Chesapeake Bay Program Education Workgroup

TEACHER-SUPPORTED MEANINGFUL WATERSHED EDUCATIONAL EXPERIENCES-DRAFT

The Chesapeake Bay Program recognizes that knowledge and commitment built from firsthand experience, especially in the context of one's community and culture, is essential for achieving environmental stewardship. A student's school years are a unique opportunity in which to deliver the set of skills necessary to think critically about multifaceted and evolving environmental challenges. Carefully selected experiences driven by rigorous academic learning standards, engendering discovery and wonder, and nurturing a sense of community connect students with their watershed, help reinforce an ethic of responsible citizenship, and promote academic achievement. Environmentally literate individuals can become effective future workers, problem solvers, and thoughtful community leaders and participants.

In recognition of this, since the Chesapeake 2000 Agreement was signed on June 28, 2000, the federal government along with the states of Maryland, Pennsylvania, and Virginia, and the District of Columbia have been committed to delivering meaningful watershed educational experiences (MWEEs) for each of the more than three million students in the watershed before graduation from high school. This Commitment not only defined the role of the jurisdictions in promoting and assisting the implementation of outdoor education, but formally engaged school divisions and schools as integral partners in the protection and restoration of the Chesapeake Bay watershed. In 2012, *The Mid Atlantic Elementary and Secondary Environmental Literacy Strategy* broadened this commitment by calling on federal, state, and nongovernmental partners to advance shared priorities for students, educators, and schools along with the systems that support them, including local education agencies. Together, these partners have the vision, expertise, and resources to create and support schools that foster citizen stewardship and graduate environmentally literate students.

The Chesapeake Bay Program Education Workgroup maintains a common set of criteria to help the Bay watershed jurisdictions meet the full intent of the MWEE commitment. From these criteria, it is expected that each jurisdiction will continue to craft and refine its own environmental literacy plan that builds on the MWEE and is tailored to its own population, geography, and natural, fiscal, and human resources. While much of the land area in the jurisdictions is outside of the Bay watershed, it is intended that all students living in the Mid Atlantic have similar opportunities within their own local setting.

What is a Meaningful Watershed Educational Experience?

The diverse Chesapeake Bay watershed and its urban, suburban, and rural communities provide excellent resources for environmental education. The Bay's tidal and non-tidal waters and the surrounding landscape provide hands-on, place-based laboratories where students can see, touch, and learn about the natural environment.

MWEEs are the cornerstones of student environmental education about and in the Chesapeake Bay watershed. MWEEs define how standards-based classroom learning can be seamlessly connected with outdoor field investigations and action projects to create a deeper understanding of the natural environment that cannot be achieved within the walls of a classroom. Specifically,

MWEEs ask students to explore local environmental issues through sustained programming that includes teacher supported classroom exploration, outdoor field investigations and action projects, and sharing of their knowledge with their schools and communities. The delivery of these programs also fosters partnerships among schools, local education agencies, natural resource agencies, universities, and nongovernmental organizations to provide a broader suite of opportunities for both students and teachers.

Beginning with the primary grades, the jurisdictions' academic learning standards in the social and natural sciences call for inquiry, investigation, and active learning. These skills, concepts, and processes increase in complexity and abstraction, building throughout the elementary, middle, and high school programs. Likewise, the experiences should reflect this progression. For a detailed description of the level of skill or knowledge appropriate for each of three grade levels—fourth, eighth, and twelfth, the Chesapeake Bay Program recognizes the NAAEE Excellence in Environmental Education: Guidelines for Learning (K-12) as a guiding document.

Local Education Agencies have an important role in establishing expectations and guidelines for the implementation of MWEEs. The Chesapeake Bay Program Education Workgroup recommends that MWEEs occur at a minimum once during each level of instruction (elementary, middle, and high school); however, it is recommended that outdoor field investigations occur each year whenever possible. To minimize cost, annual investigations can occur on school grounds or adjacent lands.

Research conducted on environmental education programs reveal that there are several core components of MWEEs that contribute to the student stewardship outcomes the MWEE is designed to deliver. It is these "essential elements" that providers of MWEEs should include in their programs regardless of the project theme, grade level, or geographic location.

Essential Elements of a Meaningful Watershed Educational Experience:

- **Teacher Supported:** Teachers are central to any MWEE and should be involved in all components of the experiences detailed below. MWEEs must be connected to what is occurring in the formal classroom, and teachers are in the best position to help students make connections and draw on past lessons. MWEEs can be enhanced and supported by individuals external to the school, such as environmental educators and natural resource professionals, but teachers have levels of accessibly and student contact that positions them to support research, answer questions, and evaluate student learning. While external partners are entirely appropriate to support MWEEs, teachers should support the experience in the classroom and in the field.

- **Investigative or project-oriented:** Experiences should be centered on questions, problems, and issues and be investigated through data, observation, and hands-on activities. Experiences should stimulate observation, motivate critical thinking, develop problem-solving skills, and instill confidence in students. Where appropriate, technology such as computers, probeware, and GPS equipment should be integrated throughout the instructional process. 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). Over time, student MWEEs can build off of one another. For example, a wetland installed by one group of students may be monitored for habitat usage by another group of students. Experiences such as tours, gallery visits, simulations, demonstrations, or nature walks may be instructionally useful, but alone do not constitute a meaningful experience.

- **Include an authentic, local context for the investigations:** Experiences are not limited to water- based activities directly on the Bay, tributaries, or other bodies of water. The local community should be viewed as a primary resource for student MWEEs. This sort of place-based education promotes learning that is rooted in what is local—the unique history, environment, culture, economy, literature, and art of a students' schoolyard, neighborhood, town or community – 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 or creek or 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 the decisions they make to the larger national and global environment.

- **Integral part of the instructional program:** Experiences should be fully integrated into what is occurring concurrently in the classroom, and should occur where and when they fit into the instructional sequence. 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 are essential for environmental education. The outdoor field experience should be part of the local education agency's curriculum and aligned with the academic standards. Experiences can be rich, multi-disciplinary units that have a unique opportunity to make strong connections between subject areas and reflect an integrated approach to learning

- **Part of a sustained activity:** Experiences are part of 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 and restoration activities, 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 experience as defined here. MWEEs consist of multiple components and each component should include time for reflection, allowing students to refocus on the question, problem, or issue. The components are:
    - ***Background research:*** *Students focus on a question, problem, or issue requiring background research and investigation. They learn about the issues from print, online, and human sources, and explore their interactions and values related to the environment. This can include data collection in the field, site visits, and/or classroom work. Teachers play an important role in presenting unbiased information and assisting students in their research.*
    - ***Field experiences*** *that include one or more outdoor field investigations sufficient to conduct the project, make the observations, or collect the data required. The field experience should be student-led to the extent possible with students actively involved in planning the investigation, taking measurements, or constructing the project as safety guidelines permit.*
    - ***Synthesis and conclusions:*** *Results of projects and investigations are analyzed and evaluated. Students make conclusions based on research, experiences, and data analysis and make recommendations for societal and personal actions to address environmental issues. 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

Recommended Elements of a Meaningful Watershed Experience:

- **Inclusion of environmental professionals and resources:** Natural resource agencies, universities, businesses, and other organizations have a wealth of applicable products and services as well as a cadre of scientific and professional experts that can heighten the impact of environmental instruction both in the classroom and in the field. These resources complement the classroom teacher's strengths and augment the educational resources. Additionally, environmental professionals can serve as important role models for career choices and stewardship.

- **Emphasis on learner-centered, collaborative instruction:** Empowerment of students in an important variable in environmental education. Students should understand they have control over environmental issues and be allowed to investigate topics that are of interest to them and actions available to address these issues.

What support do teachers need to guide student MWEEs?

Environmentally literate teachers are needed in order to produce environmentally literate students. These teachers can equip their students with an understanding of the essential principles of environmental literacy, the critical thinking skills needed to assess scientifically credible information related to the environment, the ability to communicate what they have learned in a meaningful way, and the ability to make informed and responsible decisions regarding the environment. Before teachers can effectively pass these critical skills along to their students, they must acquire them themselves. To effectively deliver high quality environmental education in support of MWEEs, teachers must possess a range of abilities, knowledge, and familiarity with specific pedagogy practices.

Teachers must have strong content knowledge appropriate to their grade level and discipline coupled with the ability to make environmental education relevant to specific learners at particular developmental levels. Incorporating differing perspectives and points of view is core to high quality environmental education. Teachers should be able to present sometimes contentious information fairly and accurately, representing both the facts and the unknowns for the environmental issue. They should also be fully capable of utilizing a wide array of environmental education pedagogical strategies, including the ability and confidence to teach outdoor lessons and to lead students in critical thinking about environmental issues.

The environment should be used as an integrating context for teaching many subject areas. Therefore, teachers should be skilled in using environmental education to address existing curriculum standards and state department of education initiatives such as Science Technology, Engineering and Math (STEM), Service Learning, and where appropriate, Common Core and Next Generation Science Standards.

In order to gain and maintain these competencies, teachers need access to sustained, high quality professional development in the field of environmental education. Many organizations throughout the region offer professional development, from natural resource agencies to non-profit organizations to Local Education Agencies. The structure and focus of this professional development can be very different from one program to another, but research indicates that all effective environmental education professional development share some essential elements.

Essential Elements of Teacher Training to support MWEEs:

- **Meets Jurisdictional Guidelines for Effective Teacher Professional Development:** Each jurisdiction has established guidance and recommendations germane to all forms of teacher professional development. Professional development opportunities in environmental education should therefore adhere to these general guidelines set forth by State Education Agencies.

- **Increases Knowledge and Awareness of Environmental Issues:** Teachers must have an adequate level of content knowledge for their MWEE topic area specific to their grade level and discipline. Teachers should also have the ability present information fairly and accurately. Recognizing that environmental issues often include different perspectives and opinions, teachers must have a deep understanding of the facts related to environmental issues along with an understanding of the various stakeholder values.

- **Includes Environmental Education Pedagogy**: Professional development should model environmental education pedagogy in its delivery as much as possible. Facilitators/trainers should utilize the same techniques and experiences in trainings that teachers are expected to use with their students, such as leading outdoor field experiences or environmental issue and action investigation. Trainings should include ample opportunity for teachers to reflect on their own teaching practices and planning for how to use knowledge and skills gained from professional development in the classroom

- **Includes Ongoing Teacher Support:** Teachers should receive sustained support for environmental education throughout the school year. Even in cases where teachers participate in robust multi-day trainings such as a summer or weekend courses, it is still essential that professional development providers have a structure in place for on-going teacher support and enrichment. This can take the form of follow up meetings or establishing web-based forums for communication and feedback. In addition, professional development itself can include mechanisms to facilitate this sustained support, such as establishing mentor teachers that can serve as points of contact, or including teams of teachers from one particular school. Continuing education credits and stipends should be used to encourage participation in on-going professional development opportunities. Outreach and training opportunities for school administrators should be utilized by provider to increase high level support for both environmental education and continuing teacher professional development for teacher.

Recommended Elements of Teacher Training to support MWEEs:

- **Includes Adequate Instructional Time:** Professional Development trainings should be of an extended duration, with a minimum of 30 hours of instructional time in environmental education. Trainings that are several hours in length can have a role in a prolonged training program, but as a stand-alone do not constitute high quality professional development. Multi-day trainings occurring consecutively or over the course of several months are needed to adequately convey knowledge and critical teaching skills for environmental education.

- **Increases Environmental Literacy of Teacher:** Teachers who demonstrate environmentally responsible attitudes and behaviors, and view themselves as role models for their students have the ability to strongly influence their students. Therefore, an explicit goal of professional development in environmental education should be to increase the

environmental literacy of the participating teachers. Professional development often focuses on increasing the environmental knowledge of teacher participants and methods to use with their students. While this is appropriate, training should be accompanied with an effort to address the disposition of teachers and increase their ability to take personal action to address complex environmental issues.

Conclusion

The preceding consensus criteria define a clear vision for bringing the environment into every classroom and every child out into the watershed in a meaningful way. It will be the goal of every educator, teacher and administrator, to move toward incorporating those experiences that build academic success, reinforce responsible citizenship, and work toward the goals of the Mid Atlantic Environmental Literacy Strategy. 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 watersheds.