Trees and Schools: Growing the Connection
A Resource Guide for Chesapeake Communities

Photo: Tree planting with students at St. Anne's School in Delaware; courtesy of Delaware Forest Service

Chesapeake Bay Program
Science. Restoration. Partnership.

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Table of Contents

I. INTRODUCTION 3

What can trees do for your school? 4
Academic Performance 4
Focus 4
Mental Health 4
Physical Health 4
Cooling 5
Equity & Resilience 5
Service Learning 5
What can trees do for your community and watershed? 7
Stormwater 7
Air quality 7
Habitat 7
Public Health 7
Social Health 7
Ideas for getting started 9
Establishing a team 9
Introducing more tree-centric education 9
Planting Trees 9
Becoming a sustainable school 10

II. CURRICULUM & OTHER RESOURCES 11

Project Learning Tree 11
***Curriculum Spotlight**: Teaching with i-Tree (Section adopted from Teaching With i-Tree) 15*
Tree Campus K-12 Learning Hub & NASA GLOBE Resources 16
Bay Backpack 17
Meaningful Watershed Education Experience (MWEE) Resources 17
Children & Nature Network 19
Eco-Schools Pathway Resources 19
Building Your Program- Funding Opportunities 20
Mapping Tools 21

III. SUSTAINABLE SCHOOL CERTIFICATION PROGRAMS 22

U.S. Dept. of Education Green Ribbon Schools 22
Eco-Schools USA 22
Maryland Green Schools 23
Pennsylvania Pathways to Green Schools 23
Virginia Naturally Schools 23
Project Learning Tree GreenSchools 24
Arbor Day Tree Campus K-12 Program 24
Combining Sustainable School and Tree Campus Certifications 26
Program Components 27
Program Components 28
Appendix: Chesapeake Watershed Goals 29
Tree Canopy Outcome 29
Environmental Literacy Goals 29

I. Introduction

This guide aims to assist Chesapeake Watershed schools, local education authorities, and communities to more easily implement tree canopy initiatives within school systems. These tree canopy initiatives can include Meaningful Watershed Educational Experiences (MWEE's) , restoration projects, environmental literacy planning, and other goals within the Chesapeake Bay Watershed Agreement (see Appendix). Through a focus on local tree canopy, schools create future environmental stewards, strengthen community resilience, and provide many ecosystem services. This guide covers why trees are increasingly vital, curriculum resources focused on trees, and ways to build tree-focused activities into established sustainable school programs. This is not an exhaustive guide to creating a more tree-friendly school. Rather, it is meant to provide context, information, and a hub of resources to help forge stronger connections between trees and schools.

This introductory section provides key points on how trees benefit schools and the local community and gives a few tips for getting started. Section II contains a hub of curriculum resources to help educators plan lessons and student activities around trees. Additional resources are included, which cover funding opportunities and mapping tools. The concluding section reviews a number of sustainable school certification programs active within the Chesapeake Watershed. These programs can help schools assess, plan, and receive recognition for sustainability initiatives. Improving tree canopy on school grounds can help with certification in any program.

As a reflection of the win-win impact of engaging students in tree canopy initiatives, the guide itself was written by Maya Claggett, a college student intern with the USDA Forest Service, with input from partners at the Chesapeake Bay Program Forestry Workgroup. We welcome any inquiries or suggestions for future versions of this guide, which can be sent to info@chesapeaketrees.net.

Ultimately, we hope the guide will be a springboard for developing greater collaboration between schools and the array of partners working to enhance tree canopy across the watershed.

What can trees do for your school?

The benefits associated with trees are not new; this section aims to succinctly convey research that can help justify the implementation of tree-related programs and projects. Trees provide numerous benefits to schools, students, and teachers. When students are taught in areas with ample green space, their academic performance, focus, and health improve. Many studies have demonstrated that being around trees, interacting with trees, and simply being able to see trees can help in all facets of education.

Academic Performance

Numerous studies have found learning in natural environments boost performance in all major subjects, enhance critical thinking, and increase enthusiasm for learning. A study from the University of Michigan found a positive relationship between student exposure to trees during school hours and scores on standardized tests, graduation rates, and plans to attend a four-year college.[1]

Focus

Greener settings improve focus for all students, even when instruction occurs indoors. Classroom views that contain many trees are correlated with significantly better performance on tests of attention.[2] Additionally, students with ADHD and ADD perform better on concentration tests after exposure to a relatively natural urban setting.[3]

Mental Health

Natural schoolyards decrease stress, reduce behavior problems, increase positive emotions, and enhance factors associated with mental resilience in children of all ages.[4] They also increase a student's ability to recover from stressful experiences, like tests.

Physical Health

Green spaces encourage exercise and provide a more restorative environment than indoor settings.[5] Increased tree canopy improves physical health, immune function, and motor function.

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[1] Matsuoka, R.H., (2010). Student performance and high school landscapes: Examining the links. Landscape and Urban Planning, 97(4), 273-282.

[2] Impact of views to school landscapes on recovery from stress and mental fatigue. Landscape and Urban Planning Journal. 148 (2016) 149-158.

[3] Kuo, F.E., and A.F. Taylor. 2004. A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study. *American Journal of Public Health* 94, 9: 1580.

[4] Chawla, L., Keena, K., Pevec, I., Stanley, E., (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. Health & Place, 28, 1-13.

[5] Pretty, J., R. Hine, and J. Peacock. 2006. Green Exercise: The Benefits of Activities in Green Places. *Biologist* 53, 3: 143-48.

Cooling

Trees provide immense cooling abilities and can help prevent heat stroke, heat exhaustion, and heat-related deaths. They can help reduce peak summer ambient temperatures by 2–9°F[6] and reduce air conditioning needs by 30 percent.[7] Additionally, shaded surfaces can be 20–45°F cooler than the peak temperatures of unshaded materials.[8] Trees are becoming even more valuable to communities as climate change intensifies and exacerbates heat risks.

Equity & Resilience

Across the nation, studies have shown that tree canopy is not equitably distributed across cities, with low-income communities and communities of color often having the highest heat and air quality risks and the lowest access to the benefits of tree canopy (see https://treeequityscore.org/). Schools are an important venue to learn about and take steps to address the social and environmental justice dimensions of tree canopy and climate resilience, through a practical, positive focus on trees.

Service Learning

Service learning is a powerful teaching method that engages students in meaningful service and addressed a community need. This allows students to develop civic engagement skills and become more active community members. Trees and green spaces provide an accessible and multidisciplinary environment for service learning.

For more information, the Children and Nature Network Research Library curates and summarizes peer-reviewed scientific literature to help build the evidence base for advancing the children and nature movement. To learn more about the value of environmental education and make a case for increased outdoor instruction, visit their database. They also provide well designed and informative infographics. The infographic below is one example from the Children and Nature Network.

[6] Kurn, D., S. Bretz, B. Huang, and H. Akbari. 1994. The Potential for Reducing Urban Air Temperatures and Energy Consumption through Vegetative Cooling (PDF) (31 pp, 1.76MB). ACEEE Summer Study on Energy Efficiency in Buildings, American Council for an Energy Efficient Economy. Pacific Grove, California.

[7] "The Value of Trees to a Community." *The Benefits of Trees*, Arbor Day Foundation, www.arborday.org/trees/benefits.cfm.

[8] Akbari, H., D. Kurn, et al. 1997. Peak power and cooling energy savings of shade trees. *Energy and Buildings* 25:139–148.

NATURE CAN IMPROVE ACADEMIC OUTCOMES

Spending time in nature enhances educational outcomes by improving children's academic performance, focus, behavior and love of learning.

BETTER ACADEMIC PERFORMANCE

Learning in natural environments can:

BOOST PERFORMANCE in reading, writing, math, science and social studies [1, 2, 3, 4, 5]

ENHANCE creativity, critical thinking and problem solving [9]

Seeing nature from school buildings can foster academic success [6, 7, 8]

ENHANCED ATTENTION

Spending time in nature can help children focus their attention:

FOCUS AND ATTENTION [10, 11, 12, 13]

ADHD SYMPTOMS [14, 15]

The greener the setting, the better the focus [14, 15]

INCREASED ENGAGEMENT & ENTHUSIASM

Exploration and discovery through outdoor experiences can promote motivation to learn:

INCREASED ENTHUSIASM FOR LEARNING [1, 16]

GREATER ENGAGEMENT WITH LEARNING [17]

IMPROVED BEHAVIOR

Nature-based learning is associated with reduced aggression and fewer discipline problems: [18, 19]

MORE IMPULSE CONTROL [10]

LESS DISRUPTIVE BEHAVIOR [20]

children & nature network | NLC NATIONAL LEAGUE OF CITIES | THE JPB FOUNDATION

ADDITIONAL RESEARCH ON THE BENEFITS OF NATURE AVAILABLE AT childrenandnature.org/research

SUPPORTING RESEARCH

[1] Lieberman & Hoody (1998). Closing the achievement gap: Using the environment as an integrating context for learning. Results of a Nationwide Study. *San Diego. SEER.* [2] Chawla (2015). Benefits of nature contact for children. *J Plan Lit*, 30(4), 433-452. [3] Berezowitz et al. (2015). School gardens enhance academic performance and dietary outcomes in children. *J School Health*, 85(8), 508-518. [4] Williams & Dixon (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Rev Educ Res*, 83(2), 211-235. [5] Wells et al. (2015). The effects of school gardens on children's science knowledge: A randomized controlled trial of low-income elementary schools. *Int J Sci Educ*, 37(17), 2858-2878. [6] Li & Sullivan (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape Urban Plan*, 148, 149-158. [7] Wu et al. (2014) Linking student performance in Massachusetts elementary schools with the "greenness" of school surroundings using remote sensing. *PLoS ONE* 9(10): e108548. [8] Matsuoka, R. H. 2010. Student performance and high school landscapes. *Landscape and Urban Planning* 97 (4), 273-282. [9] Moore & Wong (1997). Natural Learning: Rediscovering Nature's Way of Teaching. *Berkeley, CA: MIG Communications.* [10] Faber Taylor et al. (2002). Views of nature and self-discipline: Evidence from inner-city children. *J Environ Psy*, 22, 49-63. [11] Mårtensson et al. (2009). Outdoor environmental assessment of attention promoting settings for preschool children. *Health Place*, 15(4), 1149-1157. [12] Wells (2000). At home with nature: effects of "greenness" on children's cognitive functioning. *Environ Behav*, 32(6), 775-795. [13] Berto et al. (2015). How does psychological restoration work in children? An exploratory study. *J Child Adolesc Behav* 3(5). [14] Faber Taylor et al. (2001). Coping with ADD: The surprising connection to green play settings. *Environ Behav*, 33(1), 54-77. [15] Amoly et al. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: The BREATHE Project. *Environ Health Perspect*, 122:1351-1358. [16] Blair (2009) The child in the garden: An evaluative review of the benefits of school gardening. *J Environ Educ*, 40(2), 15-38. [17] Rios & Brewer (2014). Outdoor education and science achievement. *Appl Environ Educ Commun*, 13(4), 234-240. [18] Bell & Dyment (2008). Grounds for health: The intersection of green school grounds and health-promoting schools. *Environ Educ Res*, 14(1), 77-90. [19] Nedovic & Morrissey (2013). Calm, active and focused: Children's responses to an organic outdoor learning environment. *Learn Environ Res*, 16(2), 281-295. [20] Ruiz-Gallardo & Valdés (2013). Garden-based learning: An experience with "at risk" secondary education students. *J Environ Educ*, 44(4), 253-270.

C&NN recognizes that not all studies support causal statements.

What can trees do for your community and watershed?

Increasing tree canopy in schools, which are often community hubs, is also valuable for the broader community and environment.

Stormwater

The presence of trees and their canopies help to reduce and slow stormwater runoff pollution and decreasing erosion and flooding. Trees also improve water quality by filtering out chemicals and sediments in stormwater and allowing groundwater to recharge. One tree can reduce stormwater runoff by 13,000 gallons each year.[9]

Air quality

Trees naturally remove carbon dioxide and a variety of air pollutants. Particulates in the air can be reduced by up to 60% when trees are present.[10] Additionally, neighborhoods with lots of trees have lower rates of childhood asthma.[11]

Habitat

Forests provide vital structure and sustenance for many different species, even aquatic. More trees mean stronger ecosystems and more wildlife. For students, it allows them to learn first-hand about wildlife and ecosystems.

Public Health

Residents of areas with high levels of greenery were three times as likely to be physically active and 40% less likely to be overweight or obese.[12] Shade from trees reduces UV rays, the primary cause of skin cancer. And, people in cities who walk by green space have a lower heart rate, an indicator of stress, than those who don't.[13]

Social Health

Residents in areas with more trees reported that they knew their neighbors better, socialized with them more often, had stronger feelings of community and felt safer and better adjusted.[14] Numerous studies also find an increase in tree canopy leads to lower crime levels of all types, even aggressive driving.

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[9]Plum, M. 2008. Sustainable raindrops: cleaning New York Harbor by greening the urban landscape. Riverkeeper report. https://www.riverkeeper.org/wp-content/uploads/2009/06/Sustainable-Raindrops-Report-1-8-08.pdf.

[10] *Environ. Sci. Technol.* 2012, 46, 14, 7692–7699. June 4, 2012.

[11] J Epidemiol Community Health. 2008 Jul; 62(7): 647–649.
Published online 2008 May 1. doi: 10.1136/jech.2007.071894

[12] Ellaway, Anne, et al. "Graffiti, Greenery, and Obesity in Adults: Secondary Analysis of European Cross Sectional Survey." *BMJ*, vol. 331, no. 7517, 2005, doi:10.1136/bmj.38575.664549.F7.

[13] South, Eugenia C.; Kondo, Michelle C.; Cheney, Rose A.; Branas, Charles C. 2015. Neighborhood blight, stress, and health: a walking trial of urban greening and ambulatory heart rate. American Journal of Public Health. 105(5): 909-913. https://doi.org/10.2105/AJPH.2014.302526.

[14] Kuo, Frances E., et al. "Fertile Ground for Community: Inner-City Neighborhood Common Spaces." *American Journal of Community Psychology,* vol. 26, no. 6, 1998.

USDA United States Department of Agriculture

TREES in COMMUNITIES

CREATE VIBRANT COMMUNITIES

- Incorporating trees into common spaces in public housing increases social activities.[1]
- Having larger trees in yards and on the street can improve home values by 3%-15%.[2]
- Shoppers will spend 9%-12% more in areas with better tree canopy.[3]

REDUCE AIR POLLUTION

- Neighborhoods with lots of trees have lower childhood asthma rates.

PROVIDE SHADE & COOLING

- Tree canopy can reduce temperatures by up to 20 degrees, lowering health risks and utility bills.

IMPROVE HUMAN HEALTH

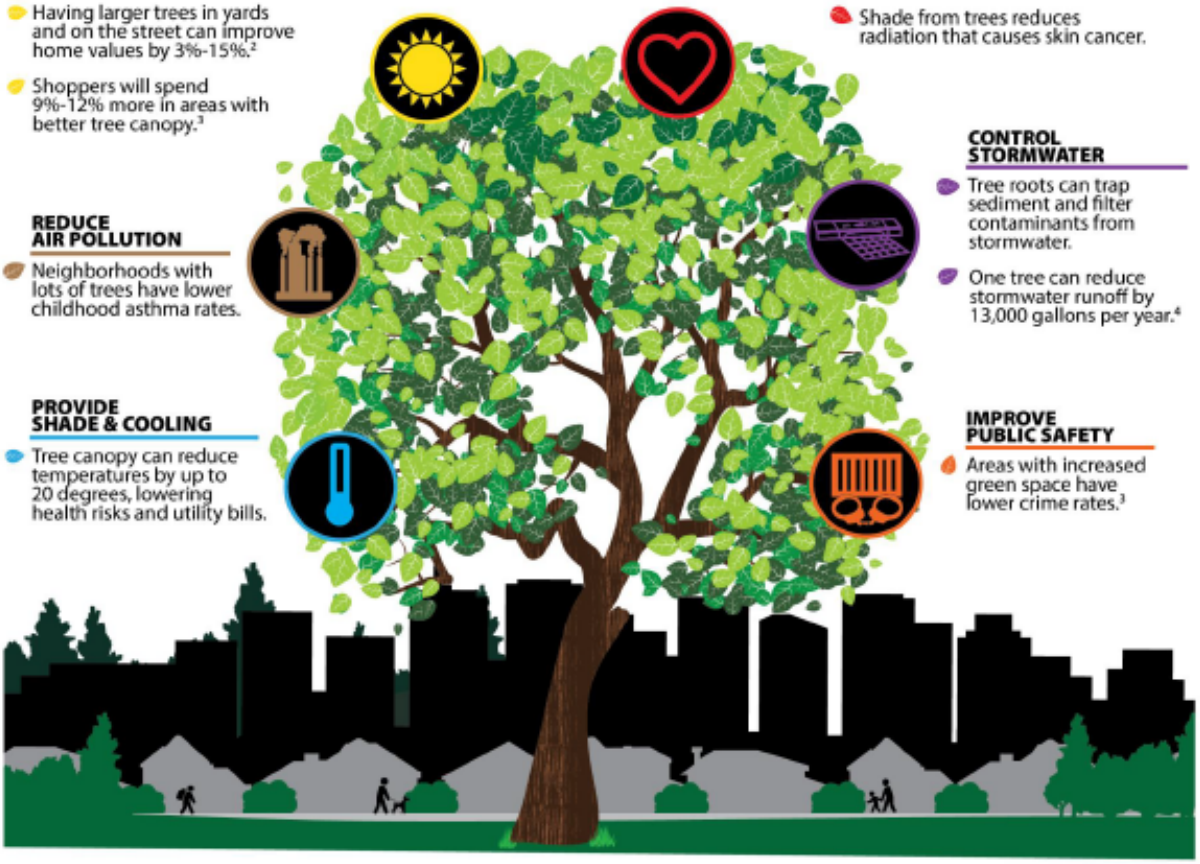
- Trees help reduce stress, lower blood pressure, and boost the immune system.
- Shade from trees reduces radiation that causes skin cancer.

CONTROL STORMWATER

- Tree roots can trap sediment and filter contaminants from stormwater.
- One tree can reduce stormwater runoff by 13,000 gallons per year.[4]

IMPROVE PUBLIC SAFETY

- Areas with increased green space have lower crime rates.[3]



[1] Wolf, K.L., and M.A. Rozance. 2013. Social Strengths - A Literature Review. In: Green Cities: Good Health. College of the Environment, University of Washington. www.greenhealth.washington.edu.
[2] Wolf, K.L. 2010. Community Economics - A Literature Review. In: Green Cities: Good Health. College of the Environment, University of Washington. http://bit.ly/UWGreenHealth.
[3] Stamen, T. 1993. Graffiti Deterrent Proposed by Horticulturist [Press Release]. University of California Riverside.
[4] Plumb, M. 2008. Sustainable raindrops: cleaning New York Harbor by greening the urban landscape. Riverkeeper report. https://www.riverkeeper.org/wp-content/uploads/2009/06/Sustainable-Raindrops-Report-1-8-08.pdf.

Forest Service Eastern Region

Ideas for getting started

Establishing a team

A good team is essential for any project. Gather a variety of motivated stakeholders within the school community to set goals. Do you want to plant more trees? Would students benefit from more tree-centered education? Does your school want to become a sustainable school through one of the available recognition/certification programs covered in Section III?

Introducing more tree-centric education

Teachers can start off by identifying areas within state standards and benchmarks where environmental and forestry education could help them meet their learning objectives. Many curriculum guides are set up to align with standards and can be easily introduced into the classroom. The Curriculum Resources section of this document has many resources for all academic levels. To include tree education into a long-term student unit that includes student inquiry and culminates in an action project, teachers could consider creating a Meaningful Watershed Educational Experience centered around trees. The MWEE Guide and other MWEE resources covered in Section II can help teachers explore whether this is a good fit for them.

Planting trees

After protecting and preserving existing trees, the best way to increase canopy is to plant new trees! This list is meant to give an idea of what goes into a tree planting and help get your school planting.

1. Form a planning committee.
2. Contact a school administrator about the project. See if the school has any limitations, specifications, or requests for the project.
3. Determine your budget, and where it's coming from.
4. Consult a tree expert. This expert can help decide what species of tree to plant, determine the planting area, help prepare and plant them correctly, and help inform about tree care.
5. Determine the planting area, how many trees will be planted, and what species they will be.
6. Set a time frame, including a date for the planting. Fall and early spring are ideal for tree plantings.
7. Decide if you're going to include students in the planting. If so, how? Determine educational material based on how the students will be helping.
8. Assign roles for the tree planting volunteers, and make sure the school community is involved.

9. Make sure equipment is available and ready for the planting. You will need equipment to plant the tree (shovels, gloves, buckets) as well as materials for tree care such as mulch, markers, and pest/animal protection.
10. Make any necessary preparations to the planting location.
11. Hold a tree planting!
12. Celebrate all the work you've done.
13. Implement a robust maintenance plan to ensure the trees survive and thrive. Pledge to care for the trees properly.

Resources for tree plantings:

- Arbor Day Tree Planting & Care guide
  - Provides support and information for every step of the tree planting process
- Projects Learning Tree's Plant a Tree
  - Curriculum to accompany a tree planting
- Pennsylvania Game Commission's Seedlings for Schools Program
  - Provides trees for students and class plantings

Becoming a sustainable school

Section III provides an overview of the state and national sustainable school programs available in different parts of the Chesapeake watershed, highlighting tree-related elements. Whatever your location, any school within the watershed can become a National Wildlife Federation Eco-School, and it's a great certification for getting started. The Eco-Schools framework provides many resources and guides to support a more sustainable school. The *Learning about Forests* and *Schoolyard Habitats* pathways in the Eco-Schools Program include easy to follow checklists and audits to help students increase tree canopies at their schools and in their local communities. Getting an Eco-School certification can set a school on a path towards state or federal level green school recognition programs, including the U.S. Department of Education Green Ribbon Schools. Even if Eco-School certification isn't your school's goal, it's still a great resource to help kick start your work.

II. Curriculum & Other Resources

This section provides an overview of some of the available tree-related curriculum resources for easy integration into state and federal standards. It also gives an overview of some funding opportunities and mapping tools that may be useful in developing your program.

Project Learning Tree

Project Learning Tree uses trees and forests as windows to increase students' understanding of the environment and actions they can take to conserve it. Curricula made by Project Learning Tree are all extensive and comprehensive guides to ensure students gain awareness, knowledge, and avenues for environmental action. These curricula consistently receive prestigious awards and recognition from leading educational organizations and have been pushing educational reform since the 1970s. They provide the tools necessary to bring the environment into classrooms and students into the environment.

- Resources are sorted by grade band. This includes early childhood and family activities.
- Curriculum guides are in the form of modules.
    - In other words, they are not singular/individual lesson plans.
    - Includes online training, e-Books, printed guides, e-units, and activities
- Includes free and purchasable, with some requiring attendance at a PLT professional development workshop
    - Activities are aligned to state and national academic standards, including Common Core, Next Generation Science Standards, C3 Framework, and Head Start.
- Includes i-Tree
    - A free online software used to calculate the benefits provided by trees and help middle and high schoolers learn about tree benefits.
- Chesapeake Watershed State PLT Coordinators
    - Virginia
    - Maryland
    - Delaware
    - West Virginia
    - Pennsylvania
    - New York
    - Washington, DC

Project Learning Tree Curricula

Resource	Type*	Cost	Grade Levels	Description
Forest Literacy Framework	Learning Guide	Free Download	K-12	Translates complex, scientific ideas into materials appropriate for K-12 learners that engages youth in forest advocacy and education.
Environmental Experiences for Early Childhood	Activity Guide	$15 for e-unit or $30 for e-unit with an online course	PreK-1	Includes over 130 experiences that engage children in outdoor play and exploration. It is specifically designed for educators who work with children ages three to six. Topics include exploring nature with five senses, meeting neighborhood trees, and experiencing trees through the seasons.
Treemendous Science!	e-unit and online training	$25 for e-unit or $40 for e-unit with an online course	K-2	Students will experience, explore, and collect tree data to develop understandings about how trees grow, the roles trees play in ecosystems, and the ways in which trees and humans interact.
Sensational Trees	Activity Guide	$6 for e-unit	K-2	Features three PLT activities for educators of students in grades K-2 that invite young learners to investigate trees using their senses.
Biodiversity Blitz	Activity Guide	$6 for e-unit	3-5	Features three PLT activities for educators of students in grades 3-5 that invite learners to investigate variability among species in an ecosystem, and how this variability – or biodiversity – helps sustain life on Earth.
Energy in Ecosystems	e-unit and online training	Attend a PLT professional development workshop in your state $25 for e-unit or $40 for e-unit with an online course	3-5	Focus on forests to understand some of the interactions present in all ecosystems and begin to widen students circle of compassion to include all of nature.
Carbon & Climate	e-unit and online training	Attend a PLT professional development workshop in your state	6-8	Includes activities and resources to help educators meet the challenges of introducing and educating students to some of the complex issues involved in climate change.

Resource	Type*	Cost	Grade Levels	Description
		$25 for e-unit or $40 for e-unit with an online course		
Discover Your Urban Forest	Activity Guide	$6 for e-unit	6-8	Features three brand new PLT activities for educators of students in grades 6-8 that invite learners to explore their urban environment and investigate environmental issues that affect their urban community.
Explore Your Environment: K-8 Activity Guide	Activity Guide	Attend a PLT professional development workshop in your state or sign up for an online course $20 for e-unit or $35 for printed guide	K-8	Includes 50 hands-on, multidisciplinary activities to connect children to nature and increase young people's awareness and knowledge about their environment. Activities integrate teaching about the environment into a multitude of subjects using hands-on classroom studies and outdoor field investigations. The guide is user-friendly, and works in classrooms and nonformal settings, in urban, suburban, and rural areas.
Teaching with i-Tree.	Units accompanied by i-Trees online software	Free (with PLT login)	Middle and High School	Discovering and analyzing the many ecosystem services that trees provide. For more information, go to the "i-Tree" box below this table.
Exploring Environmental Issues: Biodiversity	60-page e-book	$10 for e-unit or $20 for printed guide	High School	Students learn that decisions about growth and development, energy use and water quality, and even human health, all rest to some extent on perspectives about biodiversity.
Green Jobs: Exploring Forest Careers	Module (e-Book 84 pages) or available printed	$13 for e-unit or $30 for e-unit and online course	Middle and High School	Helps youth research forestry jobs, and practice managing and monitoring forest resources.
Exploring Environmental Issues: Focus on Forests	Module	Attend a PLT professional development workshop in your state.	High School	Provide an opportunity for hands-on study of forest resources while addressing concepts in biology, civics, ecology, economics, forest management, and other subject areas.

Resource	Type*	Cost	Grade Levels	Description
Global Connections: Forests of the World	Module	Attend a PLT professional development workshop in your state. Or $10 for e-unit	High School	Provides students with opportunities to apply scientific processes and higher-order thinking skills while investigating world forestry issues and conducting service-learning action projects.
Exploring Environmental Issues: Places We Live	Module	Attend a PLT professional development workshop in your state. Or $20 for printed guide	High School	Place-based education to help create a bond between young citizens and their communities. Students will explore current and future community environmental issues, enabling them to make informed decisions about those issues.
Southeastern Forests and Climate Change	Module	Free (with PLT login)	High School	Focuses on climate change impacts on forest ecosystems, the role of forests in sequestering carbon, and strategies for reducing greenhouse gas emissions and adapting to changing climatic conditions within the Southeast.
Exploring Environmental Issues: Focus on Risk	Module	Attend a PLT professional development workshop in your state.	High School and Community College	Students analyze, explore, discover, and learn about risk assessment, risk communication, risk perception, and risk management. (A separate Biotechnology Supplement Complements this curriculum)

Notes:

*Modules contain many Lessons/Activities which build on top of previous lessons

*Each e-unit contains

- Detailed step-by-step lesson plans
- Downloadable student pages to guide learning
- A range of assessment tools, including pre- and post-assessments and evaluation rubrics
- Easy-to-understand teacher background information
- Comprehensive, interactive connections to academic standards
- A self-paced online workshop with video demonstrations of the activities and lesson planning exercises
- Suggestions for fiction and non-fiction books to enhance the activities
- Links to websites, videos, and other supplementary resources

Curriculum Spotlight: Teaching with i-Tree (Section adapted from *Teaching With i-Tree*)

Produced by Project Learning Tree in collaboration with the U.S. Forest Service, Teaching with i-Tree is designed to engage middle and high school students in STEM (science, technology, engineering, and math) as they calculate the economic and environmental benefits of trees. The activities can be used in formal classroom settings or with nonformal groups, such as students enrolled in afterschool programs.
Lessons accompany i-Tree Design, a suite of free online tools developed to help students discover and analyze the many ecosystem services that trees provide.

How does i-Tree Design work?

- Select a tree.
- Visit https://design.itreetools.org/
- Input your location and the tree species, circumference, and condition.
- You'll get reports and a dollar value for the benefits the tree provides, such as:
    - Reducing greenhouse gas
    - Improving air quality
    - Intercepting stormwater

PLT's *Teaching with i-Tree* unit contains three hands-on and fun activities that teachers can use in conjunction with i-Tree Design to stimulate students' critical thinking and problem-solving. The lesson plans include video tutorials and student worksheets. The activities provide a structured alignment to Next Generation Science Standards and the Common Core State Standards for English Language Arts.

Activity 1. Tree Benefits and Identification

Students identify trees using free apps and online tree guides. They discover the products we obtain from trees, how we depend on trees in our daily lives, and the value that trees provide to their community and the environment.

Activity 2. Tree Value

Students identify, measure, and assess the health of trees. They calculate the dollar value and ecosystem services of the trees using i-Tree Design software and create an Ecosystem Services Guide for their study site. They generate a tree improvement action plan and, if feasible, implement part or all of it.

Activity 3. Land Manager Role Play

Students are challenged to apply what they've learned as they role-play being land managers. They gain skills in communicating and presenting scientific information. They also learn about a variety of forest-related careers.

Download PLT's Teaching with i-Tree unit

Project Learning Tree Trainings

In-person trainings are organized locally by PLT's state programs and led by trained PLT facilitators. Online options are also tailored to your state and provide additional resources. They are designed to give educators the tools and information necessary to best use the PLT curricula. Find trainings by state at PLT Trainings.

Tree Campus K-12 Learning Hub & NASA GLOBE Resources

The Arbor Day Foundation's Tree Campus K-12 Learning Hub is a tree-centric platform that provides links and information on many different environmental curriculum resources. A few resources to highlight include these affiliated with the NASA GLOBE programs:

The NASA GLOBE Observer Trees Tool

GLOBE Observer: Trees is an app-based tool that will help you estimate tree height. Once you have downloaded the app and created an account, the Trees tool will guide you through the observation process. Required steps include selecting a tree and using your device to measure the angle from the bottom to the top of the tree, walking to the tree and counting your steps (to determine the distance) and reporting on surface conditions. The app will use that information to calculate an estimate of the tree's height. Optional steps are taking a photograph of the tree and measuring the circumference of the tree. Even a basic observation without optional elements is valuable!

The GLOBE Trees Family Guide

The GLOBE Trees Family Guide is a place to learn, with family and friends, all about trees. On Earth, there are approximately 3 trillion trees, each of them vital to our planet. From pulling in carbon dioxide from the atmosphere, storing carbon in trunks, roots, branches, leaves, and buds, and serving as habitats for a countless number of living things, trees are extremely important to our planet's health. With the GLOBE Trees Family Guide, you can look at tree-related science themes, such as tree height, trees and carbon, impacts on trees, and trees as habitats, through a series of science journeys.

The 2021 GLOBE Trees Community Challenge: Science is Better Together

During the Community Trees Challenge, The GLOBE Program is asking citizen scientists to observe, learn, engage, and create as they track their progress on the Trees Challenge activity tracker. You can choose the best journey for your interests or try to complete all the activities. Work together as a family, as a group of friends, or independently. By completing these activities, you will improve your science observation skills, enrich your understanding of trees as part of our landscape, learn why NASA studies trees, be a part of a NASA-sponsored citizen science project, as well as join a citizen science community. Your observations of tree height contribute to a global database that is free and open so that anyone - scientists, students, communities, and citizen scientists - can conduct research.

Bay Backpack

Bay Backpack is an online resource that supports hands-on environmental learning and Meaningful Watershed Educational Experiences, or MWEEs. Their resources, which are all free, include Chesapeake Bay related books, multimedia, curriculum guides, individual lesson plans, and online data sources.

There are over 100 forest-related curriculum resources under "All Teaching Resources."

- The "Forestry" topic page;
  - Overviews the importance of forests for educators
  - Has a "Most Popular Resources" list

Sample lessons from Bay Backpack;

Adopt A Tree Lesson
Students will discover the importance of trees by adopting a tree and observing the tree over several visits throughout the year. Students will observe the tree's seasonal changes, discover the life history of a tree, and witness a wide variety of birds, insects and mammals that live in trees. Launch Resource

Being a Forest Steward Lesson
In this lesson children will learn that a forest is made up of many different working parts, will discover that forest stewardship is the responsible use and planning of forestland management, and will realize that they can be a forest "friend" or steward. Launch Resource

Dendrology Scavenger Hunt Lesson
Using a scavenger hunt, students investigate the characteristics and types of trees. Students will learn how to classify and categorize tree species. Launch Resource

Dream Park Lesson
Students examine the ecological and aesthetic benefits of architecturally landscaping a park. Launch Resource

Meaningful Watershed Education Experience (MWEE) Resources

What are MWEE's? Meaningful Watershed Educational Experiences, or MWEE's, are included in the Student outcome of the Chesapeake Bay Watershed Agreement. They are a way for teachers to teach existing curriculum through hands-on learning.
To be considered an MWEE, an activity must meet four criteria:

1. students identify and investigate an environmental question, problem, or issue.
2. students participate in one or more outdoor field experiences that allow them to collect the data needed to answer their research questions and inform their actions.

3. students take action to address environmental issues at the personal or societal level.
4. students analyze, evaluate, and communicate their conclusions.

For more information on what MWEE's are, visit the Bay Backpack's MWEE page. or the CBWA Management Strategy for students.

Bay Backpack MWEE Resources

1. MWEE Educators Guide Download
2. MWEE Toolbox for Educators Download
3. Field Studies Map
    - lots of possible MWEE locations within the watershed
    - have a similar menu to Bay Backpack curriculum list
    - can select keyword, "Forest" to limit map
    - Each site has a brief description along with; the organization, location, theme(s), grade level(s), and program length
4. MWEE forest ideas (under action projects)
    - Plant a Forest Buffer project
    - Grow a Forest: Tree & Shrub Nursery
    - Choose and Plant Trees & Shrubs
    - Improve & Maintain Your Woods

Online MWEE Training Courses

A free resource from Bay Backpack based on An Educator's Guide to the Meaningful Watershed Educational Experience and comprises three lessons: Why MWEEs? What Makes a MWEE? And Planning and Evaluating MWEEs.

MWEE 101

This online, self-paced course on Chesapeake Exploration is the first in an online series. MWEE 101 introduces the Meaningful Watershed Education Experience framework while following along with example MWEEs for each grade band—elementary, middle, and high school. Participants in this course will learn how a MWEE can support educational standards and goals and the roles taken by students and educators to make the program successful. Continuing Education Credits are available for some states.

MWEE 201

MWEE 201 is second in an online series and builds off the information from MWEE 101. This course provides more in depth instruction on how to plan your own MWEE or refine an existing MWEE. Emphasis is placed on planning and conducting outdoor investigations, student-led action, and incorporating student voice. Continuing Education Credits are available for some states.

Children & Nature Network

Children & Nature Network provides a collection of free resources, including toolkits, reports, infographics, and advocacy tools. This site has great resources to help schools implement green space learning and projects.

- Infographics on the importance of green schoolyards
- Natural Teachers Network eGuide
- Thriving Through Nature: Fostering Children's Executive Function Skills

They also provide a Green Schoolyards Resource Hub. This hub is great for resources to begin improving schoolyards and teaching outdoors. It includes many case studies which detail how other schools were able to implement outdoor learning. There are also toolkits and guides for educators.

- The curriculum section
- Taking Learning Outdoors

Eco-Schools Pathway Resources

The National Wildlife Federation provides a variety of activities and lesson plans tailored to their 12 different Eco-Schools frameworks. The resources are navigable by theme or framework. Under the Forestry Pathway is "Top 10 Tips for Learning about Forests," which includes tips, ideas, resources, and activities for teaching about forests.

Photo: Blue Ridge Elementary School Fundraiser*; courtesy of the Cacapon Institute*

Building Your Program- Funding Opportunities

From Bay Backpack:

TAPESTRY Grants for Science Teachers

Funds support projects that demonstrate creativity, involve risk-taking, possess a visionary quality, and model a novel way of presenting science. Proposed projects should promote exciting and innovative activities to motivate students in science.

Organization: Toyota
Who Should Apply? School science teachers. Middle and high school teachers must teach at least two science classes per day. All applicants must have at least two years of science teaching experience in a KĐ12 school not including the current school year.
Amount: up to $10,000
Deadline: March (Annual)
Contact: National Science Teachers Association tapestry@nsta.org

NOAA Bay Watershed Education and Training (B-WET)

The NOAA Chesapeake Bay Watershed Education and Training (B-WET Chesapeake) grant supports programs that provide hands-on environmental education about issues affecting the Chesapeake Bay watershed for students through "Meaningful Watershed Educational Experiences" (MWEEs) and related professional development for educators who serve formal K-12 audiences.

Organization: National Oceanic and Atmospheric Administration (NOAA)
Who Should Apply? K-12 public and independent schools and school systems, institutions of higher education, community-based and nonprofit organizations, state or local government agencies, interstate agencies, and Indian tribal governments
Amount: $25,000 to $150,000
Deadline: February 20, 2019 (Annual)
Contact: Elise Trelegan elise.trelegan@noaa.gov (410) 226-1015

Environmental Education

The Chesapeake Bay Trust Environmental Education Grant Program awards funding to expand and enhance Bay environmental education programs for pre-K through 12 grade students in Maryland that provide meaningful outdoor learning experiences.

Organization: Chesapeake Bay Trust
Who Should Apply? Non-profit organizations, community associations, faith-based organizations and more.
Amount: Applicants may request from $5,001 to $40,000 per year for up to three years (Maximum $120,000 total award over years 2017-2020).
Deadline: December (Annual)
Contact: Tara Baker tbaker@cbtrust.org 410-974-2941 x102

For more, including state-specific and one-time grants visit Bay Backpack's Funding page.

Children & Nature Network Funding Resources

The following are links to applicable sections of the Children & Nature Network Funding page with cases studies to learn about possible funding channels;

- Bond Funding
- Corporate Funding
- Conservation Funding
- Federal Funding
- State & Local Tax Funding

Mapping Tools

Chesapeake Bay Watershed Public School Stream BMP Evaluation Tool

This free, interactive online map can be used by school districts and their partners to discover opportunities to increase the implementation of best management practices (BMPs) on school grounds, and where partners can focus to increase equitable access to environmental literacy programming within the watershed. It was designed by Stroud Water Research Center with support from the Chesapeake Bay Trust, the U.S. EPA, and NOAA, in accordance with the Chesapeake Bay Watershed Goals, as a tool for education and natural resource decision-makers and includes many user-friendly data layers. This includes:

- School property and school district boundaries
- Environmental literacy preparedness scores and number of MWEEs in place in each district
- Equity demographic information such as Title 1 schools, % students qualifying for free and reduced meals, etc.
- School property data; land use/cover, acres, boundaries
- Stream water quality conditions on school property and their riparian buffer conditions

Model My Watershed

This tool is a watershed-modeling web app that enables citizens, conservation practitioners, municipal decision-makers, educators, and students to (1) analyze real land use and soil data in their neighborhoods and watersheds, (2) model stormwater runoff and water-quality impacts using professional-grade models and (3) compare how different conservation or development scenarios could modify runoff and water quality. The site can work at many levels, including USGS units, count, congressional, or school district level – or you can choose your own boundaries for your school or study area.

III. Sustainable School Certification Programs

Certified sustainable schools [under the Chesapeake Watershed Agreement] include public and charter schools within the Chesapeake Bay watershed that have been recognized as sustainable by the following programs: Green Ribbon Schools, National Wildlife Federation Eco-Schools USA (Bronze, Silver and Green Flag status), Maryland Green Schools, Pennsylvania Pathways to Green Schools and Virginia Naturally Schools.

While there are many high-quality US green school certification programs, this guide focuses on those programs currently recognized by the CBP Sustainable Schools outcome. Each of these certification programs requires that schools meet objectives from two or more of the three pillars of Green Ribbon Schools and requires that students take an active role in the conservation and restoration activities occurring at their schools. Two additional national recognition programs offered by Project Learning Tree (GreenSchools) and the Arbor Day Foundation (TreeCampus k-12) are included because of their strong tree focus.

U.S. Dept. of Education Green Ribbon Schools

The Green Ribbon Schools program is run by the US Department of Education and recognizes schools, districts, and institutes of higher education that:

1. reduce environmental impact and costs;
2. improve the health and wellness of schools, students, and staff; and
3. provide effective environmental and sustainability education

Combined progress in all three of these areas, known as pillars, serves as the basis for recognition. Applications go to state education authorities, and they make nomination decisions based on their own standards, but nominations must include documentation of the three pillars. Therefore, it's largely up to the state authorities to determine the influence of tree-related elements in nominations.

Whereas other programs recognize all schools that meet their criteria, Green Ribbon Schools highlights a smaller subset of exemplary schools each year. This makes the program highly competitive (there were only 55 recipients in 2020). Already certified green schools, whose programs often align with the Green Ribbon Schools program, may apply for this award for further national recognition. Between 2012 and 2017, the Chesapeake Bay Watershed had 23 schools receive Green Ribbon recognition.

Eco-Schools USA

Eco-Schools USA is a program under the National Wildlife Federation and provides the framework to make positive, lasting change in school communities. It can be directly integrated into a school's existing curriculum and is designed to meet educational standards. Within the Eco-Schools framework are 12 different pathways, or environmental focus areas, from which

schools choose. This program is often used in concert with other certifications because of its clear framework and many resources such as audits, checklists, and curricula. As of 2017, there were 55 Eco-Schools in the Chesapeake Bay Watershed.

The "Learning about Forests" pathway is a more in-depth forestry blueprint for schools and can be used as a resource to improve tree canopy and related learning under any green school certification.

Maryland Green Schools

Administered by the Maryland Association for Environmental & Outdoor Education (MAEOE), the Maryland Green Schools program goals are to enrich education by integrating hands-on, inquiry-based instruction and empowering youth to practically apply knowledge at school, home, and in their communities in ways that reduce ecological impacts and encourage sustainable practices. As schools recertify every four years, they continue to integrate and reinforce the lessons, resulting in progress toward a more sustainable future. The program is aligned with the Chesapeake Bay Watershed Agreement 2014 goals and supports the Maryland State Department of Education graduation requirements and standards. This program is one of the more extensive green school certifications nationally and the most common (by far) within the Chesapeake Watershed. They also have a partnership with Eco-Schools and highly encourage joint use. As of 2017, there were 571 Maryland Green Schools in the Chesapeake Bay Watershed.

Pennsylvania Pathways to Green Schools

Pennsylvania Pathways to Green Schools is a state program closely affiliated with Green Ribbon Schools, providing resources to help schools become more sustainable in alignment with the national recognition program. Therefore, they follow a similar structure to the Green Ribbon Schools. They do mention a partnership with Eco-Schools, and encourage it to be used for resources, but note that they only recognize Green Ribbon Schools applicants.

Virginia Naturally Schools

Virginia Naturally Schools is the official environmental education school recognition program of Virginia. Unlike other recognitions, Virginia Naturally is set up to build and achieve additional recognitions each year you participate. As schools progress, additional sustainability measures are required. In addition to the certifications, participating schools are able to choose from a list of workshops that will help to continue their effort. This program ties in with Virginia's Governor's Conservation Classroom Challenge and MWEE's from the Chesapeake Bay Agreement. As of 2017, there were 59 Virginia Naturally Schools in the Chesapeake Bay Watershed.

Sustainable Schools reported in the Chesapeake Bay Watershed

Green School Program	State	Total (as of 2017)
US Green Ribbon		
	DC	6
	MD	10
	PA	2
	VA	4
	WV	1
	Total	**23**
Eco-Schools (NWF)		
	DC	2
	MD	7
	VA	46
	Total	**55**
MD Green School (MAEOE)	MD	571
VA Naturally	VA	59

Project Learning Tree GreenSchools

**Not currently included in the Chesapeake Sustainable Schools definition*

Project Learning Tree (PLT) GreenSchools certification reflects environmental education in the curriculum, student leadership, and environmental action. The program requires five main investigations that examine school energy use, waste and recycling, water consumption, school site, and environmental quality (such as indoor air quality, school transportation, and use of chemicals) — and establish benchmarks upon which to improve. This program aligns with the U.S. Department of Education's Green Ribbon Schools program. The school site investigation requires schools to document an increase in their tree canopy as well as other forestry-related and outdoor learning metrics.

Arbor Day Tree Campus K-12 Program

**Not currently included in the Chesapeake Sustainable Schools definition*

"Tree Campus K-12 inspires collaboration between schools, students, and communities to facilitate experiences with trees as a learning tool. The program encourages schools and educators to create purposeful opportunities for students to interact with trees by offering resources as well as a framework for becoming recognized and celebrating their efforts with their community."

The first year of recognition for this new program inspired by the Arbor Day Foundation's Tree Campus K-12 program will be the 2021-2022 school year. To become a Tree Campus, schools must establish a Tree Campus Team, implement a tree-focused education plan, facilitate a hands-on experience, and hold an Arbor Day observance. The program was designed to complement national green school standards and work for all types of schools. These case studies provide insight into what the program looks like in action.

Photo: Earth Day tree planting at Wardensville Garden Market on April 22, 2018; courtesy of the Chesapeake Bay Program

Combining Sustainable School and Tree Campus Certifications

If schools commit to making various Sustainable Schools activities include tree-related projects and curriculum elements, it is relatively easy to achieve additional recognition through the Tree Campus K-12 program. Having a tree-focused education plan helps with curriculum elements.

Tree Campus K-12 Goals	Goal 1 **Establish a Tree Campus Team**	Goal 2 **Implement a tree-focused education plan**	Goal 3 **Hands-On Experience**	Goal 4 **Arbor Day observance**
US Green Ribbon School	The creation of a TC team would help certification chances.	An education plan is required under Pillar 3.	Hands-on education would aid application.	Could increase certification chances.
Eco-Schools USA	First step of becoming an Eco-School is forming an eco-action team, which can serve as a TC team if focused on tree components of the ADF program.	A tree focused education plan helps meet the forestry pathways steps requirements (specifically the action plan) and could help in other pathways.	A tree focused hands-on experience completed under Eco-Schools Forestry pathway would fulfill this goal.	Step 6, "Involve the Community" is also recommended for Arbor Day celebrations.
Pennsylvania Pathways to Green Schools	A team is not required but recommended. The creation of a TC team would help certification chances.	An education plan is required under Pillar 3.	Emphasized hands-on education, including would help application.	Could increase certification chances.
Virginia Naturally Schools	Not required. If students were added to the required administrative and staff partnership and addressed tree-related components of the ADF program, it would count as a TC team.	A tree focused education plan helps fulfill category 2, curriculum integration.	A tree centered hands-on experience would fulfill the MWEE requirement under Category 4.	Would help fulfill a long-term community involvement strategy (Category 7).
Maryland Green Schools (MAEOE)	A Green School Committee is the first step in the application process. If this team meets ADF's tree-specific goals, this would count as a TC team.	A tree focused education plan helps fulfill objective 1.2.	A tree centered hands-on experience would fulfill Objective 1.1 Curriculum and Instruction, which requires an MWEE.	Arbor Day celebrations could meet an action requirement in Objective 2 or fulfill the Celebration requirement (Objective 1.4)

*Table does not include: committing to becoming a tree campus in the beginning, applying/celebrating at the end of the process, or specific requirements of each general focus

Comparison of Program Components

Program Components	NWF Eco-School	MAEOE Green School	US Green Ribbon Schools	Pennsylvania Pathways	Virginia Naturally	Project Learning Tree GreenSchools	Arbor Day Tree Campus K-12
Staff and Student "Green Team"	First step of becoming an Eco-School; Meets 4-8 times per year; For Green Flag: 50% must be students	Established, can involve systemic and community partners	Not required, but highly recommended. Expertise from facilities, faculty, administration, students all valuable	Not required.	Not required. Does include administrative and staff partnership.	Must establish a Green Team of students, staff, and community members and meet at least 6 times a year.	Under Goal 1 a "Tree Campus Team" must meet regularly, including diverse representation from students, staff, and school leadership.
School-wide Sustainability Practices	Choose 1, 2 or 3 student-driven pathways or focus areas	School-driven example(s) for Obj. 1; then choose 4 from 7 student-driven sustainability practices for Obj. 2. Must document through pictures and student work	Innovative practices described in the application.	Innovative practices described in the application.	Encourages the majority of the school to be involved in conservation and environmental education efforts.	Five PLT GreenSchool Investigations establish benchmarks for school-wide practices.	A tree-focused education plan, hands-on experience, and Arbor Day observance.
Energy Audit	Classroom energy assessment performed by students; documentation required (optional pathway)	Can be monitored through sustainability practices	Not specified.	Not specified.	Schools can choose to complete energy and water audits on an annual basis as one activity under the "resource conservation" category	Required as one of the five mandatory investigations.	Not specified.
Curriculum Integration	Step of 5 of Eco-school framework	Included as a part Objective 1 as environmental instruction in systemic sustainability	Environmental literacy across multiple discipline areas represents ideal	Environmental literacy across multiple discipline areas represents ideal	Curriculum integration is one of the core categories schools must fulfill.	Environmental education across the curriculum and outdoor learning is required.	Included in Goal 2; Implement an education plan to serve as a guide for educators.
Community Involvement	Required, but no documentation needed (Step 6)	Requirement under Objective 3	Not a requirement, but recommended	Not a requirement, but recommended	Community partnerships and support is a requirement.	Community members are involved as part of the Green Team.	The hands-on experience (Goal 3) and Arbor Day observance (Goal 4) highly recommend.
Culture Change	Demonstrated through the development of an Eco-Code (Step 7)	Prominent under objective 1	Prominent under pillar 2	Prominent under pillar 2	Demonstrated through many of the focus categories.	Must articulate commitment to environmental action.	Shown under Goal 2 in the creation of an education plan.

Program Components	NWF Eco-School	MAEOE Green School	US Green Ribbon Schools	Pennsylvania Pathways	Virginia Naturally	Project Learning Tree GreenSchools	Arbor Day Tree Campus K-12
Time Frame	Can receive an award in one year or less; Green Flag award must be recertified every two years	Need a minimum of two years of documentation. Recertify every 4 years	No specific time frame required.	No specific time frame.	Application and school implementation must happen cyclically every year to advance and maintain recognition.	Ongoing.	Start documenting Tree initiatives in the beginning of the school year, fill out application towards end of school year.
Application	Submit applications online; provide documentation and metrics for selected pathway(s); Application accepted on rolling basis; Green Flag awarded in person within 1-2 months of submission	Submit portfolio with application requirements and documentation; recommended formats: PPT via thumb drive or shareable documents or Weebly/Prezi	Applications go to state education authorities and they make nomination decisions (up to 5 schools). Then states send to USDE for final review.	Applications will be available September each year. Must be submitted online, here, typically in early January.	Achieve additional recognitions each year you participate. To continue participation applications must be submitted yearly. Applications change depending on year-level.	Must create a school account on PLT at PLT.org to download and submit application.	Applications are due at the end of the school year. Official award recognition in the Fall.
Recognition	Three-tiered awards: Bronze (1 Pathway); Silver (2 Pathways); Green Flag (3 Pathways)	Maryland Green School Award (up to 4 cycles) Maryland Sustainable School Award (after 5+ cycles) Annual Awards/Youth Summit	US Green Ribbon School District Sustainability Award Postsecondary Sustainability Award	US Green Ribbon School State finalists Nominated Schools	A tiered recognition process which increased every year of participation.	Project Learning Tree GreenSchool	Official Recognition as a Tree Campus
Contact Information	GallagherH@nwf.org	greenschools@maeoe.org		tpeffer@pa.gov	Suzie.Gilley@dgif.virginia.gov	PLT@forests.org	ldonahoo@arborday.org
Tree Canopy Components	The "Learning about forests" pathway focuses on tree and habitat health. Provides resources that can be used for other program's tree components.	The Habitat Restoration option (under objective 2) focuses on increasing native trees. Other options under Objective 2 also encourage tree centered learning.	Not mentioned in application. Honorees seem to often incorporate trees into sustainability practices, but not consistently or specifically.	Not mentioned in application. Honorees seem to often incorporate trees into sustainability practices, but not consistently or specifically.	Tree projects could count towards the following application categories "Resource Conservation," "Meaningful Field Experiences" and "Outdoor classrooms."	Most prominent under the school site investigation where students investigate trees, habitats, and the school grounds. Asks specifically how schools have increased tree canopy.	Education plan is the main way to incorporate trees or document current initiatives. The Hands-on Experience provides opportunities for tree planting. This program is centered around trees.

Appendix: Chesapeake Watershed Goals for Environmental Literacy & Tree Canopy

The Chesapeake Bay Watershed Agreement (2014) established goals and outcomes for the restoration of the Chesapeake Bay, its tributaries, and the lands that surround them. Within this agreement, the Environmental Literacy goal aims to establish strong K-12 environmental education programs so students will graduate with the knowledge and skills to act responsibly to protect and restore their local watershed. Under this goal, partners work towards three outcomes focused on Environmental Literacy Planning, Students, and Sustainable Schools. Another goal within the agreement is Vital Habitats, which includes a Tree Canopy Outcome focused on continually increasing urban and community tree cover. This guide is intended to support both the environmental literacy goal and tree canopy outcome of the Chesapeake Bay Watershed Agreement, through supporting tree-focused learning and action opportunities at schools and beyond.

Tree Canopy Outcome

Continually increase urban tree canopy capacity to provide air quality, water quality, and habitat benefits throughout the watershed. Expand urban tree canopy by 2,400 acres by 2025.

For more information:
The Management Strategy
The Progress Site for Tree Canopy
The Logic and Action Plan (2018-2019)

Environmental Literacy Goals

There are three main outcomes:

Student

Continually increase students' age-appropriate understanding of the watershed through participation in teacher-supported meaningful watershed educational experiences and rigorous, inquiry-based instruction, with a target of at least one meaningful watershed educational experience in elementary, middle and high school depending on available resources.

For more information:
The Management Strategy
The Progress Site for Students Outcomes
The Logic and Action Plan (2018-2019)

Sustainable Schools

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.

For more information;
The Management Strategy

The Progress Site for Sustainable Schools Outcomes
The Logic and Action Plan (2018-2019)

Environmental Literacy Planning

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.

For more information;
The Management Strategy
The Progress Site for Environmental Literacy Planning Outcomes
The Logic and Action Plan (2018-2019)

In addition, the Chesapeake Bay Program is committed to Diversity, Equity, Inclusion, and Justice in all of its work. To explore data layers related to this priority, visit the Chesapeake Bay Program Environmental Justice and Equity Dashboard.