

APS Environmental Literacy Plan

APS lists among its core values excellence, innovation, collaboration, and stewardship. These values must be applied to solve future environmental problems that its students will meet after they leave the school system. In order to prepare its students for the challenges they will encounter, APS is working to create a cohesive plan to evaluate how it teaches environmental literacy throughout each student's tenure. The following statement summarizes APS's environmental literacy goals:

"To provide students with multiple opportunities to increase their environmental literacy at each grade level in order to enable students to graduate with the knowledge, skills, and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic, and social stability."

The APS Environmental Literacy Plan is based on the [APS Strategic Plan](#), [Virginia Standards of Learning](#), and [Virginia Environmental Literacy Guidelines](#). The purpose of this document is to create an outline of the resources that APS has at its disposal to meet its goal of graduating students with high levels of environmental literacy. By creating a centralized location where resources can be listed and analyzed, APS can structure a more comprehensive view of what is being done to meet its environmental literacy goals. This document is the beginning of the evaluation process. This will be a living document, as programs get added, deleted, modified, or moved.

According to the [North American Association for Environmental Education](#), there are four components to environmental literacy. The following is taken from the executive summary for developing an assessment framework for environmental literacy among society:

Competencies	Knowledge
<p>Competencies are clusters of skills and abilities that may be called upon and expressed for a specific purpose. Measurement of competencies is the primary objective in large-scale assessments. They include the capacity to:</p> <ul style="list-style-type: none">● Identify environmental issues,● Ask relevant questions,● Analyze environmental issues,● Investigate environmental issues,● Evaluate and make personal judgments about environmental issues,● Use evidence and knowledge to defend positions and resolve issues,● and create and evaluate plans to resolve environmental issues. <p>The expression of a competency is influenced by and influences prior knowledge and dispositions.</p>	<p>Environmental literacy entails knowledge of:</p> <ul style="list-style-type: none">● physical and ecological systems;● social, cultural and political systems;● environmental issues;● multiple solutions to environmental issues;● and citizen participation and action strategies.

Dispositions	Environmentally Responsible Behavior
<p>Dispositions are important determinants of behaviors related to the environment, both positive and negative. Learners' dispositions toward the environment are thought to influence their willingness to recognize and choose among value perspectives, as well as their motivation to participate in public deliberations about environmental issues. They include:</p> <ul style="list-style-type: none"> ● Sensitivity; ● attitudes, ● concern, ● and worldview; ● personal responsibility; ● self-efficacy/locus of control; ● and motivation and intentions. 	<p>Competencies, knowledge, and dispositions enable and are expressed as behaviors, and environmentally responsible behavior is the ultimate expression of environmental literacy. It describes the point at which competencies, knowledge, and dispositions are brought to bear within a particular context. Treating behavior as a component of large scale environmental literacy assessments, however, is controversial, in part because it is more difficult to assess than the other components. Measures of behavior tend, for obvious reasons, to rely heavily on self reports, which many researchers view as less reliable than other sorts of measures.</p>

The four components of environmental literacy should also be considered through a social justice lens, as environmental stewardship, decisions, policies, and the effects of them, impact different communities in different ways. In order to provide teachers (and possibly students) with background information on the [connections between environmental literacy and social justice](#), a resource list has been compiled. This is a dynamic list that can be modified as resources are used, vetted, and understanding is expanded.

In order for the goal of environmental literacy to be integrated into an already demanding course load, these four components can be aligned with the Virginia Standards of Learning. Each standard is an opportunity to build in components of environmental literacy. General science principles and environmental literacy components dovetail together to help students achieve a meaningful and socially responsible education. Studies show that when using environmental literacy as a framework, students outperform academically compared to traditional programs.

A large component of providing environmental literacy is the Meaningful Watershed Experience (MWEE) that was part of the [2014 Chesapeake Bay Watershed Agreement](#). As a helpful guide, the [NOAA definition of a MWEE](#) is provided here:

Meaningful Watershed Experience (MWEE): multi-stage activities that include learning both outdoors and in the classroom, and aim to increase the environmental literacy of all participants. Teachers should support students to investigate topics both locally and globally that are of interest to them, learn they have control over the outcome of environmental issues, identify actions available to address these issues, and understand the value of those actions.

All four of these components are required for the experience to qualify as a Meaningful Watershed Educational Experience (MWEE):

Issue Definition: Students identify an environmental question, problem, or issue and explore through background research and investigation.

Outdoor field experiences: Students participate in one or more outdoor field experiences sufficient to collect the data required for answering the research questions and informing student actions.

Action projects: Students participate in an action project during which students take action to address environmental issues at the personal or societal level.

Synthesis and conclusions: Students analyze and evaluate the results of their investigation of the issue and synthesize and communicate results and conclusions.

[Superintendent's Advisory Committee on Sustainability \(SACS\)](#)

APS also demonstrates its dedication to sustainability and environmental literacy through the continued efforts of the Superintendent's Advisory Committee on Sustainability (SACS). The mission of the SACS is to provide recommendations to the Superintendent to achieve APS's sustainability objectives. This committee is also responsible for overseeing the Sustainability Liaison Program, which has a focus on waste reduction (reduce, reuse or recycling efforts), energy conservation, and sustainability projects that are based on the school's needs or are passionate to the students and/or liaisons. This ever-expanding program aims to support teachers at APS by providing a modest stipend in exchange for coordinating and designing sustainability activities that engage students and the APS community. Through the important work of the Sustainability Liaison's, APS increases the frequency of environmental literacy learning. More information on the SACS, including its annual reports and recommendations can be found by clicking on the link above, or by clicking [here](#).

Grade Band Environmental Literacy Targets

Elementary Environmental Literacy Targets

By the end of Grade 5, APS elementary students will engage in experiences that:

- address environmental literacy as outlined in the Virginia SOLs grades K-5,
- occur in their schoolyards or outdoor learning spaces,
- provide the opportunity to participate in local outdoor education opportunities, such as Nature Center class visits in the 1st grade,
- are hands-on, outdoor learning experiences, such as the Outdoor Lab in the 3rd and 5th grade,
- engage them in sustainability education and projects led by their sustainability coordinator or classroom teachers in their schools, and
- fulfill the opportunity to participate in at least one complete MWEE experience.

[K-5 Curricular Connections](#)

Middle School Environmental Literacy Targets

By the end of Grade 8, APS Middle School students will engage in experiences that:

- address environmental literacy as outlined in the Virginia SOLs grades 6-8,
- occur in their schoolyards or outdoor learning spaces,
- are hands-on, outdoor learning experiences, such as the Outdoor Lab in the 7th grade,
- engage them in sustainability education and projects led by their sustainability coordinator or classroom teachers in their schools, and
- fulfill the opportunity to participate in at least one complete MWEE experience.

[6-8 Curricular Connections](#)

High School Environmental Literacy Targets

By the end of grade 12, APS High School students will engage in experiences that:

- address environmental literacy as outlined in the VA SOLs,
- occur in their schoolyards or outdoor learning spaces,
- engage in research, service projects, clubs or internship opportunities that promotes environmental stewardship,
- offer the opportunity to receive the Board of Education Seal for Excellence in Science and the Environment, and
- fulfill the opportunity to participate in at least one complete MWEE experience.

[9-12 Curricular Connections](#)

Additional components to incorporate within curriculum documents:

- Problem-based or project-based learning opportunities that can be connected
- Performance assessments with environmental themes
- Ways to better incorporate outdoor space available at the school
- Social justice components of environmental literacy
- [Arlington Water Quality Overview](#)

External Partnerships and Internal Support	
APS Partnering Organizations	<p>Applied Energy Services Corporation, Arlington County Department of Environmental Services, Arlington County Nature Centers, Arlington Master Naturalists, Arlington Outdoor Education Association, Dominion Energy, Eco-Action Arlington, Friends of the Planetarium, National Oceanic and Atmospheric Administration (NOAA), National Wildlife Federation (NWF)</p>
Internal APS Support	<p>Arlington Public Schools recognizes the vital role the many departments within the school system plays in supporting the Environmental Literacy Plan.</p> <ul style="list-style-type: none"> ● Facilities and Operations ● Food Services ● Information Systems ● Teaching and Learning ● Transportation ● School and Community Relations <p>Through the Science Office, the APS Chemical Hygiene Plan provides guidance on environmentally-conscious chemical use and disposal within Arlington Public Schools and is available to teachers at all grade levels within Canvas.</p>

Resources:

Alice Ferguson Foundation. (2020). Bridging the watershed. Retrieved from <https://fergusonfoundation.org/bridging-the-watershed/>

Arlington Public Schools. (2018). 2018-2024 APS strategic plan. Retrieved from <https://www.apsva.us/strategic-plan/>

Arlington Public Schools. (2020). Superintendent's advisory committee on sustainability. Retrieved from <https://www.apsva.us/aps-goes-green/superintendents-advisory-committee-sustainability/>

Board of Education: Commonwealth of Virginia. (2018). Science standards of learning curriculum framework 2018. Retrieved from http://www.doe.virginia.gov/testing/sol/standards_docs/science/index.shtml

Caring for Our Watersheds. (2018). Chesapeake Bay. Retrieved from <https://caringforourwatersheds.com/usa/chesapeake-bay/>

Chesapeake Bay Program. (2014). Chesapeake Bay watershed agreement. Retrieved from https://www.chesapeakebay.net/documents/FINAL_Ches_Bay_Watershed_Agreement.withsignatures-Hires.pdf

Chesapeake Bay Program. (2020). Underwater grasses. Retrieved from https://www.chesapeakebay.net/issues/bay_grasses

Department of the Interior. (n.d.). Every kid outdoors. Retrieved from <https://everykidoutdoors.gov/index.htm>

National Oceanic and Atmospheric Association. (2017). NOAA meaningful watershed educational experience. Retrieved from <https://www.noaa.gov/education/explainers/noaa-meaningful-watershed-educational-experience>

National Wildlife Federation. (2020). Eco-Schools USA. Retrieved from <https://www.nwf.org/eco-schools-usa>

North American Association for Environmental Education. (2020). Environmental literacy framework. Retrieved from <https://naaee.org/our-work/programs/environmental-literacy-framework>

The College Board. (2020). AP Biology: About the course. Retrieved from <https://apstudents.collegeboard.org/courses/ap-biology>

The College Board. (2020). AP Environmental Science: About the course. Retrieved from <https://apstudents.collegeboard.org/courses/ap-environmental-science>

Virginia Department of Education (n.d.). Environmental literacy. Retrieved from http://www.doe.virginia.gov/instruction/environmental_literacy/index.shtml

Virginia Department of Education. (n.d.). Environmental science course content and process guidelines. Retrieved from http://www.doe.virginia.gov/testing/sol/standards_docs/science/index.shtml.

Virginia Department of Education. (n.d.). Science outcomes: Ecology. Retrieved from http://www.doe.virginia.gov/testing/sol/standards_docs/science/index.shtml.

Kindergarten - Grade 5

This table identifies where environmental literacy instruction takes place at each grade level. These instances are aligned with the Virginia Standards of Learning (SOLs) and should support the central theme of each grade level. In addition, each grade band has identified environmental literacy targets that can be achieved through the cumulative experiences at each level.

Jump to:					
Kinder	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5

Content Areas and Themes	Environmental Literacy Strands (based on 2018 VA SOL Curriculum Frameworks)	APS Sponsored Opportunities Supporting Environmental Literacy	Suggested or Possible Sustainability Liaison Projects	Example Environmental Field Trips and Individual School Sponsored Environmental Literacy Programs/Projects
Kindergarten				
Science Using my senses to understand my world	K.11 a-c Central Idea: Humans can impact the amount of natural resources by reusing, recycling and conserving. Unit: Earth's Resources (Q4)	None identified	Recycling projects Waste free lunch Engineering challenges with recyclables	Schoolyard Nature Scavenger hunt Trips to local Nature Centers
Social Studies How can I be a good member of the local community?	K.5 a-e Students will use simple maps and globes. K.7 Students will describe how the location, climate, and physical	None identified	Mapping schoolyards or local nature centers Recycling project connecting to being involved in the community and helping	None identified

	<p>surroundings of a community affect the way people live.</p> <p>K.10 Students will demonstrate traits of good community members.</p>		others in the community.	
<p>Health</p> <p>Importance of healthy environment to include proper disposal of trash, recycle, reuse & water conservation</p>	<p>Identify everyday items that can be reduced, recycled, repurposed, or reused. (1.1q)</p> <p>The importance of proper disposal of trash and recycling (1.2q, 1.3q)</p> <p>Ways to conserve water and prevent water pollution and why it is important (1.2q, 1.3q)</p>	None identified	<p>School yard recycle project</p> <p>Reuse projects</p>	None identified
<p>Career and Technical Education (CTE)</p>	<p>Not yet developed</p>			
Grade 1				
<p>Science</p> <p>How I interact with my world</p>	<p>1.4 a, 1.5 a , 1.8 a-c</p> <p>Central idea: Natural resources (clean air, clean water & undeveloped land) are limited and need to be conserved and used responsibly. These resources also provide the basic life needs for survival of plants and animals.</p> <p>Unit: Earth's Resources (Q4) 1.8 a-c</p>	<p>Nature Center first grade class visits. Students learn about the characteristics of animals (SOL 1.5) and their adaptations to the environment. Students also have opportunities to interact with different animals from the Nature Centers.</p>	<p>Recycling projects</p> <p>Waste free lunch</p> <p>Engineering challenges with recyclables</p> <p>Litter prevention</p>	<p>Green Spring Gardens</p> <p>Local Nature Centers</p> <p>Schoolyard Nature Scavenger Hunt</p>

<p>Social Studies</p> <p>Civics, Economics, Geography, and History through the lens of The Commonwealth of Virginia.</p>	<p>1.2, 1.6, 1.10</p> <p>Virginia's diverse environment has affected the way people interact with their surroundings.</p> <p>Good community members have certain responsibilities.</p>	<p>None identified</p>	<p>None identified</p>	<p>None identified</p>
<p>Health</p> <p>Importance of healthy environment to include proper disposal of trash, recycle, reuse & water conservation</p>	<p>Identify everyday items that can be reduced, recycled, repurposed, or reused. (1.1q)</p> <p>The importance of proper disposal of trash and recycling (1.2q, 1.3q)</p> <p>Ways to conserve water and prevent water pollution and why it is important (1.2q, 1.3q)</p>	<p>None identified</p>	<p>School yard recycle project</p> <p>Reuse projects</p>	<p>None identified</p>
<p>Career and Technical Education (CTE)</p>	<p>Not yet developed</p>			
<p>Grade 2</p>				
<p>Science</p> <p>Change occurs all around us</p>	<p>2.5 c, 2.8 a-c</p> <p>Central idea: Habitats of living organisms may change due to human influence.</p> <p>Unit: Interdependence and Environmental Changes (Q4)</p>	<p>APS Planetarium show: The H2O Cycle</p>	<p>Habitat creation in schoolyard</p> <p>Soil erosion reduction</p>	<p>Green Spring Gardens</p> <p>Local Nature Centers</p>

	MWEE Opportunity			
Social Studies Civics, Economics, Geography, and History through the lens of The United States of America.	2.3, 2.7: American Indians developed different cultures because they lived in different environments of North America. In the past and present, American Indians have respected and protected the environments that make up their homelands. 2.8, 2.10: Natural resources and scarcity and also addressed. 2.11, 2.12: Good citizens have a variety of responsibilities and make contributions to their communities.	None identified	Connections can be made to habitat creation.	None identified
Health Ways to protect the environment and how it influences health	Explain my environment and how to protect it. (2.1n) Describe how the environment impacts health. (2.2n, 2.3n)	None identified	Posters / visuals to show effects of pollution on environment & health	None identified
Career and Technical Education (CTE)	Not yet developed			
Grade 3				
Science Interactions in our world	3.8 a-c Central Idea: Human behaviors can negatively impact organisms and their habitats. Conservation practices	Outdoor Lab Trip: 3rd grade students visit the Outdoor Lab and participate in outdoor experiential learning. SOLs covered: 3.3, 3.5, 3.6, 3.7	Soil conservation Schoolyard garden Composting	Outdoor Lab day trip Schoolyard/neighborhood land use survey

	<p>can lessen the effects of human activity on the environment.</p> <p>Units: Ecosystems (Q1), Soil (Q3)</p> <p>MWEE Opportunity</p>			<p>Dominion Energy: Project Plant It!</p>
<p>Social Studies</p> <p>Civics, Economics, Geography, and History through the lens of Ancient World Cultures</p>	<p>3.6, 3.7, 3.8</p> <p>Locating geographic features, considering how people in ancient world cultures adapted to their environment, and how different cultures used natural resources.</p> <p>3.11: Explaining actions that good citizens can take to improve the school and community.</p>	None identified	<p>Creating infographics or other community awareness campaigns.</p> <p>Litter clean-up</p> <p>Recycling/Reuse projects</p> <p>Schoolyard Garden</p> <p>Composting</p>	<p>Jamestown Yorktown Foundation Classroom Visits</p>
<p>Health</p> <p>Understand what happens with waste and recycled materials</p>	<p>Where waste goes (3.1r)</p> <p>What happens to recycled materials (3.1r)</p> <p>How reducing, reusing, and recycling products promotes a healthier environment (3.2r)</p> <p>How to reduce, reuse, and recycle in their home, at their school, and in their community (3.3r)</p>	None identified	<p>School Recycle Project</p> <p>Home Recycle Project</p> <p>Create Infographics on school recycling</p> <p>Create Infographics on community recycling</p>	None identified
<p>Career and Technical Education (CTE)</p>	<p>Not yet developed</p>			

Grade 4

<p style="text-align: center;">Science</p> <p>Our place in the solar system</p>	<p>4.8 a-d</p> <p>Central Idea: Virginia has many natural resources and “we all live downstream”.</p> <p>Unit: Virginia Resources (Q1)</p> <p>MWEE Opportunity</p>	<p>APS Planetarium Show: The Flight of the Butterfly</p>	<p>Litter cleanups, native species planting, stream studies</p> <p>Water quality testing at local streams</p>	<p>Trip to local stream</p> <p>All National Parks free for grade 4 students: Every Kid Outdoors</p> <p>Dominion Energy: Project Plant It!</p>
<p style="text-align: center;">Social Studies</p> <p>Virginia Studies</p>	<p>VS.2b: Understanding the relationship between physical geography and the lives of the native peoples, past and present</p> <p>VS.3e/f: Jamestown and how it was impacted by the environment and impacted the environment</p> <p>VS.6c: Impact of agricultural practices on the soil</p>	<p>None identified</p>	<p>Creating infographics and other products to raise community awareness about environmental issues.</p>	<p>None identified</p>
<p style="text-align: center;">Health</p> <p>Health consequences of water pollution</p>	<p>The definition of water pollution (4.1s)</p> <p>How water pollution impacts their health (4.1s, 4.2s)</p> <p>Strategies to reduce water pollution (4.3t)</p> <p>How to find and participate in local volunteering opportunities (4.2t, 4.3t)</p>	<p>None identified</p>	<p>Diary of daily habits that use water, analyze how to conserve</p>	<p>None identified</p>

Career and Technical Education (CTE)	Not yet developed			
Grade 5				
Science Transforming matter and energy	5.8 d Central Idea: Erosion and deposition contribute to Earth’s constantly changing geosystem. Unit: Changing Earth (Q4) 5.9 a-c Central Idea: Some resources are renewable and others are not. Unit: Conservation of Energy (Q4) MWEE Opportunity	The Outdoor Lab: students participate in an overnight trip to the Outdoor Lab. They are immersed in outdoor experiential learning activities. SOLs covered: 5.6, 5.8, 5.9 AES: Energy demo and class visit	Soil erosion reduction Reduce energy use (energy audits, no lights Friday etc)	Outdoor Lab Overnight Trip
Social Studies Ancient World History	5.2-5.9 Impact of geography on way of life	None identified	Creating infographics and other products to raise community awareness about environmental issues. Connections to soil erosion reduction and ties to flooding in ancient coastal areas	None identified
Health Effects of air and noise pollution on health	Review the definition of environment (5.1s) The importance of healthy air quality (5.1s, 5.2s, 5.3s)	None identified	List types of noises & rank loudness & strategies to reduce them	None identified

Strategies to reduce air quality and noise pollution on health and environment	How to reduce harmful air and noise pollution (5.2s, 5.3s)		PBL - create a product that shares health information with elementary age students on the dangers of air pollution	
Career and Technical Education (CTE)	Not yet developed			

Grades 6 - 8

This table identifies where environmental literacy instruction takes place at each grade level. These instances are aligned with the Virginia Standards of Learning (SOLs) and should support the central theme of each grade level. In addition, each grade band has identified environmental literacy targets that can be achieved through the cumulative experiences at each level.

Jump to:	
Grade 7	Grade 8

Content Areas and Themes	Environmental Literacy Strands (based on 2018 VA SOL Curriculum Frameworks)	APS Sponsored Opportunities Supporting Environmental Literacy	Suggested or Possible Sustainability Liaison Projects	Example Environmental Field Trips and Individual School Sponsored Environmental Literacy Programs/Projects
Grade 6				
Science Our world, our responsibility	<i>Water is important for agriculture, power, and public health: 6.6 f</i> <i>Watershed systems are dynamic and complex; interactions within these systems may influence the overall health of the watershed: 6.8 a-d</i> <i>Natural resource management and health and safety issues related to the use of resources should be considered in the development of public policy: 6.9 a-f</i>	APS Planetarium Show: Oasis in Space	Clear signage toward understanding of recycling procedures Cleanup of local watershed Peer to peer education regarding ongoing efforts	Smithsonian Environmental Research Center (SERC) Caring for Our Watersheds National Wildlife Federation: Eco-Schools USA

	MWEE Opportunity			
<p>Social Studies</p> <p>U.S. History</p>	<p>USI.2, USI.3, USI.5, Interactions between people and their environment</p> <p>USII.2 How physical features and climate influence the movement of people</p> <p>USII.4 environmental impact of the rise of big business</p> <p>USII.9: American environmental policy</p>	None identified	None identified	None identified
<p>Health</p> <p>Air quality and pollution effects on personal health Strategies to protect environment</p>	<p>Create a plan to address community environmental health and safety issues.</p> <p>Create and monitor progress toward a goal to protect the environment.</p> <p>Assess environmental health and safety issues in the community.</p> <p>Identify careers and professions associated with environmental health.</p> <p>Recognize that all individuals have a responsibility to protect and preserve the environment.</p>	None identified	<p>Investigate environmental health careers</p> <p>Use a creative product (PSA, podcast, infographic, social media, etc.) to inform, promote strategies to reduce pollution</p>	None identified

	Explain the role of the Environmental Protection Agency (EPA) and local agencies in protecting the environment.			
Career and Technical Education (CTE)	Not yet developed			
Grade 7				
Life Science	<p><i>Biotic and abiotic factors: Matter in cycles, energy flow in cycles, relationships: LS.5 a-c</i></p> <p><i>Interaction and interdependence: predator/prey in food webs, competition and cooperation, niche related to survival: LS.6 a,b,d</i></p> <p><i>Adaptation for survival: biotic and abiotic factors and physical and behavioral characteristics: LS.7 a,b</i></p> <p><i>Ecosystems and their components are dynamic and affected by small and large scale environmental changes: LS.8 b,c</i></p> <p><i>Relationship between ecosystem dynamics and human activity: LS.9 a-c</i></p>	The Outdoor Lab: Students spend the day learning ecological concepts through outdoor experiential education. LS.3 a-c; LS. 4 a, b; LS 5 a-c; LS.6 a-d; LS. 7 a, b; LS.8 a-c; LS.9 a-c; LS.11 c	<p>Removal of invasive plants and planting of native species on school grounds</p> <p>Development and remediation of schoolyard habitats</p> <p>Peer to peer education regarding ongoing efforts</p>	<p>Caring for Our Watersheds</p> <p>National Wildlife Federation: Eco-Schools USA</p>

	<p><i>Populations change over time due to many factors including environmental ones: LS.11 c</i></p> <p>MWEE Opportunity</p>			
<p>Social Studies</p> <p>Civics and Economics</p>	<p>CE.3d, e: it is a responsibility of community members to contribute to the common good.</p> <p>CE.4: Effective/thoughtful participation in civic life</p> <p>CE.6, 7, 8 The structure of government and lawmaking process at local, state, and national levels</p> <p>CE.10 Public Policy and decision making</p>	None identified	<p>Follow an environmental law through the lawmaking process</p> <p>Devising a plan to raise awareness of an environmental issue</p> <p>Communicate with lawmakers about environmental issues.</p>	None identified
<p>Health</p> <p>Humans' contribution to pollution</p> <p>Conservation of natural resources</p>	<p>Describe human behaviors that contribute to air, water, soil, and noise pollution.</p> <p>Explain how environmental health is essential to personal and community health.</p> <p>Demonstrate ways to conserve and promote the conservation of natural resources.</p>	None identified	<p>Use a creative product (PSA, podcast, infographic, social media, etc.) to inform, promote strategies to reduce pollution.</p>	None identified

Career and Technical Education (CTE)	Not yet developed			
Grade 8				
Physical Science	<i>Energy storage and transformation within the context of energy conservation: PS.5 b,c</i>	None identified	Energy Projects which may include: -Local power sources and use analysis integrated with speakers from local government - Signs to turn off lights when rooms are not in use. -Public transportation benefits and solutions to/from school -Electronics recycling events -Energy audits at school and home with communication of results and recommendations Peer to peer education regarding ongoing efforts	National Wildlife Federation: Eco-Schools USA

<p>Social Studies</p> <p>World Geography</p>	<p>WG.2: How humans influence the environment and are influenced by it.</p> <p>WG.4 Considering perspectives regarding natural resources and land use</p> <p>WG.5-13 Describing major physical and environmental features of the different regions of the world, evaluating how economic characteristics of regions impact the environment</p> <p>WG.15: examining the influence of the environment on human migration</p> <p>WG.16: environmental challenges of urban areas</p> <p>WG.18: Cooperation and conflict over resources</p>	<p>None identified</p>	<p>Compare environmental policies of different regions</p> <p>Awareness campaigns of environmental issues</p>	<p>None identified</p>
<p>Health</p> <p>Renewable energy and sustainable energy</p>	<p>Explain how humans and the environment are interdependent.</p> <p>Define and describe renewable resources and sustainable energy.</p> <p>Analyze opportunities for community service and advocacy for policies that promote environmental health.</p>	<p>None identified</p>	<p>None identified</p>	<p>None identified</p>

Career and Technical Education (CTE)	In process			
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Grades 9-12

This table identifies where environmental literacy instruction takes place in each content area. These instances are aligned with the Virginia Standards of Learning (SOLs). In addition, each grade band has identified environmental literacy targets that can be achieved through the cumulative experiences at each level.

Jump to:		
Social Studies	Health	Career and Technical Education (CTE)

Courses	Environmental Literacy Strands (based on 2018 VA SOL Curriculum Frameworks)	APS Sponsored Opportunities Supporting Environmental Literacy	Suggested or Possible Sustainability Liaison Projects	Example Environmental Field Trips and Individual School Sponsored Environmental Literacy Programs/Projects
Science				
Environmental Science	VDOE Guidelines MWEE Opportunity	The Outdoor Lab: Each high school is given one day a month for a trip to the Outdoor Lab. Various science classes will send their students to study biology, earth science, environmental science, and ecology. SOLs covered: varies	Implementation and monitoring of school recycling and waste management efforts Focus on peer to peer education regarding ongoing efforts Walk and bike to school campaign to reduce carbon footprint (Safe Routes Partnership).	Chesapeake Bay Foundation field trips Grasses for the Masses project through Chesapeake Bay Foundation NOAA B-WET sponsored projects and field experiences Environmental clubs

				<p>Internship opportunities</p> <p>Water testing at local stream site</p> <p>Trip to water treatment facility</p> <p>National Wildlife Federation: Eco-Schools USA</p>
Biology	<p><i>Bacteria affect other organisms and the environment, specifically infectious disease: BIO.4 e</i></p> <p><i>Synthetic biology has biological implications: BIO.5 e</i></p> <p><i>Changes in environmental conditions change populations of species in different ways: BIO.7 b-d</i></p> <p><i>Organisms are part of living systems and demonstrate interdependence with other organisms and the environment: BIO.8 a-d</i></p> <p>MWEE Opportunity</p>	None identified	<p>Building and installing bird and/or bat boxes for biodiversity</p> <p>Development, maintenance, and education efforts of composting bins in conjunction with cafeteria waste management</p> <p>Focus on peer to peer education regarding ongoing efforts</p> <p>Monitoring and water testing for local streams</p>	<p>Chesapeake Bay Foundation field trips</p> <p>NOAA B-WET sponsored projects and field experiences</p> <p>Environmental clubs</p> <p>Internship opportunities</p> <p>Observing macroinvertebrates and surrounding nature at local stream site</p> <p>Bridging the Watershed (Alice Ferguson Foundation)</p> <p>National Wildlife Federation: Eco-Schools USA</p>

Chemistry	<i>Stoichiometric relationships:</i> CH.4.b <i>Solution concentrations:</i> CH.4.c <i>Titration:</i> CH.4.d CH.6.b	None identified	None identified	None identified
Physics	<i>Conservation of Energy:</i> PH.4b <i>Optics:</i> PH.6 <i>Circuits, electrical power:</i> PH.8 <i>Modern/quantum, in particular nuclear, and photoelectric effect/solar panels:</i> PH.9a, d <u>AP and DE Physics:</u> <i>Thermal topics including heat engines and laws of thermodynamics</i>	None identified	None identified	None identified
Earth Science	<i>Many factors affect the use and the conservation of natural resources to include availability, renewal rates, and economics. The use and allocation of these resources globally have economic, political, and environmental impacts:</i> ES.6 a-d	None identified	Stream and/or trash and recycling pickup on school grounds Analysis of water movement and erosion on and around school grounds with development of remediation	Chesapeake Bay Foundation field trips NOAA B-WET sponsored projects and field experiences Environmental clubs

	<p><i>Water impacts geology and geological processes. Limited freshwater resources are impacted by several factors including human use: ES.8 a-d</i></p> <p><i>Oceans are dynamic systems that support life and moderate global temperatures. Natural occurrences and human activities can disrupt the equilibrium of the system: ES.10 a-c, e</i></p> <p><i>The atmosphere is a dynamic system that supports life in many ways. Natural occurrences and human activities can disrupt the equilibrium of the system: ES.11 a, c, d</i></p> <p><i>Changes in the atmosphere and oceans due to human activity affect global climate: ES.12 e</i></p>		<p>efforts in combination with school and local agencies</p> <p>Focus on peer to peer education regarding ongoing efforts</p>	<p>Internship opportunities</p> <p>Use school features to observe renewable resources.</p> <p>National Wildlife Federation: Eco-Schools USA</p>
<p>Ecology</p>	<p>VDOE Guidelines</p> <p>MWEE Opportunity</p>	<p>None identified</p>	<p>Development and/or maintenance of outdoor classroom with a focus on environmental education</p> <p>Engaging teachers in the use of the outdoor classroom</p> <p>Watershed cleanup</p>	<p>Chesapeake Bay Foundation field trips</p> <p>NOAA B-WET sponsored projects and field experiences</p> <p>Environmental clubs</p> <p>Internship opportunities</p>

				<p>Water testing at local stream site</p> <p>Use NoVA Parks to go canoeing/kayaking to observe ecosystems</p> <p>Engage with Four Mile Run Conservatory</p> <p>Bridging the Watershed (Alice Ferguson Foundation)</p> <p>National Wildlife Federation: Eco-Schools USA</p>
Oceanography	Content guidelines are currently under development by VDOE	None identified	<p>Aquaponics stream study</p> <p>Growing bay grasses for transplanting</p>	<p>Chesapeake Bay Foundation field trips</p> <p>NOAA B-WET sponsored projects and field experiences</p> <p>National Wildlife Federation: Eco-Schools USA</p> <p>Environmental clubs</p> <p>Internship opportunities</p>

<p>AP Biology</p>	<p><u>Ecology Unit</u></p> <ul style="list-style-type: none"> ● <i>Communication and responses to environmental changes</i> ● <i>Energy flow within and across ecosystems</i> ● <i>Factors in the growth, density, and success of populations</i> ● <i>Factors in community and ecosystem dynamics</i> ● <i>Invasive species, human interaction, and environmental changes</i> 	<p>None identified</p>	<p>Local biodiversity analysis with focus on educating teachers and other adults</p> <p>Participate in local citizen science environmental monitoring projects</p> <p>Stormwater management projects to reduce runoffs</p>	<p>Chesapeake Bay Foundation field trips</p> <p>NOAA B-WET sponsored projects and field experiences</p> <p>Environmental clubs</p> <p>Internship opportunities</p> <p>National Wildlife Federation: Eco-Schools USA</p>
<p>AP Environmental Science</p>	<p><u>Biodiversity Unit</u></p> <ul style="list-style-type: none"> ● <i>Introduction to biodiversity</i> ● <i>Ecosystem services</i> ● <i>Island biogeography</i> ● <i>Ecological tolerance</i> ● <i>Natural disruptions to ecosystems</i> ● <i>Ecological succession</i> <p><u>Land and Water Use Unit</u></p> <ul style="list-style-type: none"> ● <i>The tragedy of the commons</i> ● <i>The Green Revolution</i> ● <i>Types and effects of irrigation</i> ● <i>Pest-control methods</i> ● <i>Meat production methods and overfishing</i> ● <i>The impacts of mining</i> ● <i>Urbanization and ecological footprints</i> 	<p>None identified</p>	<p>Waste and recycling projects focus on educating teachers and other adults</p> <p>Participate in local citizen science environmental monitoring projects</p>	<p>Chesapeake Bay Foundation field trips</p> <p>NOAA B-WET sponsored projects and field experiences</p> <p>Environmental clubs</p> <p>Internship opportunities</p> <p>Water testing at local stream site</p> <p>Use NoVA Parks to go canoeing/kayaking to observe ecosystems</p> <p>Trip to water treatment facility</p>

	<ul style="list-style-type: none"> ● <i>Introduction to sustainable practices including crop rotation and aquaculture</i> <p><u>Energy Resources and Consumption Unit</u></p> <ul style="list-style-type: none"> ● <i>Energy sources and fuel types, including fossil fuels, ethanol, and nuclear power</i> ● <i>Global energy consumption and distribution of natural resources</i> ● <i>Natural sources of energy, including solar power, wind, geothermal, and hydroelectric power</i> ● <i>Energy conservation methods</i> <p><u>Atmospheric Pollution Unit</u></p> <ul style="list-style-type: none"> ● <i>Introduction to air pollution</i> ● <i>Photochemical smog</i> ● <i>Indoor air pollution</i> ● <i>Methods to reduce air pollutants</i> ● <i>Acid rain</i> ● <i>Noise pollution</i> <p><u>Aquatic and Terrestrial Pollution Unit</u></p> <ul style="list-style-type: none"> ● <i>Sources of pollution</i> ● <i>Human impact on ecosystems</i> ● <i>Thermal pollution</i> ● <i>Solid waste disposal and waste reduction methods</i> ● <i>Pollution and human health</i> 			<p>National Wildlife Federation: Eco-Schools USA</p>
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	<ul style="list-style-type: none"> ● <i>Pathogens and infectious diseases</i> <p><u>Global Change Unit</u></p> <ul style="list-style-type: none"> ● <i>Ozone depletion</i> ● <i>Global climate change</i> ● <i>Ocean warming and acidification</i> ● <i>Invasive species</i> ● <i>Human impacts on diversity</i> 			
Geospatial Tools and Techniques	<p><i>Geospatial technologies, such as geographic information systems (GIS), global positions systems (GPS), and remote sensing to a problem of interest.</i></p> <p><i>Apply technology to solve the problem, analyze the data, and propose and communicate possible solutions related to environmental issues.</i></p>	None identified	None identified	<p>NOAA B-WET sponsored projects and field experiences</p> <p>Environmental clubs</p> <p>Internship opportunities</p> <p>National Wildlife Federation: Eco-Schools USA</p>
Social Studies 9-12				
In all courses students will:	<ul style="list-style-type: none"> ● Use geographic information to determine patterns and trends to understand history ● Explain how indirect cause-and-effect relationships impacted people, places, and events in history ● Evaluate how the environment impacts humans and how humans impact and adapt their 	None identified	VA/US Govt: Working to influence public policy on environmental issues	None identified

<p>environment throughout history and in the present.</p> <p>WHII: Resources and economic interdependence</p> <p>VA/US Hist: Environmental impact of urbanization</p> <p>VA/US Govt: Public policy, governmental role in environmental protection, participation in civic life.</p>				
Health				
<p>Health 9</p> <p>Global health issues & strategies to improve</p>	<p>Examine the impact of global environmental health issues on local communities.</p> <p>Identify global environmental health issues.</p> <p>Evaluate strategies for improving health-related social issues.</p> <p>Develop a long-term plan for oneself and/or the family to positively impact a health-related social issue.</p> <p>Identify health-related social issues such as homelessness, underage drinking, and substance abuse.</p> <p>Promote global environmental health and/or disease prevention projects.</p>	<p>None identified</p>	<p>Peer education</p> <p>Reflection on documentary, movie, article on protecting the environment</p> <p>Roundtable discussion on global health issues and how they relate to Arlington</p> <p>Investigate the Blue Zone Project</p> <p>Create/produce an invention/product to address a global health issue</p> <p>Schedule a School Clean Up Day or community event</p> <p>Conduct an Eco-friendly audit</p>	<p>None identified</p>

<p>Health 10</p> <p>Environmental Health, Risks and Factors, Crisis Management Strategies for Natural Disasters and Emergency Situations</p>	<p>Explain how the quality of the environment (e.g., secondhand smoke, carbon monoxide, allergens, lead, toxic chemicals) directly affects a person’s health status and quality and length of life.</p> <p>Investigate natural disasters and emergency situations that affect the community.</p> <p>Identify health-related social issues, such as organ donation, homelessness, the spread of infectious diseases, underage drinking, substance abuse, and violence, and their impact on the community.</p> <p>Analyze how health literacy and health-science skills prepare one to become a productive citizen.</p> <p>Describe attributes, characteristics, and interests of individuals in health-related professions and the core academic skills needed for workplace skills in a health career.</p> <p>Identify life-threatening situations that may result from emergencies and natural disasters and</p>	<p>None identified</p>	<p>Reflection on documentary, movie, article on protecting the environment</p> <p>Roundtable discussion on global health issues and how they relate to Arlington</p> <p>Create/produce an invention/product to address a global health issue</p> <p>Schedule a School event to bring attention to global health issues</p> <p>Create a law or an environmental plan to improve a negative impact on the environment; write to local legislators about environmental advocacy</p> <p>Plan for a natural disaster</p> <p>Use a different discipline (art, music, literature, athletics, etc.) to promote awareness of environmental risk factors</p> <p>Start a school, community or family vegetable garden – donate to local food pantries</p>	<p>None identified</p>
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	<p>community resources for emergency preparedness.</p> <p>Explain the role of health, wellness, education, safety, and business professionals in addressing environmental health concerns.</p> <p>Describe how and where to access community resources related to organ donation, homelessness, underage drinking, and/or substance abuse.</p> <p>Research high school health and medical science industry-recognized credentials (e.g., personal trainer, athletic trainer, dietary aide, dental assistant, certified nurse assistant, home health aide, geriatric aide).</p> <p>Design crisis-management strategies for natural disasters and emergency situations.</p> <p>Describe strategies to reduce risk to environmental health, and establish goals for improving environmental health.</p> <p>Identify and create a plan to address a community health-related social issue, such as</p>			
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	<p>organ donation, homelessness, underage drinking, or substance abuse.</p> <p>Identify health promotion opportunities to enhance the health and wellness of oneself and others.</p> <p>Identify high school courses that lead to health and medical science industry certifications.</p>			
Career and Technical Education (CTE) - In process				

Environmental Literacy and Social Justice

Below is a list of resources that can be used to help teachers with the complex social justice issues surrounding environmental literacy. If there are additional resources that you find helpful in your instruction, please share them so that they can be added to the list.

Source	Author/Organization	Grade Level(s)	Notes
The Connection between Social and Environmental Justice	Student Affairs Administrators in Higher Education (NASPA)		A compiled list of resources that address the following: “As the impacts of climate change intensify and disproportionately impact vulnerable and marginalized populations, it has become increasingly harder to ignore just how interconnected issues of social and environmental justice are, and how consequential they have become. Climate change not only impacts the environment but the economic and social realms of human life as well. This blog post highlights a few resources that bring together perspectives from environmental, social, and economic justice lenses, and offer insights that bridge these three critical aspects of sustainability. “
Environmental Justice Factsheet	University of Michigan - Center for Sustainable Systems		“Environmental Justice (EJ) is defined as the equal treatment and involvement of all people in environmental decision making. ¹ Inspired by the Civil Rights movement, EJ became widespread in the 1980’s at the intersection of environmentalism and social justice. ² Environmental injustice is experienced through heightened exposure to pollution and corresponding health risks, limited access to adequate environmental services, and loss of land and resource rights. ³ EJ and sustainability are interdependent and both necessary to create an equitable environment for all. ⁴ ”
Environmental Justice and Eco-Social Justice	University of Colorado, Boulder - Environmental Center		“The environmental justice movement grew in response to the disproportionate environmental burdens communities of color and low-income communities bear including pollution, industrial production and processing facilities, landfills and power plants. Simultaneously these communities often have fewer environmental benefits like parks, gardens and green spaces, while facing inadequate health care, access to healthy food, less

			political power.”
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