

NOAA Meaningful Watershed Educational Experience

The Meaningful Watershed Educational Experience (MWEE) is a learner-centered framework that focuses on investigations into local environmental issues and leads to informed action. MWEEs are made up of multiple components that include learning both outdoors and in the classroom and are designed to increase environmental literacy 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. MWEEs help connect students with their local environment and equip them to make decisions and take actions that contribute to stronger, sustainable, and equitable communities.

The MWEE consists of four essential elements and four supporting practices that build upon each other to create a comprehensive, student-centered learning experience. Throughout the MWEE, teachers provide structure, support, and encouragement as students use their curiosity and creativity to investigate and take action to address a local environmental issue. To support teacher implementation of MWEEs, B-WET has also included six characteristics that are recommended to be included in teacher professional development activities.

MWEEs are appropriate for all grade levels with content and practices growing in complexity and sophistication across the grades — starting with teacher-guided investigations and progressing to student-led inquiry. Using the MWEE framework helps educators create an engaging program to achieve their learning objectives (i.e., the knowledge, skills, and attitudes that students should be able to exhibit following instruction). Learning objectives should address academic standards, but might also include other objectives, such as teamwork, social-emotional learning, and civic responsibility.

MWEE ESSENTIAL ELEMENTS

The MWEE consists of four essential elements that describe “what students do:” ***Issue Definition***, ***Outdoor Field Experiences***, ***Synthesis and Conclusions***, and ***Environmental Action Projects***. These elements, together with the supporting practices, create a learner-centered framework that emphasizes the role of the student in actively constructing meaning from the learning experiences. The essential elements are not meant to be linear. In fact, some elements, such as ***Synthesis and Conclusions***, occur repeatedly throughout the MWEE.

Issue Definition

During ***Issue Definition***, students learn about an environmental issue by planning and conducting background research and investigations. An environmental issue is an environmental problem, often with observable phenomena, to which community members bring a variety of perspectives. To provide structure for their exploration of the issue, students focus on a driving question that is defined by the teacher. This question is the “big picture” question that sparks curiosity and organizes student inquiry and investigations, which ultimately informs environmental actions. It should be open-ended, relevant to students’ lived experiences, and meet learning objectives. To support youth voice and deepen the learning, students are actively involved in co-developing supporting questions with teachers to better understand the driving question and environmental issue.

To explore the driving and supporting questions, students gather information by making observations, finding and reading credible sources, talking to experts, and carrying out field investigations. Students also consider environmental policies and community practices and reflect on personal, stakeholder, and societal values and perspectives to develop a comprehensive picture of the root causes of the environmental issue.

Outdoor Field Experiences

Students participate in multiple **Outdoor Field Experiences** to explore the driving question and strengthen their connection to the natural world. Within appropriate safety guidelines, students are actively involved in planning and conducting the field investigations, including developing supporting questions to explore the driving question in the field. Field experiences allow students to interact with their local environment and contribute to learning in ways that traditional classroom or laboratory settings may not. During field experiences, students can use their senses, scientific equipment, and technology to make observations, collect data or measurements, and conduct experiments necessary to answer their supporting questions and inform environmental action. Students who have opportunities to learn in, thrive in, and appreciate the outdoors can become informed and engaged champions for our natural resources.

Outdoor Field Experiences can take place on school grounds or at locations close to schools, such as streams or local parks. They can also take place at off-site locations such as state or national parks, wildlife refuges, marine protected areas, or nature centers that are often staffed by experts and may provide access to field equipment and facilities. A range of partners, including environmental educators, natural resource professionals, or trained volunteers, can help facilitate field experiences; however, they should be co-developed and co-taught with teachers so that field experiences support learning objectives. Teachers and partners should ensure an accessible outdoor learning environment for all participants, including students with a range of physical, cognitive, emotional, and social abilities. They should also prepare students by providing information and discussing what students can expect to see, feel, or experience during their time outdoors to ensure students feel safe and comfortable during their field experiences.

Synthesis and Conclusions

During **Synthesis and Conclusions**, students reflect on each experience and investigation in relation to the issue, and share their claims and conclusions with each other. Teachers should plan for this to occur regularly throughout the MWEE. This learning and frequent reflection provide the foundation for the development of claims and environmental action that address the driving question and connect to the environmental issue. Throughout this process, students should demonstrate understanding of their investigations and conclusions with their peers or the school community. This could involve multiple disciplines and a variety of formats including discussion, journaling, presentations, graphing, performing skits or songs, or creating art.

Environmental Action Projects

As a result of their investigations, students identify solutions and develop **Environmental Action Projects** that directly address the issue within their school, neighborhood, or community. Students are actively

engaged in and, to the extent possible, drive the decision-making, planning, and implementation of the action project. Teachers facilitate this process by forming groups, moderating, and answering questions. Students reflect on the value of the action and determine the extent to which it successfully addressed the issue.

This essential element allows students to understand that they personally have the power to bring about change by taking action to address environmental issues at the personal, community, or societal level. Taking action instills confidence in students and can contribute to students becoming environmental stewards in their communities.

Environmental Action Projects can take many forms and may fall into the following types:

- **Restoration or Protection:** actions that assist in the recovery or preservation of a watershed or related ecosystem that has been degraded, damaged, or destroyed. Examples include: plant or restore protective vegetation/trees; restore a local habitat; remove invasive plants; clean up litter at local beaches, parks, or school grounds; develop a school garden, natural history area, community garden, or other sustainable green space; install rain gardens to help manage stormwater.
- **Everyday Choices:** actions that reduce human impacts on watersheds and related ecosystems and offer ways to live more sustainably. Examples include: refuse/reduce/reuse/recycle; monitor and save water in the face of potential drought or reduction in water availability; compost food or yard waste; research and implement energy efficient strategies or energy alternatives at school and/or at home.
- **Community Engagement:** actions that inform others about how to address community-level environmental issues. Examples include: give presentations to local organizations; organize community events; record or broadcast public service announcements; share information on social media; post flyers in community; share posters at community events/fairs/festivals; mentoring.
- **Civic Engagement:** actions that identify and address issues of public concern. Students acting alone or together to protect societal values or make a change or difference in a student's school, neighborhood, or community. Examples include: present to school principal or school board; attend, speak, or present at town meetings; write to local or state decision makers or elected officials.

MWEE SUPPORTING PRACTICES

The MWEE also includes four supporting practices that describe “what teachers do,” along with their partners, to ensure successful implementation with students. The supporting practices are **Teacher Facilitation**, **Learning Integration**, **Sustained Experiences**, and **Local Context**.

Teacher Facilitation

MWEEs require that teachers support student learning for the duration of the MWEE, both inside and outside the classroom. Teachers balance roles of facilitation, direct instruction, and coaching to create a student-centered learning experience where the essential elements of the MWEE come together to support goals for learning and create opportunities for students to take active roles in the learning

process. Teachers provide space for student choice and voice by creating learning experiences that center on what students value. Even when activities or lessons occur at partner sites or are primarily led by partners at the school, teachers should be actively engaged. Teachers should connect these experiences to prior learning, foster critical thinking, and lead reflection after the experience so, regardless of the facilitator, the entire MWEE experience feels cohesive to the students.

To support this level of engagement, teachers should have access to professional development opportunities that support their content knowledge, understanding of the MWEE framework, and confidence and intention to implement MWEEs independently (see Teacher MWEE Professional Development Characteristics for specifics).

Learning Integration

The MWEE is an educational framework that helps teachers meet their learning objectives in an engaging way. MWEEs are not meant to be something “extra”, but rather a means of enriching lessons for deeper student learning while meeting academic standards. To achieve this vision, MWEEs should be embedded into the school curriculum to support goals for learning and student achievement. They can also provide authentic, engaging interdisciplinary learning that crosses traditional boundaries between disciplines. Finally, the MWEE essential elements can also be used by educators in out-of-school settings (for example, after school programs, clubs, or summer camps) to enrich activities and complement school-based programming.

Sustained Experience

MWEEs rely on teachers to plan and implement a series of rich and connected learning opportunities where each essential element — from asking questions during *Issue Definition* through implementing *Environmental Action Projects* — builds upon and reinforces the others. To accomplish this, MWEEs are incorporated into a unit or multiple units, where learning happens both in and out of the classroom. This provides adequate time for students to not only reflect on the individual lessons and experiences, but also on how all of the elements cohesively come together. While an individual lesson may occur in one class period or field experience, that lesson or experience should be explicitly connected to the larger learning sequence of the MWEE.

Local Context

MWEEs have teachers use the local environment and community as a context for learning that is relevant to students’ lives. Situating the MWEE within local contexts promotes learning that is rooted in the unique culture, history, environment, economy, literature, and art of a students’ school, neighborhood, or community. To enrich MWEEs, local resources (e.g. partners, expertise, field sites) should be incorporated. Partnerships, such as those with local community-based organizations, create opportunities for students to engage with members of their community of diverse cultures, values, and expertise that can create a more equitable and inclusive experience.

Emphasizing the local context enables students and teachers to develop stronger connections to, and appreciation for, their local environments and communities. This also enables students and teachers to

explore how their individual and collective decisions affect their immediate surroundings and in turn affect larger ecosystems and watersheds.

TEACHER MWEE PROFESSIONAL DEVELOPMENT CHARACTERISTICS

Professional development providers play a crucial role in preparing teachers to implement successful MWEEs with their students. Professional development that includes characteristics such as: relevant content; explicit modeling of educational frameworks; collaboration, feedback and modeling instruction such as student-centered teaching; adequate time for professional development including time for ongoing support; and offering participation incentives that teachers value leads to a variety of positive outcomes. Professional development should empower teachers to confidently and competently use the MWEE framework to support standards-based learning that aligns with local education agency initiatives. Teachers should gain confidence in the value of MWEEs and strategies for conducting them so that they will be able to implement MWEEs after the professional development has ended. To set teachers up for success, the following six overarching characteristics, informed by education research and evaluation results, are recommended for inclusion in professional development to support teachers implementing MWEEs.

Increases teachers' knowledge and awareness of environmental issues

Professional development facilitators should ensure that teachers have an adequate level of content knowledge in science and specific to their grade level and discipline to support their MWEE. The content knowledge should also be connected to the interactions between natural systems and social systems, including human impacts on local watersheds and larger Earth systems. Recognizing that environmental issues often include different perspectives and opinions about the environment, teachers must also experience and build skills that enable them to address these traditionally non-academic factors in their classrooms. When combined, this knowledge and these experiences often result in teachers who are more aware of, and more prepared for, the complexity of implementing MWEEs.

Models MWEE framework

Professional development should also provide opportunities for teachers to understand the goals and rationale behind the MWEE as a framework for fostering learning and environmental stewardship. Facilitators of teacher professional development should utilize the same techniques and experiences that teachers are expected to use with their students, such as hands-on **Outdoor Field Experiences**, critical thinking about environmental issues, and **Environmental Action Projects**.

Includes collaboration, feedback, and models high-quality instruction

Effective professional development includes peer collaboration, time for teachers to experience, plan for, and practice model activities and lesson plans, and opportunities for reflection and feedback. Collaborative opportunities that include observing effective teaching practices and replicating these practices with expert instruction and feedback, can result in higher likelihood that teachers will apply these practices when implementing MWEEs. Such opportunities also foster exchanging ideas and create a collaborative atmosphere for changing the culture around adopting new teaching practices at multiple levels within a school system. In addition, when teachers experience high-quality instruction, such as

active learning and student-centered inquiry, they are more likely to use high-quality instruction when implementing MWEEs with their own students.

Allows for adequate instructional time and ongoing support

Professional development should be multi-day, occurring consecutively or over the course of several weeks or months and include time for ongoing support for teachers. Professional development facilitators should build in adequate time for the types of experience described above, including time to learn, practice, reflect upon, and design practices they learn during the professional development. Even in cases where teachers participate in robust multi-day workshops, such as summer or weekend courses, it is still essential that professional development providers have structures and opportunities in place for ongoing teaching support and enrichment. This can take the form of follow up meetings, web-based forums for communication and feedback, mentor teachers who can serve as points of contact, or teams of teachers from one particular school.

Offers appropriate incentives

Having appropriate incentives can increase participation in professional development programs. For example, teachers who participated in B-WET-funded professional development programs in the past reported that receiving a stipend or continuing education credits were the “most valuable” incentives enabling them to participate in those programs. While a variety of incentives can be offered to professional development program participants, it is clear that continuing education credits and stipends can enable participation in ways that other incentives might not.

Meets jurisdictional guidelines and engages leadership

Each jurisdiction has established guidance and recommendations relevant to all forms of teacher professional development. When possible, professional development opportunities for MWEEs should adhere to guidelines set forth by state and/or local education agencies. Outreach and training opportunities for school administrators will also help ensure jurisdictional alignment and increase high level support for both environmental education and continuing teacher professional development for teachers.