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# Implementing Watershed Education into General Education Elementary Classrooms

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**Abstract**

*The purpose of this project was to determine the importance of preserving watersheds and investigate how to further educate elementary students in general education classrooms concerning watersheds. Throughout the Fall 2022 and Spring 2023 semesters, the author engaged in research and classroom experience to determine the definition, benefits, and mistreatments of watersheds, how watershed education is prioritized in Pennsylvania for elementary-aged students with a specific focus on Meaningful Watershed Educational Experiences (MWEEs), and how general education teachers are prepared and supported to teach these topics. Also included is a set of lesson plans from Pre-k to 4th grade that focuses on meaningful watershed education for each knowledge level. This article will focus on larger portions of the project, including an introduction and background on findings concerning the definition, benefits, and mistreatments of watersheds, an overview of the integration of watershed education presently in Pennsylvania, and a brief definition of MWEEs.*

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Look around. What can be seen? Perhaps you can see trees, a water body, animals, or plants. Every part of one's surroundings is part of a watershed. ACI Corporation English, a civil engineering firm in Florida, provided a definition of watersheds: areas of land that channel precipitation into water body systems, such as streams and rivers, that drain into one another (ACI Corporation English, n.d.). What people do, or in some cases, what they choose not to do, heavily impacts the health of local watersheds. Trash thrown from a car can travel quickly with rainfall into a stream. Ignoring the lack of trees surrounding a water body can invite more pollution in. This project begins by acknowledging how humans damage their local, beneficial watersheds, and how educating the next generation of Pennsylvanians will aid in reversing this destruction.

To aid in educating young students about the health of their local watersheds and how to take action, it is important to determine what Pennsylvania schools are already doing to educate students and how well teachers are prepared to lead students. Pennsylvania schools are currently using Meaningful

Watershed Educational Experiences (MWEEs) to not only educate students on their local watersheds but take them outdoors to see the damage for themselves. Students are inspired to take action, and their local watersheds reap the benefit of the young students' education. After examining the procedures currently in use, suggestions in the form of lesson plans are provided for grades Pre-K through fourth for teachers to immediately begin shaping environmental literacy in their students.

**Background**

Watersheds are expansive in size and effect. The furthest spanning watershed in the United States, the Mississippi River watershed, flows into the Chesapeake Bay Watershed, of which Lancaster, PA (a specific area of study) is included. Within these watersheds are smaller ones where water passes through (Chesapeake Bay Program, n.d.). With the Chesapeake Bay Watershed spanning more than 64,000 miles (Chesapeake Bay Program, n.d.), there is great human impact to be made, and great benefits that the watershed provides. This watershed, like any, has environmental, health, economic, and outdoor recreational benefits for humans. For example, watersheds can prevent pollutants from entering the stream through runoff, which is water from precipitation not soaked into the ground. Health benefits span far for animals and plants, including the preservation of clean drinking water and shelter for animals. Property values may also increase if they are situated in healthy and flourishing watersheds. Many of these benefits, though crucial to ensuring the health of all living in watersheds, are limited due to the human impact and destruction of watersheds.

Amongst these human impacts is pollution, of which tens of thousands of rivers, streams, and lakes are reported as impaired due to this. Climate change, as considered "climate chaos" (Systematic Alternatives, n.d.), impacts watershed health through greenhouse gas emissions. Increased runoff also negatively impacts watershed health as it carries pollutants downstream into larger bodies, leading eventually to lakes and oceans. Though it can be daunting to think of what is left to reverse, humans have the power to restore watersheds. It first takes the education of the next generation to empower populations to take action and make positive changes.

**Integration of Watershed Education in Pennsylvania**

Pennsylvania has taken the lead in propelling watershed education into all grades, relying much on the work of the Pennsylvania Department of Conservation and Natural Resources (DCNR) and MWEEs. The DCNR takes pride in its projects, the Watershed Education Program, Project WET, and WETconnect, which engage in goals to further education and preservation of local Pennsylvania watersheds. Specifically, investigation and the growth of decision-making skills are prioritized within the Watershed Education Program for students in sixth to 12th grade, in conjunction with hands-on experiments in local watersheds (DCNR, n.d.). Project WET meets similar goals of empowering and educating K-12 students to take responsibility for protecting their watersheds and values hands-on activities to achieve their program expectations (Project WET, n.d.).

**Meaningful Watershed Education Experiences (MWEEs)**

MWEEs have been used numerously and abundantly in Pennsylvania schools so far to promote watershed education. These experiences, containing four components, aim to enact change through education about local watershed health with a priority on

student engagement outdoors with their local watershed (NOAA, n.d.).

The four components of MWEEs are issue definition, outdoor field experiences, synthesis and conclusions, and action projects (Chesapeake Bay Foundation, n.d.). Students start with the issue definition phase, where they define a major problem within their local watershed. This may concern pollution by a certain chemical or trash buildup within the watershed, for example. Students will then engage in an outdoor field experience to test and determine how big of a problem is at hand, that is how much of a chemical is present in a stream, how many pieces of trash are found in a ¼ radius, etc. Students will then return to the classroom to analyze their data and conclude the severity of the problem, and then will create an action project that describes the solution that students will enact to better their watershed's health (Bay Backpack, n.d.).

## Conclusion

It is imperative that the next generation take the lead in protecting local watersheds, but this will only occur if young scholars are educated about issues impacting their local watersheds. Watersheds hold an abundance of benefits and can easily be mistreated, but students will only know of these benefits and detrimental actions if educators are prepared to teach effectively about these issues. Pennsylvania has addressed this lack of education through varying programs and MWEEs, leading as an example for other states on how to meet these goals of watershed education for students. With powerful initiatives in place and support and guidance for elementary educators, students will take action towards protecting their local watersheds and providing the seemingly infinite benefits of health watersheds to their community.

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