



Finding Out About Watersheds

Learning Outcome

The student will be able to define the term "watershed" and identify the natural and human components of a typical watershed.

Learning Procedure

What Is a Watershed, Anyway? Introduce watersheds by explaining that Washington forests are part of something bigger, i.e., they don't exist in isolation. That larger picture is called a watershed. We might not live in a forest, but we all live in a watershed. By studying one we can learn what the natural and human parts of a watershed are and how important and valuable all the resources, including forests, are to us.

Build a Watershed: Use a large plastic garbage bag and drape it over some loosely crumpled newspaper. (Use a slope outside your room or slightly slanted board inside.) The idea is to create a hilly contour with a valley in the middle, sloping "to the sea." Using a spray bottle, spray "rain" on the mountains to observe how the water forms streams and tributaries and flows downhill. (If you're doing this inside, use a towel to catch the runoff!) Many "lakes" will be formed along the way to the sea. Explain that the region that drains into a body of water is the watershed for that body of water. Discuss what another source of water might be, i.e., snow, and how, in a real watershed, the ground is permeable, causing much of the water to seep down and flow underground. This is the source of well water and springs. (Try using layers of paper napkins or tissues to simulate absorption.) Rivers, wetlands and lakes also are connected to the groundwater.

What Do We Find in a Watershed? In the classroom, divide students into pairs. Photocopy and enlarge the watershed illustration (with this lesson) and give a copy to each pair. Re-define and discuss the term "watershed" (the region that drains into a body of water). The illustration depicts a watershed for a river. If the river were named Crooked River, this would be the Crooked River watershed.

Skills

Discussion, cooperative learning, mapping, critical thinking

If **More Ideas** section is used:
Compare/contrast, research

Subject Areas

Science, social studies, geography

Materials

Large plastic garbage bag, spray bottle, 2' x 3' board (optional), newspaper

Watershed Illustration *

Drawing supplies

Butcher paper (optional)

3" x 5" cards (variation option)

* Provided



On the watershed illustrations, locate and discuss some of the elements of a typical watershed. Use the following terms:

forest (a group of trees that includes all plants and animals above and below ground)

river (a large body of water that runs into a lake, ocean or other river)

glacier (a large body of slow moving ice that melts, thereby feeding creeks and rivers)

tributary (a stream which joins a larger body of water)

spring (groundwater that comes to the surface)

wetland (low area covered by shallow water most of the time, where plants that "like to have their feet wet" grow)

marsh (a wetland where mostly grass-like plants grow, i.e., cattails)

saltmarsh (a marsh in an estuary, inundated by tides twice a day)

swamp (a wetland where mostly trees and shrubs grow, i.e., willows)

estuary (the mouth of the river where freshwater meets saltwater)

Variation: Print the watershed elements on 3" x 5" cards and have students place the cards on the watershed they created in the *Build a Watershed* activity.

What Are Some Human and Ecosystem Interactions?

Ask students to think about the functions and interactions of a watershed's natural environment. List their ideas on the board or on butcher paper.

Possible ideas include:

1. Trees and other plants stabilize the soil with their roots.
2. Trees and other plants provide oxygen.
3. Trees and other plants help clean the air by absorbing polluted air through their leaves and releasing clean air.
4. Forests filter and clean run-off water so tributaries are clear.
5. Forests provide havens of beauty and tranquility.
6. Trees on streambanks keep water cool and healthy for fish.
7. Forests provide habitat for wildlife.

8. Wetlands and forests prevent flooding by soaking up extra water.
9. Wetland plants filter sediments and pollution, keeping rivers clean.
10. Estuaries/saltmarshes produce a huge amount of food (because of their shallow, warm, high-nutrient conditions) and provide “nurseries” for the young of many species. Much of our food (clams, crabs, salmon and other fish) depends on estuary food webs.

Next, ask them to brainstorm human activities that take place in a watershed (how do people use forests, springs, wetlands, flat land, estuaries?)

Possible ideas include:

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|---|----------------------|
| Camping | Skiing |
| Logging | Farming |
| Dam-building | Shipping |
| Fishing | Working in factories |
| Building towns (stores, houses and roads) | |

Instruct students to draw elements of human civilization on their watershed illustrations. Discuss ideas for pictures: for example, logging trucks and campers on the mountains; a hydroelectric dam on the main river; barges in the estuary; paper mills and factories on the shores; farms inland, homes. Partners will need to plan their watershed together. When finished, students can share their illustrations with the class.

More Ideas

1. Use a local map to identify some of the towns, rivers, lakes, mountains, glaciers, dams, etc., in your watershed. Compare and contrast your watershed to the watershed illustration, discussing how your watershed is the same as and/or different from the typical watershed portrayed on the student illustration. Are there forests in your watershed? Is there a dam? Are there farms, ranches or orchards? Does your river flow directly into the sea? Is logging or shipping done in your watershed?

Divide the class into five groups to do homework research on the topics below, one topic per group. After information is gathered, each team is to create a visual aid (a map of the watershed illustrating the researched topic) and give a group oral report. Subjects are:

- a. Farms, ranches, orchards, dairies: How many? What products? How many acres? Where located? What markets?
 - b. Timber operations: What companies? What type of operations (sawmill, harvesting, recreation, etc.)? How many acres? Where located? Destination of products?
 - c. Recreation: What activities? What lands are used? How many sporting goods/outdoor stores? How many tourists?
 - d. Industries: What kinds? Where located? Where/how products are transported? Waste products? (If any, how eliminated or recycled?) Number of people employed?
 - e. Population: How many people? Where located? What growth trends? What problems because of growth? (i.e., utilities? schools?)
2. Create a classroom 3-D model of your watershed. Use wet dirt or sand to build the land forms. Cover the forms with strips of papier-mache. When dry, students take turns painting the watershed. Instruct them to add 3-D houses, factories, farms, campgrounds, logging operations, dams, marinas (whatever they have learned through their research).
3. Outside, find a small slope covered with vegetation and another that is relatively free of plants. Slowly pour a bucket of water from the top of each slope. Tell students to observe how long it takes the water to reach the bottom and to look for signs of pooling, erosion, etc. Discuss observed differences between the two slopes.

4. Investigate dams and fish ladders on the Columbia river.

Call Bonneville Power Administration's publication division, 1-800-622-4520, and give your name, street address and the publication you would like. Publications (including class sets) are free. The following are suggested:

DOE/BP 700 *The Magnificent Journey* (story of salmon migration and threats)

DOE/BP 249 *Enhancing Our Fish and Wildlife Resources* (history of salmon population decline on the Columbia, the 1980 Conservation Act and results)

DOE/BP 1721 map of power plants and dams on the Columbia

DOE/BP 1731 map of Columbia River watershed and multiple uses of river

DOE/BP 954 Yakima and Klickitat watersheds: salmon and steelhead problems

Contact the Washington Forest Protection Association for a copy of *The Impact of Environmental and Management Factors on Washington's Wild Anadromous Salmon and Trout*.

Also contact the Washington Department of Fisheries for salmon education materials (see resource section).

Assessment: What Did We Learn?

Instruct each pair of students to share with the class three examples on their watershed map depicting interactions between humans and the natural environment.





