ACTIVITY 2.2

DROPS OF KNOWLEDGE FOR RIVERS OF CHANGE

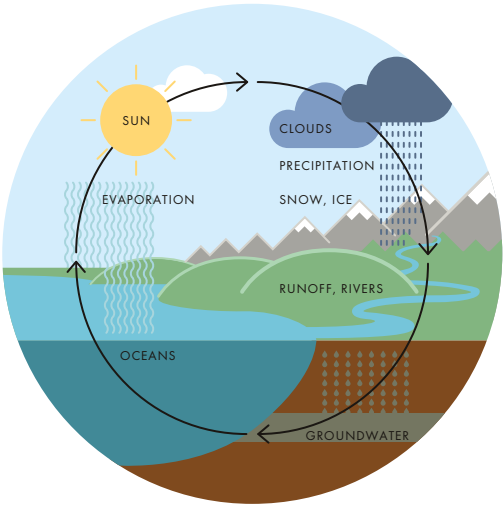
GLOBAL TEACHING AND LEARNING MATERIAL

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

SWAROVSKI
WATERSCHOOL

ACTIVITY 2.2: WATER CYCLE IN A BOWL AND ROLE-PLAY (Adapted from Swarovski Waterschool Austria)

All the Earth's water resources are interconnected in the global water cycle. The sun provides the energy that keeps water continuously circulating, as its radiation causes water on the surface of the oceans, and on the surface of the land underground throughout the world (in the form of rivers, lakes, and streams), to evaporate.



Source: http://www.srh.noaa.gov/jetstream/atmos/hydrocycle_max.html

When the rising water vapor/steam cools in the higher levels of the atmosphere and condenses, tiny water droplets come together to form clouds, which are blown around by the winds. Because cool air within the clouds can hold less water than warmer air, these drops fall to the Earth in the form of rain, snow, or hail. The precipitation is affected by gravity, and collects in streams and rivers. Then, it either evaporates back into steam or ultimately flows into the oceans. Some rain drains into the ground, where the soil absorbs it like a sponge. Trees and plants absorb water from the soil, and that water is then released into the environment in the form of water vapor. And the cycle continues forever. In some places, like big cities where concrete covers many ground areas in the form of roads and buildings, the soil is not able to absorb the water, and flooding occurs, threatening daily life on the surface.

THIS ACTIVITY HAS TWO PARTS: an experiment with a bowl of hot water and ice cubes, plus an optional step for a warm day, and staging a play about the water cycle. Younger children may particularly enjoy watching older students perform the play.

PART 1 creates a miniature water cycle of "rain" in a bowl, demonstrating that it is a closed system in which water becomes part of our daily lives and that no part of the water is lost.

PART 2 encourages everyone to use their imagination. The play is designed to help students develop an understanding of the water cycle concept by acting out the parts of water drops and the sun. The topics it covers include evaporation, water vapor, condensation, clouds, raindrops, groundwater, plants, transpiration, and the atmosphere.

PART 1: EXPERIMENT TO DEMONSTRATE PRECIPITATION

Time: 50 minutes / **Thematic Areas:** Science, Art, Theater / **Goal for Learning:** Foster a deeper understanding of the cycle of water on our planet.

Materials: ☐ 1 large clear plastic or glass bowl / ☐ Hot water (not boiling) / ☐ Clear plastic wrap / ☐ Cellophane, or a piece of a clear plastic bag (large enough to cover the top of the bowl / ☐ 1 large rubber band / ☐ Several ice cubes

Optional Extension: ☐ 1 glass and cold water

ACTIVITY STEPS:

1. Put enough hot water in the bowl to fill it about ⅓ of the way.

2. Stretch a layer of clear plastic wrap over the top of the bowl, smooth it down on all sides so that the bowl is airtight, and secure the plastic with the rubber band.

3 Watch as the water begins to evaporate and rise. Soon it will begin to drip back down from the clear plastic wrap ... it is "raining."

4 Place several ice cubes on top of the clear plastic wrap, and watch the "raindrops" form and fall more rapidly.

5 Explain that water vapor in our atmosphere gets cold and changes back into liquid, forming clouds. This is called "condensation." If the air is really cold, raindrops turn to snowflakes or ice (hail or sleet).

Optional Extension:

6 On a hot day, pour cold water into a glass. Watch what happens: drops of water form on the outside of the glass.

7 Explain that the water did not leak through the glass, but came from the air. Water vapor in warm air turns back into liquid when it touches the cold glass.

WATER CYCLE IN BOWL

PART 2: "ALINA AND VIKTOR EXPLORE THE GLOBAL WATER CYCLE"

(Script for the play, provided in ANNEX A., page 151)

Materials: ☐ 1 large piece of blue cloth to represent a puddle of water / ☐ 1 yellow cloth to represent the sun (or use a sun made of paper or cardboard) / ☐ 1 gray cloth to represent a cloud / ☐ A gong or other loud noisemaker to simulate thunder / ☐ 1 brown cloth to represent the ground / ☐ A leafy branch from outdoors to represent a tree (or use a branch made of paper or cardboard)

ACTIVITY STEPS:

1. This short play can take place on any area that can be cleared and set up for a performance; the instructions in Annex A simply refer to "the stage."

2. Before the play starts, gather the materials listed above, and ask everyone in the group to read through the script

3. Three children will volunteer to be Alina, Viktor, and Tony. One child will act as the sun, and several other children, depending on the size of the group and the stage, will appear as more water drops. Other children will be needed to spread the cloths out on the stage, and to fold them up and take them away.

4. A teacher or group leader will read the script throughout the performance

OBSERVATION AND DISCUSSION:

Spark discussion about the water cycle on Earth and how it relates to the experiment. Ask students to share their observations from the experiment and the performance.

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