

Let's Dig Up Dinner

Pre-Lab Activity – Teacher Guide

Grades K-3

Overview:

This activity focuses on having the students work with partners or teams to discover that plants use capillary action to absorb water. The capillaries (called xylem) act like straws to send water absorbed by the roots to the other parts of the plant.

Materials:

Each team will need:

- 1 or 2 cups (should hold at least 10 ounces)
- Water
- Bottles of blue and red food coloring
- 1 stalk of celery with leaves attached
- 1 plastic teaspoon

Additional Supplies:

- Paper towels
- Newspaper

Optional Supplies:

- Straw in a cup
- Container for water
- Measuring cup

Getting Ready:

- Collect the necessary materials for the class experiment.
- Cover the desks or classroom tables with newspaper or paper towels, in case there are any water spills.
- Cut the ends of each celery stalk off about ½ inch from the bottom before starting the experiment.

Procedure:

Discuss with the students what they do when they get thirsty. Since we have been studying about plants in our science class, what do plants do when they get thirsty? Have you ever heard someone say, “Give that plant a drink of water, it looks thirsty?” or maybe “The soil looks dry, that plant needs a drink.” Today you are going to discover how plants “drink” their water. It is similar to when we’re thirsty and take a drink through a straw, like this.

(Demonstrate drinking water through a straw.)

Plants have roots in the ground that they use to absorb (take in) water. The soil has nutrients in it that the plants need as well. The water dissolves the nutrients in the soil.

(You can give an example of sugar or salt dissolving in water. We can't see the salt or the sugar in the water, but we can taste it.)

As the water and nutrients go from the soil into the roots, they then travel up the stem through capillaries or xylem (zy-lem). The capillaries or xylem act like straws and carry the water and nutrients to the other parts of the plant like the stem and leaves. You will see how this works tomorrow after our celery plants have had time to drink (absorb) the water you will prepare for them.

Options for completing the activity:

- 1) The students can place the celery stalk into a cup of water with either blue **or** red food coloring added to it.
- 2) The students take a celery stalk split up the middle (about half way up the stalk) and place one side into a cup of water with red food coloring and the other side in a different cup of water with blue food coloring. This will show capillary action with both colors on one stalk of celery. (If choosing this option, use a knife to cut the celery, **not scissors**. The scissors will crush the xylem and the experiment will not work.)
- 3) The students can complete Option 1 and the teacher complete Option 2.

Next, the water needs to be added to the cups. You can have the water already poured into the cups for the students or you can have the students measure the water into a measuring cup from a pitcher. Then add the water to their experiment cup(s).

Each cup will need about 6 ounces of water (2/3 cup).

Then the students will need to add the food coloring. The more food coloring you add, the better the color will show in the leaves and along the stalk. Have the students add 1 or 2 teaspoons of food coloring per cup and stir gently. Finally, place the celery stalk into the colored water and move the cups to a safe location for overnight.

The next day allow the students to observe the stalk and leaves of the celery. The food coloring should be evident along the stalk and along the outer edges of the leaves.

We will be showing the stalk and leaves of the celery after sitting in the colored water during the e-lab connection. We will show the leaves and the capillaries under a microscope to give the students a better view (magnified image) of what has actually occurred. The image will be projected onto the large screen.

Explanation:

Water moves through the plant by capillary action. The water is pulled through the stem because the water molecules like to stick together. The capillary action is similar to drinking a liquid through a straw.

Assessment:

You can ask the following questions to the students to determine their level of understanding of this concept.

What does the plant get from the soil? (water, nutrients)

What happens to the plant if it doesn't get any/enough water? (It dies.)

How does a plant "drink" or get water from the soil?

(The roots absorb the water and that water dissolves the nutrients in the soil. They both are then pulled up through the stem by capillary action to the rest of the plant.)