

Watershed Experience Lesson 1:

Welcome to Your Watershed

ACTIVITY TYPE: *Kickoff of a Nine Lesson Series on your watershed*

AUDIENCE: *High School*

TIME FRAME: *1 hour 15 minutes*

SUMMARY: *In this unit, students will look at this driving question: **How does human activity affect the quality of water in our watershed?** To answer this, they will need background information about water and watersheds. Then they will take part in an outdoor field experience to collect data. They will synthesize and draw conclusions along the way; this will lead up to an environmental action project.*

The first day starts with understanding what a watershed is, an introduction to their watershed, and a game that deepens their conception of the water cycle.

MATERIALS:

- Intro PowerPoint *You will need to change some of the slides to reflect your watershed. Slides 7, 10, 17, 18 and 19 are currently focused on Trenton, NJ.
- Paper
- Spray bottle & cloth
- Washable Markers
- Printed paper maps of the watershed
- Incredible Journey dice and worksheets

ENGAGE:

If The Watershed Institute is delivering this lesson series, we will kick off with introducing ourselves and the mission of the organization.

PROCEDURE:

Use the PowerPoint “Intro to the Big Why” to show the visuals for the lesson.

Pre Assessment

Give the students the assessment questions before beginning. Explain that it is not a test; but we just want to know how much you know about these issues and what your interest is in STEM.

This can be sent ahead of time as a form or can be on paper in the classroom.

STEM means Science, Technology, Engineering and Math. Please answer some questions about STEM:

1. I am aware of STEM careers (Yes/No/Somewhat)
2. I am interested in STEM careers (Y/N/S)
3. I am interested in studying STEM subjects (Y/N/S)
4. I have knowledge of STEM subjects (Y/N/S)
5. Do you live in a watershed? (Y/N)
6. What waterway(s) runs through our city? (short answer)
7. I can make a positive impact on my local environment. (1-5 scale)

Watershed Demo

The first question is, “What is a Watershed?” Field answers and allow the students to ask questions, then show the visual on the PowerPoint. Discuss what this might mean, and why these boundaries are outlined. Then, hand out printer paper and markers to every student. Have them crumple their paper. Then, open it back up and lay it (don’t smooth it out!) on their desks. Have students use markers to color the high ridges of their paper; point out that high points represent landforms like hills and mountains and low points are valleys, plains, etc. Allow them to spray their papers and ask them to watch where the rain goes. Notice how it pools or runs, representing lakes, streams, rivers, etc. Discuss that a watershed works the same way, that surface water travels along the terrain, until it reaches a body of water.

Watershed Introduction

Show the map slides of your watershed. You can discuss how all land is a part of a watershed, like how all states are a part of a country, but are separated and named based on the body of water that rainwater flows into. Give them paper maps to look at in small groups. Ask them to find familiar landmarks. Start with their school, then ask them to look for their homes or places they visit. Many students might not be familiar with looking at paper maps, so help them orient the maps and show them how to find things. What do they think land use has to do with the quality of the water in the rivers?

Water Cycle Game: Incredible Journey

Review the water cycle and describe stormwater runoff. Play the Incredible Journey water cycle game from Project WET (separate attachment).

Your Watershed Introduction

Show your Watershed on an overview slide. You can discuss how all land is a part of a watershed, like how all states are a part of a country, but are separated and named based on the body of water that rainwater flows into. Point out that watersheds are nested within one another. Indicate which direction the water flows.

Discuss the water issues currently impacting our watersheds locally and globally, such as flooding and pollution. Mention climate change and its negative impacts on our environment, quality of life, infrastructure, etc. Highlight that stormwater runoff, flooding, and pollution all affect our drinking water—again emphasizing that water is constantly being recycled.

Emphasize that there are ways to mitigate and track these impacts, and you will become student scientists collecting water quality data, simulating the work of chemists and biologists in their professional fields. Data can tell us a story when collected and analyzed, one example being maps. Point out how we can make sense of maps, using legends, looking at trends, etc.

Give them paper maps of the upper, middle, and lower parts of your watershed to look at in small groups. Ask them to find familiar landmarks: school, homes, or places they visit. Many students might not be familiar with looking at paper maps, so help them orient the maps and show them how to find things. Make sure they understand the map's purpose and look at land use in each region. Ask for predictions: do you think land use will affect the quality of water in these regions differently? How, and why?

WRAP-UP:

Point out that they are learning to acquire, analyze, and share data, which can prepare them to teach other students, their families, or their communities—and advocate to their local government.

Finish with a return to our driving question: **how does human activity affect the quality of water in our watershed?** Today, you learned to understand the water cycle and looked at how streams and watersheds work. Show the overview of the semester; these lessons will build into collecting data in the field, analyzing the data, and drawing conclusions. Finally, you will need to take action, problem-solving for current issues in your community.

CAREER CONNECTIONS:

Ask the students what kinds of careers might be involved in the work they completed that day. Start a running list and add to it each week.

BACKGROUND:

This lesson series is intended to engage students using place-based and project-based learning frameworks. Familiarizing yourself with some of the tenants of these ideas, if you haven't worked with them before, will help you guide conversations and allow students to take the lead. There are many great reads, both books and online engagement on both project and place-based learning. NOAA has a guide to Meaningful Watershed Educational Experiences (MWEEs) with some very useful tools and worksheets. You can find links to these in the resource section below.

Watersheds are a great topic for high school students, as the subject connects to many of the science standards, the activities are hands-on, and the issues are ever-present in our communities. In urban areas like Trenton, students might have already encountered flooding, pollution, and erosion.

RESOURCES:


Incredible Journey lesson from Project WET

https://files.dnr.state.mn.us/education_safety/education/project_wet/sample_activity.pdf

An Educator's Guide to the Meaningful Watershed Educational Experience (MWEE)

<https://www.noaa.gov/office-education/bwet/resources/mwee-guide>

MWEE Resource Webpage

A decorative blue wavy graphic at the bottom of the page, consisting of a dark blue base with a lighter blue wave-like shape on top.

<https://www.noaa.gov/office-education/bwet/resources/mwee-resources>

