

CRITICAL THINKING ACTIVITY: THE WATER CYCLE

OBJECTIVES: Students will:

- Understand that solar energy as the main driver for the movement of water on Earth:
- ♣ Describe the movement of water within the water cycle;
- Identify and describe the forms water takes in the three states of matter:
- Discuss how water transitions between different states.

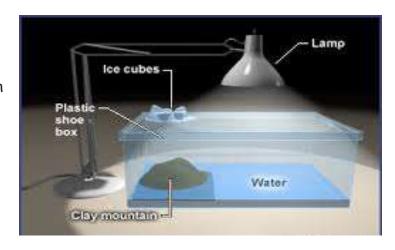
ACTIVITY #1: MODELING AND OBSERVING THE WATER CYCLE

MATERIALS:

- ♣Clear glass or plastic aguarium or shoebox
- ➡Lid for aquarium or shoe box, a piece of cardboard or plastic wrap
- ♣Rubber bands to hold the plastic wrap in place, if used.
- 🖶 A gallon or quart-sized plastic bag filled with sand, gravel or soil
- **∔**Warm water
- Blue food coloring (optional)
- ♣Jar lid or small bowl
- **∔**Ice
- ♣Small insulated cup or plastic bag for ice
- Light source: bright sunlight or lamp (40-60W). If using a lamp, desk or clamp-on type lamp works best.

PROCEDURE:

ACTIVITY 1: Set up the equipment as shown in the figure.



Teacher Sheet 2

2. Cut a hole large enough to fit the insulated cup in the "lid" of your aquarium or clear plastic shoebox.

NOTE: You can also use plastic wrap. Just place the ice in a baggie and put it directly on the plastic wrap cover.

- 3. Add enough water to fill the container with water 2-5 cm deep.

 NOTE: Add several drops of blue food coloring to make it easier to see the water.
- 4. Position and shape the sand or gravel at one end of the aquarium to create a mountain. The sand/gravel should be above the water level.
- 5. Add a small jar lid or bowl to the "land area" on top of the sand and under the ice.
- 6. Fill a cup or plastic bag with ice and place it in the opening in the lid or on top of the plastic wrap.
- 7. Place the lamp so that it heats the water at the other end of the box.
- 8. Turn on the lamp, or place the apparatus in the sun and observe.
- 9. Once the cycle begins, have student take notes and sketch what they see happening in their notebooks. They should then be able to answer the **ANALYSIS** questions for **PART 1**.

ACTIVITY 2: A Journey Through the Water Cycle

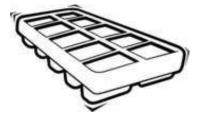
Each student should be able to describe the water cycle either orally, written or visually using the vocabulary above. A good way to assess their understanding is to have them write a story from the point of view of a water molecule as it travels through the water cycle. Ask them to be as detailed as possible so that it's obvious they understand the water cycle but encourage them to have fun with the details of the story. There are several scenarios listed that they can choose from or they can develop their own. Students should use story maps to plan out their stories, remember to use the scientific terms and write in complete sentences.

Teacher Sheet 3

EXTENSIONS:

- ♣ Create a cartoon illustrating the water cycle.
- ➡ WHERE DID THE WATER COME FROM? Analyze the following scenario:

Latisha took a sealed, plastic container of ice cubes out of the freezer. The outside of the container was dry when she took it out of the freezer. She set it down on the countertop. She did



not open the container. Half an hour later she noticed that all of the ice had melted inside the container and that the container was full of water. A small puddle had formed on the kitchen countertop, around the outside of the container.

Which best describes where the puddle of water came from?

- A. A gas in the air
- B. Melted ice inside the container
- C. Cold on the outside of the container
- D. Condensation from water inside from inside the container
- E. Water that evaporated from inside the container
- F. Cold changed hydrogen and oxygen atoms to water

Describe and illustrate your answer about where the water came from. Provide a detailed explanation to support your choice.