

# WATER—THROUGH AND THROUGH

6-8

## OBJECTIVES:

Students will be able to:

1. Observe rock samples of characteristics using the naked eye and magnifying glass.
2. Determine how much water different rock samples hold.

## BACKGROUND

Each year worldwide 517,000 cubic kilometers of water are evaporated. About 108,000 cubic kilometers of water fall to the Earth as precipitation. What happens to this water? Some water is used by plants to survive. Some runs into lakes; most of the excess flows back into the ocean. The other is called groundwater since it sinks into the porous parts of the Earth's crust. Depending on the rock, water can pass through the layer or be trapped. These two layers are called impermeable and permeable.

## Terms

**aquifer:** an underground layer of unconsolidated rock or soil that is saturated with usable amounts of water; a zone of saturation.

**artesian well:** a well in which the water comes from a confined aquifer and is under pressure. One type of artesian well is a **free-flowing artesian well** where water just flows or bubbles out of ground without being pumped.

**impermeable:** impassable; not permitting the passage of a fluid through it.

**permeable:** passable; allowing fluid to penetrate or pass through it.

**porosity:** the property of being porous, having pores; the ratio of minute channels or open spaces (pores) to the volume of solid matter.

## ADVANCED PREPARATION:

- A. Collect egg-sized pieces of rock samples (sandstone, shale, and other rocks).
- B. Get the students thinking by displaying a jar filled with pebbles. Ask if the jar is full. (No, there are air spaces.)
- C. Fill the jar with water to demonstrate.

## PROCEDURE

### *I. Setting the stage*

- A. Discuss the concepts of permeable and impermeable rock.
- B. Explain and discuss aquifers and wells.

## SUBJECTS:

Geology, Math, Language Arts

## TIME:

2 class periods

## MATERIALS:

pieces for rock samples  
water  
large beakers  
triple beam balance  
magnifying glass  
student sheet

## *II. Activity*

- A. Have students find and record the mass of each rock.
- B. Have students soak the rocks in water overnight.
- C. The next day, have the students remove the rocks from the water. Again ask them to find and record the mass of each sample.
- D. Have students complete the student sheet.

## *III. Follow-up*

- A. Ask students to discuss the following questions:
  - 1. What information did you learn about each rock as it relates to the water?
  - 2. Which rock makes the best aquifer? The worst?
  - 3. How would water react to sand, clay, or coal?

## *IV. Extensions*

- A. Write a letter to the following organization to receive more information concerning geology:

American Geophysical Union  
2000 Florida Ave. NW  
Washington, DC 20009  
<http://www.AGU.org>

- B. Research local aquifers.
- C. Have students discuss sinkholes and how they are related to aquifers.
- D. Have students research where their local community drinking water originates.

## **RESOURCES**

Hesser, D. and Leach, S., Focus on Earth Science, Merrill Publishing Company, Columbus, Ohio, 1987.

Cunningham, W. and Saigo, B., Environmental Science, 3rd Ed., William Brown Publishers, Dubuque, Iowa, 1995.

# STUDENT SHEET

# WATER — THROUGH AND THROUGH

6-8

Directions: Fill in the data from your observations and answer the questions below.

Rock Sample	Mass Before Soaking	Mass After Soaking	Difference
1.			
2.			
3.			
4.			

1. What information did you learn about each rock as it relates to the water?

2. a. Which rock makes the best aquifer? \_\_\_\_\_

b. What rock makes the worst aquifer? \_\_\_\_\_

3. How much water do you think each of the following would hold?

sand \_\_\_\_\_

clay \_\_\_\_\_

coal \_\_\_\_\_