



# CHILDREN'S CLEAN WATER FESTIVAL

Where Youth Are Making Waves!

## Groundwater

### Background:

Groundwater is water that is found underground in cracks and spaces in soil, sand and rocks. The area where water fills these spaces is called the saturated zone. The top of this zone is called the water table. The water table may be only a foot below the ground's surface or it may be hundreds of feet down.

Groundwater is often thought of as an underground river or lake. Only in caves or within lava flows does groundwater occur this way. Instead, groundwater is usually held in porous soil or rock materials, much the same way water is held in a sponge.

Groundwater is stored in, and moves slowly through, layers of soil, sand and rocks called aquifers. The speed that groundwater flows depends on the size of the spaces between the soil or rock, and how well the spaces are connected. Water in aquifers is brought to the surface naturally through a spring or can be discharged into lakes and streams.

This water can also be extracted through a well drilled into the aquifer. A well is a pipe in the ground that fills with groundwater. This water then can be brought to the surface by a pump. Shallow wells may go dry if the water table falls below the bottom of the well. Some wells, called artesian wells, do not need a pump because of natural pressures that force the water up and out of the well.

Groundwater supplies are replenished, or recharged, by rain and snow melt. In some areas of the world, people face serious water shortages because groundwater is used faster than it is naturally replenished. In other areas groundwater is polluted by human activities. In areas where material above the aquifer is permeable, pollutants can sink into the groundwater. Groundwater can be polluted by landfills, septic tanks, leaky underground gas tanks, and from overuse of fertilizers and pesticides. If groundwater becomes polluted, it is no longer safe to drink.

Groundwater is used for drinking water by more than 50% of the people in the United States, including almost everyone who lives in rural areas. The largest use of groundwater is to irrigate crops.

### **Groundwater: The Incredible Edible Aquifer**

CIM CORRELATION: Science

- Common Curriculum Goal: Understanding the properties and limited availability of the materials which make up the Earth: Recognizing that the supply of many resources is limited, and that resources can be extended through recycling and decreased use.

### The Incredible Edible Aquifer

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## Background:

Many communities obtain their drinking water from underground sources called aquifers. Water suppliers or utility officials drill wells through soil and rock into aquifers to supply the public with drinking water. Homeowners who cannot obtain drinking water from a public water supply have private wells that tap the groundwater supply. Unfortunately, groundwater can become contaminated by improper use or disposal of harmful chemicals such as lawn care products and household cleaners. These chemicals can percolate down through the soil and rock into an aquifer – and eventually into the wells. Such contamination can pose a significant threat to human health. The measures that must be taken by well owners and operators to either protect or clean up contaminated aquifers are quite costly.

## Objective:

To illustrate how water is stored in an aquifer, how groundwater can become contaminated, and how this contamination ends up in drinking water wells. Ultimately, students should get a clear understanding that what happens above the ground can potentially end up in the drinking water supply below the ground.

## Materials:

1. Clear Plastic Cups (12 or 16 Ounce)
2. Cubed Ice
3. Blue Food Coloring
4. Seven-Up
5. Crushed up Chocolate Graham Crackers
6. Clear Straws
7. Ice Cream (Dixie Cups work best)\*\*
8. Green Sprinkles
9. Multi-Colored Sprinkles

## Procedure:

1. Put a small layer of ice on bottom of cup. Place one drop of blue food coloring on ice. Add a splash of Seven-Up. This represents the “Lower Aquifer” (LA).
2. Place a healthy scoop of ice cream over the LA. The ice cream represents the confining clay layer that helps to protect the LA.
3. Add a few multi-colored sprinkles on top of ice cream (contaminants).
4. Add crushed grahams. This represents the soil layers.
5. Add green sprinkles. This represents the lawn area.
6. Add multi-colored sprinkles. This represents contaminants.
7. Top off with Seven-Up. Look to see if the contaminants are moving or changing.

Push a straw through each layer until you reach the LA. This represents a well being drilled into the aquifer. Have students look at the aquifer to see if it made any type of impact. Have students take a drink through straw. (They become the motors to pump the water out.) Have them look at the draw down. Have them watch what happens to the contaminants.

\*\* Ice cream already in small cups works great with this presentation, these can be found at your local grocery store.

**Further Discussion:** Discuss why and how water gets contaminated. What are ways that pollution can be prevented? What can you do to keep pollutants out of the groundwater?

## Resources:

### **Websites**

- The Groundwater Foundation: <http://www.groundwater.org/>
- EPA Ground Water Primer: <http://www.epa.gov/safewater/>
- National Groundwater Associations: <http://www.ngwa.org/PROGRAMS/educator/index.aspx>

**Local Contacts or Possible Field Trips:**

Oregon Groundwater Association  
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