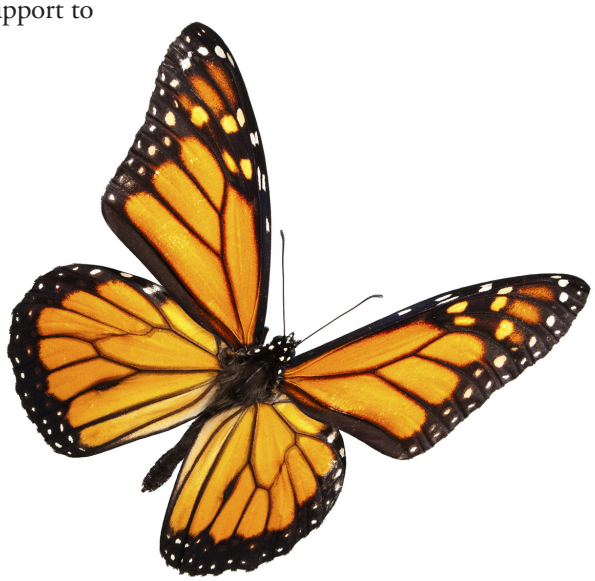
Students investigate how government and non-government agencies interact regarding environmental issues. They investigate federal, state, and local government influence on national environmental issues, as well as on the Chesapeake Bay and Maryland. The influence of non-governmental entities on government action and public opinion is also considered. Students use evidence to produce a final product related to civic action. Students present their findings in an effort to inform the public, promote government action, or add support to non-governmental entities.

## Family & Consumer Science

Depending on the course, students may consider the impact of food resources in regard to scarcity and environmental sustainability or they may investigate the green movement's impact on the fashion industry and present research on a chosen topic.

## Health

Students investigate how changes in the environment affect health. They examine how the environment influences the emergence of disease and how global climate change contributes to the spread of infectious disease.

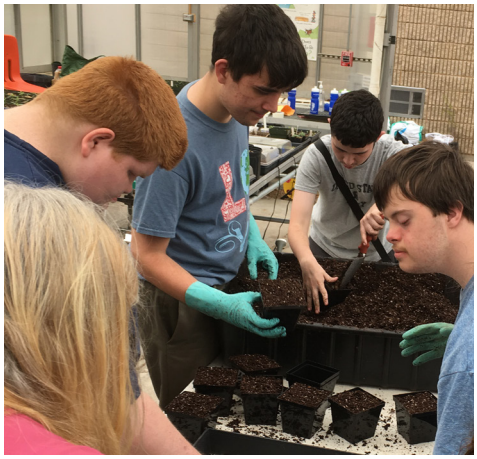


## Environmental Science

### *How do Humans and other Components of Earth Interact?*

Environmental Science is an interdisciplinary study of the world. Students use the skills and processes of science and environmental literacy to investigate and explain the interactions of the biological, physical, and chemical components of the environment. Topics include how matter and energy are conserved over time, natural resources and human needs, and the impact of environmental issues on society. The course includes Next Generation Science standards (life, physical and earth) as well as environmental literacy standards. The units are project-based, enabling students to apply their learning to real-world environmental issues. Students access primary and secondary text and visual sources, in traditional and technology-based formats. Critical thinking, peer communication/collaboration, and creativity are emphasized.

Students take action to help the environment by developing and implementing an invasive species removal plan on their school grounds or in collaboration with local parks.



## Alternative Academic Curriculum

### *Native Growers*

*Horticulture Experience*

Native Growers is a program in partnership with the Office of Special Education. High school Alternative Academic Curriculum students develop horticulture skills while learning about the importance of growing native plants and their relationships to native animals. Students grow milkweed to support Monarch caterpillars, various nectar plants to support pollinators, submerged aquatic vegetation to plant in rivers to protect the shoreline and provide habitat for marine species, and trees to be planted in restoration projects. They propagate plants by seed, root divisions and cuttings.

Students learn how to water, identify and treat plant pests using integrated pest management, transplant plants and compost. The plants produced by this program will help to support our Chesapeake Connections team to complete restoration projects with students at schools throughout the county.

# Special Environmental Programs

## *T.E.R.P.*

The Terrapin Education and Research Partnership is a supplemental classroom program, operating under a MD DNR permit. Northern Diamondback Terrapins (*Malaclemys terrapin*) are placed in classrooms in October. Students research the natural history of our state reptile, collect weekly growth data, make behavioral observations, and record husbandry protocols. Growth data are also collected during tagging just prior to release on the beaches of Poplar Island in May and June. The terrapins are implanted with a microchip for identification.

Upon recapture in future years, terrapins are scanned for tags, and growth data are compared to information collected in the classroom. By raising and releasing these terrapins, students support important terrapin conservation research. Teacher training is required for participation.

## *Envirothon*

Envirothon is a statewide competition for high school students. Students study topics such as aquatics, forestry, soils and wildlife and participate annually in an outdoor competition. Envirothon teams are made up of five students who work together to study Maryland's natural resources throughout the school year. All topics are hands-on and include practical skills. Training is conducted by experts in each field. Students train in the fall and spring with resource professionals in four content areas and one topic that changes annually.

County competitions typically occur in April, and county winners compete at the state level in June. Arlington Echo is used for training and competitions. Our staff also provide instructional support to teachers and students.

## *High School Internships*

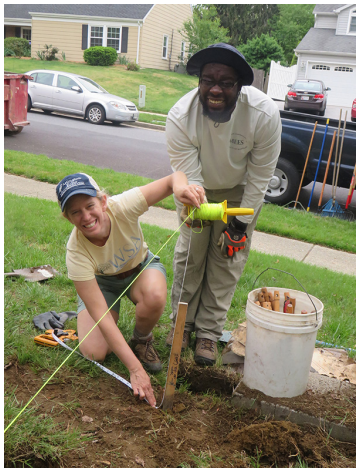
The Environmental Literacy and Outdoor Education program offers year-long and semester long high school internships. Education interns work with the kindergarten program at Camp Woodlands or the fourth grade program at Arlington Echo, teaching students through outdoor experiential learning.

Research interns undertake research projects at Arlington Echo. Research topics have included submerged aquatic vegetation, phytoplankton, water quality, rare or threatened native plants, and wildlife and bee studies. Environmental horticulture interns assist Arlington Echo staff with environmental horticultural activities in support of school-based or field-based programs. Chesapeake Connections interns support classroom outreach to middle school students and environmental stewardship field projects.

# Watershed Stewards

The Anne Arundel County Watershed Stewards Academy (WSA) is a non-profit organization based at Arlington Echo Outdoor Education Center. It is a partnership between Anne Arundel County Public Schools and the Anne Arundel County Department of Public Works. WSA envisions an Anne Arundel County in which every community is actively engaged in cleaning and protecting our waterways.

WSA trains Master Watershed Stewards to help neighbors reduce pollution in our local creeks and rivers. Our hands-on certification course gives Stewards the tools to implement change in their communities, turning knowledge and good intentions into action. Stewards work with their communities to install projects such as rain gardens or conservation landscapes to reduce pollution at its source. Collectively, these actions add up to better health for our local waterways and the Chesapeake Bay



WSA supports Environmental Literacy in AACPS by training Stewards to work directly with students and by connecting volunteer Master Watershed Stewards with schools that are undertaking environmental action. Over the years, Stewards have installed projects, provided expertise in the classroom and volunteered at school environmental events.

Since 2009, WSA has certified over 200 Master Watershed Stewards representing over 100 communities and 25 houses of worship from Brooklyn Park to Herring Bay. These Stewards have installed over 2,300 projects from rain barrels to stream restoration and volunteered over 30,000 hours to assist their communities to take action. They have reached over 135,000 people across Anne Arundel County with locally relevant environmental education.

To learn more, or to become a Master Watershed Steward, please visit aawsa.org.

# Maryland Green Schools

The MAEOE Green Schools Award Program encourages sustainability, fosters environmental literacy, and empowers youth to reduce their environmental impact. Schools that achieve Green School certification demonstrate an exceptional commitment to environmental education, environmental action and community outreach. According to studies, students whose learning is connected to their environment do better in school. Working with the environment is also a great way to integrate all academic disciplines.

More than half of AACPS schools are Maryland Green School awardees. AACPS continues to set an example for district sustainability with embedded environmental literacy curriculum and system-wide green practices. The goal is to have 100% of our schools certified.

Resource staff from the Environmental Literacy and Outdoor Education Office provide technical, instructional and programmatic support to help move schools to a more sustainable future. Maryland Green School certification is a collaborative effort of instruction and facilities. Arlington Echo Outdoor Education Center is a Maryland Green Center, supporting schools and providing resources and examples in environmental sustainability.

Schools re-certify every four years and continue to integrate and reinforce environmental lessons. The Maryland Green School objectives include environmental issue instruction, professional development for teachers, school-wide environmental behavior changes, celebration of green practices, community partnerships and student-driven sustainability practices. These practices include responsible transportation and reduced emissions, healthy living and learning environments, water conservation, pollution reduction, energy conservation, structures for environmental learning, habitat restoration, and solid waste reduction.

U.S. DEPARTMENT OF EDUCATION

GreenRibbonSchools

## *2016 U. S. Department of Education Green Ribbon District Sustainability Awardee*

The U.S. Department of Education Green Ribbon Schools (ED-GRS) recognition award honors public and private elementary, middle, and high schools, districts, and postsecondary institutions that are demonstrating progress in three Pillars:

1) reducing environmental impact and costs, including waste, water, energy use and alternative transportation;
2) improving the health and wellness of students and staff; and
3) providing effective sustainability education.

***U.S. Department of Education Green Ribbon District Sustainability***

Anne Arundel County Public Schools

***U.S. Department of Education Green Ribbon Schools***

Broadneck High & Folger McKinsey Elementary

# Additional Environmental Learning Opportunities

***AP Environmental Science:*** All twelve AACPS comprehensive high schools offer AP Environmental Science.

***Environmental Literacy Signature:*** Broadneck High School. A Signature brings together educators with local business and community leaders to make classroom instruction relevant, interesting, and challenging for students with opportunities that connect to the 21st century workplace. As an Environmental Literacy Signature, the students focus on issues that address human impact on the global environment.

The ***STEM Magnet High School*** programs have a green technology option. Students participate in environmentally focused specialty classes including Environment and Society and Green Architecture.

The STEM Magnet High School programs offers a ***Community Challenge course*** where students are paired with businesses/ community members to develop real world solutions. Examples of student development projects include invasive species removal plans, app development for stormwater tour, bicycle with cart to supply healthy food (fruits and vegetables) to AACPS community, and bioretention area redesign.

The ***STEM Middle School Magnet Program*** offers students an inquiry-based, interdisciplinary curriculum to explore diverse subjects. Student entering 6th grade are required to attend a 2-day outdoor field experience. STEM themes often engage students in environmental issues especially focused on the Chesapeake Bay.

The ***Curriculum for Agricultural Science Education (CASE)*** at one high school provides a high level of educational experiences to students to enhance the rigor and relevance of agriculture, food, and natural resources subject matter. CASE uses science inquiry for lesson foundation, and concepts are taught using activity-, project-, and problem-based instructional strategies.

The ***Honors Environmental Resources Management*** program at CAT North gives students working knowledge and first-hand experience in the areas of water resources, fisheries/wildlife, soil, forests, watershed restoration and green technology. The program focuses on the Chesapeake Bay watershed, and instruction includes classroom, hands-on, lab, field, and project-based activities. Students work with Arlington Echo's Chesapeake Connections program and with community, private, and local government programs.

All of the ***Center for Applied Technology programs,*** from Welding to Culinary Arts, include activities focused on sustainability practices for that industry.

In the ***Biomedical Allied Health program,*** students are designing and developing a vertical garden to enhance air quality and improve courtyard aesthetics.

Students from three high schools participate in an annual ***Career Symposium*** sponsored by the Chesapeake Bay Foundation.

# Community Partnerships

## Annapolis Maritime Museum

The Annapolis Maritime Museum (AMM) provides programming in support of the 6th grade Chesapeake Connections program. Four of our middle schools study oysters as part of their program and AMM provides engages them in oyster restoration, ecology and history as they learn the importance of oysters in the Chesapeake Bay.

## Anne Arundel County Department of Public Works

The Environmental Literacy and Outdoor Education Office works with the Anne Arundel County Department of Public Works (DPW) to engage students in community environmental action by planting native plants in state-of-the-art Regenerative Stormwater Conveyance Projects. These innovative ecosystem restoration and stream retrofit projects slow and infiltrate stormwater. Stormwater from impervious surfaces has been identified as the primary source of non-point pollution in the Chesapeake Bay. The student's role in this restoration effort begins in the classroom, where teachers and staff initiate an investigation of stormwater issues affecting the county's 12 watersheds. Students learn their "watershed address" and use GIS technology to identify storm drains, outfalls and impervious surfaces near the project–often in their own communities. Students learn basic engineering and ecological principles associated with restoration and the role of native plants in these projects. Students take action at newly-restored sites by planting native wildflowers, shrubs and trees as the final phase of construction. Students know the vital role that these plants play in habitat restoration, nutrient uptake, and soil stabilization. To date, Arlington Echo and AA County DPW have partnered on 22 projects.

## Anne Arundel County Recreation and Parks

Anne Arundel County Recreation and Parks is providing outdoor environmental programming for AACPS teachers and students. In this pilot partnership, mentor groups consisting of a DNR park ranger, a volunteer "Weed Warrior," and three to four teachers will work to support ninth grade Environmental Science students from six public high schools to learn about invasive plant species in our county, develop removal plans, and conduct removal projects in six Anne Arundel County community and regional parks.

## Chesapeake Bay Foundation

The Chesapeake Bay Foundation has supported Anne Arundel County Public Schools for many years through resource support, professional development of our teachers and programming. The Chesapeake Bay Foundation is a conservation organization dedicated to saving the Bay.

## Maryland Association for Environmental and Outdoor Education

The Maryland Association for Environmental and Outdoor Education (MAEOE) encourages, engages and empowers communities to understand, responsibly use and protect the natural world. They promote environmental awareness by serving teachers, natural resource managers, nature center staff and environmental program managers with training, conferences, publications, programs and other resources. A major focus for MAEOE is managing and operating the Maryland Green Schools and Green Centers Programs.

# Other Partners include:

Anne Arundel County Public Schools
Environmental Literacy and Outdoor Education Office
Arlington Echo Outdoor Education Center
975 Indian Landing Road, Millersville, MD 21108 | 410-222-3822

Arlingtonecho.org www.facebook.com/ArlingtonEcho @AEchoEnvEdAACPS

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