ROBERSON MUSEUM AND SCIENCE CENTER

Pre-Visit Confluence: Building an Aquifer

Grade Level: 4 through 7
New York State Standards: M S & T 1, 4, & 7
Pennsylvania State Standards: S & T 4.3, & 4.7

Objective: Students will learn how water is stored in an aquifer, how ground water can become contaminated, and how this contamination will eventually end up in our drinking well water. Students will learn how important it is that the careless disposal of harmful contaminants above ground can lead to contamination of our drinking water. Students will also perform an experiment to demonstrate this.

Materials:

- 1 clear plastic cup that is 2 3/4" deep and 3 ¼" wide per student
- 1 piece of modeling clay that will allow a 2" flat pancake to be made by each student for their cup
- White play sand that will measure ¼" in bottom of each students cup
- Aquarium gravel (natural color) or small pebbles approximately ½ cup per student. These should be rinsed and dried
- Red food coloring
- One bucket of clean water and a small cup to dip water from the bucket

Procedures:

1. Begin by giving students some information on drinking water. Tell your students that many communities obtain their drinking water from underground sources called aquifers. Water utility companies often drill wells through soil and rock into aquifers in the ground. The water they find will supply the public with drinking water. What is unfortunate is that ground water can often become contaminated. These contaminates come from harmful chemicals such as lawn care products and household cleaners that are not disposed of properly. Any pollutant that can enter the soil and rock can pollute the aquifer and eventually the well.

2. Now tell the students they are going to begin an experiment.
   a) Make sure each student has a clear plastic cup. Pour ¼" of white sand in the bottom of each cup completely covering the bottom of the container.
   b) Pour water into the sand, wetting it completely. There should be no standing water on the sand. Students should observe how the water is absorbed by the sand but remains around the sand particles.

c) Have each student flatten the modeling clay like a pancake and cover ½ of the sand with it. Have each student press the clay to one side of the container to seal that side off. The clay represents a confining layer that keeps water from passing through it.

d) Pour a small amount of water onto the clay. Let the students see how the water remains on top of the clay, only flowing into the sand below in areas not covered by the clay.

e) Use aquarium rocks to from the next layer of earth. Place the rocks over the sand and the clay, covering the entire container. To one side of the cup, have students slope the rocks, forming a high hill and a valley.

f) Now pour water into your aquifer until the water in the valley is even with your hill. Students will see the water storage around the rocks. Explain that these rocks are porous, allowing storage of water within the pores and openings between them. They will also notice a surface supply of water has formed like a small lake. This will give them a view of both the ground and surface water supplies which can be used for drinking purposes.

g) Put a few drops of food coloring on top of the rock hill as close to the inside of the cup as possible. Tell your students that often old wells are used to dispose of farm chemicals, trash and used motor oils. This will then show up in the ground water and drinking water. The students should see the color spread through the rocks, to the surface water and into the white sand in the bottom. This shows students one way that pollution can spread through the aquifer over time.

Developed by: Barbara Betza & www. epa.gov
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