

# Visualizing Veins

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## Standards of Learning

Science 4.1, 4.4, 5.1, 5.5

## Objective

Students will:

- Identify the differences between the vascular and nonvascular structures in plants through observing the systems in action

## Materials

- Two see-through plastic cups or glass jars
- Water
- Food coloring (blue or red)
- Celery stalks
- Piece of a fern plant
- Ruler
- Observation sheet (handout provided)

*\*Note: this activity can be done in partners or as a class, depending on the number of resources you have available.*

## Background Knowledge

Often the internal structure of plants can be confusing to young students. However, it is important for students to understand the differences between vascular and nonvascular plants. This activity provides them with this opportunity. Non-vascular plants basically means they do not have a vascular system. Non-vascular plants have no roots, stems, or leaves since each of these structures is defined by containing vascular tissue. Vascular plants are those plants that have lignified tissues for conducting water, minerals, and photosynthetic products through the plant.

## Procedure

1. Ask the students to think about how plants get water.
2. Remind the students that the water goes into the plant through the roots and then is spread throughout the plant.
3. Discuss the differences between vascular and nonvascular plants with the students. Most plants are vascular.
  - a. **Vascular plants** – have special tissues transport food and water through the plant (Examples: celery, tulip, oak tree)
  - b. **Nonvascular plants** – do not have special tissues to transport food and water through the plant (Examples: fern, moss)
4. Tell the students that they will be using what they know about vascular and nonvascular plants to do an activity in which they will actually see the water move through the veins of a plant.
5. In front of the students, fill each cup or jar with an inch of water and ask a student to measure the height of the water.
6. Draw a line on the cup/jar to mark the water level.
7. Then add a few drops of food coloring to each cup/jar and stir the water.
8. Place a celery stalk in one cup/jar, with the flowering leaf end up.
9. Place the piece of fern in the other cup/jar, with the leaves facing upwards.



10. Ask the students what they think will happen to the plants and the water in the jars.
11. Tell the students that the plants will take in the water and use it.
12. Ask the student if they think there will be a difference between the celery stalk and the fern plant.
13. Hand out the Visualizing Veins worksheet and ask the students to complete questions 1-3.
14. Continue to observe the plants over the next couple days and have students record their observations on their worksheets.
15. Each day the students should record the height of the water (measured by using a ruler) and the coloring seen in the plants.
16. After completing the activity, ask the students what they noticed about the coloring in the celery stalk verses the fern plant.
17. Discuss with the students the fact that since celery is a vascular plant, they are able to see the network of veins within the plant. Since a fern is a nonvascular plant, it does not have a network of veins and therefore, they can not see the food coloring moving through the plant.
18. Ask the students: Even though they cannot see the food coloring moving through the plant, how do they know it is moving and that the plant took in the water?

### **Extension**

Ask students to further research the differences among vascular and nonvascular plants. Are most vegetables vascular or nonvascular? Are most plants vascular or nonvascular?

Ask the students to identify other plants that they would like to find out if they are vascular or nonvascular. Redo this activity using these plans.



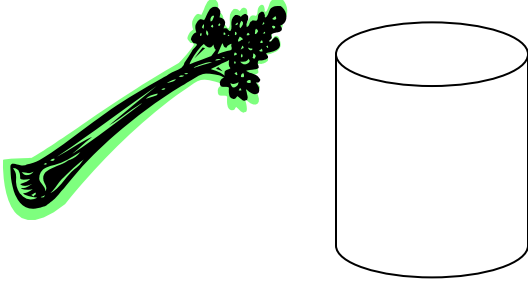
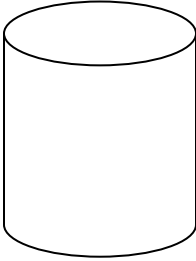
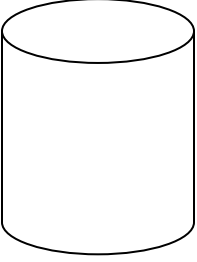
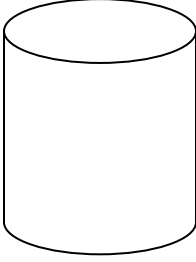
NAME: \_\_\_\_\_

**VISUALIZING VEINS**

Do you think you will be able to observe the veins in both plants? Why or why not?

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\_\_\_\_\_  
\_\_\_\_\_

**Directions: Observe the plants each day. For each day, record the height of the water in the jar and use a crayon to show the movement of the water on the picture.**

<p><b>DAY 1</b></p>  <p>A photograph of a celery stalk with green leaves, placed next to a simple line drawing of a cylindrical jar.</p>	<p><b>DAY 2</b></p>  <p>A simple line drawing of a cylindrical jar.</p>
<p><b>DAY 3</b></p>  <p>A simple line drawing of a cylindrical jar.</p>	<p><b>DAY 4</b></p>  <p>A simple line drawing of a cylindrical jar.</p>

Did you find any differences in the movement of water and food coloring between the celery and fern? Why do you think that happened?

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Which plant is vascular? Which plant is nonvascular?

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