



Water Movement Through Plants

- OBJECTIVES:**
1. To investigate the movement of water through plants.
 2. To compare the difference of movement through plants by plant species.
 3. To measure liquids.

OVERVIEW:

Students will investigate the movement of water through plants by measuring the amount of water different plants use. By placing different kinds of plants in the same amount of water, over the course of several days, the amount of water used will be measured and compared.

STANDARDS ADDRESSED:

NGSS 5-LS1-1: Students who demonstrate understanding can support an argument that plants get the materials they need for growth chiefly from air and water.

CCSS MP2: Reason abstractly and quantitatively.

CCSS MP5: Use appropriate tools strategically.

MATERIALS:

- Celery stalks
- White carnations
- Romaine lettuce leaves
- Other plants as desired
- Graduated cylinders or measuring cups (3 per class or group)
- Water
- Red food coloring (optional)

ACTIVITY STEPS:

1. Begin by reviewing the basic needs of a plant (air, water, soil, sunlight).
2. Then, introduce the idea that water moves through plants in order to help the plant survive. This is done through a series of tubes called capillaries, and we can see capillaries at work through this experiment.

3. Ask students how they think we could measure the amount of water each plant uses to create food and survive. Guide them to using the same size containers (graduated cylinders or measuring cups) with the same amount of water, and over several days, the plant that uses the most water will have the least amount of water left in the cylinder or cup.
4. Have students fill each container with water to the same level. Fill them so they are close to full but not so full that the plant will overflow the container.
5. Mix in a couple of drops of red food coloring as desired. This will show evidence of the water's movement through the plant because the leaves of the celery and romaine, and the flower, will turn the color of the food coloring.
6. Add a celery stalk to one container, a carnation stem to another, and a piece of romaine lettuce to the third.
7. Demonstrate that the levels are now different because of the size of the stem/stalk and the principle of water displacement, but the same amount of water is still in each of the containers.
8. Have the students write their predictions of which plant will use the most amount of water, and why they think so.
9. Each day, have the students read the graduated cylinder or measuring cup to see how much water has been used by the plant. Have them document their water level and make notes on any color changes they observe. Guide them to see the color changes are evidence of the water moving through the plant.

ASSESSMENT:

1. Have the students answer the following questions, either in writing or through a discussion:
 - a. Which plant used the most water? Why do you think that is? Did this result surprise you? Why or why not? (The correct answer will depend on the humidity of your classroom and other factors.)
 - b. What evidence of water movement could you observe? (Should answer based on the plants changing color.)
 - c. How does this experiment apply to the real world? (Answer should reflect understanding that plants need water to survive.)

EXTENSION (OPTIONAL):

1. Students could experiment with the lack of water moving through plants by placing a celery stalk, romaine lettuce piece, and white carnation in empty graduated cylinders, providing no water at all. How do those results compare over the course of several days?
2. Additional plant varieties could also be tested, both with and without water.