

Totally Tubular

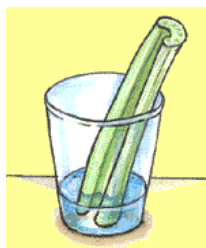
For a plant to survive, water needs to move up the stem to get from the roots to the leaves. Let's see what a stem is made of that enables water to travel from the ground up!

Materials:

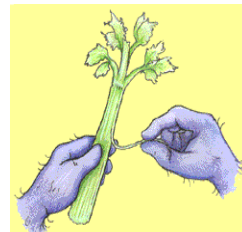
- 3 stalks of celery with leaves
- 2 glasses
- Plastic knife
- Blue food coloring

Procedures:

1. Use a plastic knife to cut the widest bottom part and also the leaves off one stalk of celery.
2. Place about 1/4 cup of water into a glass and add about 5 drops of blue food coloring. Place the bottom end of the celery into the water.



3. After three or four hours, look at the top of the celery. What do you notice? Does the blue color appear all over the top of the celery or is it darker in certain spots? Why do you think this is?
4. Take two celery stalks that each have leaves. Cut off the widest bottom part of each. On one of these stalks, try stripping away the long tubes that you saw when the celery was in blue water.



5. Place both stalks of celery in the cup of blue water. After three or four hours, look at the leaves of both celery stalks. What do you notice?

Think about this ...

Do you think you can take a single stalk of celery and make some of the leaves one color and other leaves another color at the same time? Here's a hint: You'll need to find a way to put different parts of the stem in different colored water at the same time. Good Luck!

Where's the Chemistry?

The cells that make up the stem of a plant are long and thin and connected to each other end-to-end. These connected cells create long thin tubes for water to move up the plant and for the nutrients made in the leaves to move down the plant. The celery stalk with the tubes removed should have had a harder time bringing the blue water up to the leaves. Therefore, those leaves should not have turned as blue as the leaves on the stalk with the tubes still intact.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".

