

Lesson 4—Week 4—Just Passing Through

LESSON OVERVIEW

Students participate in hands-on inquiry activities to experience how water travels on land.

LEARNING OBJECTIVES

The student will be able to:

- Compare the rates at which water flows down slopes with and without plant cover
- Explain how water infiltrates some surfaces and doesn't others (permeable vs. impermeable surfaces)

SUPPLIES

- yarn or rope (length of playing field)

WARM UP

Together, class reviews and revises its definition of a watershed. In addition, discuss what they found interesting (and learned) from their guests the previous week.

Activity 2: Seeing Watersheds

In *Just Passing Through* from *Project Wet* (p. 163–168), students investigate how vegetation affects the movement of water over land surfaces.

Part 1

- Tell students they are going to act out the role of water as it flows through a site (down a slope and into a stream). Arrange the playing field according to the diagram Slope with

Plant Cover. Lay yarn or a piece of rope down the middle portion of the field to indicate the stream. (A section of yarn can be crumbled up to represent rapids.) Have half of the class gather at one end of the playing field. These students represent “raindrops.” The remaining students represent “vegetation” and should position themselves somewhere between the raindrops and the stream.

- To begin, have students participate in Part I of the activity—the thunderstorm. At the height of the storm, raindrops move into the site and take the most direct route to the stream (walking swiftly). This represents water falling on and flowing over the land’s surface.
- Vegetation on the slope slows the flow of water. To show this, students representing vegetation try to tag the raindrops. Vegetation must keep one foot in place, but can pivot and stretch their arms (representing roots trapping water.)
- If a raindrop is tagged, the student stimulates filtering into the ground by circling five times around the vegetation. To represent water moving underground toward the stream and passing through spaces among soil particles, raindrops should crawl toward the yarn. (In reality, this process can take many days, weeks or months, depending on rock material and gradient.) Raindrops cannot be tagged a second time.
- Once raindrops reach the stream, they stand up and walk the length of the yarn. If they encounter rapids, they can spin about to represent water spilling over rocks. At the end of the stream, they should wait for the rest of the raindrops.
- Record the time it takes all the raindrops to pass through the site. Students can exchange roles and repeat the simulation.

- Discuss the results of the activity. Ask students to describe water's movement. Help students to understand how vegetation slows the rate of flow, which allows time for water to percolate into the soil.

Part 2

- Ask the students how the results of the activity will differ when vegetation is removed. Have students perform the second version of the activity. (See diagram, Barren Slope.) Half of the class simulates raindrops and the other half represents "small rocks." Students representing small rocks should sit or lie down, curling themselves into tight balls. When raindrops move near a rock, they can walk around or jump over it, continuing to flow down the slope.
- Compare the time required for raindrops to flow through sites with and without plant cover. Discuss the implications of water racing down a barren slope.

Part 3

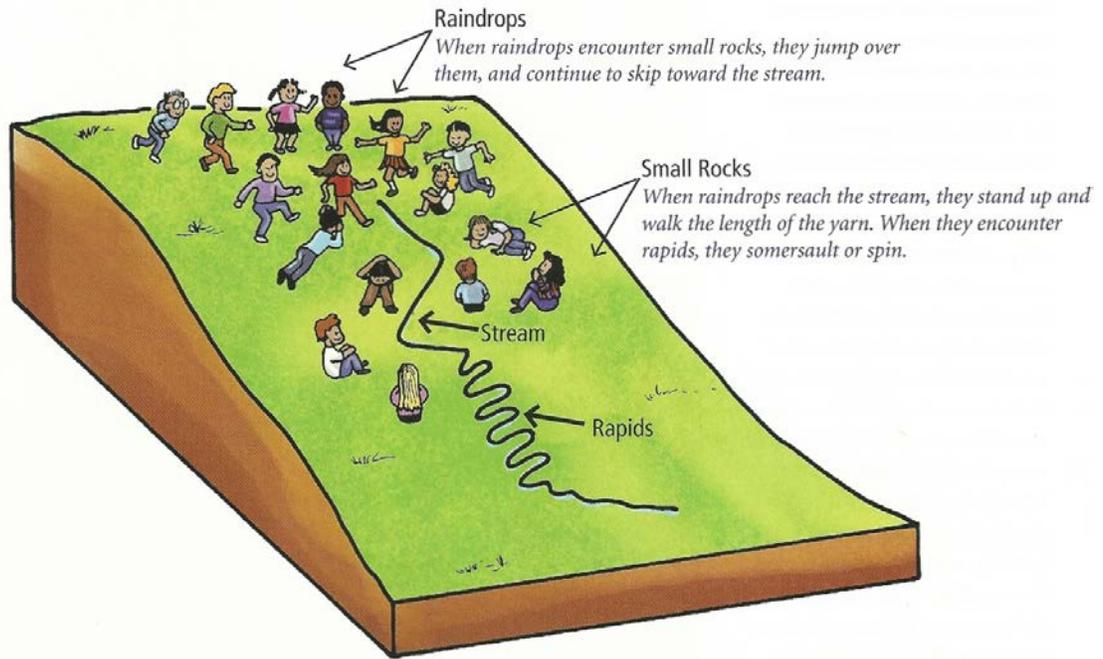
- Set up the playing field as in Part 1. As raindrops flow through the site, they pick up sediment (pebbles, twigs, dead leaves or other biodegradable items scattered by the instructor). If tagged, raindrops percolate or filter into the ground. They drop all the tokens they have collected (symbolizing soil filtering raindrops and removing sediment.) Remind students about gravity, raindrops must keep moving as they bend down to collect materials.
- After raindrops make it through the site, have them count the number of items that they are still holding.

- Arrange the activity as in Part 2, and have raindrops flow through the site, picking up sediment. At the conclusion, students should find that a larger amount of sediment has been collected by the raindrops than in the previous simulation.
- Discuss problems associated with erosion and unchecked transport of sediment. Introduce Best Management Practices that can be used to control erosion. Remind students that erosion is a natural process (necessary for adding minerals to streams and creating landscapes.) However, because a large amount of sediment is being removed within a short period of time, this simulation (part 3, final step) represents erosion that could be harmful.

Activity 2: Permeable and Impermeable Surfaces

Using buckets of water and sites around the school yard, students investigate how water behaves on different surfaces—concrete, asphalt, dirt, grass, buildings, decorative rock, etc. and with different conditions, hills, dips, depressions, etc. They record observations in tables of their own design. The end goal for this activity is to identify 3 permeable surface and 3 impermeable surface examples.

Barren Slope



1.

Slope with Plant Cover

