



THE MEANINGFUL WATERSHED EDUCATIONAL EXPERIENCE

The well-being of the Chesapeake Bay watershed will one day rest in the hands of its youngest citizens: the more than three million students in kindergarten through twelfth grade. Partners in the Chesapeake Bay Program recognize that participation in strong, targeted environmental education programs, especially in the context of one's community and culture, provide a vital foundation for watershed stewardship. A student's years in school provide a unique opportunity to build the skills necessary to understand and utilize scientific evidence to make informed decisions regarding multifaceted and evolving environmental issues. Essential to this learning are outdoor field experiences driven by rigorous academic learning standards that engender discovery and wonder; they nurture a sense of community that connects students with their watershed and help reinforce an ethic of responsible citizenship.

In recognition of this, the Chesapeake Bay Watershed Agreement, signed on June 16, 2014, 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 rigorous student inquiry coupled with participation in teacher-supported meaningful watershed educational experiences (MWEE) in elementary, middle, and high school. The agreement also highlights the important role of the jurisdictions in promoting and assisting with the implementation of environmental education, and formally recognizes school divisions and schools as essential partners in the protection, restoration, and conservation of the Chesapeake Bay watershed.

The Chesapeake Bay Program Education Workgroup oversees the implementation of the MWEE outcome. Each jurisdiction will continue to craft and refine its own comprehensive and systemic approach to environmental literacy that builds on the MWEE, and is tailored to its own population, geography, and natural, fiscal, and human resources. While some of the Mid-Atlantic lies outside of the bay watershed, states are encouraged to provide MWEEs for all students in the region.

Defining the Meaningful Watershed Educational Experience

MWEEs are the cornerstones of student environmental education about and in the Chesapeake Bay watershed. MWEEs seek to seamlessly connect standards-based classroom learning with outdoor field investigations to create a deeper understanding of the natural environment. Specifically, MWEEs ask students to explore local environmental issues through sustained, teacher supported programming that includes, but is not limited to, issue definition, outdoor field experiences, action projects, and sharing student-developed synthesis and conclusions with the school and community.

Beginning with the primary grades, the jurisdictions' academic learning standards in the social and natural sciences call for inquiry, investigation, and active learning that increase in complexity and abstraction throughout the elementary, middle, and high school programs. Likewise, MWEEs should reflect this progression. The Chesapeake Bay Program uses the North American Association for Environmental Education (NAAEE) Excellence in Environmental Education: Guidelines for Learning (K-12) to define the level of skill or knowledge appropriate for different grade levels of students.

Based on environmental education research, there are several core components of MWEEs and a series of best practices for program development that should contribute to student stewardship. Providers of MWEEs should include these “essential” elements and practices in their programs regardless of the project theme, grade level, or geographic location.

Essential Elements of Student Meaningful Watershed Educational Experiences:

MWEEs should be learner centered and focused on questions, problems, and issues to be investigated through collecting, analyzing and sharing data; learning protocols; exploring models; and examining natural phenomena. Teachers play an important role in presenting unbiased information and assisting students in their research and exploration. MWEEs should encourage observation, foster critical thinking, develop problem-solving skills, and instill confidence in students. Where appropriate, technology (e.g. tablets, probeware, and GPS equipment) may be integrated throughout the instructional process. MWEEs are stronger when they are multi-disciplinary because environmental issues often involve an interaction between natural systems (e.g. wildlife, plants, and water cycle) and social systems (e.g. communities, transportation systems, and schools). MWEEs consist of multiple components as defined below and each component should include time for reflection, allowing students to refocus on the question, problem, or issue.

Student MWEEs should include:

- 1) **Issue Definition:** *Students focus on an environmental question, problem, or issue requiring background research and investigation. They learn more about the issue through classroom instruction, the collection of data, conducting experiments and by talking to experts and reviewing credible publications. They also reflect on their personal experiences and values related to the issue. This process should be age appropriate with practices growing in complexity and sophistication across the grades, starting with educator guided investigation and progressing to student-led inquiry. As students mature, the level and complexity of inquiry will likewise progress.*
- 2) **Outdoor field experiences:** *Students participate in one or more outdoor field experience sufficient to collect the data required for answering the research questions and informing student actions. The outdoor field experiences should be student-led to the extent possible with students actively involved in planning the investigation, taking measurements, or constructing the project within appropriate safety guidelines. These experiences can take place off-site and on the school grounds.*
- 3) **Action projects:** *Students participate in an age appropriate project during which they take action to address environmental issues at the personal or societal level. These projects provide students with a better understanding of the actions that they can take to protect and conserve natural resources, and allow them to have a sense of control over the outcome of environmental issues. To the extent possible, action projects should be student directed and can take the form of on-the-ground restoration projects on school grounds or in their community, or can be focused on increasing student civic engagement.*
- 4) **Synthesis and conclusions:** *Students analyze and evaluate the results of their investigation of the issue. Students make conclusions based on research, experiences, and data analysis and consider alternate hypotheses. Students should synthesize and communicate results and conclusions to an external audience such as other classrooms, schools, parents, or the community. This allows students to become agents behind their own actions and decisions.*

Essential Practices to Support Meaningful Watershed Educational Experiences

State departments of education and local education agencies play an important role in establishing expectations and guidelines for the development and implementation of MWEEs. At the state level, plans that include strategies for MWEE implementation coupled with outreach and training

opportunities for teachers and administrators have been effective in establishing and supporting a network for environmental literacy. At the local education agency level, the MWEE should be part of the local curriculum and fully aligned with the academic standards. The agreement calls for comprehensive MWEEs to occur at least once during each level of instruction (elementary, middle, and high school); however, as part of a comprehensive approach to environmental literacy the Chesapeake Bay Program Education Workgroup recommends that less intensive outdoor field investigations occur more frequently – each year when possible. To minimize cost, annual investigations can occur on school grounds or adjacent lands and waters. As stated above, the MWEE can be part of a larger strategy to address priorities such as service learning and STEM, as well as to meet multi-disciplinary standards.

Environmental education organizations, natural resource agencies, universities, businesses, and other organizations also have a wealth of applicable products and services as well as a cadre of scientific and professional experts that can complement the classroom teacher’s strengths and heighten the impact of environmental instruction both in the classroom and in the field. Environmental education professionals can assist schools and local education agencies with all aspects of MWEE implementation, including teacher professional development, student MWEEs, and environmental action projects. Additionally, environmental professionals can serve as important role models for career choices and stewardship actions.

With these guidelines and resources in mind, student MWEEs programs should be designed with:

- 1) **Active Teacher Support:** *MWEEs should be connected to what is occurring in the formal classroom; therefore, classroom teachers should lead or actively support all phases of the MWEE for their students, including topic definition, field experiences, action projects, and synthesizing the information. MWEEs can be enhanced and supported by partners, such as environmental educators and natural resource professionals, but teachers have the sustained contact with students throughout the school year that positions them to better support research, answer questions, and evaluate student learning. Teachers can also serve as environmental role models. In order to support MWEEs, teachers should have appropriate knowledge of environmental issues, skill in connecting these issues to their curriculum, and competency in environmental education pedagogy, including the ability and confidence to teach outdoor lessons and to lead students in critical thinking about environmental issues. In order to gain and maintain these competencies, teachers need access to sustained, high quality professional development in the field of environmental education that includes ongoing support and feedback.*
- 2) **Classroom Integration:** *MWEEs should be fully integrated into what is occurring concurrently in the classroom, and should occur where and when they fit into the instructional sequence. MWEEs can be rich, multi-disciplinary units that have a unique opportunity to make strong connections among subject areas and reflect an integrated approach to learning. They can provide authentic, engaging content to address academic standards as well as statewide initiatives in Science, Technology, Engineering and Math (STEM), and Service Learning. Specifically, elements of science and social studies standards related to questioning, analysis and interpretation, knowledge of environmental processes and systems, skill for understanding and addressing environmental issues, and personal and civic responsibility align well with the MWEE.*
- 3) **Local Context:** *The local community should be viewed as a primary resource for student MWEEs. Place-based education promotes learning that is rooted in the unique history, environment, culture, economy, literature, and art of a students’ schoolyard, neighborhood, town or community, and thus offering students and teachers the opportunity to explore how individual and collective decisions impact their immediate surroundings. There are a variety of places in a community that can provide an engaging setting for outdoor learning, including the Chesapeake Bay, a stream near a school, a school building and its grounds, local parks or undeveloped areas, and even developed areas such as parking lots, ball fields, and marinas. Once a firm connection to their local environment is made, students are better positioned to expand their thinking to*

recognize the far-reaching implications of individual and societal decisions to the larger national and global environment.

- 4) Sustained Activity:** *MWEEs should be a sustained activity that stimulates and motivates the student from beginning to end. Though a field experience itself may occur as a specific event occurring in one day, the total duration leading up to and following the experience should involve a significant investment of instructional time. Rich learning experiences, especially those involving monitoring, research, and action projects, may require time increments spread over weeks or even months. Experiences such as tours, gallery visits, simulations, demonstrations, or “nature walks” may be instructionally useful, but alone do not constitute a meaningful watershed educational experience.*

Conclusion

The preceding consensus criteria define a clear vision for bringing environmental literacy about the watershed into every classroom, and to every child in a meaningful way. It should be the goal of every educator, teacher, and administrator to move toward incorporating experiences that build academic success, reinforce responsible citizenship, and work toward the goals and outcomes of the Chesapeake Bay Watershed Agreement. With inspired leaders, committed parents, and supporting communities garnering the fiscal and human resources to help make this happen, young people will be significant contributors to healthy, bountiful, and enduring waterways.