

*Have you ever wondered how water performs its gravity-defying act of moving upward from the roots to the leaves of a plant? How does water get all the way up to the top of a tall tree? In this month's Home Connections activity, you will learn about the movement of water through a plant.*

## Up Goes the Water

Water is very important to plants. Plants need water to produce food and grow. Plants make their own food through a complex, sunlight-powered process called **photosynthesis**. Simply put, in photosynthesis, water absorbed by a plant's roots and carbon dioxide taken from the air by a plant's leaves combine to make the plant's food.

Water helps transport nutrients throughout all parts of the plant. Water also helps support the plant by filling up the cells that make up the plant so it can stand up straight.

### A Long Road to Travel

Water is absorbed from the soil into the roots of a plant. However, to reach the leaves where photosynthesis takes place, water must move upward to the top of the plant. Water travels through long, thin tubes running up from the roots through the stems and leaves called **xylem**.

### Water Attracts

Water moves up the xylem through a process called **capillary action**. Capillary action allows water to be pulled through the thin tubes because the molecules of the water are attracted to the molecules that make up the tube. The water molecules at the top are pulled up the tube and the water molecules below them are pulled along because of their attraction to the water molecules above them.

A sponge also absorbs water through capillary action. The sponge is filled with thin spaces that act like thin tubes.

### What Transpires

When plants have more water in their leaves than they need, they get rid of this extra water through a process called **transpiration**. During transpiration, water evaporates from holes in the surfaces of leaves into the air. As water molecules evaporate from plant leaves, they attract the water molecules still in the plant, helping to pull water up through the stems from the roots. The combination of transpiration and capillary action delivers the water from the bottom to the top of a plant.

Use the directions on the next page to observe water on the move in a plant. When you are done you can eat your experiment for a snack.

(see reverse)

To learn more about plants, visit the following websites:

The Great Plant Escape

[www.urbanext.uiuc.edu/gpe/index.html](http://www.urbanext.uiuc.edu/gpe/index.html)

Fullerton Arboretum

[www.arboretum.fullerton.edu/educ/tchr.asp](http://www.arboretum.fullerton.edu/educ/tchr.asp)

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# The Great Celery Experiment

## Materials:

- 1 tall cup
- 1 knife—*Have an adult help you cut the celery stalk with the knife.*
- Red or blue food coloring
- 1 spoon
- 1 stalk of celery with lots of leaves at the top

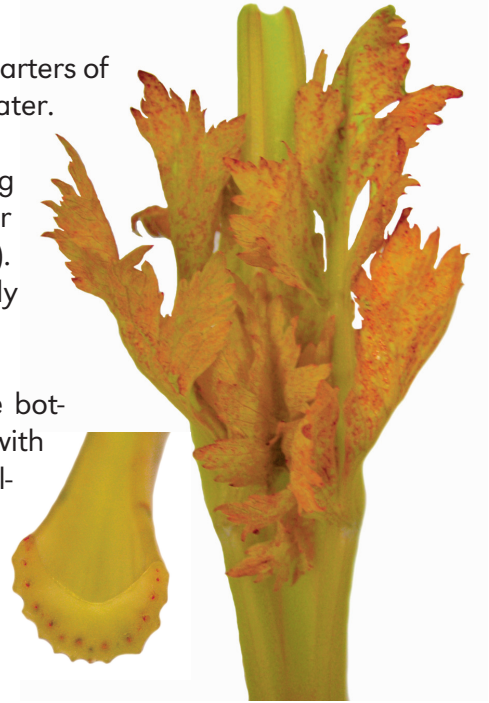


## Time needed:

15 minutes to set up, plus overnight to observe what happens.

## Directions:

1. Fill the cup about three-quarters of the way to the top with water.
2. Add drops of food coloring until the color of the water is dark (at least five drops). Stir until the color is evenly distributed throughout.
3. Cut about 2.5 cm off the bottom of the stalk of celery with the knife and place the celery in the cup with the leaves sticking up.



4. Check the stalk several times throughout the day. Observe how the leaves are changing. Let the stalk sit overnight.

## Questions and Activities for the Next Day:

- What happened to your celery stalk overnight?
- How do you know that the water reached the top of the plant (celery stalk)?
- Remove the celery stalk from the cup and cut another centimeter off the bottom.
- Look for small circles at the bottom of the stalk that are the color of the food coloring you used. (*These circles are **xylem**, the tubes that carry water up the plant.*)
- Continue cutting the celery stalk at one cm intervals. Try to follow the path of the colored water all the way up the stalk of the celery to the leaves.

## Extension Activity:

You can follow the same directions from the celery experiment to make a red, white, and blue bouquet of flowers. Use three white carnations instead of celery. Place one white carnation in a red solution and another in a blue solution in separate cups. Leave the third one in plain water. After the flowers have sat overnight, combine all three flowers in a water-filled vase for a red, white, and blue bouquet.