

Watershed Demonstration Activity

Adapted from: An original Creek Connections Activity, 2003. Creek Connections, Box 10, Allegheny College, Meadville, PA 16335. <http://creekconnections.allegheny.edu>

Grade Level: Basic

Duration: Minimally 20 minutes

Setting: Classroom

Summary: Students will participate in an interactive demonstration of the watershed concept that uses a 3-d model of a watershed.

Objectives: Students will be able to define and illustrate the watershed concept. Students will observe how water flows from higher elevations to lower elevations. Students will observe the interconnectedness between watersheds.

Vocabulary:
watershed

Related Module Resources:

- What is a Watershed PowerPoint presentation

Materials (Included in Module):

- Watershed 3-d model
- Spray bottles
- Rain cups

Additional Materials (NOT Included in Module):

- None

ACADEMIC STANDARDS (ENVIRONMENT AND ECOLOGY)

7th Grade

4.1.7.B Understand the role of the watershed.

- Identify and explain what determines the boundaries of a watershed.
- Explain how water enters a watershed
- Explain factors that affect water quality and flow through a watershed.

10th Grade

4.1.10.A Describe changes that occur from a stream's origin to its final outflow.

- Identify Pennsylvania's major watersheds and their related river systems.
- Describe changes by tracing a specific river's origin back to its headwaters including its major tributaries.

12th Grade

4.1.12.B Explain the relationships that exist within watersheds in the United States.

- Identify and describe the major watersheds of the United States.

BACKGROUND:

A **watershed** is the total land area that drains into a particular waterway. Land areas drain into chains or networks of streams of different sizes and lengths. Every waterway has its own watershed, or land area whose runoff drains into that waterway. Small streams each have their own, generally small watersheds. Small streams combine with other small streams to form larger stream networks. Their watersheds also combine to form larger watersheds. The land area around all streams in complex stream networks becomes part of an even larger watershed, and so forth, as more streams converge. That is, large waterways generally drain larger land areas and thus have larger watersheds.

Because all water drains downhill, the boundaries of watersheds, in general, are the highpoints or hilltops in a given area. A watershed might be thought of as the hilltops and the valley(s) below into which water from those hilltops and all lower elevations drains. The watershed concept can be a challenging one for students to grasp; a 3-D model, such as the one used in the exercise, can help learners more concretely visualize exactly what a watershed is.

OVERVIEW:

Students will participate in an interactive demonstration of the watershed concept that uses a 3-D model of a watershed.

PROCEDURE:

Teacher Preparation:

1. Set up the watershed model so that it empties into a catch container when water is flowing on it.
2. Fill the spray bottles up with water and find the rain cup (plastic cup with holes poked in the bottom).

Student Activity:

1. Have students surround the 3-D watershed model for an interactive demonstration. Make sure everyone can see the model.
2. If appropriate, ask students to define a watershed again. While pointing out the various parts of the model, explain that the model represents a watershed. It is a land area surrounding a waterway that contributes to or drains into that particular waterway. Water drains from high points of land (hilltops, mountains) to low points of land (waterway in the ravines/valleys). All the water (rain and creeks) flows to a central waterway and central point.
3. Have a student give name to main body of water = _____River
All rain that falls on this land will eventually drain into _____ River
Test the theory with spray bottles (*use kids as volunteers*)
Did it work? Is this a watershed?
4. A key point to emphasize: Everywhere you are at on land, you are in a watershed. Water is flowing somewhere always, uphill to downhill.
5. Big watersheds can be made up of subwatersheds - smaller watersheds for smaller creeks. So watersheds can be different sizes and contain watersheds within themselves. Point out a smaller creek on model. Have student name this creek = _____Creek.
Have a student, with finger, delineate this smaller creek's watershed.
Reiterate, high points of land vs. low points.
6. Creeks and Watersheds are connected. Point out how water from _____Creek ends up into _____River. So _____Creek is a smaller watershed within the bigger _____River Watershed. Water has flowed downstream.
7. Point out an adjacent small creek. Name creek = _____Creek. Delineate that watershed with your finger. It too flows into _____River and is a subwatershed of it.

8. High points of land are BOUNDARIES between watersheds. Point out watershed boundary (high point of land) between these two subwatersheds you used. Here water has to make a choice which way to go, which waterway it is going to end up in. Demonstrate watershed boundary concept using the RAIN CUP.
9. Water is flowing downstream. Could other things flow downstream too? How about pollution? You can demonstrate how pollution may move through a watershed by placing litter (little scraps of paper) on the model and washing them downstream. Depending on your class curriculum, you might explain that you will be covering pollution in more detail later on in the school year or unit.

DISCUSSION:

What is a watershed? What are some household/ everyday objects that are similar to a watershed? *Dish drying rack drain board, a bathtub, a parking lot that is graded downward toward a drain. A kitchen sink is not a good example. Watersheds usually do not drain 360 degrees into a body of waterway - only a lake or pond that has not outflow exit would be an example.*

Are there still watersheds in Iowa and Kansas where there are no real hills and it is pretty much flat? *Yes. Everywhere you stand on land, you are in a watershed. Water drains somewhere. The elevation difference might only be a few feet, but water will find a way to flow downgrade and reach a waterway.*

What would be an example of a small watershed around your community? What larger watershed is it a part of? *Ex. Woodcock Creek is a smaller watershed in the midst of the bigger French Creek Watershed, and even bigger Allegheny River Watershed.*

Where would there be a small watershed that is not connected to a larger watershed? *The only place would be if you had a small creek with no tributaries that flowed directly into the ocean. However, even then, it is considered to be part of the Atlantic Ocean Watershed.*

EVALUATION:

- Discussion questions.
- Peer teaching demonstration opportunity

EXTENSIONS AND MODIFICATIONS:

- Have students make their own watershed models. These can be made out of florist foam and painted with rubber proofing then spray paint. These can simply be made out of aluminum foil then painted. These could be made from wax paper.
- You could make a larger watershed model outside on a lawn using a shower curtain or plastic tablecloth (ideally green). You could place rocks or other materials

underneath to create the landscape. Instead of squirt bottles, you could use a hose or watering can.

- Have students do the same demonstration for a younger grade (i.e. Middle school going down to the elementary school to peer teach).
- Students could make a scale model of a local watershed.

NOTES (PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR TEACHERS USING THIS ACTIVITY IN THE FUTURE):

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