

Terrarium Making and the Water Cycle

The purpose of this lesson plan is to demonstrate the water cycle through the use of terrariums made in class by the students. The students will better understand the processes through their understanding of how a terrarium works.

Primary Learning Outcomes

Students will observe first hand a miniature version of the water cycle by constructing and maintaining a terrarium. Similar to the way water evaporates and rises into the atmosphere before falling again as some form of precipitation, in the terrarium, the water will evaporate and rise before condensing on the side of the terrarium container. It will then fall to provide moisture to the plants in the terrarium.

Assessed Georgia Performance Standards

SCSh3. Students will identify and investigate problems scientifically.

SCSh6. Students will communicate scientific investigations and information clearly.

SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within ecosystems.

SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.

Procedures/Activities

Step : 1 Duration: 1 hour 30 minutes

Select a large container for the terrarium such as a peanut jar, 2 or 3 liter coke bottle, or other large plastic or glass container. Clean the container and dry the inside with a paper towel. Place gravel (about $\frac{3}{4}$ inch) on the bottom of the container. Sprinkle charcoal over the gravel. Cut a soil separator and place on top of the charcoal. (Note: A soil separator is some type of material that will allow water to flow through, but will not let soil get down into the charcoal and gravel. A good material for this is a fine mesh such as window screen that can be found at hardware stores or home improvement stores.) According to the type of terrarium chosen, prepare the soil mix. Mix soil ingredients together and spoon over the soil separator until it is approximately 1 inch thick. Dig holes down to the soil separator to plant the plants in the terrarium. After plants have been planted, add any decorations such as figurines, acorns, twigs, etc. to the terrarium. Add $\frac{1}{4}$ cup of water to the terrarium and cover. The next day, check the sides of the terrarium to see if you are watering it too much. If a heavy mist appears on the walls of the container, the terrarium is being watered too much. In your discussion of the process of the water cycle, explain to the students that because very little of the water is able to evaporate into the atmosphere outside of the bottle, water is being cycled in the terrarium environment. In order to prove this point, you can construct a terrarium that is kept open all of the time instead of being a closed environment. The difference in the amount of water needed to keep the open and closed terrariums alive will show the amount of evaporation. It will also show the amount of water that is being kept in the system for use by the plants.

Materials and Equipment

1. Terrarium jars (peanut jars, two liter bottles, food jars, etc.)
2. Potting Soil
3. Perlite
4. Sand
5. Peat moss or vermiculite
6. Limestone
7. Humus
8. Soil separator (synthetic material)
9. Sprayer to mist plants
10. Small gravel
11. Charcoal
12. Various tropical, woodland, and desert plants
 - a. Tropical Plants – Arrowhead, Creeping Fig, Coral Berry, Chinese Evergreen, English Ivy, Iresine, Parlor Palm, Strawberry Begonia
 - b. Woodland Plants – Asparagus Fern, Mimosa, Norfolk Pine, Rattlesnake Plantain, Pellionia, Bird's Nest Fern, Club Moss, Polypody
 - c. Desert Plants – Ball Cactus, Cob Cactus, Easter Lily Cactus, Peanut Cactus, Prickley Pear, Star Cactus, Aloe, Agave
13. Rocks, twigs, acorns, and other decorations

Total Duration

1 hour 30 minutes

Assessment

Students will be assessed on their participation in the laboratory exercise. Students will also be tested on the concepts of the water cycle and how the terrarium relates to the natural water cycle.