

DROPS OF KNOWLEDGE FOR RIVERS OF CHANGE



GLOBAL TEACHING
AND LEARNING MATERIAL

A hands-on guide to teaching
and learning about
water, sanitation, hygiene,
and the environment

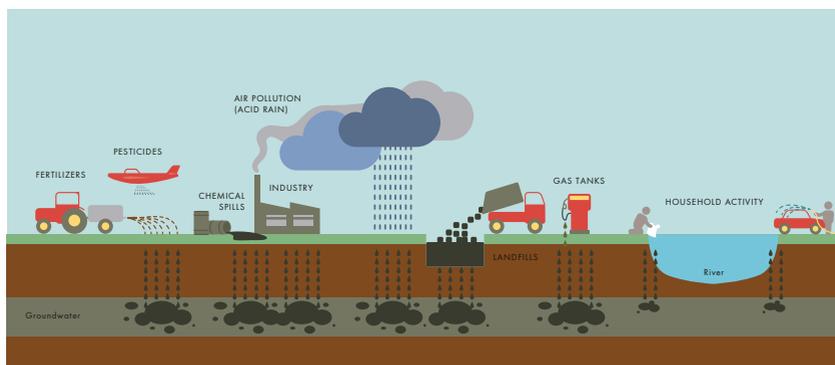
SWAROVSKI
WATERSCHOOL

ACTIVITY 7.2

ACTIVITY 7.2: HOW WATER IS STORED AND DISTRIBUTED UNDERGROUND

The term “groundwaters” has been internationally defined as “the hydrologic system composed of a number of different components through which water flows, both on and under the surface of the land. These components include rivers, lakes, aquifers, glaciers, reservoirs and canals. So long as these components are interrelated with one another, they form part of the watercourse.”³⁹

Part of the available freshwater in the world is stored in underground aquifers. Communities all around the world rely on aquifers for access to drinking water, demonstrating the necessity of protecting these sources of water on Earth. This activity is designed to illustrate how water is stored in an aquifer, how groundwater can become contaminated, and how this contamination can end up in a drinking-water source.



Source: <http://www.groundwater.org/get-informed/groundwater/contamination.html>

Time: 20 minutes / **Thematic Areas:** Science, Geography / **Goal for Learning:** Gain a clear understanding of how careless use and disposal of harmful contaminants above the ground can lead to them ending up in the drinking water below the ground.

³⁹ UN Watercourses Convention Online User's Guide, "Article 2: 2.14 Groundwater," Scotland: Centre for Water Law, Policy and Science, University of Dundee, 2015, www.unwatercoursesconvention.org/the-convention/part-i-scope/article-2-use-of-terms/2-1-4-groundwater.



Materials: □ 1 clear plastic cup 7 centimeters deep × 8.25 centimeters wide (2.75×3.25 inches) / □ Sand, enough to cover the bottom of the cup with a layer around 0.6 centimeters (1/4 inch) deep / □ 1 bucket of clean water and a small cup for dipping water from the bucket / □ Clay, enough to make a flat circle about 5 centimeters (2 inches) around / □ Approximately 1/2 cup of gravel (not artificially colored) or small pebbles / □ Red food coloring

ACTIVITY STEPS:



- 1 Pour the sand into the cup, completely covering the bottom. Pour water into the sand, wetting and mixing it in completely (there should be no standing water on top of the sand). Observe how the water is mixed around the sand, but is not absorbed into the sand particles, just as it would be in the ground.
- 2 Flatten the clay like a pancake and cover half of the sand with the clay, pressing closely to seal off one side of the cup. The clay represents a “confining layer” that keeps the water from passing through it. Pour a small amount of water onto the clay and observe that the water flows into the sand below only where the clay does not cover the sand.
- 3 Use the gravel or pebbles to form the next layer of earth. Place the gravel over the sand and clay, covering them entirely. Slope the gravel on one side of the cup to form a high “hill” and a “valley.” Then observe that these layers represent some of the many layers in the Earth’s surface.
- 4 Pour water into the “aquifer” until the water level in the valley is even with the top of the hill. You will see the water stored around the gravel. These rocks are porous, allowing storage of water within the pores and openings between them. Notice that a surface supply of water (a small lake) has formed. You are now able to see surface and ground water supplies, both of which can be used for drinking water.
- 5 Put a few drops of food coloring on top of the gravel hill as close to the inside wall of the cup as possible. Observe the passage of the color not only into the rocks, but also into the surface water and into the sand below. This shows one way that pollution can spread through an aquifer over time,

ACTIVITY 7.2



demonstrating, for example, how when people use old wells or surface areas to dispose of chemicals, trash, or used motor oils, it can impact the drinking water below

OBSERVATION AND DISCUSSION:

Learn about and discuss as a group other traditional ways of finding water.

Look into what happens when too much water is taken out of aquifers. Think about the household chemicals that are used in your home and talk about how to keep the groundwater clean in your area.

Take note of the more protected layer beneath the clay in your cup and how a deeper well might be able to access a cleaner source of water.

ADDITIONAL
RESOURCES:

Groundwater Foundation, www.groundwater.org

Vital Water Graphics, United Nations Environment Programme,
<http://new.unep.org/dewa/vitalwater/index.html>

Worldwatch Institute, www.worldwatch.org

“Approximately 40 percent of the world’s population lives in river and lake basins that comprise two or more countries, and perhaps even more significantly, over 90 percent lives in countries that share basins.”

– UN WATER⁴⁰

⁴⁰ Task Force on Transboundary Waters, “Transboundary Waters: Sharing Benefits, Sharing Responsibilities,” Zaragoza, Spain: United Nations Office to Support the International Decade for Action “Water for Life” 2005-2015, 2008, p. 1