

Activity: There's a Watershed in My Backyard!

Activity Level: Advanced

Source: *Kansas Foundation for Agriculture in the Classroom*

Purpose

Use a model to illustrate a watershed and how pollution impacts the watershed.

Example Topics It Supplements

Earth science (water cycle); geography

Activity Snapshot

1. Organize and Prepare Supplies
2. Read Background Information
3. Interest Approach
4. Conduct Activity
Students make a model of a watershed using crumpled up butcher paper placed in a plastic tub. The landscape is “sprinkled” with different powders to represent substances that can affect the watershed. A spray bottle of water will imitate rain and movement of water.
5. Ask follow up questions and make the connection to agriculture.
 - What is a watershed?
 - What force of nature causes the water to flow in a watershed?
 - What is the difference between point source pollution and nonpoint source pollution?
 - What are ways to reduce pollution in a watershed? Why is that important to agriculture?

State Standards It Supports

SS 8.3.3.b—Analyze impact of natural events on biomes, climates, and wind and water systems.
SC 5.2.2.b – Describe changes in motion due to gravity.
SC 5.3.3.d – Recognize organisms cause change in their environment.
SC 5.4.4.a – Describe how slow/fast processes change Earth’s surface.

Materials

- Clear Plastic Tub
- Butcher paper—2 feet
- Spray bottle with colored water
- Several salt and pepper shakers filled with colors of drink powder (like Kool-Aid)
- Several salt and pepper shakers filled with cocoa powder

What's the Connection to Agriculture?

Conservation and protection of natural resources is very important. Each of us lives in a watershed and it is important to protect the quality and quantity of water for use. Agricultural production of crops and animals requires clean water. We also need clean water for human consumption.

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PROCEDURES:

1. Organize and Prepare Supplies
See “Materials” on cover page.
2. Background Information
What is a watershed? It’s the land that water flows across or under on its way to a stream, river, or lake.

How do watersheds work? The 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, forestlands, suburban lawns, and city streets; or it seeps into the soil and travels as ground water. 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 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. You and everyone in your watershed are part of the watershed community. The animals, birds, and fish are too! You influence what happens in your watershed, good or bad, by how you treat the natural resources – the soil, water, air, plants, and animals. What happens in your small watershed also affects the larger watershed 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.

The quantity and quality of water draining from a watershed are dependent upon the climate, vegetation, soils, geology, and development with 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.

Undeveloped Watershed: 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.

Planned Watershed: 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 surrounding area.

Unplanned Watershed: Unplanned development within a watershed has the potential for degradation of water quality and increased loss of property from flooding. Runoff from city streets,

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improper farms, and logging techniques, poor residential and industrial chemical disposal practices can all affect water quality.

(From *What is a Watershed?* Program Aid Number 420 United States Department of Agriculture.)

3. Interest Approach

Instruct students to define what a watershed is with a partner and report back to the class. Explain that a watershed is the land that water flows across or under on its way to a stream, river, or lake. Everyone lives in a watershed. You and everyone in your watershed are part of the watershed community. The animals, birds, and fish are too! You influence what happens in your watershed, good or bad, by how you treat the natural resources – the soil, water, air, plants, and animals. What happens in your small watershed also affects the larger watershed downstream.

4. Conduct Activity

- a) Divide students in groups of four.

Each group will need:

- Large plastic storage tub
- 2 foot length of white butcher paper
- Spray bottle with colored water (colored with drink powder)
- Several packages of colored drink powder (purple, orange, red, etc. Kool-Aid)
- Several “salt shakers” to put the colored drink powder and cocoa in
- Powdered cocoa
- Book or block to elevate one end of the tub

- b) Crumple up the butcher paper to make a 3D topography complete with hills and valleys. Gently straighten out the paper leaving the “topography” and place it in the tub. Block the tub up so one end is higher than the other.

- c) Explain that we are all in a watershed and that water moves from high to low points due to gravity.

OR

Have the students hypothesize about the movement of water and what causes it to move from high to low points.

- d) Have one student spray colored water on the high points or “divides” of the watershed. Have the students notice the flow of the water. Have them notice where the water pools and collects.

- e) 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 and residential lawns. Purple Kool-Aid could be an unsanctioned dumpsite. 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 whom these pollutants affect, and discuss best management practices that protect the water.

- f) There are several water use activities that happen in a watershed; these include natural events, such as flooding, drought, mudslides, and fire – examples are included below.

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Ask students to think of some other water use activities that could be natural events or specific use from humans or animals. 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
 - *Industrial*: Factories, Schools, Storage Units, Ware Houses, Parking Lots, Gas Station Shopping Mall, Offices
 - *Household*
 - Individual Homes: Drinking, Bathing, Washing Car, Housing Complexes
 - Waste Water Treatment Systems
 - Lawns & Gardens
 - *Recreation*
 - Parks
 - Meadows Woodlands, Swamp Lands, Camping Areas, Bike Paths, Swimming Areas, Boating Areas, Softball Diamonds, Football Fields
- g) 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).

5. Ask Follow-Up Questions and Make the Connection to Agriculture.

- What is a watershed?
The land that water flows across or under on its way to a stream, river, or lake.
- What force of nature causes the water to flow in a watershed?
Gravity
- 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.
- What are ways to reduce pollution in a watershed? Why is that important to agriculture?
Answers will vary.

Optional extension activity: Organize a field trip to the local landfill to learn how pollutants, contaminants, and other waste is managed to protect our watershed and other natural resources.