Lesson 8

Water Absorption

What is the difference between a pervious and an impervious surface?
How does the type of surface in a watershed impact water quality?

GOAL To understand that the type of surface affects the flow and quality of water

OBJECTIVES Students will:

- ✓ conduct an experiment demonstrating pervious and impervious surfaces
- ✓ predict where puddles will form on school grounds
- ✓ determine how surfaces affect water quality

MATERIALS **three aluminum trays (with drainage holes cut on one side), bricks or boards to prop trays, soil, grass, leaves, hay (optional), paper, pencils, clipboards, two cups, measuring cup, watering can, water**

CORE CURRICULUM CONTENT STANDARDS

- **Math 1(1-3), 2(1), 4(1), 9(2)**
- **Science 1(1), 8(1-3), 14(1)**
- **Social Studies 9(1), 10(1-3), 12(5,7,8)**

VOCABULARY **pervious, impervious, run-off, infiltration, orient, buffer zones**

PROCEDURES

1. Begin by explaining that an experiment demonstrating two different types of surfaces will be completed.
2. Conduct a demonstration on pervious and impervious surfaces. Have three aluminum trays set up with drainage holes on one side of the tray. Prop up the trays so that water will drain.
3. Explain to students that when precipitation falls on a woodland, grass or field, it filters through a *pervious* surface into the soil. When water falls on the road, parking lot, or pavement then the water *runs-off* the surface into the storm drains. This type of surface is considered *impervious*.
4. Set up three trays for a demonstration a particular type of surface; one tray is empty, the second one has soil in it and the third one has soil with grass, hay or leaves on top.
5. Ask students to predict which surface will shed the most water and which will absorb the most water. Assign students to pour a measured amount of water from a watering can onto the surfaces. Another student can collect the water coming out of the hole of the aluminum tray using a cup or jar.
6. Have students measure the amount of water collected from each tray. Determine the percentage of runoff by dividing the original amount of water into the amount collected and multiply by 100.
7. The amounts will provide the level of infiltration from least to most. Discuss how water infiltrates through the soil and recharges the ground water aquifer.

8. Discuss how real surfaces in the natural environment and man-made environment would react in the same manner as the trays (*empty tray – pavement; soil – bare surfaces; covered tray – grass, etc.)*
9. Break students into groups to survey school grounds. Have them create a sketch of the school grounds, orienting the school building properly. Have them place an "N" with an arrow pointing in the direction of North.
10. Have students predict where puddles will form after it rains.
11. Have them mark an "x" on their sketches where they predict the puddles will form. After it rains, have students match up "x's".
12. Continue surveying school grounds. Ask students where the impervious and pervious surfaces are.
13. Ask if pervious surfaces affect water quality and quantity.
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15. After observing the area, have students think of ways to improve the impervious surfaces at their school.

EXTENSIONS

1. Have students measure how far the puddles formed from the school. Have them measure depth, width and length.
2. Have students observe the flow of water during a rainstorm to determine areas in need of buffer zones or more pervious surfaces.

RESOURCES

Rosselet, Dale A., *New Jersey WATERS, A Watershed Approach to Teaching The Ecology of Regional Systems,1999,* New Jersey Audubon Society, Bernardsville, New Jersey 07924.

GLOSSARY

buffer zones - an area that lessens or absorbs a negative environmental impact
impervious - incapable of being penetrated
infiltration - the act of permeating (a porous substance) with a liquid or gas
orient - to align or position with respect to a point or system of reference
pervious - capable of penetrating or pervading
run-off - rainfall not absorbed by soil