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 composed of multiple components that include learning both outdoors and in the classroom, and are designed to increase the environmental literacy of all participants 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 learning experience for students. This process should be tailored to each audience and be age appropriate, with practices growing in complexity and sophistication across the grades, starting with teacher-guided investigations and progressing to student-led inquiry. Teachers should support and assist students in their inquiry and investigations of local environmental issues that are of interest to them and that connect to curriculum throughout the MWEE. To support teacher implementation of MWEEs, B-WET has also included five practices that are recommended to be in place for teacher professional development activities.

**MWEE ESSENTIAL ELEMENTS**

The MWEE consists of four essential elements that describe “what students do.” These elements promote 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**

Throughout the MWEE, students focus on a driving question that guides their inquiry, investigations, and ultimately results in environmental actions. To support this, teachers define a locally relevant environmental issue, problem, or phenomenon and a driving question—often referred to as an essential question, organizing question, or overarching question. This is the “big picture” question that is important for sparking curiosity and organizing student inquiry. The driving question should be open-ended, relevant to the students’ lives, maintain continuity of activities, and meet learning objectives.

During *Issue Definition*, students are actively involved in co-developing supporting questions with teachers. They also plan and conduct background research and investigations to better understand the driving and supporting questions (e.g. making observations and/or measurements; carrying out field investigations; talking to experts or relevant stakeholders; reviewing credible resources; reviewing current environmental policies or community practices; exploring models). As a part of this process, students also reflect on personal and public values and perspectives, and root causes, related to the driving question.
Outdoor Field Experiences

Students participate in multiple **Outdoor Field Experiences** sufficient to explore the driving question. 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 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 Projects**. 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 in close proximity 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 discussing and providing information about what students can expect to see, feel, and experience during their time outdoors in order to ensure students feel safe and comfortable during their field experiences.

**Synthesis and Conclusions**

Students identify, synthesize, and apply evidence from their investigations to make claims and draw conclusions about the issue. These claims are used by students to create a plan for environmental action. **Synthesis and Conclusions** should happen regularly throughout the MWEE. Teachers dedicate time for students to reflect on each experience and investigation in relation to the issue and facilitate students sharing their claims and conclusions with each other. Students may demonstrate understanding of their investigations and conclusions through communication to a variety of audiences such as their peers, other classrooms, school leaders, parents, or the community.

**Environmental Action Projects**

Students identify and implement an environmental action project as a solution that directly addresses the defined issue within their school, neighborhood, town, or community. Students are actively engaged in and, to the extent possible, drive the decision-making, planning, and implementation of the action project, while teachers play a facilitation role 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 (e.g., 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 (e.g., 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 (e.g., 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 public values or make a change or difference in a student’s school, town, neighborhood, or community (e.g., present to school board or school principal; attend, speak, or present at town meetings; write or meet with decision makers/elected officials of a students’ school, town, neighborhood, or community).

**MWEE SUPPORTING PRACTICES**

The MWEE also includes four supporting practices that describe “what teachers do” to ensure successful implementation with students.

**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.

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 Practices 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 (e.g. after-school programs; clubs; summer camps) to enrich activities and complement school-based programming.

Sustained Experience

MWEEs rely on teachers to plan and implement a multi-faceted unit of inquiry where each essential element—from asking questions through implementing action—builds upon and reinforces the others to provide rich learning opportunities. MWEEs are spread over the course of a unit or multiple units, where learning happens both in and out of the classroom. A Sustained Experience 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, town, 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, allow students to engage with members of their community of diverse cultures, values, and expertise for 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 PRACTICES

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. In order to gain and maintain environmental education competencies, teachers benefit from 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 be able to implement MWEEs after the professional development has ended. Specifically, the following practices are recommended for professional development to support teachers implementing MWEEs.
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 the interactions between natural systems and social systems and human impacts on local watersheds and larger Earth systems. 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 environmental actions to address complex environmental issues.

Models MWEE framework

Facilitators should utilize the same techniques and experiences in professional development 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. Professional development should also provide opportunities for teachers to understand the goals and rationale behind the MWEE as a framework to learning and environmental stewardship. Professional development should include ongoing support for teachers, and include time for teachers to reflect on modeled activities, and plan for how the student MWEEs will be implemented in their own classrooms.

Allows for adequate instructional time

Professional development should be multi-day, occurring consecutively or over the course of several weeks or months. Professional development should include ample opportunity for teachers to reflect on their own teaching practices and plan for how to use knowledge and skills gained from professional development in the classroom. Opportunities to share ideas and challenges with colleagues in a cohort creates space for dialogue that can provide teachers with additional support and inspiration.

Provides ongoing teacher support and appropriate incentives

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 a structure in place for ongoing 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 help increase high level support for both environmental education and continuing teacher professional development for teachers.

Meets jurisdictional guidelines for effective teacher professional development

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 these general guidelines set forth by local education agencies.