PWCS
PRINCE WILLIAM COUNTY PUBLIC SCHOOLS
LAUNCHING THRIVING FUTURES

Prince William County Public Schools

ENVIRONMENTAL LITERACY PLAN

SCHOOL BOARD

Babur B. Lateef, M.D.
Chairman At-Large

Mrs. Lisa A. Zargarpur
Vice Chairwoman
Coles District

Mr. Tracy L. Blake
Neabsco District

Mrs. Erica C. Tredinnick
Brentsville District

Mr. Justin David Wilk
Potomac District

Mr. Richard M. Jessie
Occoquan District

Mrs. Jennifer T. Wall
Gainesville District

Ms. Loree Y. Williams
Woodbridge District

Isabella Aversano
Student Representative

Fernanda Morante
Student Representative

SUPERINTENDENT OF SCHOOLS

Dr. LaTanya D. McDade

DEPUTY SUPERINTENDENT

Dr. Carol E. Flenard

EXECUTIVE LEADERSHIP TEAM

Mr. Vernon J. Bock
Chief Operating Officer

Ms. Elisa M. Botello
Chief of Staff

Dr. Donna L. Eagle
Chief Human Resources Officer

Mr. R. Todd Erickson
Associate Superintendent for Central Elementary Schools

Mrs. Kimberly A. Gudinas
Associate Superintendent for Western Elementary Schools

Mr. Matthew Guilfoyle
Chief Information Officer

Mr. Corey Harris
Associate Superintendent for Middle Schools

Mr. Gregory Hood
Associate Superintendent for High Schools

Mrs. Denise M. Huebner
Associate Superintendent for Student Services and Post-Secondary Success

Mrs. Catherine Porter-Lucas
Associate Superintendent for Middle Schools

Dr. Ashley Reyher
Associate Superintendent for Special Education

Dr. Stephanie Soliven
Associate Superintendent for Teaching and Learning

Mrs. Kimberly A. Werle
Associate Superintendent for Eastern Elementary Schools

Mr. Keith F. Wolfe
Associate Superintendent for High Schools

Mr. Shakeel Yusuf
Chief Financial Officer

PWCS
PRINCE WILLIAM COUNTY PUBLIC SCHOOLS
LAUNCHING THRIVING FUTURES

Prince William County Public Schools does not discriminate in employment nor in the provision of educational programs, services, and activities on the basis of race, color, religion, national origin, sex, gender identity, sexual orientation, pregnancy, childbirth or related medical conditions including lactation, age, marital status, veteran status, disability, genetic information, or any other basis prohibited by law.
The following individuals will handle inquiries regarding nondiscrimination policies, including Section 504 and Title IX:

Mailing Address
P.O. Box 389, Manassas, VA 20108
703-791-7200 • www.pwcs.edu

Civil Rights, Section 504, Compliance (Employees), Equal Employment Opportunity, Americans with Disabilities Act, Grievance Procedures:
Equity and Employee Relations Office • 703-791-8764

Section 504 Compliance (Students):
Director of Special Education • 703-791-7287

Title IX Compliance:
Title IX Coordinator and Student Equity Office • 571-374-6839

Family Educational Rights and Privacy Act (FERPA):
FERPA Officer • 703-791-7445

Freedom of Information Act (FOIA):
FOIA Officer • 571-402-3150

CONTENTS


$9.00

EXECUTIVE SUMMARY

Environmental Literacy means students have the knowledge, skills, and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic, and social stability. Environmental Literacy is recognized as an essential part of a well-rounded education. To support the development of environmentally literate students, this plan, in alignment with *PWCS Vision 2025: Launching Thriving Futures Strategic Plan*, outlines how students will develop skills for understanding and addressing environmental issues and practice personal and civic responsibility for environmental decisions.

Children are naturally curious about their environment, and by tapping into that interest environmental education can be an effective tool for teaching cross-curricular environmental and sustainability concepts. PWCS recognizes that the built environment and human activity consume limited natural resources and produce greenhouse gases. A robust environmental education program is therefore essential to achieving the goals of reducing the division's overall carbon footprint, protecting the environment, conserving economic resources, and contributing to community wellness. The PWCS "Profile of a Graduate" innovator and visionary persona brings a sense of hope, creative thinking, and encouragement to collaboratively solve the challenges facing society today and in the future.

> **"Children are born with a sense of wonder and an affinity for nature. Properly cultivated, these values can mature into ecological literacy, and eventually into sustainable patterns of living."**
>
> — Zenobia Barlow

Through engagement in cross-curricular initiatives and project-based experiences, every student in the division will graduate with the knowledge and skills to make informed environmental decisions regarding stewardship of the planet. That stewardship and protection includes the air we breathe, the climate we live in, the water we drink, the watersheds we fish and swim in, the land we farm and live on, and protecting the species that share our community. The plan provides implementation goals and objectives for students, teachers, schools, and the division. Instruction must be intentional with planned measurable outcomes that will drive dispositions and behaviors leading to sustainable communities. Environmental Literacy instruction is currently taking place in grade level bands, and this document emphasizes the cross-curricular nature of environmental literacy. This plan includes an alignment guide of cross-curricular standards which indicates where directly related environmental literacy instruction is taking place as well as environmental literacy targets, measured by key performance indicators.

An environmentally literate person, then, has the ability individually, and collectively with others, to make informed decisions about their environment; is willing to act on those decisions to increase the sustainability of their community; and participate in civic life to affect changes in behavior to accomplish sustainability goals. This plan forges the pathway for all students to be part of the solution for our communities' environmental challenges.

INTRODUCTION

Why is creating an Environmental Literacy Plan important?

Children are naturally curious about the environment. By tapping into that interest, environmental education can be an effective tool for teaching cross-curricular concepts including math, science, social sciences, art, career and technical education, and language arts. Because environmental education activities are often reported by students as "fun," peer-reviewed studies find an increase in student engagement, motivation, and retention of knowledge when lessons are based on meaningful, local, and personally impactful topics. Thus, students that use their local environment as a teaching tool are more likely to understand content.

Environmental Literacy is recognized as an essential part of a well-rounded education (Ardoin et al, 2017) and is reflected in the "Profile of a Graduate" for Prince William County Public Schools (PWCS), as is exemplified in the Innovator and Visionary Persona *(PWCS, 2022):*

Persona:

An innovator and visionary persona brings a sense of hope, creative thinking, and encouragement to solving the problems facing society today and in the future. They have an entrepreneurial drive and a desire to make a positive difference.

Behaviors of the Innovator and Visionary Persona:

- Demonstrates curiosity for lifelong learning.
- Aligns knowledge, skills, and personal interests with career opportunities.
- Contributes to solutions that benefit the community, country, and world.
- Understands global challenges and the ability of the individual to affect change.
- Promotes sustainability and responsible environmental innovative practices.

Environmental Literacy goals touch on all aspects of the "Profile of a Graduate." As a Global Collaborator, student skills in the field of environmental literacy build a sense of community to solve local and global issues. A Resilient Persona with environmental literacy skills respects others and the concepts of sustainability as caring for others and future generations. The Digital Citizen will critically use technology to identify credible sources of data to build knowledge and information on which to base decisions. And finally, the Critical Thinker persona can be built through the development of Environmental Literacy as they seek to identify competing priorities for limited resources and build communication skills to work with the vast array of stakeholders involved in any environmental issue.

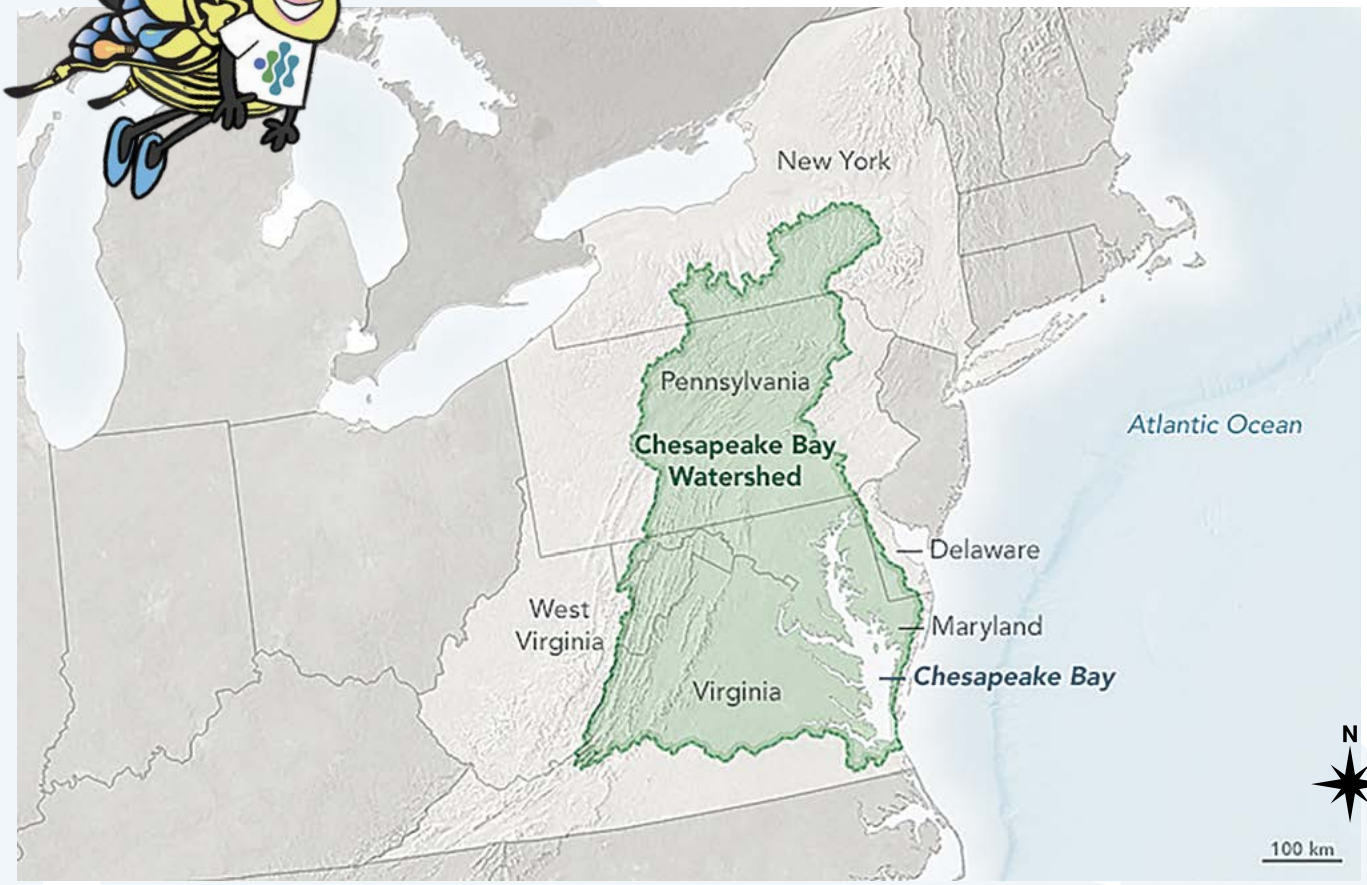
> **"Acts of Conservation without the requisite desires and skills are futile. To create these desires and skills, and the community motive, is the task of education."**
>
> — Aldo Leopold, *Conservation: In Whole or in Part? (1944)*

The Commonwealth of Virginia Goals and Prince William County Public Schools Mandate

The 2014 Chesapeake Bay Watershed Agreement, signed by Virginia Governor Terence McAuliffe on June 16, 2014, commits the Commonwealth of Virginia to meet the Environmental Literacy Goal and Outcomes of the Agreement. The Environmental Literacy Goal is to "enable students in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed." The Virginia Department of Education has defined Environmental Literacy as: "Having the knowledge, skills, and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic, and social stability" (Education, 2022).

The Outcomes for Environmental Literacy in the Commonwealth of Virginia are:

- Continually increase students' age-appropriate understanding of the watershed through a target of participation in teacher-supported Meaningful Watershed Educational Experiences (MWEE) once each in elementary, middle, and high school.
- Continually increase the number of schools in the region that reduce the impact of their buildings and grounds on their local watershed, environment, and human health through best practices, including student-led protection and restoration projects.
- Each participating Bay jurisdiction should develop a comprehensive and systemic approach to environmental literacy for all students in the region that includes policies, practices, and voluntary metrics that support the environmental literacy goals and outcomes of this agreement.



To support the development of environmentally literate students, environmental education's principles and best practices include the following *(NAAEE, 2022)*:

- Developing inquiry and investigative skills for the analysis of systems.
- Acquiring knowledge of environmental processes and human systems.
- Developing skills for understanding and addressing environmental issues.
- Practicing personal and civic responsibility for environmental decisions.

With the adoption of PWCS Regulation 495, Sustainability as a result of the 2021 PWC School Board Sustainability Initiative, the Prince William County School Board clarified their desire to protect and enhance the quality of life for all who live, work, learn, and play in our community. PWCS recognizes that the built environment and human activity consume limited natural resources and produce greenhouse gases. Therefore, a robust sustainability program is essential to achieving the goals of reducing the division's overall carbon footprint, protecting the environment, saving economic resources, and contributing to community wellness. According to the regulation, to ensure a successful sustainability program, we must expand environmental literacy with a focus on sustainability education for all PK-12 students *(PWCS, 2021)*.

Plotting the Course to Sustainability Through Environmental Education

In their "Education for Sustainable Development Plan," and the "Sustainable Development Goals (SDGs)," the United Nations recognize children as drivers of change for a sustainable future (*UNESCO, 2022*). This sustainability journey is complex but essential as we ensure that the future we create as a society provides well-being for all. The Sustainability Compass illustrates how Nature, our Economy, personal Well-Being, and Society are interwoven into a system driving us toward sustainability. Similarly, Environmental Literacy requires a cross-curricular approach, bringing in students' knowledge of a variety of seemingly disparate concepts into their understanding of the environmental system in which they live. This system is one we must teach our students to navigate if they are to be resilient members of our world.

According to the PWCS regulation 495-1, all levels of our division must provide support and guidance for Environmental Literacy. Some of those requirements include:

- Measurable standards for Environmental Literacy, which are evaluated annually.
- Providing students with the opportunity to engage in project-based learning at every grade level, both in and out of the classroom, designed to increase the understanding of environmental sustainability.
- Schools that plan and communicate with families about community-wide environmental stewardship and sustainability volunteer opportunities.
- Student representatives from every school to promote awareness of environmental literacy within their schools.

"Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations" *(EPA, 2022)*. A sustainable community is a resilient community. PWCS is guiding our division toward a sustainable future for our stakeholder community *(PWCS, 2021)*.

Sustainability and Environmental Literacy

The interrelated components Nature, Economy, Society, and Well-Being support the understanding of what is required for sustainability and the development of environmentally literate students. Actions resulting from Environmental Literacy activities lead to sustainable and resilient communities. According to Superintendent of Schools, Dr. McDade, "Service builds mutual responsibility and accountability for a better tomorrow." Focusing only on knowledge of environmental concepts in one course does not lead to the skills, disposition, and behaviors necessary for the creation of well-rounded, 21st century, environmentally literate graduates. Communities need members who can communicate effectively about environmental issues and then problem solve to reduce impacts and prevent those issues in the future. Synergistically combining Social Emotional Learning with Environmental Literacy leads to the ability to communicate, problem-solve, and work collectively with others to make decisions.

An environmentally literate person, then, has the ability individually, and collectively with others, to make informed decisions about their environment; is willing to act on those decisions to increase the sustainability of their community; and participate in civic life to affect changes in behavior to accomplish sustainability goals. To do so, a person must possess the knowledge, understanding, and skills necessary to interact with a wide range of environmental concepts and issues. These include cognitive skills and abilities that will lead to sound, well-tested, data-driven, community-based decisions in a wide variety of environmental contexts. PWCS follows the much anthologized statement: "In the end we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught" (Valenti, 2005). Instruction must be intentional, with planned measurable outcomes that will drive dispositions and behaviors leading to sustainable communities.

The Interactive Components of Environmental Literacy

KNOWLEDGE about environmental issues
- Physical, ecological, social, cultural, & political systems
- Environmental issues & their multiple solutions
- Strategies for community participation & action

DISPOSITION toward environmental issues
- Attitudes & concern toward the environment
- Assumption of personal responsibility
- Motivation & intention to act
- Sense of self-efficacy

COMPETENCIES related to environmental issues
- Identify & ask relevant questions
- Investigate & analyze from primary & secondary sources
- Evaluate & make personal judgments about them
- Use evidence & knowledge to select & defend one's own position(s) to resolve them
- Create & evaluate plans to resolve them

ENVIRONMENTALLY RESPONSIBLE BEHAVIOR
- Involvement in intentional & habitual behaviors, individually & collectively, that work towards solving current issues & preventing new ones

CONNECTING ENVIRONMENTAL LITERACY TO THE *PWCS STRATEGIC PLAN*

To accomplish the PWCS Strategic Plan goals for Environmental Literacy, the division has established the following under the guidance of the Superintendent's Advisory Council for Sustainability:

PWCS Vision:

Prince William County Public School division will engage students, staff, schools, and communities in environmental literacy learning activities resulting in the skills necessary to make informed decisions that positively affect and sustain our indoor and outdoor environment.

PWCS Mission:

Through collaboration, PWCS will work with all stakeholder groups to infuse Environmental Literacy components as a part of the PK-12 curriculum to provide students and staff with the skill sets needed to make positive changes in our environment for a sustainable future.

of schools will actively integrate Environmental Literacy into all grade levels

Provide consistent access to high-quality learning experiences, in and out of the classroom, for students and staff, that promote Environmental Literacy across all content areas.

PWCS will incorporate environmental literacy standards into the PWCS curriculum and develop cross-curricular professional development. By 2023, 200 teachers will participate in this training. PWCS is also promoting pathways for students to achieve the Virginia Board of Education's Seal for Excellence in Science and the Environment. By 2025, all schools will have access to robust environmental literacy curriculum across all grades (PK-12) and professional development for all teachers.

PWCS will have at least five schools earn the U.S. Department of Education Green Ribbon School designation

Incorporate project-based learning across all grade levels through the development of resources designed to utilize the school building as a teaching tool.

PWCS will support the pursuit of U.S. Department of Education Green Ribbon School designations for individual schools, so that by 2025 at least five schools will receive the designation. PWCS commits to creating site-specific outdoor environmental experiences.

Develop and embed high-performing maintenance strategies and construction standards, resulting in a reduction in the dependency of fossil fuels and broader incorporation of renewable energy into our building portfolio.

PWCS has committed to a systemic and strategic approach to sustainability through relationships with external sustainability experts. The PWCS Energy Management Team has established energy dashboards demonstrating building attributes and energy performance. PWCS is implementing multiple design principles based on industry and federal standards for building construction focused on various aspects of energy management and sustainability. By 2024, these principles will be incorporated into all school renovation and new construction projects. In 2025, PWCS will complete our first Net Zero new construction school replacement.

"Today's children will one day be responsible for making decisions that will shape the future health of the environment," wrote Deborah Mitchell, senior editor for Environmental Protection magazine, in Promote Environmental Education for Children, **"To prepare them for such responsibilities, they need a sound environmental education as a foundation upon which to make those decisions."**

PWCS Environmental Literacy Goal:

As a result of our "Environmental Literacy Plan," students will be prepared to address the environmental issues in Prince William County, the Commonwealth of Virginia, the United States, and globally with 21st Century skills and knowledge. Environmentally literate students will "have the knowledge, skills and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic, and social stability."

PWCS Environmental Literacy Objectives:

- PWCS' PK-12 educational system will prepare students to understand, analyze, and address major environmental challenges facing the local community, state, nation, and the world.
- Provide place-based field experiences, including MWEEs as part of the regular school curriculum, across all content areas and at all grade levels as an engaging context for teaching STEAM.
- Support programs that contribute to healthy lifestyles through outdoor recreation and sound nutrition.
- Create opportunities for enhanced and ongoing professional development for teachers that improve their environmental knowledge and skills in teaching students about environmental issues, including the use of interdisciplinary, field-based, and research-based learning, as well as innovative technology in the classroom.

COMMONWEALTH OF VIRGINIA GRADE BAND OUTCOMES FOR ENVIRONMENTAL LITERACY

Based on requirements from the Department of Education in the Commonwealth of Virginia Standards of Learning (SOLs), the Chesapeake Bay Watershed Agreement, guidance from NAAEE (pp 22-86), and the PWC School Board Sustainability Initiative and resulting regulation, these are the expected minimum environmental literacy outcomes at each educational level in PWCS.

Preschool and Elementary Environmental Literacy

By the end of grade five, PWCS elementary students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades kindergarten through five and the PK Aligned Planning Guide.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Introduce students to lessons that use the school building as a teaching tool.
- Enable learners to identify ways in which they are responsible for the environmental, social, and economic effects of their actions.
- Engage them in sustainability education and projects led by their sustainability liaison or classroom teachers in their schools.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Use this Link to go to the K-5 Environmental Literacy Alignment Guide of Cross-Curricular Standards

Use this Link to go to the PK Environmental Literacy Alignment Guide of Cross-Curricular Standards

Middle School Environmental Literacy

By the end of grade eight, PWCS middle school students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades six through eight.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Engage students with lessons that use the school building as a teaching tool.
- Introduce specific career connections related to environmental literacy skills.
- Enable learners to understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.
- Engage them in sustainability education and projects led by their sustainability liaison or classroom teachers in their schools.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Use this Link to go to the 6-8 Environmental Literacy Alignment Guide of Cross-Curricular Standards

High School Environmental Literacy

By the end of grade 12, PWCS high school students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades 9-12.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Engage students with lessons that use the school building as a teaching tool.
- Explore career connections related to environmental literacy skills.
- Engage in research, service projects, clubs, or internship opportunities that promotes environmental stewardship.
- Enable learners to communicate, evaluate, and justify their own views on environmental issues and alternative ways to address them.
- Offer the opportunity to receive the Board of Education Seal for Excellence in Science and the Environment.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Use this Link to go to the 9-12 Environmental Literacy Alignment Guide of Cross-Curricular Standards

Goals and Objectives for Students

1. Every student in the school division will graduate with the knowledge and skills to make informed environmental decisions regarding stewardship of the planet.
   - Students will understand environmental systems and how humans impact them.
   - Students will engage in hands-on, outdoor learning experiences that include inquiry and problem solving. This should be both structured and unstructured learning activities.
     - Authentic inquiry-based learning such as MWEEs (Meaningful Watershed Educational Experiences) will occur at least once in elementary, middle, and high school.
     - Site-based lessons using the building and campus as a learning tool will be offered at least once in elementary, middle, and high school.
   - Students will understand the underlying structures for decision making on the local and national scale and should practice civic skills for exercising their voices, particularly around natural resource topics.
   - Students will gain the tools and resources to become stewards of the environment through taking actions in their individual lives, as well as in the community.
   - Students will be able to engage in project-based experiences at every grade level, both in and out of the classrooms, that promote the 5C's outlined in a Profile of a Virginia Graduate:
     - Critical Thinking
     - Creative Thinking
     - Collaboration
     - Communication
     - Citizenship
2. Students will engage in career exploration and readiness opportunities that connect with local communities and partners.
3. Students will be given the opportunity for service-learning activities so that they may be recognized by the division upon graduation with the Board of Education's Seal for Excellence in Science and the Environment.

Goals and Objectives for Teachers

1. Educators and staff will be prepared and equipped to teach Environmental Literacy concepts and implement Environmental Literacy learning opportunities in all grade levels where content already exists in their curriculum documents.

2. Teachers and staff will engage all multilingual learners guided by the Four Pillars for Sense-Making, including:
   - Providing students opportunities to engage with real-world events and prompting students to pose and pursue additional questions.
   - Positioning students in ways that elicit their ideas to support their engagement as competent members of a learning community.

3. Teachers will participate in professional learning in environmental education that will empower them to improve their environmental content knowledge, skill in teaching about environmental issues, and field-based pedagogical skills.
   - Professional learning will increase teachers' self-efficacy for teaching Environmental Literacy topics.
   - Educators will be prepared to engage all learners in culturally relevant and inclusive environmental education, especially when considering environmental issues that are controversial, and will be prepared to lead learners through reflections on their own and others' perspectives.
   - Teachers will be provided in-person, hybrid training, and asynchronous opportunities through the Professional Learning Catalog to address gaps identified in their needs assessment.

4. Teachers will be provided resources to integrate educational activities from high quality, vetted environmental education materials such as:
   - Projects WET, WILD and Learning Tree
   - Eco Schools USA
   - Chesapeake Bay Foundation Education Programs

5. Teachers will be offered training in the delivery of project-based learning opportunities such as MWEEs and using the school building as a teaching tool.

6. A cohort of mentor teachers will participate in professional development, share best practices for environmental literacy, and create turnkey resources for teachers within the division.

Goals and Objectives for Schools

1. The administration, teachers, students, and parents will work together to define their community.
2. In coordination with external partners, schools will provide opportunities for students to participate in service-learning projects and internships that relate to the environment and environmental issues.
3. Promote career and college choices for students that emphasize environmental literacy and the wide variety of environmental careers.
4. Disseminate information to students about the Seal for Excellence in Science and the Environment.
5. Support motivated teachers who desire to collaborate on environmental education projects with the local community.
6. Support professional development opportunities for teachers to increase their environmental literacy, to include advancing best practices for educators not certified in Science or History who instruct English Learners, multilingual students, and a wide range of unique learners requiring specialized instruction.
7. Utilize School Specialty Programs to extend the learning which provide pathways to creating environmentally literate global citizens. Programs that include extended studies in environmental topics are:
   - IB, AP, and Cambridge Programs
   - Pathways to Global Citizenship
   - Agriculture
   - Environmental Engineering
   - Environmental Science (CENS)
   - CTE Specialty Programs
   - Project Lead the Way
8. School Educators and Administrators will have the opportunity to take part in professional development designed for school leadership and environmental education focused on developing the use of school grounds that incorporate natural areas and outdoor classrooms.

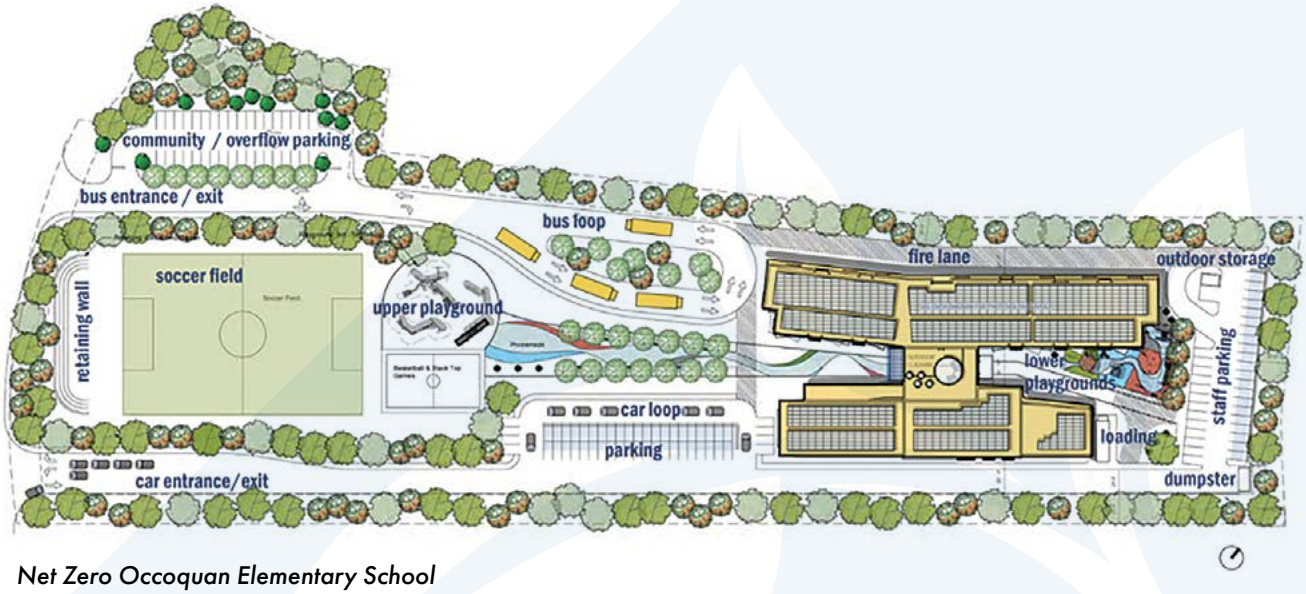
   - Schools can request specialized professional development from the Energy and Sustainability team in the Facilities Department for their teachers based on needs established by their PLC groups including accessibility and equity, utilizing outdoor spaces effectively, and using their school building as a teaching tool.
   - School Leaders Environmental Leadership Program from the Chesapeake Bay Foundation is available annually at no cost to all school-based administrators.
9. Have an active Sustainability Liaison in support of the requirements of PWCS regulation 494-1, PWCS regulation 494-3, and PWCS regulation 495-1.
10. Encourage sustainability-related extracurricular activities in academic or service oriented environmental clubs.

11. Encourage the school participation in environmental-related competitions which could include:
    - Science Olympiad
    - PWCS Science Fair
    - Envirothon
    - Sea Perch/Robotics
    - Caring for Our Watersheds
    - Poster and Essay Contests sponsored by Community Partners.
12. Encourage the use of outdoor learning spaces and create a plan for the maintenance of those areas.
    - Encourage teachers to use existing natural areas on school grounds or nearby including woods, wetlands, creeks, ponds, as well as meadows and field trips to local natural areas.
13. Promote and reinforce sustainability measures at their school to serve as a model for their students by conserving and reducing use of energy, water, and natural resources.
14. Pursue certification and recognition by participating in one of the many recognition programs for Environmental Literacy such as:
    - Project Learning Tree Green Schools
    - Virginia Naturally
    - National Wildlife Federation Eco-Schools USA
    - U.S. Department of Education's Green Ribbon School

Goals and Objectives for the Division

1. PWCS will identify and partner with the diverse community stakeholders to:
    - Bring greater awareness to the need for and implementation of Environmental Literacy in schools.
    - Increase opportunities for teachers, students, and staff with school-based initiatives that support the Division's Environmental Literacy Vision and Mission in Commitment 2 Positive Climate and Culture Objective 2.3.
    - Build community connections that represent our school division's diversity serving as "mirrors and windows, allowing students to see themselves, their cultures, and rich history as well as the world around them" (*PWCS, 2022*).
    - Provide support to teachers through volunteers, classroom visits, career connections, real-world application of content topics, and supervision of outdoor events.
    - Support environmental project-based and service-learning action projects.
    - Secure resources and opportunities that can be shared with schools to support school grounds improvements for environmental literacy.

2. PWCS will offer meaningful environmental literacy professional development that:
   - Is sustained.
   - Will integrate theories, research, and models of environmental learning.
   - Will be evidence-based with the goal of increasing teacher effectiveness and student outcomes.
   - Is based on needs assessment surveys.
   - Includes best practices for environmental education.
3. PWCS will establish and enhance Model School Grounds and Built Environment to include:
   - Equitable and Accessible Outdoor learning spaces
     - Restoring or creating wildlife habitats such as bluebird trails, natural habitats (meadows and forests), and pollinator gardens.
     - Assisting schools in making outdoor learning spaces accessible.
     - Providing professional development for school staff focused on the development of school grounds as an instructional tool, which include effective safety guidelines and training.
     - Providing strategies for how division facilities staff will incorporate environmentally sustainable practices such as no mow zones.
     - Promoting and supporting Adopt-a-Spot, Adopt-a-Pond, and Adopt-a-Stream programs.
   - High-performing buildings with sustainability measures in schools to support:
     - Energy efficiency and conservation technologies.
     - Recycling, composting, and waste reduction strategies.
     - Water conservation practices.
4. PWCS will secure funding and other necessary support through grants and budgeting for the above.



Net Zero Occoquan Elementary School

IDENTIFYING SUCCESS: MEASURING ENVIRONMENTAL LITERACY

Measuring environmental literacy is a necessary step for assessing progress toward our PWCS Strategic Plan goals. You cannot manage what you do not measure. Standards of Learning assessments take a picture of student knowledge on one day in time; environmental literacy, however, is a multifaceted state of being for members of our community that can be captured in a myriad of ways. There is not one best path for identifying success. Continuous Improvement Plans should include environmental literacy in their goals. This could either be a new goal for your plan or embedded into a preexisting goal with action steps that are related to the goal from Commitment 2, Objective 2.3: "***100% of schools will actively integrate Environmental Literacy into all grade levels.***"

Measuring environmental knowledge as facts on a test is only the tip of the iceberg when measuring environmental literacy. Just as important are measures of those critical thinking skills, rates of environmental civic engagement, and school community personal growth toward becoming civically engaged, environmentally aware members of our community.

As we strive toward the goals and objectives set forth in this plan, students, teachers, schools, and the division will monitor our progress using key performance indicators that are selected to best fit their scope. To provide examples, some sample measures are listed on the next page. This is not an exhaustive list and individual Continuous Improvement Plans could utilize other measures. Contact Energy and Sustainability in the Facilities Department to assist with developing measurable and meaningful environmental literacy goals for your Continuous Improvement Plan.

(NAAEE, 2022)

Sample Measurement Indicators for Environmental Behaviors and Attitudes

Key Performance Indicators for Developing Environmental Literacy in Prince William County Public Schools		
Environmental Behaviors/Attitudes	**Data to Support Indicator**	**PWCS Strategic Plan Connection**
Student Implementation Level		
Student volunteer hours related to environmental conservation, restoration, and stewardship	Student reported hours through Naviance, Clubs, Specialty program requirements, Seal of Excellence in Science and the Environment applications, or other methods.	Commitment 1, Objective 1.1, pg. 15
School Implementation Level		
School Recycling Diversion Rate	Collected through waste audits.	Commitment 1, Objective 2.3, pg. 33 and 35
School Energy consumption statistics	Collected through energy audits, PWCS Energy Challenge, or through Energy and Sustainability Dashboard.	Commitment 2, Objective 2.3, pg. 36 Commitment 4, Objective 4.3, pg. 49
Active School Environmental Club numbers	Provided by school staff mentor to school administration.	Commitment 1, Objective 1.1, pg. 17
Service-Learning participation rates for activities like Adopt-A-Spot, Adopt-A-Pond, or other service-learning projects	Provided by school staff mentor to school administration.	Commitment 2, Objective 2.3, pg. 33 and 35
School Waste reduction statistics	Per student waste production collected through waste audits, tracking water bottle refill station numbers, and purchasing rates of single use water bottles in schools.	Commitment 2, Objective 2.3, pg. 33 and 35
School Water savings statistics	Per student water consumption rates collected through water audits.	Commitment 2, Objective 2.3, pg. 33 and 35
Environmental external partner participation rates	External partner involvement in school supported environmental literacy activities as measured by numbers of volunteers, numbers of students interacted with, or money/resource value provided.	Commitment 3, Objective 3.2, pg. 41
Active school Sustainability Liaison and participation in PWCS Energy Challenge	Registration in Energy Challenge.	Commitment 2, Objective 2.3, pg. 33 and 35
Use of outdoors as part of a school's Social Emotional Learning Program	Numbers of hours or students that were provided outdoor SEL opportunities.	Commitment 1, Objective 2.1, pg. 29

Key Performance Indicators for Developing Environmental Literacy in Prince William County Public Schools		
Environmental Behaviors/Attitudes	**Data to Support Indicator**	**PWCS Strategic Plan Connection**
Division Implementation Level		
Track service-learning opportunity responses in PWCS Climate and Culture survey for Parents and MS/HS Students	Data provided by divisionwide Climate and Culture survey and categorized by school from the Research, Accountability, and Strategic Planning Department.	Commitment 4, Objective 4.2, pg. 47
Staff response rates to the PWCS Climate and Culture survey regarding incorporation of environmental literacy units of study	Data provided by division-wide Climate and Culture survey and categorized by school from the Office of Data Analysis and Reporting.	Commitment 4, Objective 4.2, pg. 47
Reduction in CO_2 emissions from transportation to schools	Transportation statistics documenting percentage of students arriving by bus, walking, and/or biking.	Commitment 2, Objective 2.3, pg. 36
Reduction in CO_2 emissions from the creation and maintenance of high-performing buildings	Annual energy use reduction, increased renewable energy percentages, and implementation of embedded design principals for high performing building construction and maintenance.	Commitment 2, Objective 2.3, pg. 36

Sample Measurement Indicators for Environmental Knowledge and Skills

Key Performance Indicators for Developing Environmental Literacy in Prince William County Public Schools		
Environmental Knowledge/Skills	**Data to Support Indicator**	**PWCS Strategic Plan Connection**
Student Implementation Level		
Number of students earning the Governor's Seal for Excellence in Science and the Environment yearly growth	Data provided by Student Services and Post-Secondary Success Department-Office of School Counseling.	Commitment 1, Objective 1.1, pg. 15
Science Fair participation numbers on a yearly basis with projects that focus on environmental topics	Data provided Student Learning Department-Office of Science and Family Life Education.	Commitment 1, Objective 1.1, pg. 15
Envirothon and other environmental related competition participation numbers on a yearly basis	Provided by school staff mentor to school administration.	Commitment 2, Objective 2.3, pg. 35
Teacher Implementation Level		
Learning pedagogy that uses the school building as a teaching tool	Data provided by Sustainability Liaisons through the PWCS Energy Challenge registrations.	Commitment 2, Objective 2.3, pg. 35
Number of students participating in MWEEs	Data reported to Student Learning Department Science and Family Life Education in the Environmental Literacy survey to Chesapeake Bay.	Commitment 2, Objective 2.3, pg. 35
School Implementation Level		
Numbers of teachers, administrators, and staff completing environmental literacy professional development	Data reported from Professional Learning catalog and schools.	Commitment 2, Objective 2.3, pg. 35 Commitment 1, Objective 1.3, pg. 26
Division Implementation Level		
Staff response rates to the PWCS Climate and Culture survey regarding incorporation of environmental literacy units of study	Data provided by divisionwide Climate and Culture survey and categorized by school from the Research, Accountability, and Strategic Planning Department.	Commitment 2, Objective 2.3, pg. 35
Student enrollment statistics in elective environmental literacy content courses including those in science, Social Sciences, and CTE	Data reported by high school counseling offices to Student Learning and CTE.	Commitment 1, Objective 1.2, pg. 23
Career fair and classroom opportunities for students to explore the expanding fields of environmental careers	Data provided by the Department of Student Services and Post-Secondary Success Career and Technical Education Programs.	Commitment 1, Objective 1.2, pg. 22 and 24

Sample Measurement Indicators for Access to Dedicated Outdoor Learning Environments

Key Performance Indicators for Developing Environmental Literacy in Prince William County Public Schools		
Access to Dedicated Outdoor Learning Environments	**Data to Support Indicator**	**PWCS Strategic Plan Connection**
Teacher Implementation Level		
Students are given the opportunity to regularly spend time outdoors engaging with nature as part of their curriculum	Number of hours/opportunities as recorded by teachers or Sustainability Liaisons through surveys.	Commitment 2, Objective 2.3, pg. 35
School Implementation Level		
Student groups are given opportunities to plan and participate in school grounds habitat projects	Data provided by Sustainability Liaisons through the PWCS Energy Challenge registrations or directly reported by schools.	Commitment 2, Objective 2.3, pg. 35
School will apply for recognition programs such as Green Schools, Green Ribbon, and Virginia Naturally	Data provided by Sustainability Liaisons through the PWCS Energy Challenge registrations or directly reported by schools.	Commitment 2, Objective 2.3, pg. 35
Division Implementation Level		
Numbers of schools with dedicated outdoor learning environments to include progress improvements and grant funded projects	Data is collected by annual needs assessment for School Sustainability Measures Profiles completed by Facilities Department—Energy and Sustainability.	Commitment 2, Objective 2.3, pg. 35
Funding and budgetary earmarks for outdoor learning resources	Tracking grants and matching funds to benefit outdoor learning resources.	Commitment 4, Objective 4.3, pg. 48
Equitable access to dedicated outdoor learning improvements such as signage, pollinator gardens, sensory gardens, and accessibility for all students	Data is collected by annual needs assessment for School Sustainability Measures Profiles completed by Facilities Department—Energy and Sustainability.	Commitment 1, Objective 1.1, pg. 12 Commitment 4, Objective 4.3, pg. 48
MS4 related educational signage on storm water retention basins providing site-based information about watersheds and human influences	Facilities Department report of creation and installation of signage at all school storm water basins.	Commitment 2, Objective 2.3, pg. 35

APPENDIX 1

Alignment Guide of Cross-Curricular Standards

Kindergarten—Grade 5

This table identifies where directly related Environmental Literacy instruction takes place at each elementary grade level. These instances are aligned with the Virginia Standards of Learning (SOLs) and should support the central theme of each grade level subject. In addition, each grade band has suggested projects or learning activities that can occur at that level. These activities are either place-based, outdoors, or use the school building as a teaching tool to address the Commitment 2, Objective 2.3 strategic priority that states that schools will "Incorporate project-based learning across all grade levels through the development of resources designed to utilize the school building as a teaching tool. PWCS commits to creating site-specific outdoor environmental experiences."

**Note: World Languages Content for elementary is written based on the PWCS World Language pacing guide which supports other content standards in the form of ACTFL "can do" statements.*

As a living document, the content topics will be updated as new VA SOL curriculum frameworks are adopted.

Other content areas provide supporting skills to develop environmental literacy. While a Mathematics or English Language Arts course may not specifically assess skills or content directly related to environmental literacy, the skills gained in those courses directly support its acquisition and are equally important.

Elementary Environmental Literacy Targets:

By the end of grade five, PWCS elementary students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades kindergarten through five.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Introduce students to lessons that use the school building as a teaching tool.
- Enable learners to identify ways in which they are responsible for the environmental, social, and economic effects of their actions.
- Engage them in sustainability education and projects led by their Sustainability Liaison or classroom teachers in their schools.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Kindergarten		
Science: Force, Motion, and Energy	K.4 The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include: **a.** Water occurs in different phases; and **b.** Water flows downhill.	Predict and then track the flow of water outdoors.
Science: Life Processes	K.6 The student will investigate and understand that there are differences between living organisms and nonliving objects. Key ideas include: **a.** all things can be classified as living or nonliving; and **b.** living organisms have certain characteristics that distinguish them from nonliving objects.	Living/Nonliving school yard scavenger hunt.
Science: Life Processes	K.7 The student will investigate and understand that plants and animals have basic needs and life processes. Key ideas include: **a.** living things need adequate food, water, shelter, air, and space to survive; and **b.** plants and animals have life cycles.	Use your school garden or outdoor plants to observe what plants and animals need to survive. Invite a local farmer to read "Tops and Bottoms" by Janet Stevens.
Science: Earth and Space Systems	K.8 The student will investigate and understand that light influences temperature on Earth's surfaces and can cause shadows. Key ideas include: **a.** the sun provides light and warms Earth's surface; **b.** shadows can be produced when sunlight or artificial light is blocked by an object; and **c.** objects in shadows and objects in sunlight have different temperatures.	Take students outside to make observations and measure the temperature in the sunlight over grass, in the sunlight over asphalt, and in the shade of the building, and in the shade of a tree.
Science: Earth and Space Systems	K.9 The student will investigate and understand that there are patterns in nature. Key patterns include: **a.** daily weather; **b.** seasonal changes; and **c.** day and night.	Take local school data observations about daily weather and then compare it to describe patterns over time.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Kindergarten		
Science: Earth Patterns, Cycles, and Change	K.10 The student will investigate and understand that change occurs over time. Key ideas include: **a.** natural and human-made things change over time; **b.** living and nonliving things change over time; **c.** changes can be observed and measured; and **d.** changes may be fast or slow.	Long term repeated observation of the same place on school grounds.
Science: Earth Resources	K.11 The student will investigate and understand that humans use resources. Key ideas include: **a.** some materials and objects can be used repeatedly; **b.** materials can be recycled; and **c.** choices we make impact the air, water, land and living things.	Classroom waste audit to identify what should and should not be recycled.
History and Social Science: Geography	K.5 The student will use simple maps and globes to: **a.** develop and awareness that a map is a drawing of a place to show where things are located and that a globe is a round model of Earth; and **b.** locate land and water features.	Provide a printed "footprint" of the school and surrounding areas and identify the locations of outdoor classroom spaces.
History and Social Science: Geography	K.7 The student will describe how the location, climate, and physical surroundings of a community affect the way people live, including their food, clothing, shelter, transportation, and recreation.	Discuss our local climate and the trends each season. How does that affect our clothing choices?
Visual Arts: Technique and Application	K.17 The student will create artworks inspired by a variety of sources and subjects: **a.** use nature as inspiration.	Outdoor art exploration. Use outdoor natural materials as a medium for art projects. Read the books "Leaf Man" by Lois Ehlert and "Nature Is an Artist" by Jennifer Lavallee.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 1		
Science: Living Systems and Processes	1.4 The student will investigate and understand that plants have basic life needs and functional parts that allow them to survive. Key ideas include: **a.** plants need nutrients, air, water, light, and a place to grow.	Use your school garden or outdoor plants to observe what plants need to survive.
Science: Living Systems and Processes	1.5 The student will investigate and understand that animals, including humans, have basic life needs that allow them to survive. Key ideas include: **a.** animals need air, food, water, shelter, and space (habitat); and **b.** animals have different physical characteristics that perform specific functions.	Observe animals in the schoolyard and describe their physical properties.
Science: Interrelationships in Earth/Space Systems	1.6 The student will investigate and understand that there is a relationship between the sun and Earth. Key ideas include: **a.** the sun is the source of energy and light that warms the Earth's land, air, and water; and **b.** the sun's relative position changes in the Earth's sky throughout the day.	With guidance, conduct a simple investigation to show how the sunlight changes the temperature at different times during the day (1.6b).
Science: Earth Patterns, Cycles, and Change	1.7 The student will investigate and understand that there are weather and seasonal changes. Key ideas include: **a.** changes in temperature, light, and precipitation occur over time; **b.** there are relationships between daily weather and the season; and **c.** changes in temperature, light, and precipitation affect plants and animals, including humans.	Observe and record seasonal changes in plants, including budding, growth, and losing leaves; recognize the seasons during which budding and losing leaves will most likely occur.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 1		
Science: Earth Resources	1.8 The student will investigate and understand that natural resources can be used responsibly. Key ideas include: **a.** most natural resources are limited; **b.** human actions can affect the availability of natural resources; and **c.** reducing, reusing, and recycling are ways to conserve natural resources.	Determine a resource in the school or home that may be conserved, brainstorm solutions, and implement a plan to address the conservation concern (1.8 a, b, c). Conduct a simplified classroom waste audit of your recycling and trash cans to identify what should and should not be recycled while including that recycling saves natural resources (1.8 b and c).
History and Social Science: Geography	1.6 The student will develop a geographic understanding that: **a.** the location of Virginia determines its climate and results in four distinct seasons; and **b.** the landforms of Virginia affect the places people live.	Have students note the angle of sun over various seasons of the year and tie to seasonal weather changes.
World Languages: My Life at School *	I can ask and answer what the weather is like.	Outdoor practice describing characteristics of current weather.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 2		
Science: Living Systems	2.5 The student will investigate and understand that living things are part of a system. Key ideas include: **a.** plants and animals are interdependent with their living and nonliving surroundings; **b.** an animal's habitat provides all of its basic needs; and **c.** habitats change over time due to many influences.	Predict and describe natural changes in habitats and their effects on plants and animals (2.5 c). Track the changes in a school yard habitat over time. Describe the changes in the school yard habitat due to various influences (2.5 c).

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 2		
Science: Interrelationships in Earth/Space Systems	2.6 The student will investigate and understand that there are different types of weather on Earth. Key ideas include: **a.** different types of weather have specific characteristics; **b.** measuring, recording, and interpreting weather data allows for identification of weather patterns; and **c.** tracking weather allows us to prepare for the weather and storms.	Observe, describe, and record daily weather conditions using weather instruments; graph and analyze data to identify patterns; predict weather based upon identified patterns (2.6 b). Observe and describe seasonal weather patterns and local variations (2.6 c). Use an outdoor rain gauge and outdoor thermometer (see Mathematics objective) to record data over time at the school.
Science: Earth Patterns, Cycles, and Change	2.7 The student will investigate and understand that weather patterns and seasonal changes affect plants, animals, and their surroundings. Key ideas include: **a.** weather and seasonal changes affect the growth and behavior of living things; **b.** wind and weather can change the land; and **c.** changes can happen quickly or slowly over time.	Take a school yard field trip to identify the growth and behavioral responses of plants and animals to weather and seasonal changes (2.7a). Include plants that have no above ground growth during winter, those that lose leaves during winter, and those that do not.
Science: Earth Resources	2.8 The student will investigate and understand that plants are important natural resources. Key ideas include: **a.** the availability of plant products affects the development of a geographic area; **b.** plants provide oxygen, homes, and food for many animals; and **c.** plants can help reduce the impact of wind and water.	Construct and interpret models as to how plants help reduce the impact of wind and water (2.8 c). After a school yard field trip to uncover erosion, propose solutions to erosion which include installation of native plant ground covers.
History and Social Science: Geography	2.6 The student will develop map skills by using globes and maps of the world and the United States to locate: **a.** the equator, the prime meridian, and the four hemispheres; and **b.** major rivers, mountain ranges, lakes, and other physical features in the United States.	Locate the Potomac and Occoquan rivers and their tributaries. Describe which is closest to your school.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 2		
History and Social Science: Economics	2.7 The student will locate and describe the relationship between the environment and culture of: **a.** Powhatan **b.** Lakota **c.** Pueblo	In what ways was the relationship of their culture with their environment different than ours?
History and Social Science: Economics	2.8 The student will describe natural resources (water, soil, wood, and coal), human resources, and capital resources.	Take a school yard field trip to identify natural resources.
History and Social Science: Economics	2.1 The student will explain that scarcity (limited resources) requires people to make choices about producing and consuming goods and services.	Consider local resources to use as a case study to discuss exhaustible resources and why we should move toward sustainability.
Visual Arts: Critical Thinking and Communication	2.3 The student will analyze and interpret artwork using art vocabulary: **a.** Categorize works of art both real and imaginary, by subject matter, such as portrait, landscape, still life, and architecture.	Utilize landscape artist's work of local sites to enhance students' sense of place.
World Languages: My Community *	I can label the two oceans that surround North America and label the parts of a plant.	Go outside and use content vocabulary to create labels for the parts of a plant in the school yard.
Mathematics	2.11 The student will read temperature to the nearest 10 degrees.	Utilize an outdoor thermometer as part of the measurement tools.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 3		
Science: Living Systems and Processes	3.4 The student will investigate and understand that adaptations allow organisms to satisfy life needs and respond to the environment. Key ideas include: **a.** populations may adapt over time; **b.** adaptations may be behavioral or physical; and **c.** fossils provide evidence about the types of organisms that lived long ago as well as the nature of their environments.	Look at images of local fossils found in Virginia and explain the role that fossils play in making inferences about their environment from long ago and how it has changed to today. (Example: marine organisms found in the Appalachian region)

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 3		
Science: Living Systems and Processes	3.5 The student will investigate and understand that aquatic and terrestrial ecosystems support a diversity of organisms. Key ideas include: **a.** ecosystems are made of living and nonliving components of the environment; and **b.** relationships exist among organisms in an ecosystem.	Take students on a school yard walk to differentiate among producers, consumers, and decomposers. Explain plant-pollinator-pest interactions in the school yard garden.
Science: Earth and Space Systems	3.6 The student will investigate and understand that soil is important in ecosystems. Key ideas include: **a.** soil, with its different components, is important to organisms; and **b.** soil provides support and nutrients necessary for plant growth.	Take a soil sample in at least 2 different sites on the school grounds to identify soil layers; use the samples to create soil texture columns for sand, silt, and clay using any straight sided clear container and a drop of detergent; let is sit for 4 days and measure the layers that form; this will analyze and describe the different components of soil (3.6 a).
Science: Earth and Space Systems	3.7 The student will investigate and understand that there is a water cycle and water is important to life on Earth. Key ideas include: **a.** there are many reservoirs of water on Earth; **b.** the energy from the sun drives the water cycle; and **c.** the water cycle involves specific processes.	Identify and locate major water sources in the local community (3.7 a).
Science: Earth Resources	3.8 The student will investigate and understand that natural events and humans influence ecosystems. Key ideas include: **a.** human activity affects the quality of air, water, and habitats; **b.** water is limited and needs to be conserved; **c.** fire, flood, disease, and erosion affect ecosystems; and **d.** soil is a natural resource and should be conserved.	Observe and provide evidence of soil erosion around the schoolyard or community; create and implement a plan to reduce erosion (3.8 d).
History and Social Science Geography	3.6 The student will develop map skills by using globes and maps to locate and describe major rivers, mountain ranges, and other geographic features of: **a.** a-e regions	Find Prince William County and Virginia on a map. Compare the two geographic regions of the Coastal Plain and Piedmont regions.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 3		
History and Social Science: Geography	3.7 The student will describe how people in ancient world cultures adapted to their environment.	Research cultures they are currently studying and compare to their lives. How has technology reduced our need to adapt?
History and Social Science: Economics	3.8 The student will demonstrate an understanding of different cultures and the natural, human, and capital resources they used in the production of goods and services.	Compare the Eco Footprint of different cultures around the world to their own.
Visual Arts: Critical Thinking and Communication	3.3 The student will analyze and interpret artwork using art vocabulary. **a.** Identify distinguishing characteristics of selection of art, such as landscape, portrait, still life, and narrative works.	Utilize local landscape artists' work of PWC sites to divide the landscape into foreground, middleground and background. Invite local landscape artists to your classroom.
World Languages: My life at school *	I can ask and answer, "What is the weather?"	Take students outside and discuss weather using appropriate academic content language.
World Languages: My Community *	I can talk about my favorite arctic and desert animal, categorize animals according to their habitat, and label the continents on a map.	Compare their favorite arctic or desert animal to an animal living in our local temperate deciduous forest ecosystem.
Mathematics	3.1 The student will read temperature to the nearest degree.	Utilize an outdoor thermometer as part of the measurement tools.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 4		
Science: Life Systems and Processes	4.2 The student will investigate and understand that plants and animals have structures that distinguish them from one another and play vital roles in their ability to survive. Key ideas include: **a.** the survival of plants and animals depends on photosynthesis; **b.** plants and animals have different structures and processes for obtaining energy; and **c.** plants and animals have different structures and processes for creating offspring.	Utilize existing plants in the school yard to identify adaptions that plants use for attracting pollinators (4.2c).

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 4		
Science: Living Systems and Processes	4.3 The student will investigate and understand that organisms, including humans, interact with one another and with the nonliving components in the ecosystem. Key ideas include: **a.** interrelationships exist in populations, communities, and ecosystems; **b.** food webs show the flow of energy within an ecosystem; **c.** changes in an organism's niche and habitat may occur at various stages in its life cycle; and **d.** classification can be used to identify organisms.	Students identify a food web on their school property demonstrating energy flow (4.3b); construct the food web while on your school yard investigation and discuss how changes in one part of the food web would affect other organisms (4.3c).
Science: Earth and Space Systems	4.4 The student will investigate and understand that weather conditions and phenomena affect ecosystems and can be predicted. Key ideas include: **a.** weather measurements create a record that can be used to make weather predictions; **b.** common and extreme weather events affect ecosystems; and **c.** long-term seasonal weather trends determine the climate of a region.	Use weather instruments (thermometer, barometer, rain gauge, anemometer) and observations of sky conditions to collect, record, and graph weather data over time; analyze results and determine patterns that may be used to make weather predictions (4.4 a).
Science: Earth and Space Systems	4.6 The student will investigate and understand that there are relationships among Earth, the moon, and the sun. Key relationships include: **a.** the motions of Earth, the moon, and the sun; **b.** the causes for Earth's seasons; **c.** the causes for the four major phases of the moon and the relationship to the tide cycles; and **d.** the relative size, position, age and makeup of Earth, the moon, and the sun.	Have students look up the local tide charts and compare those to the moon phases for a month (4.6 c).

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 4		
Science: Earth and Space Systems	4.7 The student will investigate and understand that the ocean environment has characteristics. Key characteristics include: **a.** geology of the ocean floor; **b.** physical properties and movement of ocean water; and **c.** interaction of organisms in the ocean.	Identify the local ocean currents such as the Gulf Stream and then compare the motions of water as related to currents and tides (4.7 b).
Science: Earth Resources	4.8 The student will investigate and understand that Virginia has important natural resources. Key resources include: **a.** watersheds and water; **b.** plants and animals; **c.** minerals, rocks, and ores; and **d.** forests, soil, and land.	Meaningful Watershed Educational Experiences (MWEE) best match this objective. Investigate the school yard or local ecosystem to identify questions, problems or issues that affect a natural resource in that area and determine a possible solution to an identified problem (4.8 a,b,c,d). "We all live downstream" (4.8 a).
History and Social Science: Virginia Studies Skills	VS.1 The student will demonstrate skills for historical thinking, geographical analysis, economic decision making, and responsible citizenship by: **a.** analyzing the impact of geographic features on people, places, and events to support an understanding of events in Virginia history.	Look at the Appalachian plateau region, with coal as a resource, and how burning coal has benefited our economy but also harmed human and environmental health. Using the local power company website, identify the fuel sources for most of their energy today.
History and Social Science: Virginia Studies Virginia: The Physical Geography and Native Peoples	VS.2 The student will demonstrate an understanding of the relationship between physical geography and the lives of the native peoples, past and present, of Virginia by: **a.** locating Virginia and its bordering states on maps of the US; **b.** locating and describing Virginia's Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian plateau; **c.** Locating and identifying water features important to the early history of Virginia; and **d.** describing how American Indians related to the climate and their environment to secure food, clothing, and shelter.	Share local images of the coastal plain and its features (ex: Leesylvania State Park). Lead a school yard adventure and identify what would change in your clothing and shelter if you had to utilize the natural resources around you and how it would change over the seasons.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 4		
History and Social Science: Virginia Studies Political Growth and Western Expansion	VS.6 The student will demonstrate an understanding of the role of Virginia in the establishment of the new American nation by: **a.** explaining the influence of geography on the migration of Virginians into other states.	Identify the human health problems related to mosquitos and brackish water and how that influenced the movement of people.
World Languages: My Life at School *	I can describe the weather according to the season.	Take students outside and discuss weather using appropriate academic content language.
World Languages: My Community *	I can talk about my favorite animal in the rainforest and forest, label the oceans, and categorize animals according to their habitat.	Use local native animals that live in our local temperate deciduous forest ecosystems as a choice list for students to use as their discussion topic.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 5		
Science: Earth and Space Systems	5.8 The student will investigate and understand that Earth constantly changes. Key ideas include: **a.** Earth's internal energy causes movement of material within the Earth; **b.** plate tectonics describe movement of the crust; **c.** the rock cycle models the transformation of rocks; **d.** processes such as weathering, erosion, and deposition change the surface of the Earth; and **e.** fossils and geologic patterns provide evidence of Earth's change.	Locate, chart, and report weathering, erosion, and deposition at home or on the school grounds; create and implement a plan to reduce weathering, erosion, and/or deposition problems that may be found and discuss the results of the experiment (5.8 d).
Science: Earth Resources	5.9 The student will investigate and understand that the conservation of energy resources is important. Key ideas include: **a.** some sources of energy are considered renewable and others are not; **b.** individuals and communities have means of conserving both energy and matter; and **c.** advances in technology improve the ability to transfer and transform energy.	Given school energy data from the office of Energy and Sustainability in the Facilities Department, create and implement a plan to conserve energy in the school (5.9 b).

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 5		
History and Social Science: North American Geography Map and Globe Skills	NAG 5.1 The student will use maps, globes, photographs, charts, graphs, and tables to: **a.** position and label the seven continents and five oceans to create a world map; **b.** use the equator and prime meridian to identify the hemispheres; **c.** use parallels of latitude and meridians of longitude to locate specific places; and **d.** develop an awareness of Global Positioning Systems (GPS) and how people use them.	Locate the Chesapeake Bay. Find the Atlantic Ocean. What is the latitude and longitude of the mouth of the Bay as it enters the Atlantic Ocean?
History and Social Science: North American Geography Geographic Concepts	5.2 The student will demonstrate knowledge and understanding of geography by: **a.** defining geography; and **b.** identifying and explaining the five themes of geography: Place, Region, Location, Movement, Human/Environment Interaction.	Discuss how human interaction with the environment has changed our local environment and geography through roads, housing, and natural resource extraction.
History and Social Science: North American Geography Regional Study: The American Northeast	5.3 The student will explore the Northeast region of the United States by: **a.** explaining the physical and climate characteristics of the Northeast region; and **b.** analyzing the natural resources and economic activity of the Northeast region.	Compare/contrast the climate of the Northeast with our local climate.
History and Social Science: North American Geography Regional Study: The American Southeast	5.4 The student will explore the Southeast region of the United States by: **a.** explaining the physical and climate characteristics of the Southeast region; and **b.** analyzing the natural resources and economic activity of the Southeast region.	Compare/contrast the climate of the Southeast with our local climate.
History and Social Science: North American Geography Regional Study: The American Midwest	5.5 The student will explore the Midwest region of the United States by: **a.** explaining the physical and climate characteristics of the Midwest region; and **b.** analyzing the natural resources and economic activity of the Midwest region.	Compare/contrast the climate of the Midwest with our local climate.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 5		
History and Social Science: North American Geography Regional Study: The American Southwest	5.6 The student will explore the Southwest region of the United States by: **a.** explaining the physical and climate characteristics of the Southwest region; and **b.** analyzing the natural resources and economic activity of the Southwest region.	Compare/contrast the climate of the Southwest with our local climate.
History and Social Science: North American Geography Regional Study: The American West	5.7 The student will explore the West by: **a.** explaining the physical and climate characteristics of the West region; and **b.** analyzing the natural resources and economic activity of the West region.	Compare/contrast the climate of the West with our local climate.
History and Social Science: North American Geography Neighboring Countries: Canada	5.8 The student will explore Canada by: **a.** explaining the physical and climate characteristics and climate of Canada; and **b.** analyzing the natural resources and economic activity of Canada.	Compare/contrast the climate of Canada with our local climate.
History and Social Science: North American Geography Neighboring Countries: Mexico	5.9 The student will explore Mexico by: **a.** explaining the physical and climate characteristics of Mexico; and **b.** analyzing the natural resources and economic activity of Mexico.	Compare/contrast the climate of the Mexico with our local climate.
History and Social Science: North American Geography Neighboring Countries: Central America	5.10 The student will explore Central America by: **a.** explaining the physical and climate characteristics of Central America; and **b.** analyzing the natural resources and economic activity of Central America.	Compare/contrast the climate of the Central America with our local climate.
History and Social Science: North American Geography Neighboring Countries: The Caribbean Islands	5.11 The student will explore the Caribbean Islands by: **a.** explaining the physical and climate characteristics of the Caribbean Islands; and **b.** analyzing the natural resources and economic activity of the Caribbean region.	Compare/contrast the climate of the Caribbean with our local climate.

Grade 6 - 8

This table identifies where directly related Environmental Literacy instruction takes place at each middle school grade level. These instances are aligned with the Virginia Standards of Learning (SOLs) or Virginia student competencies. In addition, each grade band has suggested projects or learning activities that can occur at that level. These activities are either place-based, outdoors, or use the school building as a teaching tool to address the Commitment 2, Objective 2.3 strategic priority that states that schools will "Incorporate project-based learning across all grade levels through the development of resources designed to utilize the school building as a teaching tool. PWCS commits to creating site-specific outdoor environmental experiences."

World Languages Content for middle school and high school is written based on the state-described ACTFL Proficiency Level Standards. Language courses are not grade level specific but do follow a pathway of increasing proficiency and expectations. To view World Language's Alignment Guide of Cross-Curricular Standards, use this link to move to that section of this document.

As a living document, the content topics will be updated as new VA SOL curriculum frameworks are adopted.

Other content areas provide supporting skills to develop environmental literacy. While a Mathematics or English Language Arts course may not specifically assess skills or content directly related to environmental literacy, the skills gained in those courses directly support its acquisition and are equally important.

Middle School Environmental Literacy Targets:

By the end of grade eight, PWCS middle school students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades six through eight.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Engage students with lessons that use the school building as a teaching tool.
- Introduce specific career connections related to environmental literacy skills.
- Enable learners to understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.
- Engage them in sustainability education and projects led by their Sustainability Liaison or classroom teachers in their schools.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 6		
Science	6.3 The student will investigate and understand that there is a relationship between the sun, Earth, and the moon. Key ideas include: **a.** Earth has unique properties; **b.** the rotation of Earth in relationship to the sun causes day and night; **c.** the movement of Earth and the moon in relationship to the sun causes phases of the moon; **d.** Earth's tilt as it revolves around the sun causes the seasons; and **e.** the relationship between Earth and the moon is the primary cause of tides.	Have students look up the local tide charts and compare those to the moon phases for a month (6.3 e).

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 6		
Science	6.4 The student will investigate and understand that there are basic sources of energy and that energy can be transformed. Key ideas include: **a.** the sun is important in the formation of most energy sources on Earth; **b.** Earth's energy budget relates to living systems and Earth's processes; **c.** radiation, conduction, and convection distribute energy; and **d.** energy transformations are important in energy usage.	Go outside and utilize passive and active solar energy to investigate how light energy (radiant energy) can be transformed into other forms of energy (e.g., mechanical, chemical, and electrical) (6.4 d).
Science	6.6 The student will investigate and understand that water has unique physical properties and has a role in the natural and human-made environment. Key ideas include: **a.** water is referred to as the universal solvent; **b.** water has specific properties; **c.** thermal energy has a role in phase changes; **d.** water has a role in weathering; **e.** large bodies of water moderate climate; and **f.** water is important for agriculture, power generation, and public health.	On a school yard walk, chart, record, and describe evidence of chemical and physical weathering in the local environment (6.6 d). Analyze and explain the difference in average winter temperatures among areas in central and western Virginia and cities and counties along the Chesapeake Bay and Atlantic coast (6.6 e) and compare to their local average temperatures.
Science	6.7 The student will investigate and understand that air has properties and that Earth's atmosphere has structure and is dynamic. Key ideas include: **a.** air is a mixture of gaseous elements and compounds; **b.** the atmosphere has physical characteristics; **c.** properties of the atmosphere change with altitude; **d.** there is a relationship between air movement, thermal energy, and weather conditions; **e.** atmospheric measures are used to predict weather conditions; and **f.** weather maps give basic information about fronts, systems, and weather measurements.	Use a school yard weather station to collect local place-based air temperature, air pressure, and humidity, using appropriate units of measurement and tools (6.7 b).

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 6		
Science	6.8 The student will investigate and understand that land and water have roles in watershed systems. Key ideas include: **a.** a watershed is composed of the land that drains into a body of water; **b.** Virginia is composed of multiple watershed systems which have specific features; **c.** the Chesapeake Bay is an estuary that has many important functions; and **d.** natural processes, human activities, and biotic and abiotic factors influence the health of a watershed system.	Complete a Meaningful Watershed Educational Experience (MWEE) on your school grounds to meet most of the essential knowledge and practices for this objective and for Objective 6.9 as well; students will identify and describe their local watershed, how it drains into the Chesapeake Bay, and identify human activities, both biotic and abiotic, that affect the health of our watershed.
Science	6.9 The student will investigate and understand that humans impact the environment and individuals can influence public policy decisions related to energy and the environment. Key ideas include: **a.** natural resources are important to protect and maintain; **b.** renewable and nonrenewable resources can be managed; **c.** major health and safety issues are associated with air and water quality; **d.** major health and safety issues are related to different forms of energy; **e.** preventive measures can protect land-use and reduce environmental hazards; and **f.** there are cost/benefit tradeoffs in conservation policies.	In order to analyze how renewable and nonrenewable resources are used and managed within the home, school, and community (6.9 b), look at local policy decisions regarding land use; use portions of the Prince William County comprehensive plan to look at long range land use plans for the area around your school; investigate practices that can reduce environmental hazards or improve land use (6.9 e).
History and Social Science: US History to 1865 Geography	US1.2 The student will interpret maps, globes, photographs, pictures, or tables to: **a.** locate the seven continents and 5 oceans; **b.** locate and describe the major geographic regions of North America.	Students map the Chesapeake Bay watershed, its tributaries, and importance to the history of the region; tie into environmental health of the waterways and location of development.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 6		
CTE: Family and Consumer Science Exploratory I	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Family and Consumer Science Exploratory I	"Developing Responsibility for Living Environments" (Personal Environments). Optional: Demonstrate ways to maintain a clean environment. Optional: Identify ways to conserve natural resources. Optional: Apply sustainability practices to the individual's personal living environment.	School yard trash pickups and characterization. Methods and rationale for cleaning with biodegradable and organic cleaning materials including a comparison of results.
CTE: Technology and Engineering Education Introduction to Technology	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Technology and Engineering Education Introduction to Technology	Identify resources used in technology and engineering. Process/Skill Questions: • What are examples of each of the resources? • What is a renewable resource? • What is the definition of an exhaustible resource? • What are examples of exhaustible resources? • What is sustainability, and how does it affect resources?	Outdoor scavenger hunt for natural resources and methods to sustainably manage those resources.
CTE: Technology and Engineering Education Introduction to Technology	(Optional) Describe the agricultural and biological technologies contexts of technology and engineering. Process/Skill Questions: • How has the emergence of biotechnologies affected biodiversity and ecology in the environment?	Planting school gardens to preserve resources such as water, incorporating crop rotation, utilizing fewer chemicals, and enhancing the use of beneficial insects.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 6		
CTE: Business and Information Technology STEM/Computer Solutions	Demonstrate big picture thinking by defining your understanding of one's role in fulfilling the mission of the workplace and a consideration of the social, economic, and environmental effects of one's actions.	Share company mission and vision statements that include consideration of their effect on the environment; would this inclusion make you more likely to pursue employment with this company?
CTE: Business and Information Technology STEM/Computer Solutions	Manage time and resources Consider natural resources and how to incorporate responsible and sustainable practices.	Using a local company as an example, identify the natural resources they must manage and how efficiency and productivity can be improved by sustainable resource practices.
CTE: Business and Information Technology STEM/Computer Solutions	Demonstrate workplace safety by adhering to Occupational Safety and Health Administration (OSHA) standards and instructor and manufacturer guidelines which includes: • interpreting safety data sheets (SDS): the physical, health, and environmental health hazards.	Look at the SDS for approved cleaning products for our school and identify the guidelines custodial staff must follow in their use.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 7		
Science: Life Science	LS.5 The student will investigate and understand that biotic and abiotic factors affect an ecosystem. Key ideas include: **a.** matter moves through ecosystems via the carbon, water, and nitrogen cycles; **b.** energy flow is represented by food webs and energy pyramids; and **c.** relationships exist among producers, consumers, and decomposers.	On a school yard walk, analyze local aquatic and/or terrestrial ecosystems, identify biotic and abiotic components, and describe their roles in the cycling of matter and flow of energy (LS.5 a); while on the walk, you can also recognize examples of common producers, consumers, and decomposers and explain the role of each in the flow of energy and cycling of matter through an ecosystem (LS.5 c); and provide examples to illustrate the effects of human activity on the activity of producers, consumers, and decomposers in the school yard (LS.5 c) such as mowing, students walking on grass, and presence of invasive species (LS 11c).

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 7		
Science: Life Science	LS.6 The student will investigate and understand that populations in a biological community interact and are interdependent. Key ideas include: **a.** relationships exist between predators and prey and these relationships are modeled in food webs; **b.** the availability and use of resources may lead to competition and cooperation; **c.** symbiotic relationships support the survival of different species; and **d.** the niche of each organism supports survival.	Find an example of a community of organisms in the school yard that interact (LS.6 a), and predict the effect of limiting factors on organisms, populations, and/or communities in school yard food web/ecosystem (LS.6 b).
Science: Life Science	LS.7 The student will investigate and understand that adaptations support an organism's survival in an ecosystem. Key ideas include: **a.** biotic and abiotic factors define land, marine, and freshwater ecosystems; and **b.** physical and behavioral characteristics enable organisms to survive within a specific ecosystem.	Observe and sketch various leaves from the school grounds with a diverse array of adaptations; investigate how structural adaptations among populations allow organisms to survive with ecosystems (LS.7 b). Examples include thorns, spikes, pointed tips, waxy coatings, etc.
Science: Life Science	LS.8 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time. Key ideas include: **a.** organisms respond to daily, seasonal, and long-term changes; **b.** changes in the environment may increase or decrease population size; and **c.** large-scale changes such as eutrophication, climate changes, and catastrophic disturbances affect ecosystems.	Utilizing the National Climate report and data from NOAA, students will predict the environmental effects of large-scale changes, such as climate change (including drought) and sea-level rise on our local community (LS.8 c); the links will be updated over time, check for the most recent version.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 7		
Science: Life Science	LS.9 The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. Key ideas include: **a.** changes in habitat can disturb populations; **b.** disruptions in ecosystems can change species competition; and **c.** variations in biotic and abiotic factors can change ecosystems.	Use evidence from the school yard to describe the impact of human activity on the biotic and abiotic factors within an ecosystem (LS.9 c); plan an investigation examining relationships between ecosystem dynamics and human activity on school grounds.
Science: Life Science	LS.11 The student will investigate and understand that populations of organisms can change over time. Key ideas include: **a.** mutation, adaptation, natural selection, and extinction change populations; **b.** the fossil record, genetic information, and anatomical comparisons provide evidence for evolution; and **c.** environmental factors and genetic variation, influence survivability and diversity of organisms.	Spiraling back to LS.8, have students construct an evidence-based explanation about how environmental factors such as climate change and genetic variation can influence species' survival, reproduction, and diversity (LS.11 c).
History and Social Science: US History 1865 to the Present Geography and the United States Since WWII	USII.2 The student will use maps, globes, photographs, pictures, or tables for: **a.** explaining how physical features and climate influences the movement of people westward; **b.** explaining the relationships among natural resources, transportation, and industrial development after 1865; and **c.** evaluating and explaining American foreign policy, immigration, the global environment, and other emerging issues.	Discuss how resources, terrain, and climate drove historical development and immigration patterns; reinforce that many of the same development patterns exist today but are expanding due to technology. What are the environmental implications for sustainability of resources?
CTE: Career Connections Career Investigations	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 7		
CTE: Career Connections Career Investigations	Explore the 17 Career Clusters including: • Agriculture, Food, and Natural Resources • Energy	Invite local farmers, entrepreneurs, and state extension office personnel to share career-related expertise.
CTE: Family and Consumer Science Exploratory II	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Family and Consumer Science Exploratory II	"Maintaining Living Environments" (Personal Environments). Optional: Demonstrate ways to conserve natural resources within the family. Optional: Maintain a clean and safe environment.	School yard trash pickups and characterization. Methods and rationale for cleaning with biodegradable and organic cleaning materials including a comparison of results.
CTE: Technology and Engineering Education Inventions and Innovations	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Computer and Information Science Computer Science Discoveries	Demonstrate big picture thinking by defining your understanding of one's role in fulfilling the mission of the workplace and a consideration of the social, economic, and environmental effects of one's actions.	Have students identify, research, and present one change they could make in their daily lives at school (their workplace!) that would reduce their impact on the environment.
CTE: Computer and Information Science Computer Science Discoveries	Manage time and resources. Consider natural resources and how to incorporate responsible and sustainable practices.	As a class, discuss and then choose one sustainable practice that students and staff could begin that would reduce their impact on the environment and conserve resources. Track that change over time to quantify its effect.
CTE: Computer and Information Science Computer Science Discoveries	Demonstrate workplace safety by adhering to Occupational Safety and Health Administration (OSHA) standards and instructor and manufacturer guidelines which includes: • interpreting safety data sheets (SDS): the physical, health, and environmental health hazards.	Have students look at the OSHA requirements for woodworking, automotive, or other CTE courses to identify general categories of federal safety considerations that must be addressed.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 8		
History and Social Science: Civics and Economics	CE.1 The student will demonstrate skills for historical thinking, geographical analysis, economic decision making, and responsible citizenship by: **a.** taking informed action to address school, community, local, state, national, and global issues.	Include the idea of externalities into economic decision making and how it impacts natural resources and global ecosystem health.
History and Social Science: Civics and Economics	CE.13 The student will apply social science skills to understand the role of government in the US economy by: **a.** describing how governments regulate to protect consumers, labor, the environment.	Introduce national, state, and local environmental regulations and their layers of protection for the environment and humans.
Physical Education: Social and Emotional Development	8.4 h Exercise enhances mood and overall well-being, provides opportunities to connect with family and friends, enjoy the outdoors, unwind, and meet new people with similar interests.	Discuss with students the benefit of being outdoors to mental health and stress reduction.
CTE: Family and Consumer Science Exploratory III	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Family and Consumer Science Exploratory III	Analyze multiple life roles and responsibilities as a community member. Analysis should include the roles and responsibilities as a student, young adult, parent, employee, volunteer, voter, and neighbor. Process/Skill Questions: • Leadership • How does volunteering in your community, voting in elections, and participating in other civic activities demonstrate good citizenship? • How can you take an active role in encouraging sustainability in your community?	Invite community volunteers and representatives of volunteer organizations to share opportunities for students to become actively engaged in sustainability-related volunteerism. Example organizations could include Virginia Master Naturalists, Keep Prince William Beautiful, 4-H, Scouts of America, Virginia Master Gardeners, and local watershed clean up groups.

Need help with any of these activities? Reach out to the PWCS Energy and Sustainability Team for hands on training, demonstrations, or support.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 8		
CTE: Family and Consumer Science Exploratory III	"Analyzing Living Environments" (Personal Environments) Optional: Examine global concerns related to the community. Optional: Implement strategies to conserve natural resources in the school and community.	Have students identify a global environmental issue that affects their local community such as food waste. Using school and community resources, students develop a plan to address their identified issue; implement their plan.
CTE: Family and Consumer Science Exploratory III	Repurpose textile products and apparel. Repurposing should include altering, repairing, reconditioning, consignment, donation or recycling. Management: How does the use of repurposed textiles and apparel benefit the environment?	Gather materials from the community for students to use in an upcycling project to demonstrate the usefulness of used supplies, ways to reduce their waste footprint, and develop a mindset of resource conservation.
CTE: Technology and Engineering Education Technological Systems	Manage time and resources. Management should include considering resources: • natural—using responsible and sustainable practices.	Proper school recycling and waste disposal. Conservation of resources with class materials.
CTE: Technology and Engineering Education Technological Systems	Analyze ethics related to technological systems. Analysis should include a definition of ethics and how it relates to societal and environmental responsibility.	Using case studies such as electronic waste, solar panels, and electric vehicle batteries to complete an environmental cost/benefit analysis.
CTE: Technology and Engineering Education Technological Systems	Explain the influences of technology on history. Explanation should include the forces that shape the selection and use of technology the changes it has caused in the development of civilization. Process/Skill Questions: How have advances in technology changed the way resources are gathered, processed, and used?	Using case studies such as fast fashion (NPR T-shirt project), large scale monoculture agriculture, local mining processes, and deforestation to compare/contrast historic vs. modern resource consumption patterns and the sustainability implications.
CTE: Technology and Engineering Education Technological Systems	Assess the effect of technological systems on individuals, resources, society, and the environment. Assessment should include collecting performance data on economic, environmental, and social consequences of a technological system.	Using our local landfill as a case study and the electronic waste that is collected there, construct a life cycle analysis of their cell phone or gaming system and the environmental connections.

Content Area and Topics	VDOE Environmental Literacy Strands	Suggested Learning Activities
Grade 8		
CTE: Business and Information Technology STEM Applications/Digital Technology Foundations	Demonstrate big picture thinking by showing your understanding of one's role in fulfilling the mission of the workplace and consideration of the social, economic, and environmental effects of one's actions.	Students look at the PWCS mission and vision statements related to sustainability. Do you think this is important as we look at fiscal and environmental stewardship of community resources?
CTE: Business and Information Technology STEM Applications/Digital Technology Foundations	Manage time and resources: Consider natural resources and how to incorporate responsible and sustainable practices. What are examples of responsible and sustainable practices in the workplace?	Investigate our school system's sustainable practices by looking at regulation 495-1; have students pick one of the practices to investigate and present about.
CTE: Business and Information Technology STEM Applications/Digital Technology Foundations	Demonstrate workplace safety by adhering to Occupational Safety and Health Administration (OSHA) standards and instructor and manufacturer guidelines which includes: • interpreting safety data sheets (SDS): the physical, health, and environmental health hazards.	Bring in a guest speaker or resource documents from science to discuss the requirements for the safe storage of chemicals for science labs in PWCS.
CTE: Business and Information Technology STEM Applications/Digital Technology Foundations	Demonstrate leadership skills through participation in student organization activities such as meetings, programs, and projects. Demonstration should include contributory participation in activities such as meetings, fund-raising projects, school- and community-service projects, and competitive events.	Provide students with information about school environmental club "if present" and opportunities for community service projects on school grounds or in the community.

Grade 9 - 12

This table identifies courses where directly related Environmental Literacy instruction takes place at high schools across the division. These instances are aligned with the Virginia Standards of Learning (SOLs) or other curriculum evaluator agencies. There are far too many high school courses offered in PWCS to enumerate each standard or competency that supports environmental literacy development. In addition, courses are not always taken at one particular grade level, and so courses will not be categorized as such but instead by major content area.

World Languages Content for middle school and high school is written based on the state-described ACTFL Proficiency Level Standards. Language courses are not grade level specific but do follow a pathway of increasing proficiency and expectations. To view World Language's Alignment Guide of Cross-Curricular Standards, with more information about how their standards are organized, use this link to move to that section of this document.

Other content areas provide supporting skills to develop environmental literacy. While a Mathematics or English Language Arts course may not specifically assess skills or content directly related to environmental literacy, the skills gained in those courses directly support its acquisition and are equally important.

High School Environmental Literacy Targets:

By the end of grade 12, PWCS high school students will engage in experiences that:

- Address environmental literacy as outlined in the Virginia SOLs grades 9-12.
- Occur in their schoolyards or outdoor learning spaces.
- Are hands-on learning experiences.
- Engage students with lessons that use the school building as a teaching tool.
- Explore career connections related to environmental literacy skills.
- Engage in research, service projects, clubs, or internship opportunities that promotes environmental stewardship.
- Enable learners to communicate, evaluate, and justify their own views on environmental issues and alternative ways to address them.
- Offer the opportunity to receive the Board of Education Seal for Excellence in Science and the Environment.
- Fulfill the opportunity to participate in at least one complete MWEE experience.

Category	Course Name
Career and Technical Education Courses	
Agricultural Education	Horticulture Landscaping I Landscaping II Turf Grass Establishment and Maintenance
Business and Information Technology	Business Law Business Management Principles of Business and Marketing International Business and Marketing Economics and Personal Finance
Family and Consumer Sciences	Introduction to Culinary Arts Culinary Arts I Culinary Arts II Culinary Arts III Introduction to Fashion Careers Life Planning Nutrition and Wellness

Category	Course Name
Career and Technical Education Courses	
Health and Medical Sciences	Introduction to Health and Medical Services Pharmacy Technician I Pharmacy Technician II Practical Nursing II
Marketing	Fashion Marketing Advanced Advanced Marketing
Technology and Engineering Education	Engineering Analysis and Applications II Graphic Communication Systems Power and Transportation Production Systems Sustainability and Renewable Technologies Technology Foundations Civil Engineering and Architecture Engineering Design and Development Environmental Sustainability
Trade and Industrial Education	Automotive Technology II Automotive Technology III Aviation Maintenance Technology I Building Trades I Building Trades II Cabinetmaking I Cabinetmaking II Computer Networking and Hardware Operations I Electricity I Firefighting I Plumbing I Plumbing II Welding I Welding II Welding III

Category	Course Name
World Languages	
Modern Roman Alphabet World Languages	French, German, Italian, and Spanish I French, German, Italian, and Spanish II French, German, Italian, and Spanish III French, German, Italian, and Spanish IV French and Spanish V
Modern Non-Roman Alphabet World Languages	Arabic, Chinese, Russian, and Korean I Arabic, Russian, and Korean II Arabic, Russian, and Korean III Arabic and Korean IV

Category	Course Name
World Languages	
American Sign Language	ASL I, II, III, and IV
Advanced Placement World Language Courses	AP French, German, Russian, Spanish, and Latin II AP French, German, Russian, Spanish, and Latin III AP French, German, Russian, Spanish, and Latin IV
Spanish for Fluent Speakers	Spanish for Fluent Speakers I, II, and III
Classical Languages	Latin I, II, III, IV, and V
Cambridge Programme World Language Courses	IGCSE French, Spanish, and Italian III AICE Classical Studies I AICE French and Spanish IV
IB Programme World Language Courses	IB Pre-Diploma Programme French and Spanish II IB Advance Middle Years Program French and Spanish III IB AM Initio French and Spanish I IB French and Spanish IV (SL) IB French and Spanish V (SL)

Category	Course Name
Health, Physical Education, and Driver Training	
Elective Course Sequence for Physical Education	Personal Fitness
Required Course Sequence for Physical Education	Health, Physical Education, and Classroom Driver Education II

Category	Course Name
History and Social Science	
Standard Social Studies Courses	World History and Geography to 1500 World History and Geography From 1500 U.S. and Virginia History
Advanced Placement Social Studies Courses	Advanced World History and Geography to 1500 AP Human Geography AP World History AP Government and Politics: U.S. AP Economics
IB Programme Social Studies Courses	Advanced Middle Years Programme—World History and Geography From 1500 IB Geography (SL)
Social Studies Elective Courses	Hands on History: Discovering Prince William County's Past IGCSE Global Perspectives AICE Global Perspectives World Geography

Category	Course Name
Science	
Standard First-Year Science Courses	Earth Science I Environmental Science Biology I Chemistry I Physics I
Advanced Placement Science Courses	Advanced Biology I Advanced Earth Science I AP Environmental Science Advanced Chemistry I AP Biology
Cambridge Programme Science Courses	IGCSE Biology AICE Biology (AS Level) AICE Biology (A Level) AICE Environmental Management (AS Level)
IB Programme Science Courses	Advanced Middle Years Programme Earth Science IB Environmental Systems and Societies (SL) Advanced Middle Years Programme Biology I IB Biology I (HL)
Dual Enrollment Science	AP Environmental Science IB Biology II (HL)
Standard Science Electives	Earth Science II: Oceanography Biology II: Ecology Earth Science II: Astronomy Earth Science II: Physical Geology
The Governor's School @ Innovation Park Science Courses	GS Microbiology + Lab GS Environmental Chemistry + Lab GS General Biology II + Lab

World Languages Alignment Guide of Cross-Curricular Standards

The Alignment Guide for World Languages utilizes the VDOE Standards of Learning with Progress Indicators for Modern World Languages. These include novice, intermediate, and advanced (high) levels for intercultural communication, interpretive communication, interpersonal communication, presentational communication, and communicative literacy. Language courses are not grade level specific but do follow a pathway of increasing proficiency and expectations. These proficiency expectations are divided into those for Levels I and II difficulty ratings, and those for Levels III and IV languages as shown below.

Content standards which support Environmental Literacy for PWC students are recorded below. Note the proficiency levels as depicted with the letters following the content standard. Where some standards overlapped with the same content, but only with increased facets of mastery, only one instance may have been recorded in the table.

These standards can be assessed in numerous ways, leading to a variety of instructional possibilities in the classroom. Many use the terms "such as" and then suggest several topics, some of which may include environmental literacy-related topics. Ecological themes are found throughout all levels of World Language courses.

Each standard also has suggested projects or learning activities that can occur at that level. These activities are either place-based, outdoors, or use the school building as a teaching tool to address the Commitment 2, Objective 2.3 strategic priority that states that schools will "Incorporate project-based learning across all grade levels through the development of resources designed to utilize the school building as a teaching tool. PWCS commits to creating site-specific outdoor environmental experiences."

Key: N=Novice, I=Intermediate, A=Advanced, L=Low, M=Mid, H=High.

World Language		
Standard	**Progress Indicator**	**Suggested Activities**
3.1.NM.b	Recognize items in texts such as a shopping list, food label categories, or information from a weather forecast with symbols.	Use local forecasts to demonstrate target language specific vocabulary and conversation skills.
4.1.NH	Exchange simple oral or signed information about similarities and differences between typical products and practices to help understand perspectives in native and other cultures, such as school schedules, course selection, and the importance of academics; national parks, study of geography, and the importance of natural resources.	Discuss local parks such as Prince William Forest Park or Manassas Battlefield National Park, their natural resources, and how to preserve them. How is ecology practiced in various cultures?
6.1.NM	Ask and answer simple questions about the weather when deciding what to wear to an outdoor event.	Using current weather conditions, discuss appropriate clothing for outdoor activities. Compare the climate of our local area to another location where the language is spoken.
9.2.NH	Identify similarities and differences between typical products and practices to help understand perspectives in native and other cultures, such as monuments, architecture, and national pride; national parks, leisure activities, and popular parks.	Identify differences in building materials between different cultures and the school community. How do they differ in natural resource use and energy efficiency? What types of outdoor leisure activities do the target language countries engage in and how is that different from our local area?

Key: N=Novice, I=Intermediate, A=Advanced, L=Low, M=Mid, H=High.

World Language		
Standard	**Progress Indicator**	**Suggested Activities**
1.1.IH	Compare and contrast the relationships among familiar and unfamiliar products, practices, and perspectives in native and other cultures, such as green products, recycling, and earth friendly beliefs; historical events, social norms, and value of demonstrations; family structures, weddings, and the treatment of elders; obituaries, funerals, and attitudes toward death.	Look at the history of environmental awareness in the United States. How did the pace of environmental awareness differ in the target language countries?
4.2.IM	Exchange written information to compare everyday products, practices, and perspectives in native and other cultures, such as reusable bags, recycling, and environmental responsibility; food pyramid, exercise routines, and trends in dieting.	Discuss recycling in your classroom and school. Do you recycle properly? Why is recycling an important part of natural resource conservation?
9.2.IM	Compare everyday products, practices, and perspectives in native and other cultures, such as reusable bags, recycling, and environmental responsibility; food pyramid, exercise frequency, and trends in dieting.	Compare recycling behaviors in your community with those from one of your world language global communities.
12.1.IH	Describe the benefits of volunteering for a recent or upcoming community event based on personal experience.	Plan a service-learning project for your school involving school grounds beautification. Have students reflect on that project in a journal entry.
12.2.IL	Create a trip review for an ecotourism website on traveling abroad in an environmentally friendly manner.	Create a sample advertisement in the target language for visitors to come to Prince William County, highlighting outdoor activities and opportunities for ecotourism.
4.1.AM	Exchange oral or signed information to compare the relationships among global products, practices, and perspectives in native and other cultures, such as professional or social schedules, influence of time on scheduling, and cultural concepts of time; environmental problems, solutions to such problems, and respect for such solutions.	Discuss global differences in the approach to issues surrounding global climate change, biodiversity loss, or plastic pollution.
4.2.AM	Exchange written information to compare the relationships among global products, practices, and perspectives in native and other cultures, such as globalized products, prevalence of such products, and impact of such products on society and individual lifestyles; environmentally friendly transportation options, use of such options, and priority of such options.	Compare mass transit systems of various target language communities in comparison to our local system. Why did they develop differently and what are the benefits of each?

Key: N=Novice, I=Intermediate, A=Advanced, L=Low, M=Mid, H=High.

World Language		
Standard	**Progress Indicator**	**Suggested Activities**
9.1.AM	Compare the relationships among global products, practices, and perspectives in native and other cultures, such as professional or social schedules, influence of time on scheduling, and cultural concepts of time; environmental problems, solutions to such problems, and respect for such solutions.	Identify the practice of greenwashing in advertising globally.
9.2.AL	Compare the relationships among a variety of unfamiliar products, practices, and perspectives in native and other cultures, such as material comforts, lifestyles, and materialism; exports, trade practices, and natural disasters and disaster relief efforts.	Research and present information about a natural disaster to identify causes and how we can reduce their impacts in the future. An example could include flooding: building homes away from shorelines or maintaining wetlands to reduce flooding.
9.2.AM	Compare the relationships among global products, practices, and perspectives in native and other cultures, such as globalized products, prevalence of such products, and impact of such products on society and individual lifestyles; environmentally friendly transportation options, use of such options, and priority of such options.	Challenge students to reduce their carbon footprint by using mass transit, carpooling, or riding the bus to school. Track it for 2 weeks and measure their successes. Journal or discuss in the target language their experience.
13.2.AL	Create an announcement for a fundraiser for a health care cause or a human or animal rights cause that has had a personal impact.	Have students identify an environmental cause locally that they can engage in civically to affect change.
HL1.1.AL	Compare the relationships among global products, practices, and perspectives of the heritage culture and the predominant culture, such as ecotourism; environmental problems; impact of contemporary media on society.	What are the environmental justice implications of ecotourism? How can we reduce those impacts by educating our community?
HL1.1.AM	Analyze the relationships among global products, practices, and perspectives of the heritage culture and the predominant culture, such as innovations; ethics and science; effects of technology on self and society.	What products do we import from other countries that perhaps have ethical considerations regarding pollution or natural resource degradation?
DL3.1.NL	Identify and repeat names of items related to content lessons and topics, such as calendar and weather, foods, or plants and wildlife, and compare them to other cultures.	Take students on a target language vocabulary hunt outdoors or within the school building.
DL3.1. NM	Present very simple information related to content topics, such as currency, seasons, habitats, weather forecasts, or healthy food options, and compare them to other cultures.	Compare agricultural food products of local sources to those in a target language country. Explore which fruits and vegetables are "in season" as part of their comparison. Access information about current produce available in local grocery stores and where they were grown. Which target language countries are represented?

Preschool Alignment Guide of Cross-Curricular Standards

Prince William County Public Schools Preschool Programs use an Aligned Planning Guide (APG) for instruction at the Prekindergarten (PK) level. This guide organizes Virginia's Early Learning and Development Standards (ELDS), curriculum evidence, and alignment to the Head Start Early Learning Outcomes along a developmental continuum that ranges from 36-60 months of age for our youngest learners. PWCS chose the HighScope® Preschool Curriculum for their content, which also provides Key Developmental Indicators (KDIs) for each focus area of learning.

While many areas of learning can help to enhance and develop environmental literacy among our PK population through the intentional use of their local environment as a context for place-based learning, the content areas most directly related to environmental literacy fall within the PK Science and Technology and Social Studies KDIs which include the following:

Science and Technology

- **Observing:** Children observe the materials and processes in their environment.
- **Classifying:** Children classify materials, actions, people, and events.
- **Natural and physical world:** Children gather knowledge about the natural and physical world.

Social Studies

- **Geography:** Children recognize and interpret features and location in their environment.
- **Ecology:** Children understand the importance of taking care of their environment.

Content standards within the APG which support Environmental Literacy for our PK students in PWCS are recorded below. Note that the developmental continuum is not included in this document. These standards can be assessed in numerous ways, leading to a variety of instructional possibilities in the classroom. Each PK room will have learners that have different needs and the approaches to learning will vary based on the necessary educational supports.

Each standard has suggested projects or learning activities that can be used to develop these skills in our PK students. These activities are either place-based, outdoors, or use the school building as a teaching tool to address PWCS Commitment 2, Objective 2.3 strategic priority that states that schools will "Incorporate project-based learning across all grade levels through the development of resources designed to utilize the school building as a teaching tool. PWCS commits to creating site-specific outdoor environmental experiences."

ELDS Standard	Head Start Early Learning Outcomes	Curriculum Evidence (KDI)	Suggested Activities
APL1.1. Being curious learners **APL1.2.** Taking initiative	**P-ATL 11.** Child shows interest in and curiosity about the world around them.	**Use of resources:** Children gather information and formulate ideas about their world. **Geography:** Children recognize and interpret features and locations in their environment.	Visit sites in the school yard and identify key features of that area as you travel to the site and arrive there. Revisit the site and use environmental features to help students guide themselves to that area next time. Look for trees, sidewalks, rocks, or other environmental "signposts" to guide their travels.
HPD4.2. Adopting safe behaviors	**PMP 6.** Child demonstrates knowledge of personal safety practices and routines.	**Healthy behavior:** Children engage in healthy practices.	Students are guided while outdoors in how to safely observe nature while exploring the world around them. Emphasis is placed on using senses other than touch to interact with wildlife and gather information about all aspects of nature.
CD1.1. Paying attention to the natural world	**P-SCI 1.** Child observes and describes observable phenomena. **P-SCI 2.** Child engages in scientific talk. **SCI 6.** Child analyzes results, draws conclusions, and communicates results.	**Observing:** Children observe the materials and processes in their environment. **Communicating ideas:** Children communicate their ideas about the characteristics of things and how they work. **Tools and technology:** Children explore and use tools and technology. **Ecology:** Children understand the importance of taking care of their environment. **Vocabulary:** Children understand and use a variety of words and phrases. **Data analysis:** Children use information about quantity to draw conclusions, make decisions, and solve problems. **Drawing conclusions:** Children draw conclusions based on their experiences and observations. **Natural and physical world:** Children gather knowledge about the natural and physical world.	Using tools such as hand lenses, binoculars, and measuring devices, students can use their senses to observe living and non-living objects found in their school environment. Drawing pictures in their nature journal, students will develop a greater understanding of change over time, how to make increasingly more detailed observations, and describe what they experience in the school yard. Students can collect items that are the same and different and use verbal adjectives to describe what they see. Students will respond to scientific words such as describe, compare, predict, and measure as they explore.

ELDS Standard	Head Start Early Learning Outcomes	Curriculum Evidence (KDI)	Suggested Activities
CD1.2. Testing questions and ideas	**SCI 4.** Child asks a question, gathers information, and makes predictions. **SCI 5.** Child plans and conducts investigations and experiments.	**Use of resources:** Children gather information and formulate ideas about their world. Predicting: Children predict what they expect will happen. **Data analysis:** Children use information about quantity to draw conclusions, make decisions, and solve problems. **Experimenting:** Children experiment to test their ideas. **Communicating ideas:** Children communicate their ideas about the characteristics of things and how they work. **Tools and technology:** Children explore and use tools and technology.	Students can investigate which time of the day they will be able to create longer shadows. On a sunny day, have the students trace the outline of various objects or themselves at different times during the day. This demonstrates that the sun's position changes the length and direction of shadows.

APPENDIX 2

Definitions

Term	Definition
ACTFL	American Council on the Teaching of Foreign Language. This Alexandria, Virginia, based group provides leadership and support for quality teaching and learning of foreign languages.
Dedicated Outdoor Learning Environment	A space set aside with the explicit purpose of providing a site for interactive outdoor learning.
Environmental Action Civics	An approach to teaching that helps young people learn through connecting their lessons to their own experiences and the needs of their community by practicing the skills and dispositions needed by members of a community.
Environmental Conservation	To prevent the wasteful use of natural resources and protecting ecosystems for future generations.
Environmental Literacy	Having the skills, understanding, and motivation to make environmental decisions that consider your relationship to natural systems, your community, and future generations.
Environmental Resilience	The ability of an ecosystem to respond to environmental disturbances by resisting damage and recovering quickly.
Environmental Stewardship	To engage in activities that care for the environment and move toward sustainable practices.
Externalities	Those costs not included in the price of a good; often includes negative environmental and human impacts that are not priced out such as pollution, health effects, and loss of natural resources.
High performing buildings	A building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.
Leadership in Energy and Environmental Design (LEED)	A green building rating system that utilizes an evaluative point system that works to save money, improve efficiency, lower carbon emissions, and create healthier places for people to work and live.
Meaningful Watershed Educational Experience (MWEE)	A learner centered framework that focuses on local environmental issues and leads to informed action. It includes both indoor and outdoor components and leads to a student driven action project to affect change.
Model School Grounds	School grounds that link curriculum to the school community-initiated landscape.
MS4 Permit	Municipal Separate Storm Sewer System (MS4) Permit that regulates stormwater discharges with the goal of protecting local surface water quality.
Natural resources	Goods and services derived from nature. They include resources that have commercial value but also aesthetic, scientific, and cultural value.
No Mow Zones	An area of land that has reduced frequency of disturbance from mowers in order to allow native plants to colonize the area and promote biodiversity.

Term	Definition
Place-based learning	Engaging the student in their community, including their environment, local cultures, and local history to prioritize engagement and authentic real-world learning.
Recycling Diversion Rate	The measure of how much waste you divert from the landfill and instead send to the local materials recovery facility (recycling center).
Service learning	A form of experiential learning where students apply concepts learned in the classroom to real world volunteer opportunities that address human, environmental, and community needs. It provides opportunities to problem solve in real time and with meaningful outcomes.
Social Capital	A set of shared values that allows a group of people to work together effectively toward a common goal.
SOL—Standards of Learning	The Virginia Department of Education establishes educational standards for public school courses. Several courses have annually assessed Standards of Learning exams with scores that are reported to the state and federal government.
STEM	Science Technology Engineering and Mathematics. "A" is often also included as STEAM to include the Arts.
Sustainability	Being in a state where you are considering human well-being, society as a whole, economic progress, and nature as a system in order to maintain ecological balance and avoid depletion of natural resources for future generations.
Watershed	The land area that drains to a particular body of water and is influenced by all activities that take place within that area.

APPENDIX 3

External Community Partners Providing Resources

School and division partnerships are an essential part of environmental literacy as we strive to connect students to real world community-based issues. Partnerships help students gain specific environmental knowledge and action skills, increase social capital, and enhance the physical infrastructure of schools. Partnerships benefit the community organizations as they seek to meet their own goals as well through community engagement. Schools or staff looking for specific contacts at these organizations can reach out to sustainability@pwcs.edu for more information. If you are an external partner, contact sustainability@pwcs.edu to be added to this list and to share opportunities for students and staff.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Alice Ferguson Foundation	www.fergusonfoundation.org	• Can provide on-site and virtual field trips at Hard Bargain Farm in Accokeek, MD, for all ages. • For middle and high school, we can provide field trips to a nearby National Park through the Bridging the Watershed program. • View virtual programs on their website.
American Disposal Services	www.americandisposal.com/virginia	• Career connections • School presentations • Touch-a-truck event
Audubon at Home Program	https://www.audubonva.org/audubon-at-home	• Recognition Program for school grounds that support wildlife. • Audubon for Kids. • Information about local conservation efforts. • Use this link to guide your planning process.
Bull Run Protectors	https://www.facebook.com/bullrunwaterprotectors/	• Can provide speakers and help with educational resources as well as community volunteer opportunities. • A project at the Bull Run stream valley has been a bi-annual event from 9-11:30am on the 2nd Saturday of March and December. • Certificates are available for the participants for verification of volunteer hours.
Bull Run Unitarian Universalists (BRUU) Green Team	https://www.bruu.org/about-us/social-justice/the-green-team/	• Identifies how Prince William residents can live in a more-sustainable way by minimizing greenhouse gas emissions, supporting environmental justice, evaluating cost-effective ways to install solar panels, and serving in leadership roles to educate others. • Organizes outdoor experiences.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Chesapeake Bay Foundation	https://www.cbf.org/join-us/education-program/meet-our-educators/cindy-duncan.html	• Teacher and administrator overnight PD programs (some with complete funding covered). • Teaching lessons/curriculum. • Immersion for students. • Chesapeake Classrooms resources. • https://www.cbf.org/join-us/education-program/professional-learning/chesapeake-classrooms-summer-courses/index.html.
Citizens Climate Lobby - Prince William Chapter	https://community.citizensclimate.org/groups/home/1357	• Teach students/clubs about civic engagement techniques. • Present on climate change and ways to address the causes and results.
Compost Crew	https://compostcrew.com/	• Provides food scrap composting services at several PWCS schools. • Increasing waste diversion and educating students and staff about the benefits of composting food scraps and other organic waste.
Dominion Energy Services, Inc. Sustainability	https://www.dominionenergy.com/our-company/customers-and-community/educational-programs	• Scholarship programs. • Environmental education and stewardship grants. • Project Plant It! • Strong men and women in history writing contest. • Power station tours. • Speakers Bureau Program. • Virtual Speakers Bureau Program.
Earth Force	www.earthforce.org	• General Resources. • Caring for Our Watersheds Competition. • Events: https://earthforce.org/events/.
EPA Communications specialist	https://www.epa.gov/education	• Recognizes outstanding environmental educators and youth (PWCS students have won in the past). • Lesson plans, videos, project ideas. • Funds the ee360 Environmental Education program. • Offers grant programs for funding of larger projects.
Farmers market Dale City	https://www.visitpwc.com/listing/dale-city-farmers-market/422/	• Weekly community event providing citizens of Prince William County direct access to Virginia based producers of farm goods and other commodities. • Supports other county projects and activities, such as, the Northern Virginia Food Rescue, where donations of fruits and vegetables aid regional efforts to address food insecurity. • Provides a venue where organizations like the Master Gardeners and Keep Prince William Beautiful (KPWB) can interact with the public.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Freestate Farms	https://www.freestatefarmsva.com/	• Composting food and yard waste (receiving facility). • Compost and mulch for school gardens (PWC Solid Waste donation program). • Facility tours for school groups.
Friends of the Occoquan	https://www.friendsoftheoccoquan.org/	• Offers free Rain Barrel Workshops to schools, community organizations, and homeowners. • Donates rain barrels to support community and school gardens. • Provides schools/community gardens with materials to build a raised bed, including soil, compost, plants, and seeds. • Offers students environmental stewardship opportunities through our biannual cleanups.
Greater Prince William Trails Coalition	www.gpwtrails.org	• Works to advance the completion of an interconnected, interjurisdictional network of trails. • Host several educational hikes every month that are open for all to attend. • Always looking for volunteers to help us map and advocate for a better trails network.
Keep Prince William Beautiful	www.kpwb.org	• Locally coordinates programs spanning education on litter, recycling, and water quality, and advocates and supports community cleanups. • Provides education and outreach events, virtual and in-person school activities, and student project-based environmental leadership activities. • Offers environmental program internships.
Leesylvania State Park	www.dcr.virginia.gov/state-parks/leesylvania	• Provides volunteer opportunities for students and staff. • Hosts a wide variety of educational events about nature, history, recreation, and a preschool Little Rangers program. • Career development programs, youth conservation corps, and AmeriCorps programs. • Summer recreational programs for students.
Leopold's Preserve and White House Farm foundation	www.leopoldspreserve.com	• Seven miles of public hiking trails with 35 interpretive signs. • Diverse habitats including wetlands, meadows, and forests. • Monthly guided hikes free of charge. • School field trips and volunteer opportunities.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Manassas National Battlefield	www.nps.gov/mana	• Public guided tours. • Hiking and bridle trails. • Field trips, K-12 focused on the battles of Manassas in 1861 and 1862. • Track Trails Program for kids which explores natural and historical resources at the park.
Meadows Farms	www.meadowsfarms.com https://meadowsfarms.com/locations/manassas/	• Free kids' events monthly March-December. • Family guide to getting started gardening with kids available at all locations. • Educator guide to getting started gardening with kids available at all locations. • In school field trip opportunities contact motoole@meadowsfarms.com.
Micron	https://www.micron.com/gives/educators/k12-educators	• Education and career pathway presentations including career connections through job shadowing, Girls Going Tech, Chip Camp, and online virtual stem resources. • Online lessons library and Free virtual STEM Resources. • Job shadowing events and Women in Technical Careers programs. • Grants for STEM programs. • Email them for additional opportunities.
Moseley Architects	www.moseleyarchitects.com	• Provides speakers for topics like sustainable buildings, engineering, construction, etc. • Participate in career days, offer shadow days. • Volunteers that will work with you on projects. • Teacher workshops for using the building as a teaching tool. • Assist with developing educational signage for buildings. • Curriculum for sustainability that can be adaptable to school audiences.
Prince William NAACP	www.pwnaacp.org https://pwnaacp.org/education-committee-meeting-invitation/	• Programs focusing on free, high-quality, public education for all, youth engagement. • Education Committee advocates for all disadvantaged students and students of color to experience an educational path to college, successful career, or trade by ensuring access to exceptional teaching, equitable resources, and a challenging curriculum. • Strive to eliminate racial inequities that continue to plague our education system.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
National Energy Education Development Project (NEED)	www.need.org	• Specializes in energy education providing state-aligned FREE curriculum materials, teacher training, and student leadership development. • With a strong portfolio designed for interdisciplinary use across K-12 grade levels, NEED provides classroom teachers with tools for success with any grouping of students in virtually all learning situations.
National Oceanic and Atmospheric Administration	www.noaa.gov	• NOAA Chesapeake Bay Office offers professional development for formal and nonformal educators through the Environmental Science Training Center (ESTC). • ESTC workshops and webinars connect educators with science content from NOAA and our partners and include how to apply this science with students through Meaningful Watershed Educational Experiences.
National Wildlife Federation	https://www.nwf.org/eco-schools-usa	• Educational tools and resources through the Eco-Schools USA program. • A seven-step framework for success to enhancing your school's environmental education program and sustainability. • A pathway to recognition for your school and assists with your journey toward Green Ribbon Schools program recognition.
NatureBridge	https://naturebridge.org/locations/prince-william-forest	• 3-day, 2-night environmental education programs in Prince William Forest Park, a National Park Service site. • Immersive educational experiences focused on watersheds and forest ecology which support Virginia Standards of Learning. • An opportunity for students to connect with one another through team-building and other activities that support social & emotional growth.
Northern Virginia Conservation Trust	https://www.nvct.org/	• Downloadable place-based student activities related to their projects. • Information on Land Conservations and easements to protect habitat. • Community Events.
Northern Virginia Community College Sustainability	https://www.nvcc.edu/sustainability/	• All six campuses have energy efficiency projects, opportunities for sustainability education, eight LEED certified buildings, spaces to hold events and trainings.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Northern Virginia Electric Cooperative (NOVEC)	www.novec.com	• Provide expertise for career events and education. • Safety Trailer for your school event. • Permission to use Cooperative Living publication from NOVEC for classroom lessons.
Northern Virginia Regional Commission	https://www.novaregion.org/	• Information on solid waste and recycling, regional trails, stormwater, and many other topics.
NoVA Outside	www.novaoutside.org	• Resources and guidance for the Living Schoolyard initiative. • Organizer for Student Environmental Action Showcase.
OmniRide	https://omniride.com/service/programs/youth/	• Helping youth understand the value of public transportation and reduced eco footprint. • Offers free rides on all local routes, reducing the carbon footprint of travel within our county. • Preschool and elementary student program. • Middle School Program.
Pink Space Theory	https://www.pinkspacetheory.org/	• Makes offering after-school STEM programming easy! We provide meaningful hands-on, problem-based educational programs for students in grades three through eight. • Some popular workshops include the Solar Design Boat Challenge, Girl Power: Intro to Green Living, and STEM-tastic: Engineering with a Purpose.
Potomac Environmental Research and Education Center and GMU Environmental Science	https://perec.science.gmu.edu/	• The mission of the Potomac Environmental Research and Education Center is to utilize the tools of scientific research, restoration, education, and policy analysis to help society, schools, and teachers understand and sustain natural processes in ecosystems, watersheds, and landscapes.
Prince William 4-H Club	https://www.pwcva.gov/department/virginia-cooperative-extension/4-h-programs	• Embryology program (chick hatch). • Facebook page for 4H. • Scholarships for 4H members. • Summer and day camp. • A variety of community youth events.
Prince William Conservation Alliance	www.pwconserve.org	• Public programs on community engagement in underserved areas. • Work to establish equitable sustainable communities.
Prince William County Sustainability Office	https://www.pwcva.gov/department/sustainability	• Provide information about local community and statewide agreements related to local waste reduction, recycling, natural resource conservation, water quality, stormwater management, clean air, and more. • Can speak on climate action planning on the local government level.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Prince William County Department of Parks, Recreation and Tourism	https://www.pwcva.gov/department/parks-recreation-tourism	• Adopt a Park. • Children's programs. • Farmers Markets. • Historic preservation and natural resources. • Nature and Outdoor programs.
Prince William County Department of Parks, Recreation and Tourism—Science in the Park	www.pwcva.gov/department/childrens-programs/science-park	• Leads fun, hands-on programs for students kindergarten through grade six. • Lessons provide meaningful, inquiry-based learning using our local forest, lakes, streams, and fields. Each lesson was developed to align with the 2018 Standards of Learning (SOL). • See website for the complete list of grade specific topics and park locations.
Prince William County Department of Public Works	https://www.pwcva.gov/department/environmental-services https://www.pwcva.gov/department/public-works	• Programs for supporting environmental literacy, sustainable activities, and public outreach events. • Prince William County Watershed Management Branch can provide information and presentations about the following topics: watersheds, importance of forests, water quality, wetlands, stream restoration, and resource protected areas.
Prince William County Forest and Pest Management	https://www.pwcva.gov/department/construction-operations/about-mosquito-and-forest-pest-management-branch	• Online information about local integrated pest management and invasive pests. • Opportunities for educational outreach for your school. • Publications about local natural resource inventory. • Careers resources.
Prince William County Public Libraries	https://www.pwcva.gov/department/library	• Digital Library. • Programs. • Story Trails, Pollinator Gardens, Composters, Central Green. • Education Resources Newsletter.
Prince William County Service Authority	www.pwcsa.org	• Classroom Outreach | PWCSA. • H2Go Kids | PWCSA. • Drinking & Wastewater Loaner resources: o EnviroScape. o Watershed. o The Big Stink. o Build-a-Filter.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Prince William County Solid Waste Management Division (landfill)	www.pwcva.gov/trashandrecycling	• Landfill Tours (currently on hold). • Compost Facility Tours. • Landfill Outdoor Discovery Trail. • Classroom Recycling and Waste Disposal Presentations.
Prince William Forest Park	https://www.nps.gov/getinvolved/volunteer.htm https://www.nps.gov/teachers/index.htm	• Check out these programs: o https://www.nps.gov/prwi/learn/education/specialprograms.htm. o https://www.fergusonfoundation.org/our-programs/. o https://naturebridge.org/programs/prince-william-forest-school-environmental-science. • Summer camps for students. • Fourth grade Every Kid Outdoors Program—free pass. • Partner with NatureBridge overnight multiple day outdoor education for grades 4-12. • Educational programs by request from rangers. • Orienteering. • Junior ranger program.
Prince William Soil and Water Conservation District (PWSWCD)	www.pwswcd.org	• Provide leadership in the conservation of soil, water, and related resources to all Prince William County citizens through technical assistance, information, and education. • Provides MWEE, water quality training, stream training, and youth environment scholarships and summer programs.
Prince William Trails and Streams Coalition	www.pwtsc.org	• The Greater Prince William Trails Coalition works to advance the completion of an interconnected, interjurisdictional network of trails. • We host several educational hikes every month that are open for all to attend. • We are always looking for volunteers to help us map and advocate for a better trails network.
Prince William Wildflower Society	www.vnps.org/princewilliamwildflowersociety	• Guided nature walks in a park or on school grounds. • Assistance in plant identification. • Advice on school native plant gardens. • Advice on the removal of invasive plant species. • Programs or presentations to school ecology clubs. • Small grants for native plants, supplies, signage, books, etc.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Public Broadcasting Service-Learning Media	https://www.pbslearningmedia.org/collection/climate-change-understanding-the-impact/	• Short instructional videos with accompanying activities, discussion questions, teaching tips, and additional resources. • Cross-curricular with materials for a variety of grade levels.
Republic Services	https://www.republicservices.com/recycling/recycling-education	• Educational activities about plastics, recycling, outdoor scavenger hunts/bingo, and more. • The Recycling Simplified Education Program.
Secure Solar Futures	https://securesolarfutures.com/	• Workforce development. • Partners with NEED educational materials. • Throwing Solar Shade Program.
U.S. Green Building Council	https://www.usgbc.org/	• Provides educational support for green school supporters. • Summer high school program toolkit. • Green building scavenger hunt worksheets. • Assists in guiding the process to earning the DOE Green Ribbon School recognition award. • Offers certification test for becoming a Green Classroom Professional. • Provides a framework for Whole School Sustainability.
US Bureau of Land Management	https://www.blm.gov/educators	• Offers educational programs and materials for teachers on resource management and how people affect land use decisions. • Every Kid Outdoors Program with free passes for 4th graders to all federal parks, lands and waters. • Classroom investigations on a variety of topics including turn-key activities for all grade levels.
US Fish and Wildlife Service Potomac River National Wildlife Refuge Complex—Occoquan Bay NWr	https://www.fws.gov/refuge/occoquan-bay	• Open to the public. • Outdoor classroom space around Painted Turtle Pond with a pavilion and two docks. • An indoor classroom with AV systems that can seat 40 students. • Youth Conservation Corps summer jobs available to high school students.
US Geological Survey Eastern Ecological Science Center Wildlife Biologist	https://www.usgs.gov/centers/eesc	• Provides a wide variety of searchable real world data visualizations for secondary students including place based data sets. • Research resource for a variety of science topics. • Field trip opportunities at the National Center site offers a woodland and rock garden walk.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Virginia Agriculture in the Classroom	www.agintheclass.org	• Request an AITC Educator to come into your classroom teach agricultural and environmental literacy lessons that connect with Virginia SOLs. • Open to all elementary grade levels and are free of charge. • Please contact abby.hemby@vafb.com to set up a date and select a lesson.
Virginia American Water	https://www.amwater.com/vaaw/News-Community/Community-Involvement/	• Wastewater treatment plant field trips. • Speakers about the important work of protecting our watershed. • Career speakers; they'll come to you or you can come to them.
Virginia Bluebird Society	www.virginiabluebirds.org	• Grants for bluebird boxes, nest cameras, and trails. • Provide training for monitoring. • Will speak with students in classroom presentations about lifecycle of bluebirds and conservation efforts. • Fourth grade bluebird conservation lesson plans that align with standards of learning. • Community science data opportunity for place-based learning.
Virginia Cooperative Extension Prince William Master Gardeners program	https://www.pwcva.gov/department/virginia-cooperative-extension/teaching-garden https://www.mgpw.org https://www.pwcva.gov/department/virginia-cooperative-extension/natural-resources	Our mission is to provide unbiased, research-based information. We can provide assistance with: • School gardens – siting, planning, reinvigorating, training, site visits, technical assistance, advice on greenhouses, etc. • Speakers on environmental issues including urban and agricultural impacts on water quality, and best practices for a healthier environment. • Teaching garden tours. • Resources for developing lessons about the environment and agriculture.
Virginia Department of Forestry and PLT Director	https://dof.virginia.gov/education-and-recreation/educator-resources/	• Provides lesson plans, field trips, and professional development. • Offers free downloadable identification guides and resources. • Project Learning Tree Resources.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Virginia Department of Wildlife Resources	https://dwr.virginia.gov/	• Training for teachers in Project WILD, Archery Education (NASP), and Hunter Education. • Resources for teachers including: wildlife related lesson plans , fishing tackle loaner program, guides to creating schoolyard habitat, DWR's Virginia Naturally Schools Recognition Program, Birding Basics, our Livestreaming Wildlife Cameras, and DWR managed lands for viewing wildlife. • Virginia's Fish and Wildlife Information Service- access real data about specific species in Virginia.
Virginia Master Naturalists—Merrimac Farm Chapter	https://merrimacfarmvmn.wixsite.com/mysite	• Virginia certified, dedicated volunteers. • Provide guided tours of parks and other natural areas. • Will collaborate with educational staff to develop materials and educational opportunities focusing on topics we specialize in including wildlife, ecosystem processes, and botany. • Brings volunteer and education opportunities for projects in the community including those for environmental literacy, conservation, and sustainable landscapes.
Virginia Outdoors Foundation (Bull Run Mountain)	https://www.vof.org/protect/reserves/bull-run-mountains/ Instagram & Facebook handle: @bullrunmountains	• Over seven miles of public access hiking trail in the Public South Section plus 10 more miles with facilitated access. • Restricted access to the North Section trails. • Historic diversely populated homestead sites and cemeteries dating back to the 1700s. • Trout in the Classroom release site and research opportunities along Catharpin Creek. • Ecosystems from beech & oak-dominated mixed hardwoods, wetlands, and early successional areas. • Guided Hikes, Bio Blitzes. • Trail Volunteer Days.
Virginia State FFA	https://www.vaffa.org/	• Provides K-12 Ag in the classroom resources. • Student resources for research and careers. • Resources for FFA advisors.
Vulcan Industries	https://csr.vulcanmaterials.com/	• Provides land/access for schools around quarry to use for watershed and outdoor learning activities. • May provide quarry tours again sometime in the future.

Environmental Literacy Community Partners		
Name of Organization	**Website**	**Resources they offer**
Wetland Studies and Solutions Inc	https://www.wetlands.com/	Sustainable LEED-Gold office building featuring LID/LEED aspects including: • Several stormwater management techniques. • Solar energy. • Water-efficiency and energy-efficiency measures. • Recycled and rapidly renewable materials. • CU-Structural Soil patio. Audubon Society Home Wildlife Sanctuary Certification and Wildlife Habitat Council (WHC) Conservation Program Silver Level Certification: • Native landscaping. • Forest and nature trail. • Rain garden. • Self-guided and guided tours available. • Environmental careers speaker and presentations.
Wildlife Rescue League	https://www.wildliferescueleague.org/	Our educational programs are designed to: • Create awareness of local wildlife, including their characteristics, habits, and habitats. • Develop appreciation for wildlife and its role in the environment. • Educate about human/wildlife interactions and conflicts caused by urban development. • Encourage discussion regarding possible solutions to wildlife/human-related conflicts. Our programs can be modified to address various grade levels.
Woodbridge Potomac Communities Civic Association	Facebook page link	• Organizes volunteers to address issues of land use, environment, transportation, and development through meaningful acts of service. • Hosts stream, park, neighborhood, and roadway cleanup projects.

REFERENCES

ACTFL (n.d.). *ACTFL Proficiency Guidelines 2012*. ACTFL Language Connects. https://www.actfl.org/resources/actfl-proficiency-guidelines-2012

Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2017). Environmental education and K-12 student outcomes: A Review and analysis of Research. *The Journal of Environmental Education, 49*(1), 1–17. https://doi.org/10.1080/00958964.2017.1366155

Association of Fish and Wildlife Agencies. (2022). *Project Wild Resources.* Project WILD Resources: Association of Fish & Wildlife Agencies. https://www.fishwildlife.org/projectwild/project-wild-resources

Chepesiuk, R. (2007). Environmental literacy: Knowledge for a healthier public. *Environmental Health Perspectives, 115*(10). https://doi.org/10.1289/ehp.115-a494

Chesapeake Bay Foundation. (2022). *School Leaders Environmental Leadership Program.* SCHOOL LEADERS ENVIRONMENTAL LEADERSHIP PROGRAM. https://www.cbf.org/join-us/education-program/professional-learning/programs-for-principals/

Education, V. D. of. (n.d.). *Environmental literacy.* VDOE: Environmental Literacy. https://doe.virginia.gov/instruction/environmental_literacy/

EN, B., D, S., I, T., S, B., AB, F., AM, B., AJon, S., J, F., J, E., MC, M., & TL, V. (2021, May 27). *The benefits of environmental education for K–12 students.* eePRO @ NAAEE. https://eepro.naaee.org/eepro/research/eeworks/student-outcomes

Environmental Protection Agency. (2022, November 14). Learn About Sustainability. https://www.epa.gov/sustainability/learn-about-sustainability#what

Hollweg, K., Taylor, J., Bybee, R., Marcinkowski, T., McBeth, W., & Zoido, P. (2011, December 1). *Developing a Framework for Assessing Environmental Literacy: Executive Summary.* https://cdn.naaee.org/sites/default/files/inline-files/envliteracyexesummary.pdf

Keep Prince William Beautiful | A Non-Profit Environmental Organization. (2022, October 21). *Adopt a spot - keep Prince William beautiful: A non-profit environmental organization.* Adopt a Spot. https://kpwb.org/keep-prince-william-beautiful/programs/adopt-a-spot/

Kensler, M. (2020, August 4). *Director's corner: Interconnectedness and the compass of Sustainability.* Auburn University Office of Sustainability. http://sustain.auburn.edu/dc_compass/

Monroe, M.C., Ballard, H.L., Oxarart, A., Sturtevant, V.E., Jakes, P.J., Evans, E.R., (2016). *Agencies, educators, communities and wildfire: Partnerships to enhance environmental education for youth, Environmental Education Research, 22*(8), 1098-1114.

National Oceanic and Atmospheric Administration. 14th Street & Constitution Avenue NW Room 6217, Washington, DC 20230. Tel: 202-482-6090; Fax: 202-482-3154; e-mail: noaa-outreach@noaa.gov; Web site: http://www.noaa.gov/. (2008, November 30). *Education strategic plan 2009-2029: Focusing on science, Service & Stewardship.* National Oceanic and Atmospheric Administration. https://eric.ed.gov/?id=ED512909

National Wildlife Federation. (2022). *Eco-schools USA.* https://www.nwf.org/eco-schools-usa

NOAA Sea Grant. (2019, July 18). 10-YEAR NOAA SEA GRANT ENVIRONMENTAL LITERACY VISION. https://seagrant.noaa.gov/Portals/1/Network%20Visioing/2019_0718_ELit_Visioning.pdf

North American Association for Environmental Education. (2022, October 27). *Guidelines for excellence series.* eePRO @ NAAEE. https://eepro.naaee.org/eepro/resources/guidelines-excellence-series

Office of Environmental Education and Public Affairs. (2017). *North Carolina Environmental Literacy Plan.* https://files.nc.gov/deqee/documents/files/elp-plan-2017.pdf

Pennsylvania Department of Education. (n.d.). *Environmental literacy plan template for Lea or building.* https://www.education.pa.gov/documents/postsecondary-adult/greenschools/environmental%20Literacy%20Plan%20TEMPLATE%20for%20LEA%20or%20Building.docx

Prince William County Public Schools. (2022, February 2). *PWCS Vision 2025 Strategic Plan.* https://www.pwcs.edu/about_us/strategic_plan/index

Prince William County Public Schools School Board. (2021, June 16). BoardDocs® policy: 495 - sustainability. http://go.boarddocs.com/vsba/pwcs/Board.nsf/goto?open&id=C5BJMC4D385D

Project WET Foundation (2020). *Project WET: Water education today.* https://www.projectwet.org/

Smith, C., & Landry, M. (2023). Executive Summary. *Prince William County Public Schools Environmental Literacy Plan* (p. 4). PWCS.

Sustainable Forestry Initiative. (2021, June 30). *Learning is in our nature.* Project Learning Tree. https://www.plt.org/

UNESCO. (2022). *Education for Sustainable Development.* https://en.unesco.org/gap/priority-action-areas

Virginia Department of Education (n.d.). *2018 Science standards of learning environmental science concept development.* https://www.doe.virginia.gov/home/showpublisheddocument/2198/637950001854970000

Valenti, J.M., & Tavana, G. (2005). Report: Continuing Science Education for Environmental Journalists and Science Writers. *Science Communication, 27*, 300 - 310.

Virginia Board of Education (2021, March 1). World language standards of learning for Virginia public schools. Department of Education Virginia. https://www.doe.virginia.gov/home/showpublisheddocument/2248/637950302146500000

Virginia Department of Forestry. (2022). *Learn about water quality protection - Virginia department of forestry.* Chesapeake Bay Watershed and Virginia. https://dof.virginia.gov/water-quality-protection/learn-about-water-quality-protection/

ACKNOWLEDGEMENT

We would like to thank Dr. Cynthia Smith for her invaluable contributions to the Environmental Literacy Plan.

PWCS

PRINCE WILLIAM COUNTY PUBLIC SCHOOLS

LAUNCHING THRIVING FUTURES

pwcs.edu/energyandsustainability

sustainability@pwcs.edu

@PWCSEnergyTeam