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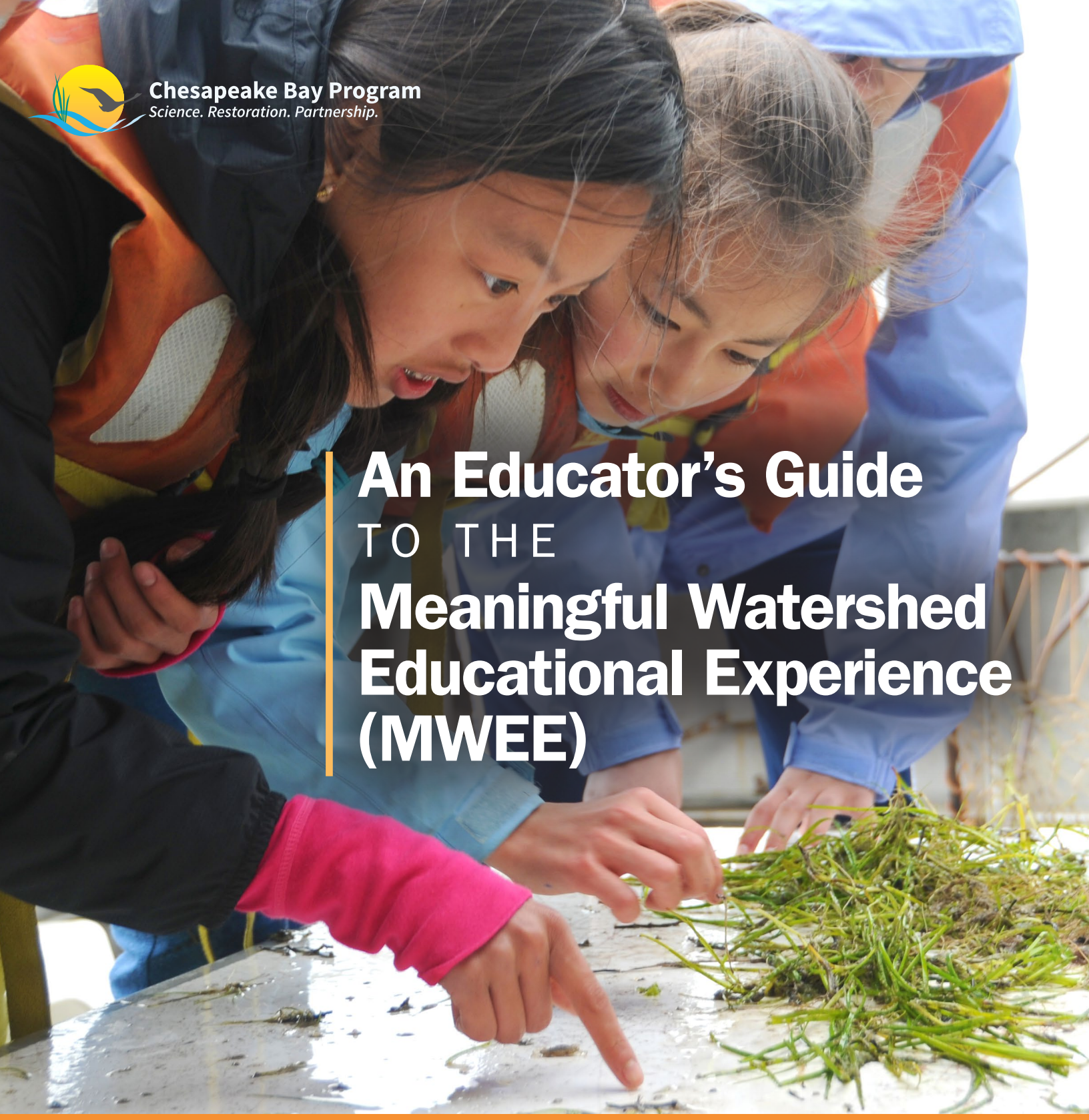

An Educator's Guide TO THE Meaningful Watershed Educational Experience (MWEE)

MWEE

Preface

The protection and restoration of the Chesapeake Bay watershed must be built on the collective wisdom of its citizens and this begins by building the environmental literacy of our youth. The Meaningful Watershed Educational Experience (MWEE) is the bedrock upon which the region's environmental literacy efforts have been built. For more than three decades, watershed states have embraced environmental education as foundational to the work of protecting the water quality and productivity of the Chesapeake.

Beginning in 1987 when the Bay Agreement first included specific objectives, leaders committed to "provide curricula and field experiences for students." This was buoyed by the publication of a formal definition of the MWEE in 2001 and the establishment of the National Oceanic & Atmospheric Administration (NOAA) Bay Watershed Education and Training Program (B-WET) in 2002 to support their implementation. Since then, the robust partnerships and programs in our region have created a culture in which systemic environmental education is poised to become the norm and where school districts increasingly promote inquiry-based environmental education as a valid and effective way to spark curiosity, improve student achievement, promote Science-Technology-Engineering-Math (STEM) programs, and provide critical life skills.

An Educator's Guide to the Meaningful Watershed Educational Experience (MWEE) is an easy-to-use manual for constructing high-quality educational experiences for all students. Our hope is that this guide is used by teachers and non-formal educators to deepen and strengthen outdoor learning for students throughout the region and that this leads to young citizens who understand and respect our natural world.

Sincerely,

Nicholas DiPasquale
Director, Chesapeake Bay Program

Authors:

Shannon Sprague, NOAA
Amy Green, Chesapeake Bay Foundation
Tara Baker, Chesapeake Bay Trust
Kevin Schabow, NOAA
Erin O'Neal, Environmental Literacy Works
Andrew Pizzala, Chesapeake Research Consortium

CBTRUST Chesapeake Bay Trust

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How to Use This Guide

This guide has been designed to be relevant to users with varying levels of familiarity with the MWEE. While most information contained in the guide is relevant regardless of your experience with the MWEE, the following tips may help you find the information most useful to you.

Getting Started: If you are not sure what a MWEE is or why you would want to do one with your students, start at the beginning. "Recognizing the MWEE as a Powerful Educational Tool" and "Understanding the MWEE" sections address the important topics of what a MWEE is and why MWEEs are a valuable teaching approach. The rest of the guide walks you through planning, implementing, and sustaining a MWEE.

Planning a MWEE: If you are already familiar with the MWEE and want to design one to use with your students, start with "Designing and Implementing a MWEE," which guides you through brainstorming MWEE ideas, creating a solid plan that connects a MWEE to the curriculum, and auditing a MWEE or other outdoor program to see if it meets the MWEE definition.

Evaluating a MWEE: If you have an existing MWEE and want to strengthen it, start with the "Evaluate" section under "Designing and Implementing a MWEE" which will help you identify opportunities to build on the experience and assess its success.

Keeping it Going: If you are looking for information on sustaining a MWEE that you are already doing, see "Supporting a MWEE Project" for guidance on communicating MWEE successes and securing funding.

Look for these symbols to guide you to additional resources that can help plan and implement a MWEE.

A student from Eastport Elementary School in Annapolis, Maryland, plants native wetlands at Truxton Park.

NOAA B-WET

Recognizing the MWEE as a Powerful Educational Tool

The 2014 Chesapeake Bay Watershed Agreement includes an Environmental Literacy Goal that commits states in the region to prepare every student with the knowledge and skills necessary to responsibly protect and restore their local watershed. The cornerstone of this goal is providing teacher-supported MWEEs in elementary, middle, and high school. Each state or local education agency is responsible for establishing locally relevant approaches to environmental literacy that include MWEEs. Many districts are working to incorporate these experiences into the curriculum to set the expectation that they are provided for all students in a grade or a course. This is often referred to as systemic implementation. Though the Watershed Agreement applies only to school districts in the watershed, states are encouraged to support these opportunities for all students in their jurisdiction.

Middle school students from Allegany County, Maryland Public Schools investigate the biological health of Evitts Creek.

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MWEEs support high-quality teaching and learning by actively engaging students in building knowledge and meaning through hands-on experiences. In these experiences, the core ideas and practices of multiple disciplines are applied to make sense of the relationships between the natural world and society. The MWEE definition has been designed to support state science and social studies standards and

> ***"This Guide will definitely help me as an educator*** as I move forward implementing a broader, more enduring, and sustainable program within our school."
>
> ***—Sonia Saunders, Brandywine Springs School, Wilmington, Delaware***

align with standards-based initiatives, including STEM education; the Common Core State Standards; Next Generation Science Standards; and the College, Career, and Civic Life (C3) Framework for Social Studies. The MWEE definition also reflects research-based instructional models, including place-based education, the NAAEE Guidelines for Excellence, and Investigating and Evaluating Environmental Issues and Actions (IEEIA).

> ***"There is a mountain of evidence that suggests environmental education is a powerful way to teach students.*** Over 100 studies found that it provides transformative learning opportunities. There is no doubt that environmental education is one of the most effective ways to instill a passion for learning among students."
>
> ***—Dr. Nicole Ardoin, Stanford University Graduate School of Education and Woods Institute for the Environment***
>
> Key findings of her research include:
>
> - 98% of studies that examined whether students gained knowledge from environmental education saw a positive impact,
> - 90% reported increased skills, and
> - 83% reported enhanced environment related behaviors.
>
> A summary can be found at bit.ly/eeworks.

MWEEs Increase Student Engagement and Enthusiasm for Learning. By involving students in research about local issues that affect their schools, neighborhoods, and communities, MWEEs reach beyond textbooks and connect more authentically to the lives of students. Conducting hands-on, outdoor investigations and meaningful action projects related to real-world issues fully engages students as active learners.

MWEEs Support Student Achievement. MWEEs provide the opportunity for students to engage in problem-solving situations that place learning in the context of their daily lives. When this sort of life-relevant, student-centered learning is integrated into the curriculum or used to connect and organize themes across the curriculum, students are better equipped to meet academic standards.

MWEEs Advance 21st Century Skills. MWEEs ask students to think critically, solve problems, employ analytical skills and higher-order thinking, and communicate effectively. These skills are essential to prepare a workforce ready for the innovation and challenges of the 21st century. In addition, today's economy offers tremendous opportunities for careers directly related to the environment. MWEEs can help prepare students for these jobs.

MWEEs Promote Environmental Stewardship and Civic Responsibility. A student's years in school provide a unique opportunity to build the knowledge, skills, and motivation to make informed decisions regarding complex and evolving environmental issues. MWEEs prepare students for this civic responsibility by having them examine local issues and take action to help their community.

Understanding the MWEE

MWEEs are learner-centered experiences that focus on investigations into local environmental issues that lead to informed action and civic engagement. Teachers play an important role in presenting unbiased information and assisting students with their research and exploration. Four essential elements and four supporting practices build upon each other to create this comprehensive learning experience for students.

Students in Baltimore City model polluted runoff with the Living Classrooms Foundation.

NOAA B-WET

MWEE Essential Elements

The MWEE consists of four essential elements that describe "what students do." These elements promote a learner-centered approach that emphasizes the role of the student in actively constructing meaning from the learning experiences. Throughout the process students have time for reflection, allowing them to refocus on how what they are learning and experiencing affects the driving question of their investigations.

> ***"Part of the beauty of MWEEs is that they are not something extra*** but are, indeed, a means of enriching lessons for deeper student learning while strengthening local and national academic standards."
>
> ***—Donna Balado, Maryland State Department of Education***

We all live in a watershed. The **Planning Toolbox** includes a map and description of the ***Chesapeake Bay Watershed***.

Issue Definition

Students focus on a driving question that addresses a locally relevant environmental issue, problem, or phenomenon requiring background research and investigation. Students learn more about the issue through classroom instruction and by making observations, collecting data, conducting experiments, talking to experts, and reviewing credible publications. They also reflect on personal and public values and perspectives related to the issue.

Outdoor Field Experiences

Students participate in one or more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon. Investigations may involve making observations, collecting data, and/or conducting other activities required for answering their questions and informing student actions. To the extent possible and within appropriate safety guidelines, students are actively involved in planning the inquiry that occurs during the outdoor field experience(s). These experiences can take place off-site and on the school grounds.

Synthesis and Conclusions

Students identify, synthesize, and apply evidence from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon. Students communicate these conclusions and claims to internal and external audiences in venues that may range from the school classroom to the larger public community.

Action Projects

Students identify, explore, and implement solutions for action. The solutions address conclusions and claims drawn through investigation. Students reflect on the action and determine the extent to which the action successfully addressed the problem, challenge, or phenomenon reflected in the claim. Students may also share proposals for sustaining or extending the action.

Criteria for Effective Driving Questions

- Support learning objectives
- Are relevant and related to everyday life
- Are thought-provoking and intellectually engaging
- Are open-ended (i.e. typically will not have a single, final, and correct answer)
- Promote further inquiry (i.e. raises additional questions)
- Encompass both natural and social systems and topics
- Require students to revisit the problem frequently as knowledge and understanding evolves
- Call for higher-order thinking, including analysis, inference, prediction, and evaluation
- Include concepts and practices from multiple disciplines

Types of Action Projects

- **Watershed Restoration or Protection** (e.g., create schoolyard habitat, planting trees or grasses, invasive species removal, community cleanup, stormwater management)
- **Civic Action** (e.g., town meetings, voting, writing elected officials/ decision makers, advocating for policy change)
- **Community Engagement** (e.g., presentations, social media, event-organizing, messaging at community events/fairs/festivals, mentoring, PSAs, flyers, posters)
- **Everyday Choices** (e.g., reduce/reuse/ recycle/upcycle, composting, energy conservation, water conservation)

MWEE Supporting Practices

The MWEE also includes four supporting practices that describe "what teachers do" to ensure success.

Active Teacher Support

MWEEs depend on teacher facilitation and ongoing support of student learning. Teachers ensure that the essential elements of the MWEE come together to support academic goals for learning while creating opportunities for students to take active roles in their learning.

Elementary school students study macroinvertebrates at Delaware Nature Society's Flint Woods Preserve.

DEREK STONER

Classroom Integration

MWEEs are anchored to curriculum standards and support formal goals for learning and student achievement. They provide authentic, engaging opportunities for interdisciplinary learning that crosses traditional boundaries between disciplines. Some portions of the experience, such as the outdoor field experiences, may occur off school grounds and/or be facilitated in partnership with external providers, however, the MWEE is integrated into the scope and sequence of the academic program.

Local Context

MWEEs occur within a local context (i.e. schoolyard, neighborhood, town, or community) in order to establish the life-relevancy of the issue, problem, or phenomenon being studied. Situating the MWEE within local contexts enables students and teachers to explore how individual and collective decisions affect their immediate surroundings and how their immediate surroundings affect the larger environment.

Sustained Activity

MWEEs represent sustained activity that engages students from beginning to end. Though a field experience may occur on one day, the total duration leading up to and following the experience involves a variety of rich learning opportunities spread over the course of a unit or multiple units. Experiences such as tours, gallery visits, simulations, demonstrations, or nature walks may be instructionally useful, but alone do not constitute a MWEE.

Designing and Implementing a MWEE

This section will highlight how to begin designing a MWEE. The way that MWEEs are designed and implemented may change over time as an educator gains experience and personal insights, but this section provides some basic tools to help think, plan, and evaluate a MWEE.

An educator with the National Aquarium works with students to interpret water quality data.

NOAA B-WET

Think: This section walks through some big-picture questions that are important to keep in mind as a backdrop to planning.

Plan: This section introduces the Environmental Literacy Model (ELM), which helps develop a plan for a MWEE and situate it into the existing curricular program.

Evaluate: This section offers an opportunity to review the planned program against the MWEE definition and reflect on the process. It also introduces resources that can help formally evaluate an environmental education program.

Think

MWEEs may be inspired by a learning objective that lends itself to field-based learning or by a compelling problem, issue, or challenge. They may also be built from existing field trips or use existing schoolyard or community assets.

> ***"Partnerships provide opportunities for teachers and students*** to experience the natural world beside those who live and breathe practical environmental literacy on a daily basis."
>
> ***—Jonathan Wickert, Delaware Department of Natural Resources and Environmental Control***

During this phase, it may be worthwhile to consider existing district, community, or school-based intiatives for opportunities to integrate a MWEE. Exploring and gathering information on local environmental issues, options for field experiences, and exisiting teaching resources can also help generate ideas. There are likely opportunities for field experiences to occur on or near the schoolyard, for example at local parks, museums, or nearby fields or streams. Outdoor experiences are also available through environmental education providers.

Successful MWEEs often involve the support of multiple partners who play important roles in planning, delivering, and/or sustaining MWEE programs. Environmental education professionals from the school district or local nonprofit organizations can often assist with MWEE planning and implementation, including brainstorming MWEE ideas, offering teacher professional learning, and assisting with outdoor field experiences and/or action projects. District content specialists may also be able to provide access to information, materials, and resources. Additionally, community partners like businesses, universities, and government agencies can often be called on to support MWEEs by offering time, expertise, and supplies. Remember that while these are wonderful resources, active teacher participation in all elements of the MWEE is required.

The following questions can help facilitate brainstorming and planning:

- What are the objectives for learning?
- What are the local phenomena, problems, or issues to explore?
- What field trips, outdoor assets, or other resources exist at my school?
- Who can I work with on this project?
- What else do I need to consider?

The Chesapeake Bay Program maintains a suite of resources that can help you begin to explore options for your MWEE.

Bay Backpack is an online resource for educators that houses lesson plans, information on field experience providers, and a detailed guide for using schoolyards for outdoor education at baybackpack.com.

National Park Service maintains a **map of public access sites** in the Chesapeake Bay at bit.ly/baypublicaccess.

The **Chesapeake Bay Program website** has interesting and up-to-date information about the Bay, its issues, and the effort to protect and restore this national treasure at chesapeakebay.net.

The ***MWEE Think Cloud*** in the **Planning Toolbox** will help you organize your thoughts for this initial THINK phase. Even if you are an experienced MWEE practitioner, you can use this tool to brainstorm new opportunities and stronger connections.

"My greatest success was student engagement. Students who have not been particularly interested in science this year were drawn in by the real-world application of this project."

–Scott Hartmen, Hamilton Elementary/Middle School, Baltimore, Maryland

MWEEs provide a rich platform for cross-curricular understanding and study.

Consider possibilities for involving other teachers and content areas in your MWEE. For example:

- **Science and Engineering:** In what ways can students engage in authentic scientific and engineering practices in the service of making sense of natural phenomena?
- **Social Studies/Geography:** How will students investigate the history of the land and people who live there? How is the geography of the area connected to environmental issues? How is the public involved in the issue or question of your MWEE?
- **Math:** Can students explore how math supports their claims or use it to strengthen their claims? Can math be used to enhance school ground investigations? What data can be collected and/or organized during your MWEE?
- **Reading:** Will students interact with various texts: sets of directions, nonfiction books, brochures, websites, and literature? What has been written before about environmental problems in your local community and/or the issue you are exploring through your MWEE?
- **Writing:** How will students synthesize ideas in writing and write for authentic audiences as part of the MWEE?
- **Art:** What opportunities are there for students to create illustrations to enhance written work or the MWEE?
- **Music:** Can students create, perform, or learn through music connected to their investigations? Has music been created or inspired about the issue, problem, or phenomenon of your MWEE?
- **Technology:** How can students explore and better understand our abilities to modify the natural world to meet human needs and wants?

Wilderness Leadership & Learning (WILL) students in Washington, DC participate in a field experience at the Chesapeake Bay Foundation as part of their ongoing investigation into water quality.

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ENVIRONMENTAL LITERACY MODEL ELM

		Curriculum Anchor	Issue Investigation	Stewardship and Civic Action
MWEE Essential Elements	Issue Definition	✓		
	Outdoor Field Experiences		✓	
	Synthesis and Conclusions		✓	✓
	Action Projects			✓
MWEE Supporting Practices	Active Teacher Support	✓	✓	✓
	Classroom Integration	✓		
	Local Context	✓		
	Sustained Activity	✓	✓	✓

Plan

The Environmental Literacy Model (ELM) Planning Document helps educators think through the details of a MWEE. ELM is designed to help situate the MWEE within the scope and sequence of the curriculum, and to assist in communicating to school leadership, the local community, and colleagues. ELM features three primary components—Curriculum Anchor, Issue Investigation, and Civic Engagement—that are directly aligned with the MWEE essential elements and supporting practices.

The **Curriculum Anchor** identifies connections of the MWEE to academic standards and establishes life-relevant, local contexts for learning. By defining the learning objectives and driving question within the local context, it addresses the MWEE essential element of ***Issue Definition*** and the supporting practices of ***Classroom Integration*** and ***Local Context***.

Issue Investigation provides the opportunity for students to construct knowledge and

The ***ELM Planning Document*** in the **Planning Toolbox** will help you plan your MWEE with an emphasis on better integrating the issue investigation and stewardship Action Project with your academic curricular program. ELM was created by the Chesapeake Bay Foundation as part of the Maryland Environmental Literacy Partnership. A MWEE-specific version was created for this guide and can be found in the Planning Toolbox. For more information about ELM, visit bit.ly/elm-rationale.

These additional resources in the Planning Toolbox may also help to organize information as you work through the components of the ELM Planning Document:

- ***Developing Driving Questions***
- ***Identifying MWEE Field Study Sites that Support the Driving Question***
- ***Moving from Synthesis and Conclusions to Action***

understanding through field-based investigations of a life-relevant issue, problem, or phenomenon. In working together throughout the investigation to construct, communicate, and refine explanations about the driving question, students participate in the MWEE essential elements of ***Outdoor Field Experiences*** and ***Synthesis and Conclusions***.

Stewardship and Civic Action empower students to adapt and apply the knowledge they have constructed through investigation. As students develop a claim, identify solutions, design plans, and take informed action, they again address the MWEE essential element of ***Synthesis and Conclusions***, and also fulfill the essential element requirement for ***Action Projects***.

By doing the full suite of activities outlined in the ELM Planning Document, the supporting strategies of ***Active Teacher Support*** and ***Sustained Activity*** from the MWEE are also fulfilled.

The ***Teaching Resources Collections*** on **Bay Backpack** provide information, lesson plans, and classroom resources about the Bay and its watershed. Access this information at baybackpack.com/collections.

Use the ***MWEE Audit Tool*** in the **Planning Toolbox** to determine if your project meets the full definition of the MWEE. Even if you meet the minimum criteria, the tool can help identify areas that could be strengthened.

Evaluate

Evaluating a MWEE can improve its long-term success and inform future projects and experiences. The first step is to make sure the plan meets all the criteria of the MWEE definition, including the essential elements of ***Issue Definition***, ***Outdoor Field Experiences***, ***Action Projects***, and ***Synthesis and Conclusions*** along with the supporting practices of ***Active Teacher Support***, ***Classroom Integration***, ***Local Context***, and ***Sustained Activity***.

Activities in a MWEE must be sustained and connected, providing students the ongoing opportunity to evaluate and communicate the results of their inquiry. Review lesson plans to ensure they provide space and structure for these important outcomes. Look for areas that may need support through community involvement and start reaching out to people before beginning the MWEE.

In addition to classroom learning assessments, tracking outcomes related to student watershed literacy, environmental stewardship, and science learning may also be of interest to some educators implementing MWEEs. Information and questions that can be used to evaluate these outcomes as part of the MWEE can be found at bit.ly/measuring-mwee.

Supporting a MWEE Project

Building Awareness

Students immerse themselves in stewardship and civic action through oyster reef restoration.

NOAA B-WET

Building broad awareness about a MWEE may strengthen community support and, ultimately, the long-term success of a MWEE. This can be beneficial at the school, district, and broader community levels as well. Actively engaging students in this process can be an interesting extension to the ***Synthesis and Conclusions*** element of a MWEE, and depending on the nature of the outreach may even be appropriate as an ***Action Project***.

At the school building level, it is important to celebrate success to garner additional resources and excitement for the project, and to build toward or reinforce a school culture that embraces outdoor education. Principals, other teachers, Parent Teacher Associations (PTA), building services staff, parents, and other students are all important partners. Getting them involved in and excited about the project can go a long way toward ensuring that a MWEE has the support to continue into the future. It is also important to recognize partners who lend their support. Schools often have a variety of built-in mechanisms for helping with this—from the school or PTA newsletter, website, or social media accounts to the morning announcements, bulletin boards, or events.

It is also useful to build support at the school district level. Districts can incorporate MWEEs into the curriculum and expectations for schools. This can create the space, permission, and sometimes even funding for schools and teachers to implement MWEEs. Partners at this level include superintendents, members of boards of education, and central office staff, such as curriculum and facilities managers, and staff. Invitations from schools to attend press events, community outreach events, or other celebrations are often met favorably by these partners. Students can deliver powerful testimonials at these events or at school board meetings.

The community surrounding a school is generally extremely interested in learning more about school initiatives, especially because many of the community members have children who are attending, will attend, or have attended the school. Reaching out to the community through the media, public service

announcements, meetings of local government officials, and/or community outreach events can increase awareness and support of a MWEE. Presenting to local government officials about the findings of their MWEE is sometimes a logical and powerful culmination of the student ***Action Project*** element of the MWEE. Teachers, school administrators, or partners may also want to reach out to local television stations, newspapers, and online media services to invite them to witness a MWEE in action.

These are just some ideas for how to build awareness for a MWEE. There may be additional opportunities within the community.

Many practitioners reach out to media at some point during their MWEE. Be sure to check with your school and/or school district to see if they have protocols in place to guide media outreach. See the **Planning Toolbox** for guidance on ***Spotlighting Your MWEE***.

Securing Funding

Many MWEEs can be built around local sites (i.e. school grounds or nearby parks and streams) and/or existing resources (i.e. planned field trips or events, or materials and equipment in classrooms or storage facilities), so they may not require additional funding. For those MWEEs that incorporate new off-campus trips, specialized supplies, or other resources not currently available, additional funding may be required. Long-term project funding also needs to be considered. MWEEs take time and effort to develop, so building something sustainable makes sense.

Information on writing grants as well as a list of available grant programs can be found at baybackpack.com/funding.

The school and local community can be a great source for funding. Field trip fees can often be paid by parents, and when this is not possible, the school PTA can sometimes help defray the costs. Many PTAs have budgets for special projects and are often supportive of hands-on field experiences. They may also be able to help out with funding of supplies or equipment. Even if a PTA does not have the funding to support the MWEE, parents can have excellent ideas about how to reach out to the broader community. When looking to the broader community, neighborhood organizations, local nonprofits, and local businesses will often donate supplies, equipment, or time, and may offer easy-to-manage small grants with very little paperwork.

For larger or ongoing projects, teachers and principals are encouraged to look to school district budgets. Many school districts support the installation of schoolyard projects, support

"Thousands of our 7th grade students participate in a formal MWEE with our partners, George Mason University and the Fairfax County Park Authority. Students see first-hand how their everyday actions and decisions can make a difference when they plan and implement their stewardship projects."

—Elaine Tholen, Fairfax County Public Schools

> ***"MWEE implementation with K-12 students is most effective*** when the teachers, themselves, have experienced MWEEs during professional learning opportunities, often provided by local colleges & universities, resource agencies, and EE non-profits."
>
> ***—Tamra L. Willis, Mary Baldwin University College of Education***

Teachers conduct a salamander survey as part of a week-long course on designing locally relevant field-based investigations.

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system-wide field trips for students, or otherwise provide ongoing, reliable funding for components of the MWEE. And if a school happens to be planning construction, staff can sometimes work with facilities staff to incorporate green elements, including outdoor classrooms and other schoolyard projects that can be used by students for authentic research (i.e. that stormwater retention pond can be a great wildlife habitat if planned appropriately).

In addition to school and school district funding, there are many opportunities to secure funding from external sources, including grants from federal and state government, businesses and corporations, and private foundations. Some school districts have grants coordinators to assist in these efforts. Students may even be able to assist with grant writing as part of their MWEE to further develop their 21st century skills.

While grants are wonderful to help kick-start a project, they are not meant to provide long-term support. In fact, many grant makers ask for a sustainability plan as part of their application process. The information from the previous section on Building Awareness can also be used to put together a communications plan that generates the excitement and momentum that can lead to longer-term support for the MWEE.

Conclusion

MWEEs are unique and compelling opportunities for students to explore local environmental issues through sustained, teacher-supported programming. The tools and information in this guide can help ensure that MWEEs are done thoroughly and thoughtfully to meet the needs of students, teachers, and the environment. Well-designed MWEEs enhance student engagement and enthusiasm for learning, academic achievement, 21st century skills, and environmental stewardship and civic responsibility. MWEEs are becoming an increasingly popular teaching approach throughout the Chesapeake Bay region and beyond. As more students participate in high-quality MWEEs throughout the region, we hope for an engaged and informed citizenry who actively participate in the protection and restoration of the Chesapeake and local watersheds. For more information, please contact the Chesapeake Bay Program Education Workgroup at bit.ly/cbp-workgroup.

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Planning Toolbox

MWEE

The Chesapeake Bay Watershed

A watershed is all of the land whose water and rainfall will eventually drain into a particular river, lake, bay, or other body of water.

The Chesapeake Bay watershed is 64,000 square miles and has 11,600 miles of tidal shoreline, including tidal wetlands and islands. The watershed encompasses parts of six states: Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia, as well as Washington D.C. Approximately 17 million people live in the watershed; about 10 million people live along its shores or near them.

MWEE Think Cloud

Developing Driving Questions

Driving questions are the "big picture" questions. They are central to the MWEE Essential Element of ***Issue Definition***, which aligns with the Environmental Literacy Model's ***Curriculum Anchor*** component. Driving questions engage students in meaningful inquiry by focusing on a locally relevant environmental problem, issue, or phenomenon. These questions—often referred to as essential questions, organizing questions, or overarching questions—are important for sparking curiosity and organizing inquiry for the issue investigation. Posed by the teacher to address specific learning standards or leverage existing resources or programming, driving questions provide students with a framework for learning across disciplines.

Supporting questions are generated by the students to help find the missing information needed to answer the driving question. They should uncover the students current knowledge about the issue, create interest, and begin to frame an investigation that addresses the driving question in a local context. Supporting questions provide an opportunity to bring in a variety of subject disciplines, strengthening the life-relevant and authentic contexts for learning.

Criteria for Effective Driving Questions

- Support learning objectives
- Are relevant and related to everyday life
- Are thought-provoking and intellectually engaging
- Are open-ended (i.e. typically will not have a single, final, and correct answer)
- Promote further inquiry (i.e. raises additional questions)
- Encompass both natural and social systems and topics
- Require students to revisit the problem frequently as knowledge and understanding evolves
- Call for higher-order thinking, including analysis, inference, prediction, and evaluation
- Include concepts and practices from multiple disciplines

MWEE Issue	Driving Question	Supporting Question	Standard(s)
		Supporting Question	**Standard(s)**
		Supporting Question	**Standard(s)**

Identifying MWEE Field Study Sites that Support the Driving Question

Outdoor field experiences are essential elements of the MWEE. Field study sites can be located on school grounds or at locations in close proximity to schools such as streams or city parks. They can also take place at offsite locations like state parks, wildlife refuges, or education centers that are equipped with experts, gear, and facilities. A range of individuals, including teachers, environmental educators, natural resource professionals, or trained volunteers, can facilitate field experiences. The following template is an example of a tool for assessing, recording, and communicating the possibilities.

	Possible Site #1	Possible Site #2	Possible Site #3	Possible Site #4
Site Location				
Accessibility for students and other logistical considerations (safety, transportation, entrance fees).				
How is this site a good match for your students, grade level, curriculum?				
Does this site provide resources to help you (tools, experts, adult helpers)? Are there fees associated with it?				

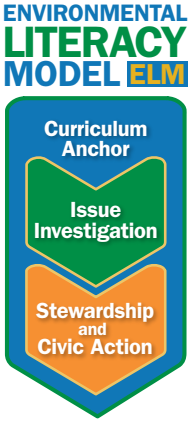
Moving from Synthesis and Conclusions to Action

Once students have had the opportunity to investigate their driving and supporting questions and have begun to generate claims from their synthesis and conclusions, they should work in small groups or as a class to brainstorm and evaluate ideas for action. These actions may include traditional restoration activities, but could also include civic action, community engagement, or other types of projects. Throughout this process, teachers play an important facilitation role by forming groups, observing, moderating, answering questions, encouraging the flow of ideas, and synthesizing findings.

Types of Action Projects

- **Watershed Restoration or Protection** (e.g., create schoolyard habitat, planting trees or grasses, invasive species removal, community cleanup, stormwater management)
- **Civic Action** (e.g., town meetings, voting, writing elected officials/decision makers, advocating for policy change)
- **Community Engagement** (e.g., presentations, social media, event-organizing, messaging at community events/fairs/festivals, mentoring, PSAs, flyers, posters)
- **Everyday Choices** (e.g., reduce/reuse/recycle/upcycle, composting, energy conservation, water conservation)

Conclusions from Investigations			
	Solution #1	**Solution #2**	**Solution #3**
What actions could be taken to address the environmental problem, issue, or phenomenon? See **Types of Action Projects** above.			
How would this help to address the environmental problem, issue, or phenomenon?			
What resources would you need?			



Planning Document

Title	
Author	
School, District	
Audience (grade, course)	

Curriculum Anchor	Notes
Defining the Learning Objectives and Curriculum Connection Curriculum indicators, performance expectations, and/or learning objectives.	
Describing the Local Context The issue that will serve as the context for learning.	
Identifying the Driving Question A broad, open-ended, life-relevant question that is based on the standards/learning objectives. Guides inquiry for the investigation(s) and prompts the development of actionable claims.	

ENVIRONMENTAL LITERACY MODEL ELM

Issue Investigation	Notes
Asking Questions, Defining Issues and Problems Students define the issue, problem, or phenomenon to be investigated and develop questions that are relevant for investigation.	
Planning and Conducting Investigations Students develop plans for collecting, analyzing, and communicating information and/or data to help them answer their questions and understand the problem. Students identify and justify appropriate sources of information and/or data, and determine methodologies for the collection of information and/or data.	
Analyzing and Interpreting Data Students present and share information and/or data to reveal patterns that indicate relationships. Students apply disciplinary concepts as they analyze and interpret information and/or data to make sense of the issue, problem, or phenomenon.	
Constructing, Communicating, and Refining Explanations Students identify, synthesize, and apply evidence from their investigations (for example, measurements, observations, and patterns) to draw conclusions about the driving question.	

ENVIRONMENTAL LITERACY MODEL ELM

Stewardship and Civic Action	Notes
Developing a Claim and Identifying Solutions Students develop a claim based on conclusions drawn in the Issue Investigation. The claim should reflect a problem, challenge, or opportunity that warrants informed action. Students identify and explore solutions to address the problem, challenge, or opportunity reflected in their claim.	
Designing a Plan and Taking Informed Action Students design a plan for implementing solutions through informed action in their classrooms, schools, and/or communities. The plans should include criteria for determining the extent to which the action successfully addresses the problem, challenge, or opportunity reflected in the claim. Students implement their plans.	
Evaluating Action Students reflect on the action and determine the extent to which it successfully addresses the problem, challenge, or opportunity reflected in the claim. Students share proposals for sustaining or extending the action.	

MWEE Audit Tool

This audit tool is designed to help you strengthen your planned or existing project to meet the full definition of a MWEE as defined in the 2014 Chesapeake Bay Watershed Agreement. It will help you assess the degree to which your project already contains the MWEE elements. A low score DOES NOT mean that your project is wrong or bad!

Classroom Integration	**Score**
MWEEs are anchored to formal goals for learning and student achievement. They provide authentic, engaging opportunities for interdisciplinary learning that crosses traditional boundaries between disciplines. Some portions of the experience, such the outdoor field experiences, may occur off school grounds and/or be facilitated in partnership with external providers, however, the MWEE should be fully integrated into the scope and sequence of the academic program.	
The primary academic standards and/or learning objectives are clearly defined. Multi-disciplinary objectives are encouraged. *(Score 0 if not clear; Score 2 if clearly defined and connected to the issue.)*	0 2
The MWEE clearly supports the identified academic standards and/or learning objectives. *(Score 0—does not support the identified standards and/or learning objectives; Score 2—at least part of the MWEE (i.e. the issue investigation or action projects) clearly supports the identified standards and learning objectives; Score 4—all parts of the MWEE clearly and explicitly support the identified standards and learning objectives.)*	0 2 4
The core ideas and practices of multiple disciplines are clearly defined and integrated into the MWEE. *(Score 0 if one discipline is clearly defined; Score 2 if one or more disciplines are clearly defined.)*	0 2
Subtotal	____/8

CRITERIA

Less than or equal to 2: Your project needs to have a clearer connection with academic standards and/or learning objectives to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure classroom integration in your MWEE.

Between 3 and 5: There are elements of classroom integration, but it could be stronger with either (1) better support the academic standards and/or learning objectives you defined or (2) connect with other academic standards and/or learning objectives that may be more appropriately met through the MWEE. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 6: Congratulations! There are always areas for improvement, but your project strongly supports academic standards and learning objectives.

AREAS FOR IMPROVEMENT

Local Context	Score
MWEEs occur within a local context (i.e. schoolyard, neighborhood, town, or community) to establish the life-relevancy of the problem, issue, or phenomenon being studied. Situating the MWEE within local contexts enables students and teachers to explore how individual and collective decisions affect their immediate surroundings and how their immediate surroundings affect the larger environment.	
The project is linked to a locally relevant issue, problem, or phenomenon. *(Score 0 if your issue does not have local relevance; Score 1 if your MWEE is addressing a local issue.)*	0 1
The MWEE provides opportunities to explore the impacts of the locally relevant (i.e. schoolyard, neighborhood, town, or community) environmental issues. *(Score 0 if the MWEE does not relate to the local schoolyard, neighborhood, town, or community; Score 1 if the local context is included, but peripheral to the learning objectives; Score 2 if the local context is integral to achieving the learning objectives.)*	0 1 2
Subtotal	____/3

CRITERIA

Less than or equal to 1: Your project needs to occur within a local context to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure your MWEE is linked to a locally relevant issue, problem, or phenomenon.

Greater than or equal to 2: Congratulations! There are always areas for improvement, but overall your project is occurring within a local context.

AREAS FOR IMPROVEMENT

Issue Definition	Score
Students focus on a locally relevant environmental issue, problem, or phenomenon requiring background research and investigation. Students learn more about the issue through classroom instruction and by making observations, collecting data, conducting experiments, talking to experts, and reviewing credible publications. They also reflect on personal and stakeholder values and perspectives related to the issue.	
The problem, issue, or phenomenon that you selected for your MWEE is clearly articulated. *(Score 0 if the issue is not clear; Score 2 if the issue is clearly defined.)*	0 2
The project makes a clear effort to increase environmental stewardship of the Chesapeake Bay and/or its watershed. *(Score 0 if there is no focus on Bay-related issues; Score 1 if the driving question addresses an issue only peripherally related to the Bay or its watershed; Score 3 if the driving question addresses an issue directly related to the Bay or its watershed.)*	0 1 3
The driving question has the following characteristics: (check all that apply) ❑ Supports learning objectives ❑ Is relevant and related to everyday life ❑ Is thought-provoking and intellectually engaging ❑ Is open-ended (i.e. typically will not have a single, final, and correct answer) ❑ Promotes further inquiry (i.e. raises additional questions) ❑ Encompasses both natural and social systems and topics ❑ Requires students to revisit the problem frequently as knowledge and understanding evolves ❑ Calls for higher-order thinking, including analysis, inference, prediction, and evaluation ❑ Includes concepts and practices from multiple disciplines *(Score 0 if you did not check any; Score 1 if one to three are checked; Score 3 if four to five are checked; Score 5 if six or more are circled.)*	0 1 3 5
Students engage in background research in order to understand the issue and develop supporting questions for further investigation. *(Score 0 if no background research is required; Score 1 if some background research is required; Score 2 if background research is required; Score 3 if background research is required and directed by students.)*	0 1 2 3
Students apply prior knowledge and reflect on personal and stakeholder values and perspectives related to the issue. *(Score 0 if this is not incorporated; Score 2 if this is incorporated.)*	0 2
Subtotal	____/15

CRITERIA

Less than or equal to 5: Your project needs to focus on a locally relevant environmental issue, problem, or phenomenon requiring background research, further inquiry and investigation to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure issue definition in your MWEE.

Between 6 and 9: There are elements of issue definition but the identified issue and/or questions could be more comprehensive and complex. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 10: Congratulations! There are always areas for improvement, but your project is focused on a locally relevant environmental issue, problem, or phenomenon requiring background research, further inquiry, and investigation.

AREAS FOR IMPROVEMENT

Outdoor Field Experiences	Score
Students participate in one or more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon. Investigations may involve making observations, collecting data, and/or conducting other activities required for answering their questions and informing student actions. To the extent possible, and within appropriate safety guidelines, students should be actively involved in planning the inquiry that occurs during the outdoor field experience(s). These experiences can take place off-site and on the school grounds.	
Students participate in one or more outdoor field experiences. *(Score 0 if students do not go outside; Score 3 if students study outdoors once during the course of their MWEE; Score 6 if students study outside more than once.)*	0 3 6
The outdoor field experiences are directly related to the issue and questions the students are studying. *(Score 0 if field experiences are not related to the issue; Score 3 if field experiences are indirectly related to the issue; Score 6 if some of the field experiences are directly related to the issue but some are not directly related; Score 9 if all field experiences are directly related to the issue.)*	0 3 6 9
Students are actively involved in planning the inquiry that occurs during the outdoor field experience(s). *(Score 0 if the students are not involved at all; Score 2 if students are involved but mostly planned by the teacher/external partners; Score 4 if students are actively involved in the planning with some help from the teacher/external partners.)*	0 2 4
Students are actively involved in exploring the driving question and supporting questions during the outdoor field experience(s). *(Score 0 if the questions are not related to the outdoor experience; Score 3 if the outdoor experience is related to the driving and supporting questions; Score 6 if the outdoor experience is designed to purposefully explore the driving and supporting questions.)*	0 3 6
Subtotal	____/25

CRITERIA

Less than or equal to 9: Your project needs to include one or more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure robust outdoor field experiences in your MWEE.

Between 10 and 16: Your outdoor field experiences could be more directly connected to investigating the issue and questions being studied and/or student involvement in planning the inquiry could be increased. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 17: Congratulations! There are always areas for improvement, but your project has one or more outdoor field experiences sufficient to investigate the issue, problem, or phenomenon.

AREAS FOR IMPROVEMENT

Action Projects	Score
Students identify, explore, and implement solutions for action. The solutions address conclusions and claims drawn through investigation. Students reflect on the action and determine the extent to which the action successfully addressed the issue, problem, or phenomenon reflected in the claim. Students may also share proposals for sustaining or extending the action.	
Students participate in an action project. *(Score 0 if no, Score 6 if yes.)*	0 6
The action project is directly related to the issue the students are studying. *(Score 0 if the action project is not related to the issue; Score 3 if the action project is indirectly related to the issue; Score 7 if the action project is directly related to the issue; Score 10 if the action project is directly related and a proposed solution to the issue investigated.)*	0 3 7 10
Students are actively involved in planning and implementing the action project. *(Score 0 if the students are not involved at all; Score 3 if students are involved in implementation, but not design or if they plan a project but don't implement it; Score 6 if students are involved in both, but the teacher chose the action project; Score 9 if students are involved in both and also chose the action project.)*	0 3 6 9
Subtotal	____/25

CRITERIA

Less than or equal to 9: Your project needs to include action projects that address conclusions and claims drawn through the investigation of your issue and questions to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure robust action projects in your MWEE.

Between 10 and 16: There are action projects but they could be more directly connected to investigating the issue and questions being studied and/or increased student involvement in planning and implementation. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 17: Congratulations! There are always areas for improvement, but your project has student-centered action projects that address conclusions and claims drawn through the investigation of your issue and questions.

AREAS FOR IMPROVEMENT

Synthesis and Conclusions	Score
Students identify, synthesize, and apply evidence from their investigations to draw conclusions and make claims about the issue, problem, or phenomenon. Students communicate these conclusions and claims to internal and external audiences in venues that may range from the school classroom to the larger public community.	
Students have dedicated class time to make conclusions based on their research, outdoor field experiences, and related data analysis. *(Score 0 if no time; Score 2 if students have one in-class opportunity to make conclusions; Score 4 if two opportunities; Score 6 if students regularly revisit their research to make conclusions.)*	0 2 4 6
Students communicate results and conclusions to an audience beyond their classroom. *(Score 0 if none; Score 2 if communicating results to audiences internally within the school [fellow students, other grades within the school, teachers, admin]; Score 4 if communicating results outside of the school [parents, community events, nonprofits, political representatives, conferences, summits]; Score 6 if communicating results to both school and community audiences.)*	0 2 4 6
Subtotal	____/12

CRITERIA

Less than or equal to 3: Your project needs to include synthesis, conclusions, and communication of the claims drawn through the investigation of your issue and questions to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure robust synthesis, conclusions, and communication occur in your MWEE.

Between 4 and 7: There is some synthesis, conclusions, and communication of your investigation but it can be more extensive. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 8: Congratulations! There are always areas for improvement, but your project has student-centered action projects that address conclusions and claims drawn through the investigation of your issue and questions.

AREAS FOR IMPROVEMENT

Active Teacher Support	Score
MWEEs depend on teacher facilitation and ongoing support of student learning. Teachers ensure that the essential elements of the MWEE come together to support academic goals for learning while creating opportunities for students to take active roles in their learning.	
Level of classroom teacher's role in determining the *issue definition*. *(Score 0 if the teacher is not involved at all; Score 1 if the teacher is involved but mostly facilitated by external partners; Score 2 if teacher facilitated.)*	0 1 2
Level of classroom teacher's role in the *outdoor field investigations*. *(Score 0 if the teacher is not involved at all; Score 1 if the teacher is involved but mostly facilitated by external partners; Score 2 if teacher facilitated.)*	0 1 2
Level of classroom teacher's role in the selection, design, and implementation of the *action projects*. *(Score 0 if the teacher is not involved at all; Score 1 if the teacher is involved but mostly facilitated by external partners; Score 2 if teacher facilitated.)*	0 1 2
Level of classroom teacher's role in the *synthesis and conclusions*. *(Score 0 if the teacher is not involved at all; Score 1 if the teacher is involved.)*	0 1
Subtotal	____/7

CRITERIA

Less than or equal to 2: Your project needs to include more teacher facilitation and ongoing support of student learning to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure active teacher support your MWEE.

Between 3 and 4: There is some teacher facilitation and ongoing support of student learning but it could be more extensive. Review the sections where you did not score highly and see what you might be able to do to earn more points. Check out *An Educator's Guide to the MWEE* for help.

Greater than or equal to 5: Congratulations! There are always areas for improvement, but your project has active teacher facilitation and ongoing support of student learning.

AREAS FOR IMPROVEMENT

Sustained Activity	Score
MWEEs represent sustained activity that engages students from beginning to end. Though a field experience may occur on one day, the total duration leading up to and following the experience involves a variety of rich learning opportunities spread over the course of a unit or multiple units. Experiences such as tours, gallery visits, simulations, demonstrations, and nature walks may be instructionally useful, but alone do not constitute a MWEE.	
The MWEE includes multiple opportunities for learning. Outdoor activities are fully supported through sustained classroom experiences both prior to and following the experience. *(Score 0 if the MWEE does not include multiple learning opportunities; Score 1 if the MWEE includes multiple learning opportunities, but there is no meaningful connection among these learning opportunities; Score 3 if the MWEE includes multiple, connected learning opportunities with limited classroom support before and/or after the outdoor experience(s); Score 5 if the MWEE includes multiple, connected learning opportunities with robust and intentional classroom support before and/or after the outdoor experiences.)*	0 1 3 5
Subtotal	____/5
CRITERIA **Less than or equal to 1:** Your project needs to be a sustained activity that engages students from beginning to end to be a MWEE. Don't be discouraged, there are resources and tools to help! We suggest starting with *An Educator's Guide to the MWEE* to ensure sustained activity in your MWEE. **Greater than or equal to 3:** Congratulations! There are always areas for improvement, but your project is a sustained activity that engages students from beginning to end.	
AREAS FOR IMPROVEMENT	
TOTAL	_____/100

For your project to be a MWEE it must incorporate all of the essential elements (issue definition, outdoor field experiences, action project, synthesis and conclusions) and supporting practices (classroom integration, local context, active teacher support, sustained activity) at some level. To determine if your project is a MWEE please follow the criteria below.

IF YOUR TOTAL SCORE IS:

Between 90 and 100—Grade A: Congratulations! There are always areas for improvement but overall you are running a strong MWEE.

Between 80 and 89—Grade B: Your project is meeting the full definition of a MWEE. However your MWEE could be stronger. Review the sections where you did not score highly and see what you might be able to do to earn points. Check *An Educator's Guide to the MWEE* for help in those sections.

Between 70 and 79—Grade C: Your project is most likely incorporating all of the components of a MWEE. However your MWEE could be much stronger. Review the sections where you did not score highly, especially if it is an essential element section, and see what you might be able to do to earn points. Check *An Educator's Guide to the MWEE* for help in those sections.

Between 60 and 69—Grade D: Your project does not contain enough components to be a MWEE. Don't be discouraged though, there are resources and tools to help! Review the sections where you did not score highly and see what you might be able to do to earn points. We suggest starting with *An Educator's Guide to the MWEE*.

Below 60: Your project is missing the essential elements necessary to meet the full definition of a MWEE. Review the sections where you did not score highly and see what you might be able to do to earn points. We suggest starting with *An Educator's Guide to the MWEE*.

Spotlighting your MWEE: Tips and Tools for Highlighting your MWEE to the Media

We want more people to know about your MWEE! Sharing information about your work with the media is a great way to amplify your work—and to build support for MWEEs in general. We know that you are educators, not "PR people," so we offer this information to get you started.

Getting Information to Reporters

- There are several ways to go about getting "the word" out to media—newspapers, TV/radio stations, bloggers, etc. You may wish to contact a certain reporter at one media outlet, or you may want to send out a more general press release to let several media outlets in your area know about your program. Either way has its benefits!
- Reporters often like to get "exclusives," where they are the only media outlet covering a story. This method—usually generated by contacting a specific reporter—will generally get you deeper coverage. These "exclusives" can often be generated by a simple phone call or email to a local reporter, introducing them to your MWEE and inviting them to join you and your students to learn more.
- Days in the field are very attractive to reporters!
- Sending out a press release may mean that your content is included in more media outlets—but coverage may not be very deep. In fact, many smaller media outlets—especially online versions of newspapers and blogs—are so strapped for resources and reporters, they often will run your press release verbatim, with no additional reporting involved.

Press Release Tips

- Keep it short and sweet—your goal is to entice readers to call you for more information. Many organizations strive to keep their press releases to one side of a piece of paper; this is a good rule of thumb but not a requirement.
- Many newspapers, especially in smaller markets, have shrinking resources and fewer reporters than in years past. They may just print your press release verbatim—be sure to include your most important "messages."
- Quotes are a great way to share information and convey buy-in from others. Because space is limited, be sure any quotes cover content you want to have in the press release.
- Be sure to include good contact information—phone and email is best, and make sure it's to someone who can give a reporter more meaty information about your MWEE (probably to you, rather than your school principal).
- Headlines are important! Use action words to highlight what you are trying to convey ("NOAA B-WET-funded Project Helps 500 Students Experience Watershed"). In addition to generating interest, this kind of headline tends to make what you want to share very clear.
- People are eager to learn more...especially if it's easy. Include links to websites/social media on your MWEE, if available.

DAVE HARP

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Chesapeake Bay Program

Science. Restoration. Partnership.

MWEE