

# Exploring the Water Cycle

Area: Physical Science

Age Group: 1<sup>st</sup> – 5<sup>th</sup> Grade

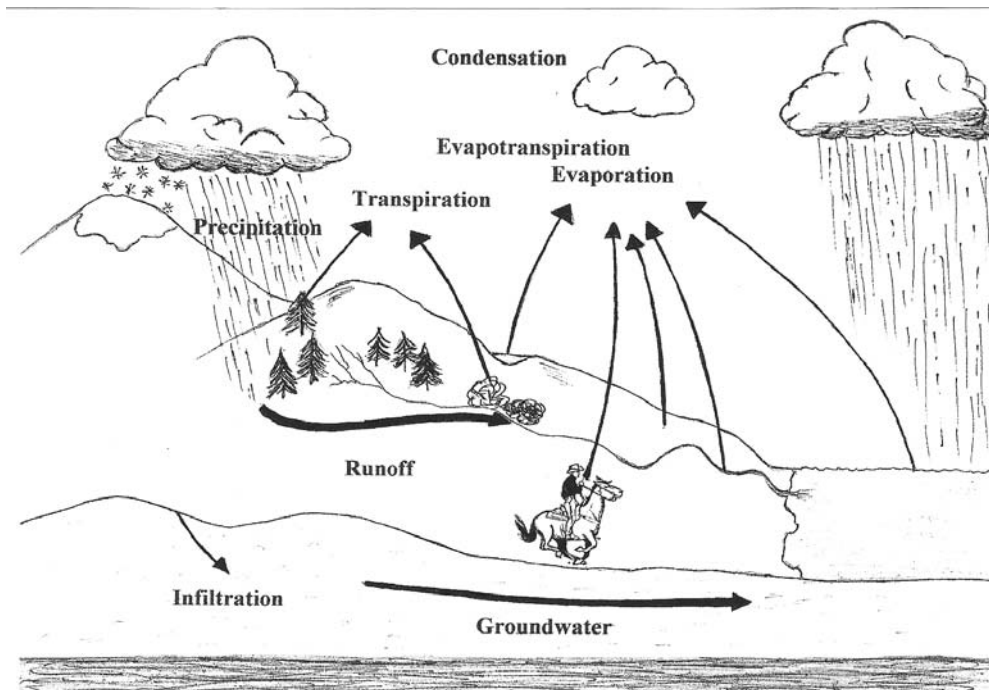
## I. Materials:

- Plastic 2-liter bottles
- Scissors
- Potting soil
- Plant Seeds
- Water
- tape

## II. Objective:

To allow students to visually explore the water cycle through the creation of a miniature enclosed ecosystem (terrarium).

## III. Background Information:



The Water Cycle or Hydrologic Cycle

Water is the essential fluid of life. Our bodies are made up largely of water and thus, our lives and other organisms' lives are dependent upon the water cycle. The sun's energy powers the water cycle, consisting of evaporation, condensation, and precipitation that resupplies earth's surface water and groundwater. Plants take their water from the soil through their roots. Animals get the water they need by drinking surface water or from the food they eat.

**Evaporation:** Water leaves the surface of the land, bodies of water, and the bodies of animals by evaporation. Water changes from a liquid state to water vapor, a gas.

**Transpiration:** Plants release water through openings (stomata) in their leaves into the atmosphere.

**Evapotranspiration:** the processes of evaporation and transpiration

**Condensation:** In the atmosphere, the water vapor returns to a liquid state and collects around tiny particles in the air (nuclei of condensation). This is how clouds are formed.

**Precipitation:** When there is too much water in the clouds, the water falls back to the Earth as rain, snow, sleet, or hail.

**Infiltration:** As the precipitation strikes the Earth, some of the water soaks into the soil and travels downward to become groundwater.

**Runoff:** This refers to water that does not infiltrate into the ground and instead flows over the land and returns to streams, rivers, lakes, oceans, etc after precipitation.

## IV. Procedure

### Teacher Preparation:

1. Cut the plastic 2-liter bottles into two pieces about 4 inches from the base.
2. Distribute the following to each student:
  - a. An already cut plastic 2-liter bottle
  - b. About a cup of potting soil
  - c. A few seeds or a small plant
3. Make copies of the Daily Log and Terrarium Observations.

### Student Activity: Preparing the Terrarium

1. Pour about 3 inches of potting soil into the bottom of the plastic bottle.
2. Plant a few seeds or a small plant. Do not plant the seeds too deep, but make sure they are sufficiently covered by the soil.
3. Water the soil. Water enough so that the soil is damp. There should be little excess water, but do not flood the soil.
4. Place the top portion of the bottle inside the bottom to make a dome. You can tape the two halves back together for reinforcement. Make sure that the bottle top is on and that the two halves are sealed tightly.
5. Make sure the student's name is on both the top and bottom portion of the bottle.
6. Put the terrariums where they will be able to receive sunlight. However, make sure the plants and terrarium do not bake in the sun. There can be too much sun.

**Student Activity – Daily Predictions and Observations**

1. Ask students to make predictions about the growth of the plant; the movement of water within the terrarium; and any other predictions.
2. Ask students to monitor their terrariums on a daily basis.
3. Students should make and record any observations on the observation log.
  - a. Stage of the water cycle the terrarium is in
  - b. Plant growth
  - c. Other physical characteristics of the terrarium
4. Drawings of their observations should also be recorded.
5. The students should be able to see all stages of the water cycle. Students should even be able to see it rain in their terrariums.

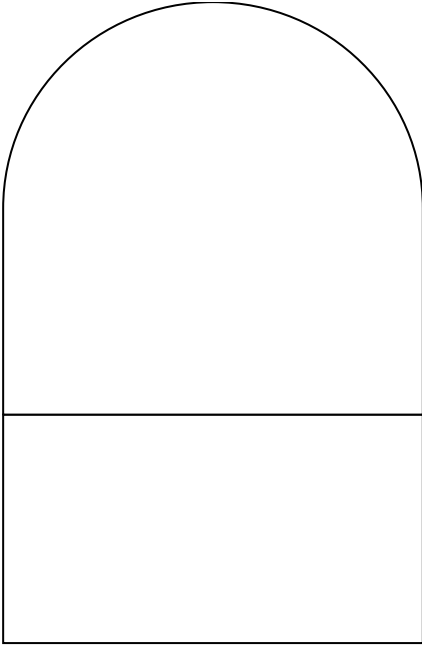
**Supplementary:**

Add insects to the terrarium to explore the qualities of an ecosystem. Earthworms and spiders are recommended.

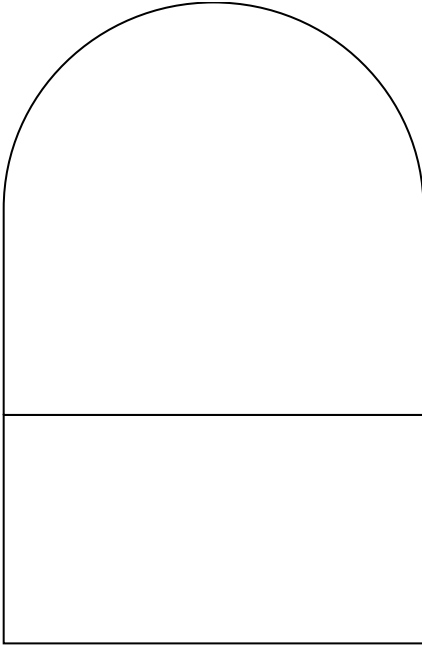
# Exploring the Water Cycle - Daily Log

Name:

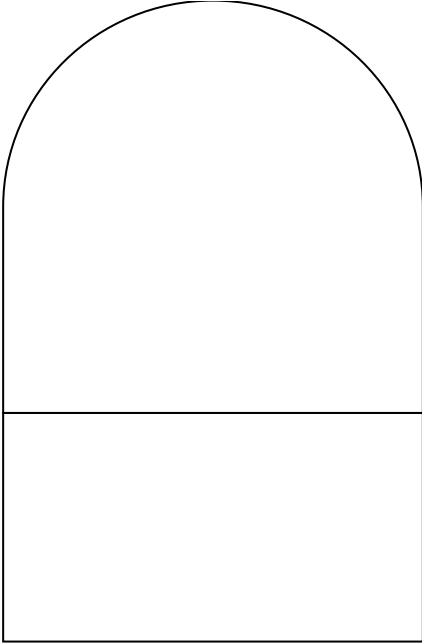
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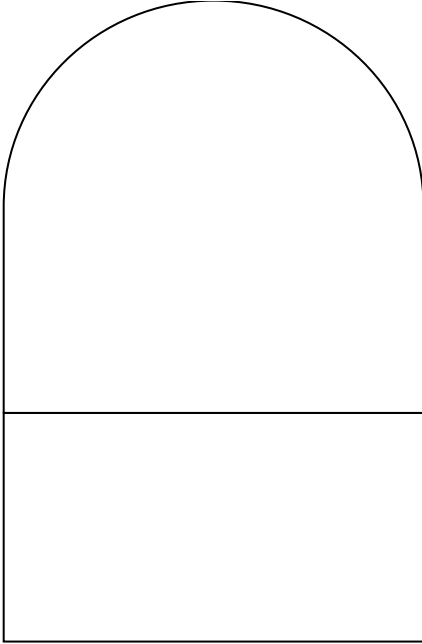
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# Terrarium Observations

Name:

| Day   | Date | Height | Water Cycle Stage | Observations |
|-------|------|--------|-------------------|--------------|
| Day 1 |      |        |                   |              |
| Day 2 |      |        |                   |              |
| Day 3 |      |        |                   |              |
| Day 4 |      |        |                   |              |
| Day 5 |      |        |                   |              |
| Day 6 |      |        |                   |              |