

Drinking Dinosaur Water

Goal: To help students understand the hydrologic cycle and show how the underground water supply can be protected from pollutants.

Subject: Science

Vocabulary Words: hydrologic cycle—leach—groundwater—hazardous chemicals—evaporate.

Background:

*Did you know there is no new water? The water we use today may be the same water some dinosaur drank or bathed in. The water we drink may have traveled through the **hydrologic cycle** hundreds of thousands of times since the earth was formed. The hydrologic cycle is another way of saying the water is recycled. It falls to earth in the form of rain or snow. Then it runs off into lakes and streams or soaks into the ground to become part of the underground water supply. Water in lakes and streams **evaporates** into clouds that make more rain and snow. The underground water eventually comes back to the surface. That water is used in many different ways and also eventually evaporates to become clouds that become rain or snow.*

The thought of drinking recycled water may be a disturbing one. When water falls as rain, it picks up gases from the atmosphere. Water has a natural ability to dissolve materials, so it picks up minerals and gases as it passes through the earth. But nature has ways of cleaning the water before you have to drink it again.

*Most of the water we drink comes from underground water supplies, called **groundwater**. As this water travels through many layers of soil and rock, the soil and rock takes out most of the impurities. By the time the water gets to underground streams it is pretty much fit to drink. That's if it has moved slowly enough for the soil to do its work.*

*Poisons can get into our underground water supplies in several different ways. Sometimes the poisons we spray on our lawns to kill weeds and insects will **leach** into the water. Sometimes septic tanks that aren't properly maintained can cause problems. Another big problem is leaking into the underground storage tanks. These are tanks under abandoned gas stations where gasoline was stored. In many cases, gasoline that has been left in the storage tanks start to leak into the underground water supply when the old tanks start to leak. Now there are laws that require people who run gas stations to store their gasoline above ground. Landfills can cause big problems with the underground water supply. When the rain falls on the landfill, the water may pick up **hazardous chemicals** from motor oil, paint, bug sprays, and household cleaner's people have thrown out. These poisons can be carried through the ground into our water supplies. This can be a real problem if the groundwater is too close to the surface of the earth or if the soil under the landfill is very sandy. Then the water moves through the soil too quickly for the impurities to be removed.*

But if the landfill has been set up properly, the water supply is protected. The bottom and sides of a landfill are lined with layers of compacted clay and thick plastic. That way any water that flows through the landfill is slowed down by the clay and stopped by the plastic from soaking into the ground. This water is called leachate. The

leachate goes into drains and is collected in one place. Landfill workers treat the leachate to get the poisons out. Then it is released back into the water supply to be recycled in the hydrologic cycle.

Activity:

1. Bring three plastic pop bottles to class. Cut the top one half of the bottle to serve as a funnel. Place the top of the bottle upside down in the bottom part of the bottle.
2. Line all three funnels with the foot of an old pantyhose, paper towels, or coffee filters. Place about one cup of moist sand in the first funnel, one cup of mist clay in the second and one cup of moist garden or potting soil in the third.
3. Slowly pour about one cup of water in each funnel.
4. Use a stopwatch and record the amount of time it takes the water to get through each funnel. Compare the color of the water in each of the three bottles. Measure the water in each bottle to determine how much was absorbed by each type of soil.

Related Activities:

1. Try the funnel experiment again, but this time place one teaspoonful of unsweetened powdered beverage mix in the top of each funnel before adding water. Tell students the powdered beverage mix represents pollutants that can get into the water from landfills, septic tanks, improper dumping of hazardous waste (like pesticides and chemical fertilizers), and other sources. Have students compare the color of the liquid in the three bottles.
2. Have students bring their own pop bottles and small amounts of soil from home. Have them conduct their own experiments to see how fast water travels through the soil in your own area. Make a classroom graph to record the results of the experiments. Was there much difference in the rates at which water traveled through the different soils?
3. Try mixing cornmeal, salt, flours, oil, and other substances with the water to see which ones are most easily filtered by the soil. Leave the water uncovered in the bottles for several days and see what is left once the water evaporates. Evaporations is one of the methods used for cleansing pollutants from the hydrologic cycle.