

Soil & Water

What in the World is a Watershed?

There's a Watershed in My Backyard - Activity 1

Science, Geography

Materials

- Umbrella
- Spray bottle with water
- Large bath towel
- Supplemental watershed diagram (included with this lesson)

Overview

Students will connect to information about conservation and protection of natural resources. They will understand how each person in a watershed – all of us – can work together to protect the quality and quantity of water for our use.

Objectives

1. Students will learn the definition of a watershed.
2. Students will learn how water moves in a watershed.

Instant Experts

Exploring Kansas Natural Resources Educator's Guide. Unit 6 – Water Overview (101-110). Kansas Foundation for Agriculture in the Classroom. To order, visit www.ksagclassroom.org.

What is a Watershed? PA-420. USDA-NRCS Landcare Delivers Publications & Forms. <http://landcare.nrcs.usda.gov>

Background Information

A **watershed** is the land that water flows across or under on its way to a stream, river, or lake. Landscape is made up of many interconnected basins or watersheds. Within each watershed, all water runs to the lowest point such as a stream, river, or lake. On its way, water travels over the surface and across farms, fields, forest lands, suburban lawns, and city streets; or it seeps into the soil and travels as groundwater. Large watersheds like the ones for the Mississippi River, Columbia River, and Chesapeake Bay are made up of many smaller watersheds across several states.

Watersheds come in many different shapes and sizes. A watershed can be affected by many different activities and events. Construction of cities and towns, farming, logging, and the application and disposal of many garden and household chemicals can affect the quantity and quality of water flowing from a watershed.

Grade Level: 5-6

Time: 20 minutes

Standards:

Physical Science
Life Science
Geography

What in the World is a Watershed?

Everyone lives in a watershed, and we are a part of a watershed community. The animals, birds and fish are, too! People influence what happens in watersheds, good or bad, by how the natural resources – the soil, water, air, plants, and animals – are treated. The quantity and quality of water draining from a watershed are dependent upon the climate, vegetation, soils, geology, and development of that watershed. Activities that change the vegetation and surface characteristics of some watersheds will affect the quantity and quality of water contributed to a stream. For example, a greater volume of water, perhaps of poorer quality, will flow from a parking lot than from a forest or pasture. This volume of water from a parking lot may result in increased flooding in a watershed because the greater volume exceeds the natural ability of the stream to transport the water. What happens in small watersheds, such as pollution, also affects the larger watersheds downstream.

There are three different types of watersheds:

Underdeveloped watersheds are drainage basins that have no development affecting the quality or quantity of water in that watershed. These watersheds are primarily on public-owned lands in national forests, national parks, and wilderness areas. Underdeveloped watersheds provide scientists with areas to study the natural processes of a watershed.

Planned Watersheds are drainage basins that contain planned development. Planning the development within a watershed requires consideration of the entire drainage basin. Planned actions consider the effect on the natural resources of the watershed and help preserve the quality and quantity of water flowing from the watershed. Actions such as controlling surface runoff and protecting stream channels help preserve the quality and quantity of water flowing from a watershed. Limiting the number and type of structures on a flood plain is one method of preventing loss of property from floods. Placing parks, golf courses or farmland on a flood plain can reduce property loss caused by floods.

Unplanned Watersheds are drainage basins that do not contain planned development. Unplanned development within a watershed has the potential for degradation of water quality and increased loss of property from flooding. Runoff from city streets, improper farms and logging techniques, poor residential and industrial chemical disposal practices can all affect water quality. Locating homes and businesses on flood plains greatly increases the chance of damage from flooding. Levees or dams may need to be put in place to protect development already located on the flood plain.

Instructional Format

1. Share background information with students.
2. This lesson will be a class demonstration with student participation.
3. Upon completing the lesson, students will answer conclusion questions and discuss the activity.

Procedures

1. Share background information with students, and show them the diagram of a watershed.

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2. *This part of the lesson may be done outside to prevent carpet from getting wet.* Have a student volunteer hold an opened umbrella with the top of the umbrella waist high so the students can gather round to look at the top of the umbrella. Have the students count the number of divides or ribs in the umbrella.
3. Have students hypothesize how water, if sprayed on the umbrella, would move.
4. Have another student volunteer spray the top, center of the umbrella and observe how the water moves down the ribs of the umbrella. Explain that each rib represents a divide with a watershed on each side.
5. Have students determine how many “watersheds” are on the umbrella. Explain this is how it is on earth, too.
6. Have student volunteer spray water on a bath towel, and have students compare the water activity between the umbrella and the towel.
7. Discuss activity and answer conclusion questions.

Conclusion Questions (Assessments)

1. What force of nature causes the water to flow on the sprayed umbrella?

Gravity

2. How many watersheds are represented in the umbrella?

Depending on the umbrella, it is usually six or eight?

3. What in nature in a real watershed soaks up the water and slows the water down?

Permeable surfaces, like soil.

4. What in a real watershed acts like the surface on the umbrella (where water does not soak in to the earth)?

Less permeable or non-permeable surfaces, like pavement or house roofs.

Resources

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Want More? Extensions

To determine how your land is being used in your watershed, visit <http://www.ks.nrcs.usda.gov/technical/RWA/index.html>. Scroll down to your watershed, and click on the watershed and pages of information.

Contact your NRCS personnel in your county and get the contact name for the WRAPS coordinator for your watershed. Invite this person to present the current health of the watershed and plans of action to maintain or improve the health of the watershed.

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Additional Resources

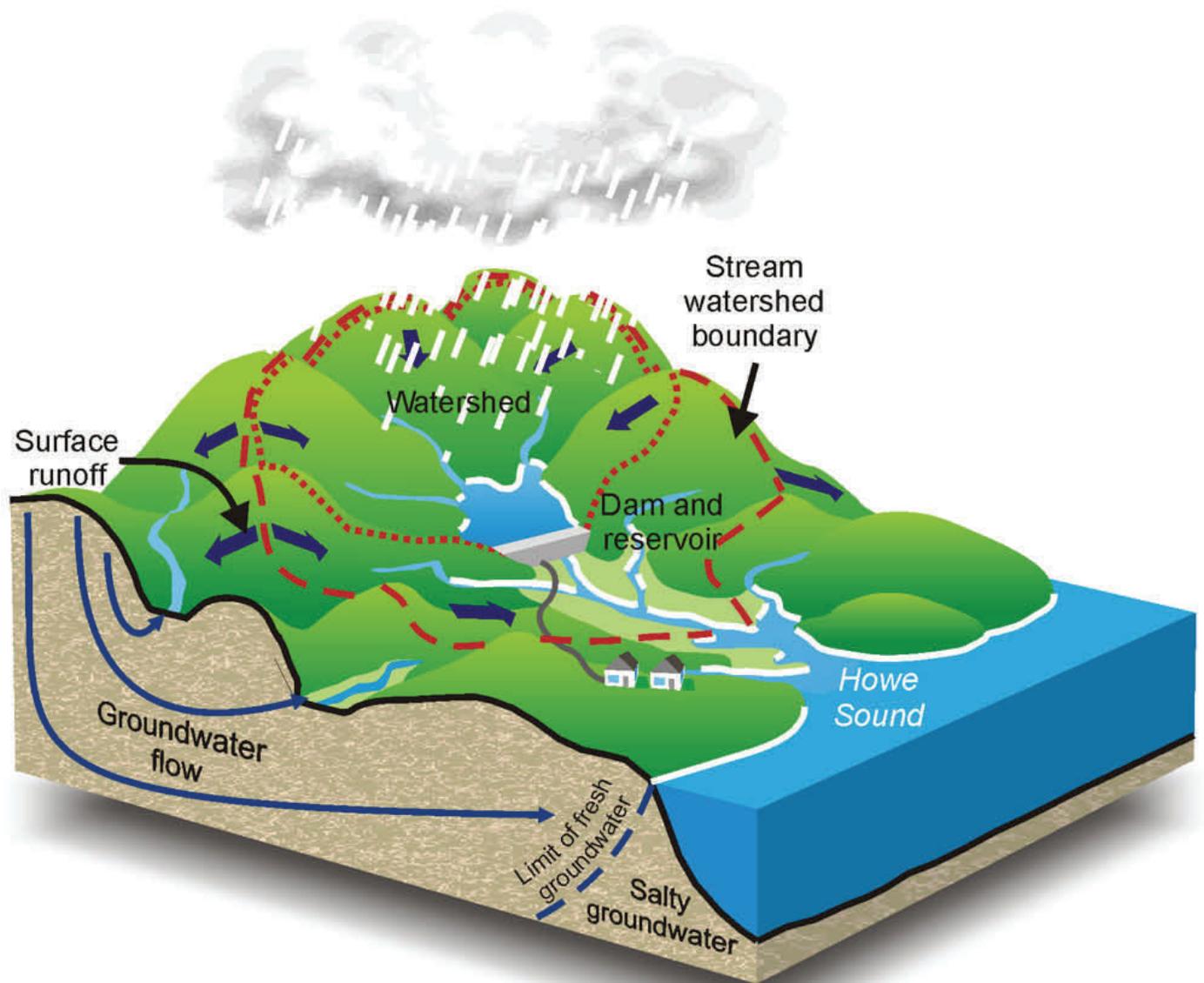
USDA Natural Resources Conservation Service. Water resources. <http://www.nrcs.usda.gov/technical/water.html> /

What is a watershed? <http://www.walkillriver.org/watershed.gif>



What in the World is a Watershed?

Watershed Diagram



From: http://geoscape.nrcan.gc.ca/h2o/bowen/images/watershed_e.jpg



Soil & Water

There's a Watershed in My Backyard!

There's a Watershed in My Backyard - Activity 2

Science, Geography

Materials

- Large, clear plastic tub
- Waxed paper or butcher paper – at least 2 feet
- Spray bottle filled with colored water
- Couple salt/pepper shakers filled with cocoa powder, chocolate sprinkles, colored sugar sprinkles and different colors of drink mixes (e.g. orange, purple, etc., Kool-Aid)
- List of vocabulary words in large print (Appendix A)

Overview

Students will connect to information about conservation and protection of natural resources. They will understand how each person in a watershed – all of us – can work together to protect the quality and quantity of water for our use.

Objectives

1. Students will learn the definition of a watershed.
2. Students will learn how water moves in a watershed.
3. Students will learn the vocabulary represented in a watershed.
4. Students will learn about point source and nonpoint source pollution.
5. Students will identify ways to reduce pollution of water.

Instant Experts

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Grade Level: 5-6

Time: 10 minutes preparation + 20 minutes

Standards:
Physical Science
Life Science
Geography

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states.

Watersheds come in many different shapes and sizes. A watershed can be affected by many different activities and events. Construction of cities and towns, farming, logging, and the application and disposal of many garden and household chemicals can affect the quantity and quality of water flowing from a watershed.

Everyone lives in a watershed, and we are a part of a watershed community. The animals, birds and fish are, too! People influence what happens in watersheds, good or bad, by how the natural resources – the soil, water, air, plants, and animals – are treated. The quantity and quality of water draining from a watershed are dependent upon the climate, vegetation, soils, geology, and development of that watershed. Activities that change the vegetation and surface characteristics of some watersheds will affect the quantity and quality of water contributed to a stream. For example, a greater volume of water, perhaps of poorer quality, will flow from a parking lot than from a forest or pasture. This volume of water from a parking lot may result in increased flooding in a watershed because the greater volume exceeds the natural ability of the stream to transport the water. What happens in small watersheds, such as pollution, also affects the larger watersheds downstream. **Point source pollution** is water pollution from an activity originating from an identifiable source. **Nonpoint source pollution** is water pollution from sources not easily identified or located.

Preparation

Cocoa powder, chocolate sprinkles, colored sugar sprinkles and drink mixes should be poured into salt/pepper shakers before the demonstration is performed.

Instructional Format

1. Share background information and vocabulary words with students.
2. This lesson will be a class demonstration with student participation.
3. Upon completing the lesson, students will answer conclusion questions and discuss the activity.

Procedures

1. Share background information and vocabulary words with students.
2. Have a student crumple up the waxed/butcher paper to make a 3D topography, complete with hills and valleys, that is to be placed in the large, clear plastic tub.
3. Gently straighten out the paper leaving the “topography” and place it in the tub.
4. Block the tub up so that one end is higher than the other.
5. Explain to students that we all live in a watershed. Have the students hypothesize about the movement of the water and what causes it to move from high to low points.
6. Have one student spray colored water on the high points or “divides” of the watershed. Encourage the students to notice the flow of the water and where the water pools and collects.
7. To make the point that many land uses affect the water (both quantity and quality) in the watershed, have the students shake on “pollutants” of the watershed. For example, orange Kool-Aid powder could be excess fertilizer on the golf course. Purple Kool-Aid could be a

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local dump site. Chocolate sprinkles could represent dog poo at the local dog park, and cocoa powder may be the soil moved during construction in a new housing development that is unprotected. Have the student spray colored water over these “pollutants” and have the students note the flow of the pollutants into the pools and collection areas. Discuss who is affected by these pollutants, and discuss best management practices that protect the water.

8. Have students generate a list of water use activities that happen in their local watershed. These may also include natural events, such as flooding, drought, mudslides, and fire – examples are included below. Students may determine how these uses affect local water quality and quantity. Further, they may also determine best management practices or what changes in these activities could help protect the water in the watershed.

Agriculture

Crops
Animals
Golf Course
Horticulture Crops

Household

Individual homes: drinking, bathing, washing car
Housing Complexes
Waste Water Treatment Systems
Lawns & Gardens

Industrial

Factories
School
Storage Units
Ware Houses
Parking Lots
Gas Station
Shopping Mall
Offices

Recreation

Parks
Meadows
Woodlands
Swamp lands
Camping Areas
Bike Paths
Swimming Areas
Boating Areas
Softball Diamonds
Football Fields

9. Have students list possible contaminants that irresponsible land use could contribute to the watershed. Determine if the pollution is point source (direct pollution) or nonpoint source pollution (non-direct pollution).
10. Discuss activity and answer conclusion questions.

Conclusion Questions (Assessments)

1. What is a watershed?

The land that water flows across or under on its way to a stream, river, or lake.

2. What force of nature causes the water to flow in a watershed?

Gravity

3. What is the difference between point source pollution and nonpoint source pollution?

Point source pollution is water pollution from an activity originating from an identifiable source. Nonpoint source pollution is water pollution from sources not easily identified or located.

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4. What are ways to reduce pollution in a watershed?

Answers will vary.

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A vested interest in water quality! This is a creative way to have students share their ideas by having them make vests out of paper bags. Encourage students to decorate vests with “H2O Heroes” on one side and their water conservation or quality idea on the other side. To make vests, take a paper grocery bag, cut straight down the center to the bottom of the bag, cut a hole in the bottom of the bag (this will be the top) and cut a hole on each side for arms. The shoulders may need to be stapled or cut for a better fitting vest. Students can paint or decorate their vests with markers, construction paper, cut-out pictures, etc.

SPLASH is an interactive computer game that delivers information on nonpoint source pollution in a fast-paced and entertaining format. Ap-peeling for audiences of all ages, it teaches fundamental concepts about nonpoint source pollution prevention measures in a farm, city, and neighborhood setting. Point and click screens that move and have sound help players learn how day-to-day decisions can affect the water quality of lakes and streams. For a demo, visit <http://www.epa.gov/nps/kids/splash/webpage2/>.

Additional Resources

U.S. Environmental Protection Agency. Improving Old MacDonald's farm.
http://www.epa.gov/owow/nps/nps_edu/pdf/farms.pdf

U.S. Environmental Protection Agency. Polluted runoff (nonpoint source pollution).
<http://www.epa.gov/owowwtr1/NPS/dosdont.html>

U.S. Environmental Protection Agency. Stop pointless personal pollution!
http://www.epa.gov/owow/nps/nps_edu/pdf/stop.pdf

U.S. Environmental Protection Agency. Streams in the city.
http://www.epa.gov/owow/nps/nps_edu/pdf/urban.pdf

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U.S. Environmental Protection Agency. Bon voyage to bad boating habits.
http://www.epa.gov/owow/nps/nps_edu/pdf/boat.pdf



There's a Watershed in My Backyard!

Watershed Vocabulary

Divide: points of higher ground that separate two adjacent streams or water sheds

Drainage Basin: land area drained by a river

Gulf: a part of an ocean or sea extending into the land

Lake: considerable inland body of standing water

Nonpoint Source Pollution: Water pollution from sources not easily identified or located

Ocean: the whole body of salt water that covers nearly three-fourths of the surface of the earth

Point Source Pollution: Water pollution from activity originating from an identifiable source

Pond: A small body of water fed by a stream or spring

River: a natural stream of water with volume larger than a stream or creek

Run-off: part of precipitation that appears in surface-water bodies

Stream: a body of water that moves from higher to lower ground along well-defined paths

Tributary: a stream that contributes its water into another stream or body of water

Watershed: the land that water flows across or under on its way to a stream, river, or lake

