Rainy Day Hike

(30 minute activity for classroom preparation)

Objectives

Students will be able to:

1) Identify the watershed in which their school is located
2) Explain the role the schoolyard plays in the watershed

Materials

- ❑ Maps of the local community, showing streams, lakes and topography
- ❑ Drawing paper
- ❑ 2 sets of copies of the Legend
- ❑ Waterproof outerwear (large trash bags can be used for ponchos by making a neck hole in the sealed end and small openings for the hands on the sides)
- ❑ Clipboards of sturdy cardboard with rubber band to secure paper (Tape 2 pieces of cardboard to form a book; students can close map inside cardboard to keep it dry.)
- ❑ Plastic wrap
- ❑ Pencils

Making Connections

Students may be familiar with the idea of a watershed, but unaware that they live and attend school within one. Observing water flowing through and collecting on their school grounds provides students with direct experience in their watershed.

Background

Puddles, streams, and lakes all have something in common. They collect water that has drained from watersheds. Watersheds are like funnels; they are drainage basins where surface water runs off and drains into a common collection site. Watersheds are separated from each other by land forms (ridge lines or mountain divides). Water falling on each side of the divide drains into different watersheds and collection sites.

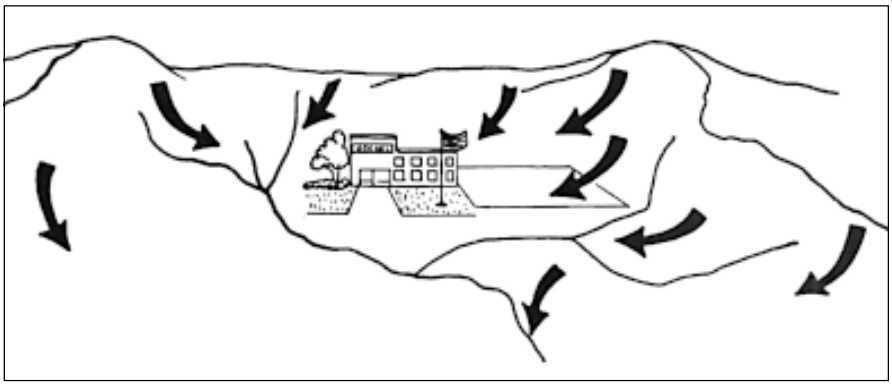
Surface runoff flows over a school s grounds on its way to the collection site (e.g., a river). Therefore, school yards are part of a watershed. (Puddles are the collection sites of mini-watersheds: land surrounding puddles are the mini-drainage basins that empty into the puddle.) When the puddles overflow or the soil becomes saturated, water is released.

As water flows from the school grounds, it combines with runoff from other land areas within the drainage basin. Materials from these other places are carried by the water.

Background *continued*

While some substances decompose, settle out, or are filtered by soil, other matter continues to travel long distances downstream. Organic materials carried by the water nourish aquatic life. Some substances are toxic, however, and can endanger organisms consuming or living in the water.

Contaminants whose entry point into the watershed is difficult to locate are classified as non-point source pollutants. Along with residential areas, agricultural fields and paved parking lots, school grounds can contribute to non-point source pollutants. The schoolyard contributes point source pollution when the source of the pollutant can be traced back to a specific location on the school grounds (e.g., sewer, ditch, pipe).



Procedure

1. Show students a map of the community and identify local rivers or lakes. Ask the class if they think a connection exists between their schoolyard and these bodies of water. Tell the class they will take a fair-weather and a rainy-day hike, to study what happens to the water that falls on and flows over their school property.

   Although plans for a rainy-day hike will generate student excitement, the wait for a wet day may prove discouraging. The lack of rain offers the opportunity to discuss with students the idea that people do not control the rain or other aspects of the weather. Remind students that even if people cannot control the weather, they can often predict it.

2. Have students listen to, watch, or read weather reports. When is rain predicted? Students can mark the calendar with the date and continue preparations for the hike.

The Activity **Part I**

While planning for the rainy day have students create a map of the school grounds. Divide the grounds into sections and assign groups to map each area. Orient students to which direction is north so all maps face the same direction.

1. Remind groups to include the following: school buildings, parking lots, designated playgrounds, natural areas (trees, grass, flower gardens) with an emphasis on water features like streams, temporary and permanent ponds, and constructed water features like bird baths and fountains.

2. After students have completed their initial mapping, if there is a school building in their area, have them consider the following questions. Can they determine where the water that falls on the roof goes? Does it flow off the roof into gutters that lead to waterspouts or does it fall directly onto the ground? Have students place an X on the buildings to indicate the location of waterspouts.

3. Make two copies of student maps, one for the fair-weather hike where students make predictions of water flow and one for the rainy-day hike when students check their predictions.

4. For the fair-weather hike, give each group a copy of their mapped section and the *Legend*. Have each group predict the direction water will flow through their section. Where do students think water will be stored? Are there ponds or low spots?

5. Have students survey the ground of their section for possible sources of point and non-point contamination (oil stains on parking lots, trash, tainted soil near the school dumpster). What materials could be on the roof of the school building that could be washed off during a rain (bird and rodent droppings, insects, dirt, roofing material, leaves, twigs, etc)?

6. Assemble the map sections from the groups and post in the classroom. Have them summarize their predictions. How do the predictions of individual groups relate to each other? Where do students think water flows onto the school grounds? Where will it flow off the school grounds?

Activity continued

Part II

1. On a rainy day, have students dress properly. Take them outside and begin a simple tour of the school grounds. Have students identify patterns in the water flow. Discuss what influences the direction water moves. Have students:
   - ❑ note slopes, depressions, cracks in the sidewalk, erosion trails, rocks, buildings, gardens, trees, etc.
   - ❑ compare how fast or slow water flows in different places.
   - ❑ identify ways water affects the surface of the school grounds (e.g., watering plants, eroding soil, piling up litter, washing away litter).
   - ❑ note water flowing from the roofs of buildings and waterspouts.

Demonstrate point/non-point source pollution by calling USFWS 509.548.7641 to borrow or 703.631-8810 to purchase an Enviroscape model

2. Divide the class into their original groups and give each group a copy of their unmarked map section and the *Legend*. Have students indicate the following on their maps: direction and patterns of flowing water; natural and unnatural materials being carried onto and off their study area; and areas of standing water. Remind students to use pencils because ink runs. They can cover their note pads with plastic wrap or cardboard when they are not writing.

3. When students have completed their investigation, assemble the map sections and post. Arrows of adjacent map sections should line up. If they don t, discuss reasons for discrepancies.

Discussion

Have students summarize the general patterns of surface water as it flows across the school property. They should identify areas where the flow of water is slowed by land forms and vegetation, where it collects in depressions, and where it flows off school property. Have them compare the completed map on the rainy-day hike to the map indicating their predictions. How accurate were their predictions?

Referring to a community map, discuss the school s location within a watershed. Trace the likely course of runoff from the school grounds into a local lake or river.

City engineers or planners have information on storm drainage systems, or can identify destinations of storm water runoff from streets and parking lots.

Have the class list uses of water in local lakes or rivers (e.g., drinking water, animal habitat, irrigation, swimming, fishing, etc.). Do any activities on your school grounds affect, positively or negatively, the water moving across it?

Some school property plans incorporate surface water treatment systems, such as detention ponds, to reduce materials carried by runoff. Ask the principal for a copy of the school site plan. Does the plan show the surface water management system for the school?

If students believe their school grounds contribute to erosion or to point or non-point source pollution, they may want to develop a plan to improve the area. They can plant trees or a garden, encourage parking lot patrons to keep their cars in tune, promote wise use of fertilizers and pesticides, etc.

Assessment

Ask students to:

- ❑ Predict the movement of water and possible contaminants across their school grounds (Part I, steps 5 through 7).
- ❑ Identify the school s location within a watershed or in relation to a body of water (from *Discussion*)
- ❑ List ways the school grounds positively affect water passing through the watershed (from *Discussion*)
- ❑ Locate sources of point and non-point source pollution on the school grounds (from *Mapping* and *Discussion*)

Extensions

To increase the detail of their study area maps, students may include measurements of slope. Slopes can be classified as level, gentle, moderate, or steep. How does the steepness of slope affect rates of water flow, erosion, and sediment load? To measure slope, one student stands at the top of the study area (top of the slope) and another student, holding a meter stick, stands at the bottom. The run or distance between the two students is measured. The student at the top holds one end of a string at his ground level and the other end is extended to the student at the bottom of the slope. A level is needed to ensure the string is held straight. The point at which the string intersects the meter stick held by the second student is the rise. Slope gradient is calculated by dividing the rise by the run.

Extensions
continued

run ÷ rise = slope gradient (expressed as a percentage)