

The Incredible Journey

Modified from Project WET Curriculum and Activity Guide, 1995

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Purpose:

The purpose of this activity is to explore the movement and state of water within the water cycle. This activity helps students to understand that the water cycle is far more complex than what is often presented in textbooks.

Objectives:

1. Students will be able to identify the different ways in which water moves through the water cycle, including moving in different states, rates, and patterns.
2. Students will be able to write a story of a water molecule as it moves through the water cycle, using the bracelet that they create as a visual illustration of the water's journey.

Materials:

-10 different colored pony beads (from craft stores)
-10 large pieces of paper to designate the following stations: plant, animal, lake, soil, river, clouds, ocean, ground water, glacier, sun*

-10 cubes labeled according to chart
-string for beading bracelets
-markers
-paper

Engage:

A week before conducting this activity, place a flat dish of water on the window sill and have the students make observations of what happens to the water as the days pass. Engage in a discussion of where the water that was on this dish has gone (evaporates and in its gas form is released into the atmosphere). At the conclusion of the week's observations, assess prior knowledge by having the students think about where the water in the dish could eventually go as it moves in through and around the earth. Write these on the large pieces of paper (and if students are not able to name all, be sure to include those missing so that you have the nine stations listed above). Ask the students how it is that water moves? What is necessary? (gravity and heat) Label one large sheet SUN to symbolize this source of energy.*

Explore:

Tell the students that they are now going to become water molecules moving through the water cycle. They will create bracelets to symbolize the stops they have made on their journey (like charms on a bracelet, for instance) and each student must first start with the sun as the sun provides the energy source necessary for water to move through the cycle (note: you could use ultraviolet detecting beads that change color when exposed to sun—available at www.teachersource.com). Then divide the students equally among the other 9 stations. This is their starting point and the students should begin by placing a bead of that color on their bracelet. Then explain to students that they will need to roll the cube (make sure you have cubes labeled according to chart and at the appropriate station). Students should take turns rolling the cube and then progressing onto the station indicated by the cube. At the next station, students are to place another bead on their bracelets and roll the cube at that station to determine where they should go next. If a student rolls STAY, they should place the same color bead on their bracelet and go to the end of the line. Allow the students to continue moving through the stations until they have a pre-determined number of beads on their bracelets (10-20 gives students a good feel for where they might travel on their journey).



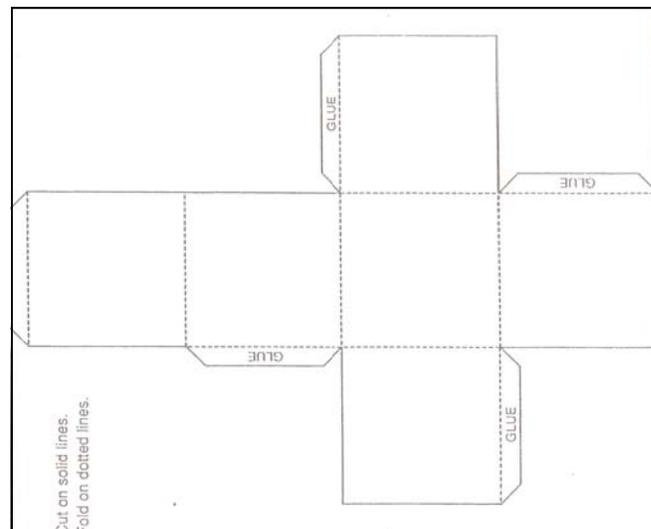
Presenter prepares beads and string at the Topeka Water Festival
Photo by Hank Ernst

ACTIVITY PAGES

STATION	CUBE SIDE LABELS	EXPLANATION
Soil	one side plant one side river one side ground water two sides clouds one side stay	Water is absorbed by plant roots. The soil is saturated, so water runs off into a stream. Water is pulled by gravity; it filters into the soil. Heat energy is added so the water evaporates and goes to the sky. Water remains on the surface-e.g. in a puddle, adhering to particles.
Plant	four sides clouds two sides stay	Water leaves the plant through the process of transpiration Water is used by the plant and stays in the cells.
River	one side lake one side ground water one side ocean one side animal one side clouds one side stay	Water flows into a lake. Water is pulled by gravity, it filters into the soil. Water flows into an ocean. An animal drinks water Heat energy is added so water evaporates and goes to the sky. Water remains in the current of a river.
Clouds	one side soil one side glacier one side lake one side ocean two sides stay	Water condenses and falls on soil Water condenses and falls as snow onto a glacier. Water condenses and falls into a lake Water condenses and falls into the ocean. Water remains as a droplet clinging to a dust particle.
Ocean	two sides clouds four sides stay	Heat energy is added and water evaporates and goes to the sky. Water remains in the ocean.
Lake	one side ground water one side animal one side river one side clouds two sides stay	Water is pulled by gravity and filters into the soil. An animal drinks the water. Water flows into a river. Heat energy is added and water evaporates and goes to the sky. Water remains within the lake or estuary.
Animal	two sides soil three sides clouds one side stay	Water is excreted through feces and urine. Water is respired or evaporated from the body. Water is incorporated into the body and remains in cells.
Ground Water	one side river two sides lake three sides stay	Water filters into a river. Water filters into a lake. Water stays underground.
Glacier	one side ground water one side clouds one side river three sides stay	Ice melts and water filters into the ground. Ice evaporates and water goes to the clouds (sublimation). Ice melts and water flows into a river. Ice stays frozen in the glacier.



GOOD SOURCE FOR CHEAP BEADS:
www.sunshinecrafts.com



ACTIVITY PAGES

Explain:

Gather the students back together and have them make observations about how their bracelets are alike and different. Students should notice that while some water molecules traveled to many different places, others seemed to stay in just a few places. Some students will remain in the clouds, for instance, others in the glacier. The probability of rolling each option with each cube could be determined to incorporate math into the activity. Without calculating probability, however, students can logically conclude that water molecules in oceans, glaciers and ground water for instance, are more likely to stay put. Here are some questions to explore with students to guide this discussion:

- Where do you think water molecules are likely to move quickly from in the water cycle?
- Where do you think water molecules are likely to stay longer in the water cycle?
- Were there any students who completed a cycle? (e.g. returned to the same station where they started)
- What forms (solid, liquid, vapor, gas) were water molecules in as they moved through various parts of the water cycle? -What conditions do you think were necessary for water to move from each station? (take time to explore each cube and discuss possible explanations (listed in chart) for the different options.
- Give students examples from around the school of where water is found and have them discuss where water could travel from that point (puddles, sidewalk, human body, etc).

Elaborate:

Have the students write about their journeys as water molecules. This writing could take the form of a poem, story, journal, or cartoon, to name a few. Consider having students create a water cycle play and act it out for younger students. Have students alter the game to include other variables that influence how water moves through the water cycle, such as geographic location, seasons, etc. Have the students modify this game to show how pollutants move through the water cycle and how water can be cleaned (for instance in a buffer strip along a riparian area). Have students develop a story of how water travels through different soil types, through the body of an animal, a plant, etc. Have students explore African traditions of "story necklaces" and research to see if other cultures have similar customs.

Evaluate:

Use students' final projects as an evaluation tool--develop a rubric with specific criteria according to the nature of the final project.



Students at the Valley Heights Water Festival participate in The Incredible Journey
Photo courtesy of The Groundwater Foundation



Water Festival Organizers participate in The Incredible Journey
Photo by Hank Ernst

See a computerized version of The Incredible Journey and find out more about Project WET at www.projectwet.org

