

“Water Cycle in a Bag”

Objective: Students create an enclosed environment where they can observe the stages of the water cycle and its necessity for plant growth. 9

Grade Level

Kinder-3rd

Time Frame

Approximately 45 minutes

Learning Objectives	Vocabulary	Science TEKS	Materials
Students will: <ul style="list-style-type: none"> Observe and describe the three major phases of the water cycle Explain how sunlight and temperature affect the water cycle Explain why it is important to conserve and protect available drinking water 	<ul style="list-style-type: none"> <i>Evaporation</i> <i>Transpiration</i> <i>Condensation</i> <i>Precipitation</i> <i>Percolation</i> <i>Conservation</i> <i>Cycle</i> 	K.7(B)(C),K.9(B),K.10(D) 1.5(B) 2.5(B),2.6(A),2.8(C),2.9(A) 3.5(B),(C),3.8(B),	<ul style="list-style-type: none"> Illustration of hydrologic cycle Black permanent marker Soil Sandwich baggies Small gravel Sand Illustration Cards Plant seeds

Prior to activity

Locate a sunny place where the bags can sit undisturbed for 3 days.

Background

Water covers 71 percent of the Earth, and can exist in liquid, vapor, or solid forms. Water is constantly moving; for example, it evaporates from oceans into the atmosphere, condenses to form clouds, falls as rain or snow, and eventually returns to the oceans through a system of streams and rivers. Scientists describe this movement of water in a model called the water cycle. Energy from the sun, which allows evaporation, is the driving force that powers the water cycle.

Water can be a liquid or a solid and can go back and forth from one form to the other.

When liquid water disappears, it turns into a gas (vapor) in the air and can reappear as a liquid when cooled, or as a solid if cooled below the freezing point of water.

Illustration cards help with understanding

Engage

1. Ask students to define a cycle. Ask them to name cycles in their lives (i.e. morning, afternoon, night, winter, spring, summer, and fall).
2. Ask students to think of where their water comes from. Ask them if they have ever heard of the water cycle.
 - a. Tell students that the water cycle is a model for thinking about the journey that water takes

Explore

1. Cut out the illustration of the hydrologic cycle and place it inside the bag
2. Using the black permanent marker, trace the outline of the illustration onto the bag. When you have finished coloring, remove the picture from the bag.
3. Place a handful of gravel in the bottom of the bag to represent the aquifer
4. Place a handful of soil on top of the gravel
5. Drop one or two plant seeds in the soil and press down
6. Gently spray water over the soil and rock mixture until moist
7. Zip the bag shut and place it upright in an area that receives indirect sunlight.

Explain

Have students observe their bags each day for three consecutive days.

- a. Ask students to share their observations
- b. During what phase of the water cycle is water invisible? (Evaporation)
- c. Why is the water invisible during this phase? (It is a gas)
- d. What causes water to evaporate in the water cycle? (Heat from the sun)
- e. During what time of day was evaporation in the bag the greatest? (The sunniest, hottest part of the day)
- f. During what time of day was condensation in the bag the greatest? (Cooler, dark night hours)
- g. What stage of the water cycle do the water droplets inside the baggie represent? (Condensation)
- h. When many droplets of condensed water collect in the atmosphere, what do we see? (Clouds)
- i. Is the total amount of water in the baggie the same after 3 days? (Yes, unless the bag is not sealed tightly)
- j. When water droplets collect at the bottom of the baggie, what state of the water cycle does this represent? (Precipitation)
- k. Based on your baggie experiment, what are the indications that the water cycle is taking place?

Elaborate

1. Remind students that although they cannot always see it happening, the water cycle is constantly occurring all around them.
 - a. Emphasize that the earth contains the same amount of water today that it contained when the dinosaurs walked the Earth. The experiment models this by showing the same amount of water in the bag at the beginning and the end of the experiment.
2. Speculate whether or not the total amount of Earth's water ever decreases or increases.
 - b. During the Ice Age, more of Earth's water was frozen in glaciers, but the amount of water present during the Ice Age was the same as the amount of water we have today.

Evaluate

1. How concerned should the people of Earth be about running out of water?
 - a. Develop the idea that although water on Earth is abundant overall, the vast majority of water on Earth is either trapped as frozen ice or found as salt water in the oceans.
 - b. Explain that 97% of the Earth's water is saltwater in the oceans and 2% of the Earth's water is frozen.

- c. Of all the water available on Earth, only about 1 gallon out of every hundred gallons is available as drinking water. As a result, we must be careful to conserve our available fresh drinking water and protect it from contamination and pollution.

Glossary

EVAPORATION – vapor created when the sun heats water in lakes, streams, rivers, oceans, puddles, etc.

TRANSPIRATION – vapor created when plants and trees give off moisture

CONDENSATION – tiny droplets of water formed when water vapor rises into the air and cools.

PRECIPITATION – moisture released from clouds in the form of rain, snow, sleet and hail. PERCOLATION – the downward movement of water through the ground

CONSERVATION – the act of preserving, guarding or protecting; wise use.

CYCLE – a complete set of events occurring repeatedly in the same sequence