

The NOAA Meaningful Watershed Educational Experience

The NOAA Bay Watershed Education and Training (B-WET) Program is an environmental education program that promotes locally relevant, authentic experiential learning focused on K–12 audiences. The primary delivery of B-WET is through competitive funding that promotes Meaningful Watershed Educational Experiences (MWEEs). MWEEs are multi-stage activities that include learning both outdoors and in the classroom, and aim to increase the environmental literacy of all participants. Teachers should support students to investigate topics both locally and globally that are of interest to them, learn they have control over the outcome of environmental issues, identify actions available to address these issues, and understand the value of those actions.

NOAA adopted this definition of the MWEE in order to assist grantees in developing effective projects founded in best practices determined through environmental education evaluation and research¹. This definition builds on the work of the Chesapeake Bay Program Education Workgroup and is further informed by over a decade of B-WET MWEE project implementation and evaluation work across the country. While these criteria represent some standard national guidelines, it is expected that each B-WET regional program will continue to craft and refine its own priorities that build on the MWEE and are tailored to the local population, geography, and natural, fiscal, and human resources.

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¹ STAC (Chesapeake Bay Program Scientific and Technical Committee). 2013. Research Based Best Practices in Environmental Education. STAC Publ. #13-002, Edgewater, MD. 31 pp.

1. Meaningful Watershed Educational Experiences (MWEEs) for Students

MWEEs for students 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. These activities, grounded in best practices and the context of the local community and culture, help increase student interest, motivation, and attitudes toward learning, and achieve environmental stewardship. As a result of the MWEE activities students should have an understanding of basic watershed concepts, as well as the interaction between natural systems (e.g. wildlife, plants, and water cycle) and social systems (e.g. communities, transportation systems, and schools), highlighting the connection between human activity and environmental conditions. MWEEs consist of multiple components as defined below.

1.1 Issue definition and background research

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, talking to experts and reviewing credible publications. 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.

1.2 Outdoor field activities

Students participate in multiple outdoor field activities sufficient to collect the data or make observations required for answering the research questions and informing student actions, or as part of the issue definition and background research. Students should be actively involved in planning the investigation, taking measurements, or constructing the project within appropriate safety guidelines, with teachers providing instruction on methods and procedures, data collection protocols, and proper use of equipment as needed. These activities can take place off-site and/or on the school grounds.

1.3 Stewardship action projects

Students participate in an age appropriate project during which they take action to address environmental issues at the personal or societal level. Participants in B-WET MWEE activities should understand they have control over the outcome of environmental issues, be encouraged to identify actions to address these issues and understand the value of those actions. Examples of stewardship activities include:

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

1.4 Synthesis and conclusions

Students analyze and evaluate the results of projects and investigations. Students synthesize and communicate results and conclusions to an external audience such as other classrooms, schools, parents, or the community.

2. Support for Meaningful Watershed Educational Experiences (MWEEs) with Students

In addition to the components identified above, NOAA recommends that the following elements are in place to fully support successful MWEE implementation with students.

2.1 Teacher participation for the duration of the MWEE

While external partners are entirely appropriate to support MWEEs, teachers should support the experience in the classroom and in the field. Teachers are in the best position to help students make connections and draw on past lessons, serve as environmental role models, and enhance students overall outdoor education experience and should be involved in all components of the experiences detailed above. To support them in this role, teachers should have appropriate knowledge of environmental issues and watershed concepts, 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.

2.2 Integration with classroom curriculum

Experiences should be integrated into what is occurring in the classroom, and can provide authentic, age appropriate, engaging multi-disciplinary content to address academic standards. Specifically, elements of science and social studies standards related to questioning and investigation, evidence-based analysis and interpretation, model and theory building, knowledge of environmental processes and systems, skill for understanding and addressing environmental issues, and personal and civic responsibility align well with MWEEs. Non-school activities may enrich traditional classroom curriculum when needed, though this need should be documented and supported by local education agencies.

2.3 Use of the local context for learning

The local community and environment 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. 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.

2.4 Experiences are a set of activities over time

The MWEE includes the full duration leading up to and following the outdoor field experiences. Each component should involve a significant investment of instructional time, incorporate time for reflection, and include all students. Experiences such as tours, simulations, demonstrations, or nature walks may be instructionally useful, but alone do not constitute an entire meaningful watershed educational experience as defined here.

2.5 Includes NOAA assets, including personnel and resources

NOAA has 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. Additionally, environmental professionals can serve as important role models for career choices and stewardship. For more on NOAA assets for education please see: <http://www.noaa.gov/education>

3. Teacher Professional Development for Meaningful Watershed Educational Experiences (MWEEs)

Teachers should be skilled in using environmental education and MWEEs to address multiple subjects' curriculum standards and local education agency initiatives. In order to gain and maintain environmental education competencies, teachers need access to sustained, high quality professional development that includes ongoing support and feedback. Teachers should gain confidence in the value of MWEEs and strategies for conducting them so that they will conduct MWEEs after the B-WET supported program has ended. Specifically, the following elements are recommended for professional development to support teachers implementing MWEEs:

3.1 Increases teachers' 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, including an understanding of basic watershed concepts and the human connection to the watershed. Recognizing that environmental issues often include different perspectives and opinions, teachers must also have a deep understanding of the facts related to environmental issues along with an understanding of the various stakeholder values. In addition, teachers who demonstrate environmentally responsible attitudes and behaviors may be role models for their students and increase their ability to guide students in actions to address complex environmental issues.

3.2 Models environmental education pedagogy

Facilitators/trainers should utilize the same techniques and experiences in trainings that teachers are expected to use with their students, such as hands-on, place-based, outdoor field experiences and environmental issue investigation and action.

3.3 Allows for adequate instructional time

Professional Development trainings should be multi-day, occurring consecutively or over the course of several months. 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.

3.4 Provides ongoing teacher support and appropriate incentives

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, creating web-based forums for communication and feedback, establishing mentor teachers who can serve as points of contact, or including teams of teachers from one particular school. Continuing education credits and stipends can be used to encourage participation in on-going professional development opportunities. Outreach and training opportunities for school administrators may help increase high level support for both environmental education and continuing teacher professional development for teachers.

3.5 Meets jurisdictional guidelines for effective teacher professional development

Each jurisdiction has established guidance and recommendations germane to all forms of teacher professional development. When possible, professional development opportunities in environmental education should adhere to these general guidelines set forth by local education agencies.