

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 4.4: PUMPING WATER UP

After an underground source of water is found, the next step is bringing the water to the surface for access. Delivering water from an underground source such as an aquifer requires a pump. Pumps of all kinds use air pressure to create suction that draws the water up out of the ground.

Suction is created when an opposing force is removed. A drinking straw can be used for a simple demonstration of this principle. When you place a straw in a glass of water, the air pressure pushing down on the water inside the straw is the same as the air pressure pushing down on the water outside the straw. All is in balance. This is the same principle that is used when a pipe is installed to reach an underground aquifer. In a water-delivery system, the pump removes the opposing force inside the pipe by creating a vacuum. The air pressure outside the pipe does all the work.

Time: 30 minutes / **Thematic Areas:** Science, Mathematics / **Goal for Learning:** Discover the science behind water pumping.



Materials: Drinking straw / Clear glass of water / Eye-dropper or turkey baster

ACTIVITY STEPS:

- 1 Place a straw in a glass of water. Note that the level of water in the glass and in the straw is the same. Explain to students that this is because the air pressure in the straw and in the glass is equal.
- 2 Hold a finger securely on top of the straw and lift the straw out of the glass: the same amount of water will remain in the straw. When you release your finger (and so, the air pressure), the water will fall out.
- 3 Place the empty straw back in the glass and use your breath to remove the air pressure from inside the straw, creating suction that causes the water to be drawn up into your mouth. As long as you continue to suck the air pressure out of the straw, the water will continue to rise and flow; the moment that you stop, the flow also ends.

ACTIVITY 4.4



- 4 Explain that water pumps use different mechanisms to create the same effect, drawing water out of an aquifer and into a tap.

- 5 To extend the activity, conduct this simple demonstration of pumping water with the use of an eyedropper or turkey baster: when you place the eyedropper or baster into the water, nothing happens until you squeeze the bulb (exhaling the air from the tube and creating a vacuum). As you release the bulb, the water is drawn up into the tube. The tube of the eyedropper or baster is now full of water. If a hole and another tube were added to distribute the water, it would function as a water tap.

OBSERVATION AND DISCUSSION:

Ask students to brainstorm examples of places where water is pumped in their own lives. For example, how does the water get into their homes? Consider visiting a local water source or utility and talk about how the water travels.