

OH WELL...- HOW WE GET WATER FROM THE GROUND

K-2

OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Explain, orally or in writing, how water gets into an aquifer;
2. Demonstrate, orally or in writing, an understanding of how wells pump water from the ground;
3. Construct a model of a well; and
4. Give an oral or written definition of the new terms: aquifer, artesian well, groundwater, and well.

SUBJECTS:

Science, Language Arts

TIME:

1-2 hours

MATERIALS:

9-ounce cups or jars
large rocks (rinsed off)
small rocks
water
clay soil, top soil, or sand
clear plastic straws
paper cup with pin holes in the bottom

BACKGROUND INFORMATION

A well is a hole in the ground from which water can be withdrawn. Wells are dug in the Earth until they reach a zone of sand, gravel, or rock that is saturated with water. These zones are called aquifers. Wells work because water will flow from soaked sand, gravel, or rocks into holes. Sometimes electric pumps are used to pump water up the well.

Terms

aquifer: porous, water-bearing layer of sand, gravel, and rock below the Earth's surface; reservoir for groundwater.

artesian well: water forced up by hydrostatic pressure.

groundwater: water that infiltrates into the Earth and is stored in usable amounts in the soil and rock below the Earth's surface; water within the zone of saturation.

well: a bored, drilled, or driven shaft or dug hole; wells range from a few feet to more than six miles in depth, but most water wells are between 100 and 2,000 feet in depth.

ADVANCE PREPARATION

- A. Gather materials for the experiments. The first experiment can be done with sand instead

of rocks. However, for efficient pumping of the water into the cup, use different size rocks rather than sand. The sand can clog the straw and make it difficult to trap water.

PROCEDURE

I. Setting the stage

- A. The teacher should review what happens in the water cycle. Place emphasis on the 'accumulation' step of the cycle. Remind the students that water from rain and melting snow trickles down into the ground and is trapped below the surface as groundwater.

II. Activities

A. Construction of a model well

1. Place a clear straw into the 12-ounce cup and press it against the wall of the cup. Place about 1/4 cup of large rocks and 1/4 cup of small rocks into the cup.
2. Pour or sprinkle, from a paper cup with pin holes in the bottom of it, about 1/3 cup of water over the rock layers. Discuss with the class where the water accumulates (aquifer).
3. Now to remove the water from the aquifer, place a finger over the top of the straw. This will trap some water in the straw.
4. Release finger from the top of the straw and water should move into another cup.
5. Discuss how this experiment simulates a well by explaining how a machine, called a pump, is used to get water up from the ground.

III. Follow-Up

- A. Students can construct their own wells and describe how they work in their daily journals.
- B. The water added to the rock layers simulates rain. Discuss how various levels of rainfall affect a well.
- C. Predict what will happen to the well if it doesn't rain for several days. Explain prediction. Test it.

IV. Extensions

- A. Do this experiment again, but this time use clay soil, top soil, or sand instead of rocks. Describe the results. Determine which of the materials works best in a well.
- B. Discuss flowing artesian wells and why pumps are not required to get the water out of the ground from this kind of well.

RESOURCES

Allen, Maureen, et. al., All About Water, Developed in cooperation with Dept. of Water Resources, State of California, 1992.

World Book Encyclopedia, Young Scientist, Vol 4, p. 72-73, World Book, Inc., Chicago, 1992.