KANSAS CORN STEM

Stems

3rd - 5th Grade

Introduction

Every seed holds a miniature plant called the embryo. Once that seed is planted, the plants life can be divided into five stages:

1. Germination: when a seed sprouts, the first part to grow is a root.
2. Seedling: When the plant starts to grow, it still relies on the seed for food.
3. Active Growth: The food in the seed has been used up and the plant is growing.
4. Flowering/pollination: To make seeds, a flowering plant must grow a flower and produce pollen.
5. Maturation: Seeds require some time after they are produced to become viable. Viable seed means that a plant can grow a plant.

This lesson will focus on the function of stems during Active Growth.

Objective

- Students will understand the basic function of plant stems.
- Students will be able to identify parts of a common stem.

Background

The Stem

The root has the important job of absorbing water and nutrients. That water and those nutrients are needed throughout the plant. The stem has four functions:

1. Support the leaves and flowers.
2. Move water and minerals from the roots to the leaves.
3. Move food produced by the leaves to other parts of the plant.
4. Store food.

Photo provided by: https://sites.google.com/site/elps301plantstructures/home/growth

Parts of the stem can be arranged differently among plants, but all stems have the same basic parts for moving nutrients:

1. Phloem: moves water food throughout the plant.
2. Xylem: transports water and nutrients to the leaves.
3. Cambium: grows new phloem and xylem.

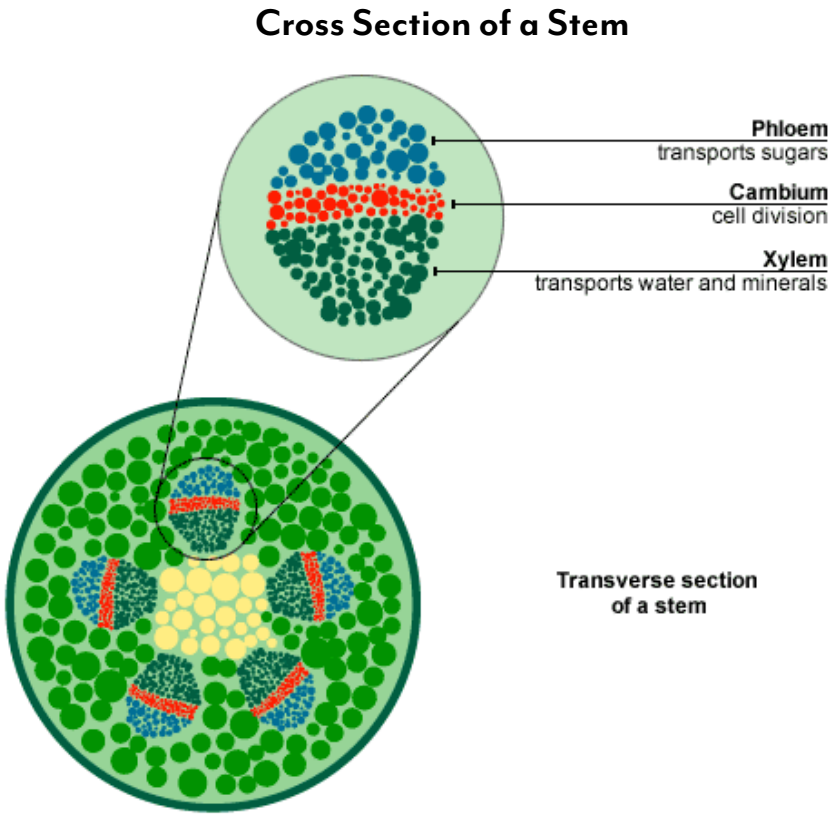

Photo provided by: https://www.toppr.com/ask/question/anu-ket-a-plant-into-a-beaker-of-red-coloured-water-as-shown-in-figure/

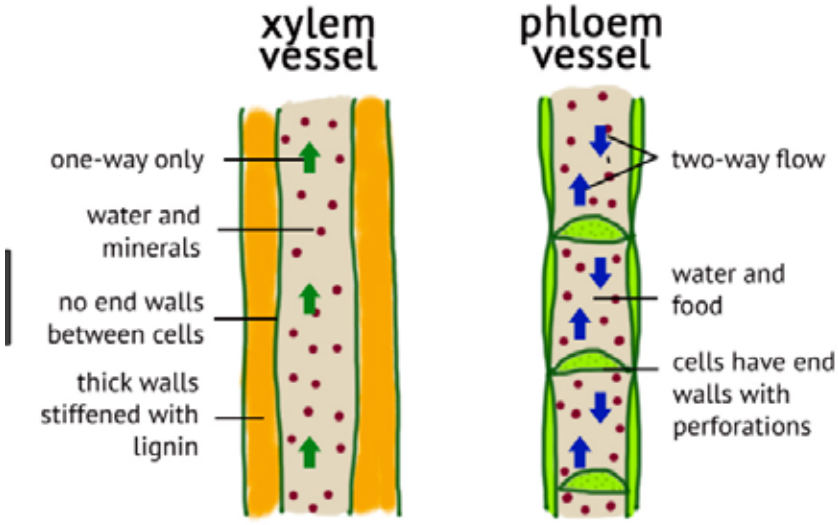

Photo provided by Vivadifferences

The xylem and phloem are tiny tubes. Think of the xylem as a one-way street with no stop lights. It has trucks hauling water and minerals up the plant from the roots to other parts of the plant. Water leaves the plant through the leaves which pulls water from the roots through capillary action. Capillary action is when water molecules are attracted to solids causing the water to work its way up the plant.

The phloem is a two-way street with stop lights. It has trucks hauling water and food wherever it is needed in the plant.
Stems are able to stand up and support the parts of the plant through the water pressure in the cells of the stem. If you stop watering a plant, it will wilt and fall down because it does not have water pressure.

Water and nutrients can be stored in the stem to help the plant survive when there is a shortage. A cactus is an example of a plant that stores large amounts of water in its stem to survive in the desert.

We commonly eat the stems of plants such as celery, asparagus and rhubarb.

Photo provided by Real Food 4 Kids.

Supplemental videos

- Available at kansascornstem.com

Experiment #1: Capillary Action

Materials

- 2 cups
- Water
- Food coloring
- Paper towel

Directions

1. Fill one cup approximately 2/3 full of water.
2. Add 5 drops of food coloring.
3. Place empty cup beside the cup with water.
4. Fold the paper towel three times tightly.
5. Place the ends of the paper towels in both cups.
6. Wait at least one hour.

Explanation

The water will be attracted to the solids in the towel because of capillary action. This will cause half of the water to "wick" over to the other cup. If left long enough, there will be equal amounts of water in each cup.

Experiment #2: Xylem

Materials

- Bundle of celery with leaves
- 3 cups
- Water
- Food coloring
- Knife

Directions

1. Fill 3 cups 2/3 full of water
2. Add 10 drops of dark food coloring. A different color in each cup.
3. Break three sticks of celery from the bundle. Use sticks with leaves.

4. With adult supervision, use a sharp knife to neatly cut the bottom two inches off of the celery.
5. Place one stick in each cup. Be careful to prop it against the wall so, it does not tip over!
6. Leave overnight. This may take at least 24 hours.
7. View results.
    a. Pull the celery out of the water and look at the end that was cut.

Explanation

The xylem in the celery will transport the colored water to the leaves. Also, the food coloring will make it easy to see the xylem when you look at the cut end.

Conclusion

The stem is an important part of the plant. It can look very different in some plants. The stem of a corn plant is straight and long. The stem of lettuce is short and fat however all stems have the same jobs.

The stem worksheet will help test what you have learned about stems.

Stem Worksheet

1. Place the correct letter from the terms below with its description:
   a. Germination
   a. Seedling
   a. Active Growth
   a. Flowering/Pollination
   a. Maturation

   ___ Seeds require some time after they are produced to become viable
   ___ When a seed sprouts
   ___ When the plant starts to grow, it still relies on the seed for food
   ___ The food in the seed has been used up and the plant is growing
   ___ To make seeds

2. List the four jobs of the stem:

3. What are the two types of tubes that move water and nutrients around the plant?

4. Name two plants that we commonly eat the stems of:

5. Water moves up the plant using _____ action.

Stem Worksheet

ANSWER KEY

1. Place the correct letter from the terms below with its description:
   a. Germination
   a. Seedling
   a. Active Growth
   a. Flowering/Pollination
   a. Maturation

   e Seeds require some time after they are produced to become viable
   a When a seed sprouts
   b When the plant starts to grow, it still relies on the seed for food
   c The food in the seed has been used up and the plant is growing
   d To make seeds

2. List the four jobs of the stem:
   - **Support the leaves and flowers.**
   - **Move water and minerals from the roots to the leaves.**
   - **Move food produced by the leaves to other parts of the plant.**
   - **Store food.**

3. What are the two types of tubes that move water and nutrients around the plant?
   Xylem and phloem

4. Name two plants that we commonly eat the stems of:
   Celery, asparagus, rhubarb...

5. Water moves up the plant using **capillary** action.