

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

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## OBJECTIVES

At the end of this lesson, the students will 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, English

**TIME:** 1-2 hours

## 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A well is a hole in the ground from which water can be withdrawn.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 layers 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, 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.

## MATERIALS:

- \*2 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.

## **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  
(**Science TEKS K.2B, K.10A,B, 1.2B, 1.10A,B,C, 2.2B, 2.10B**)
  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 pinholes in the bottom of it, about 1/3 cup of water over the rock layers (rain). 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. Move the straw to the second cup and release your finger from the top of the straw. 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.
- B. Have a lesson on our local water supply, the Edward's Aquifer (See page 11 of this workbook for more information).
  1. How could increased well drilling affect the Edward's Aquifer?

- C. Have the students color the flow of water from the re-charge zone in the Hill Country until it is pumped out of the ground in San Antonio (📖 P.24)

**(Note: Do this Edward's Aquifer lesson before moving to the next activity- "How Low Can You Go?: The Water Table and Aquifer").**

### III. Follow-Up

- A. Students can construct their own wells and describe how they work in their daily journals. **(English TEKS K.15C,D,E, 1.18C,D, 1.19A,B, 2.20A,B,C)**
- B. The water added to the rock layers simulates rain. Discuss how various levels of rainfall affect a well. **(TAAS Reading-Cause & Effect-Objective 4)**
- C. Predict what will happen to the well if it doesn't rain for several days. Explain prediction. Test it. **(TAAS Reading-Predicting Outcomes-Objective 4)**

### IV. Extensions

- A. Do this experiment again, but this time use day 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

"The Water Soucebook: A Series of Classroom Activities for Grades K-2 Produced for Georgia Water Wise Council," Education Research and In-Service Center, University of North Alabama.