



## *The Returning Raindrop*

Did you know that some of the water molecules we drink today may have been around when dinosaurs walked the Earth thousands of years ago? Water is continuously recycling in a process called the hydrologic cycle. Heat energy from the sun causes liquid water to change into its gaseous form, water vapor, through evaporation, whereby the water vapor rises up into the atmosphere. Evaporation happens constantly from lakes, rivers, oceans, etc. When water vapor enters the atmosphere, it cools as it rises. Particles of dust and salt attract the water molecules. These microscopic particles are light enough to remain suspended indefinitely in the air. The water gathers together in larger and larger droplets and forms clouds. This change from vapor back into a liquid is called condensation. Condensation will occur whenever warm air comes in contact with a cold surface. When enough water droplets collect, the water will fall back to Earth in some form of precipitation, such as rain, sleet, hail, or snow, only to have the process start all over again.

This view of the hydrologic cycle is rather simplistic. Heat energy directly influences the rate of motion of water molecules. When the motion of water molecule increases because of an increase in heat energy, water will change from solid to liquid to gas. With each change in state, physical movement from one location to another usually follows. The simple view of the water cycle fails to consider ground water, melting ice or snow, animals, plants, and the roles each plays in the water cycle.

### **KEY VOCABULARY:**

**Condensation** is the process by which a vapor becomes a liquid (the opposite of evaporation).

**Conservation** is the use of water-saving methods to reduce the amount of water needed for homes, lawns, farming, and industry and increase water supplies for optimum long-term economic and social benefits.

**Evaporation** is the process by which the liquid form of water is turned into a gas and returns to the atmosphere. Water evaporates from all bodies of water or any wet surface when the air is warmer than the water.

**Ground water** is water that has been absorbed into the soil and is contained in rock pores, cracks and crevices in rock formations, sand, gravel, and other porous materials. Aquifers are one kind of ground water. Water from wells or springs are ways of tapping ground water.

**Precipitation** (see definition of **Condensation**).

**Transpiration** is the process by which water absorbed by plants (usually through the roots) is evaporated into the atmosphere from the plant surface (principally from the leaves).

## OBJECTIVE:

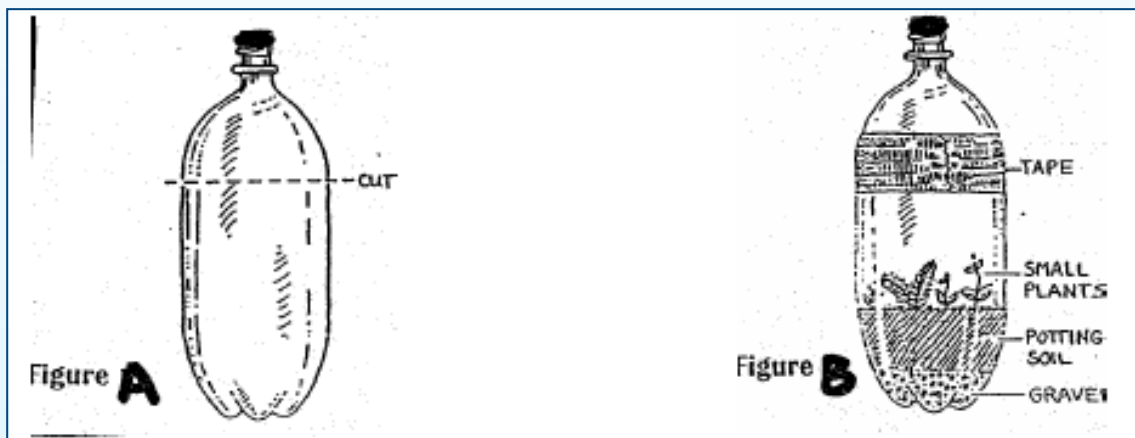
Make a simple terrarium. The terrarium offers a simple way for students to watch the water cycle as it operates on a small scale: groundwater, evaporation, condensation, and precipitation. Although there is little control over the hydrologic cycle and the primary water supply is firmly fixed, water must be managed and conserved to accommodate the ever-increasing human uses of water.

## MATERIALS:

- 2-liter clear soda bottle with cap
- Potting soil
- Small plants or moss
- Gravel
- Tape
- Ruler
- Scissors
- Misting bottle
- Water

## PROCEDURE:

Put the students into groups of 4 or 5. Assign a job to the students in each group.



1. Cut the bottle as shown in Figure A. (Teacher should do this with a utility knife.)
2. Place  $\frac{1}{2}$  inch of gravel in the bottom of the bottle.
3. Cover the gravel with approximately 2 inches of potting soil.
4. Place the small plants in the soil.
5. Use a misting bottle to gently add water until the soil is moist.
6. Place the top back on the bottle and tape it securely. (See Figure B)
7. Place the terrarium in a well-lit (but not too sunny) area. The plants will thrive and the water cycle will be demonstrated year-round.

Use the attached discussion questions when the small groups come back together.

## THE RETURNING RAINDROP Teacher Answer Sheet

1. What will keep the plants moist? How will they get watered?

**Answer: The Water Cycle**

2. The plant will draw moisture through the soil and release it through their leaves. What is this process called?

**Answer: Transpiration**

3. What will happen next?

**Answer: Evaporation and Condensation**

4. How will “rain” get back into the soil?

**Answer: Precipitation**

5. Why do we seal the bottle?

**Answer: It keeps the evaporating water from escaping from the bottle.**

6. Will we ever need to add more water to the terrarium?  
What happens if precipitation does not occur in an area for a long time?

**Answer: If rain does not occur in an area for a long time we experience a drought. Lower levels of water are dangerous to the life and safety of humans and animals.**

Name \_\_\_\_\_

Date \_\_\_\_\_

### THE RETURNING RAINDROP Discussion Questions

1. What will keep the plants moist? How will they get watered?

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2. The plant will draw moisture through the soil and release it through their leaves.  
What is this process called?

\_\_\_\_\_

3. What will happen next?

\_\_\_\_\_

4. How will “rain” get back into the soil?

\_\_\_\_\_

5. Why do we seal the bottle?

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6. Will we ever need to add more water to the terrarium?

\_\_\_\_\_

7. What happens if precipitation does not occur in an area for a long time?

\_\_\_\_\_

## THE RETURNING RAINDROP Exercise

Fill in the labels. Write on the bottom of the page what you learned about the Water Cycle.

