NEWWA
New England
Water Works
ASSOCIATION

New England Water Works Association
Youth Education Committee
Classroom Module

Interactive Watershed Overview

Summary and Objective
This module is a hands-on, interactive session which will review the following topics:

- What is a watershed?
- Where can I find a watershed?
- What lives in and around a watershed?
- How does a watershed impact the way we live?

Applicable Curriculum Standards

NGSS

MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

CCSS-M

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

Recommended Grade Level(s)
4-8

Time Required
1 class session

Materials and Facilities Required

This is a turn-key option developed and provided by Xplorations, ALC in Nashua, NH. The cost to the schools or after school programs is $150 for an initial session and $75 for additional sessions.

Acknowledgements
This module was prepared by Jeremy Griffus, Xplorations Coordinator, ALC, Nashua, NH in partnership with Pennichuck Water Works, Inc. and is offered as part of the NEWWA Youth Education Council's classroom module series.

Watershed Workshop

Appropriate Grade Levels: 3 – 6

Introduction / Discussion with instructor: Guiding questions:

- What is a watershed?
- Where can I find a watershed?
- What lives in and around a watershed?
- How does a watershed impact the way we live?

Bridge key concepts relevant to population: Key Points:

- We have the same amount of water on earth that we did when the dinosaurs roamed the earth.
- We have an increasing population but still not more water. Why is it so important to take care of our watersheds?
- https://www.populationeducation.org/content/world-population-video The segment of this video through Population Education will be shown to students to quickly show the population growth through time.

Hands on activities for students: Regular classroom size 25 – 30 students will be divided into 3 groups. Students will rotate to 3 different stations.

Model A

(representing common public pollution)

Custom built model (Areas in and around Nashua students will recognize)

Some examples to be included: baseball field, golf course, shopping mall, farm, gas stations, roads, ect.

Directive:

At this station students will take turns adding dye and other physical agents to represent relative forms of pollution. An example; brown will represent oil at the gas station or on the road, green will represent fertilizer that's put on the golf course or farm land, purple will represent salt on the roads during winter, ect. Students will simulate a rainfall using spray bottles. They will observe the water runoff as it collects in streams, rivers, ponds, etc. For the purpose of this activity, the runoff water will collect in a clear test tube so students can see the effects of pollution on our watershed. The water collected is dark and dirty looking.

Model B

(Representing solutions to public pollution)

Identical to Model A

Directive:

At this station students will take turns adding different dyes to represent alternatives to the pollutants or methods used in Model A. This is to simulate better practices, proper disposal and alternatives for fertilizers. Students soon realize that even after a heavy rain like that at Model A, the watershed isn't effected as much and in turn is much better for the environment. They will observe the water runoff as it collects in streams, rivers, ponds, etc. For the purpose of this activity, the runoff water will collect in a clear test tube so students can see the effects of pollution on our watershed. The water collected is mostly clear.

Model C

Shaping Watersheds (Augmented Reality Sandbox)

What is it?

"Shaping Watersheds" is an interactive augmented reality 3D exhibit. This exhibit was created by a team of scientists, computer scientists, science educators, exhibit designers, and evaluation professionals as part of a grant funded by the National Science Foundation. The exhibit was developed as one part of a set of materials, activities and media designed to improve public understanding and stewardship of freshwater lake ecosystems using 3D visualizations. As such, the exhibit was called "Shaping Watersheds" and more generally the "AR Sandbox" by the museum community because it uses augmented reality a computer - generated sensory input projected onto a real-world environment.

Major concept?

Water is a critical resource for all life on earth. The landforms found on the earth's surface were created by a variety of processes such as erosion, tectonics, and glaciation. When water flows on the earth's surface, it travels, converges and diverges based on the shape of landforms. This distribution of water which leads to regions called watersheds plays a key role in the type and distribution of ecosystems around the world.

Directive:

At this station students will take turns shaping the "earth". They will be creating mountains, hills and valleys. The students will cue a rainfall and observe how the simulated water will run off hills and run down valleys creating rivers, streams, lakes and ponds. Next, students will be asked to look at a topographical map from the area in which they live and try to mimic some of the land features. This will help visualize how water travels in their home town.

Review

All the students will visit all three stations (Model A, B & C). A discussion will take place at the end of this workshop as students will contribute and share their observations. At the end of this workshop, students will have a strong understanding of what a watershed is and the best practices on how to preserve and take care of it. Some additional topics that will be touched on will be; water cycle, elevation, erosion, geographic and hydrologic concepts. This workshop will meet several educational standards that the classroom teachers are required to target. It should be considered an introduction or an add-on to the watershed curriculum teachers are currently using.

Relevant educational standards:

NGSS

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