

Lesson 6:

Plant Parts



Time Allotted

60 Minutes

Target Audience

Grades 1-8

Objectives

- Students will identify the six parts of the plant
- Students will assess how each plant part contributes to the plant's survival
- Students will recognize visual characteristics of each plant part
- Students will categorize different fruits or vegetables based on plant parts.

Materials

- Plant part worksheet
- Physical examples of each plant part - see teacher key (optional)
 - Roots: carrot, radish, jicama, beets
 - Stems: celery, asparagus
 - Leaves: spinach, lettuce, kale, basil
 - Flowers: broccoli, cauliflower
 - Fruits: cucumber, tomato, pepper
 - Seeds: sunflower, pumpkin, cooked garbanzo beans

Summary

Students learn the six parts of a plant and their functions.

Background

Almost all fruits and vegetables we eat come from plants. Mushrooms, a fungus, are one of the only types of food that does not come from plants. Even the snacks and non-plant foods we eat have ingredients that originate from plants. Corn and soy, for example, are major ingredients in snacks, baked goods, prepared meals, and packaged goods we consume. Comparing the foods we eat to the plant parts from which they originate can help to understand the nutritional value of these foods, when we harvest them, and how we may need to process them for consumption.

Plants consist of six parts: roots, stems, leaves, flowers, fruits, and seeds. Each of the fruits and vegetables we eat can be categorized as one of these parts. This lesson requires teachers to provide at least one example of each plant part we eat. Some examples include carrots, the roots; celery, the stem; and spinach, the leaf. Each of these plant parts has a different function for helping plants grow and survive.

See the list below for definitions of each plant part function and the suggested corresponding symbols to represent each function.

- Roots absorb nutrients and water from the soil, anchor the plant in the soil, and provide storage for food and nutrients. (symbol: refrigerator, anchor)
- Stems carry nutrients and water from the roots to other parts of the plant (symbol: veins, straw)
- Leaves absorb sunlight and transform it into food through a process called photosynthesis. (symbol: sponge, skin)
- Flowers enable sexual reproduction by attracting pollinators to help produce seeds. (symbol: showy costume/clothes)
- Fruits store and protect seeds and attract animals to eat and disperse seeds (symbol: lunchbox, Tupperware)
- Seeds provide materials for new growth. (symbol: baby)

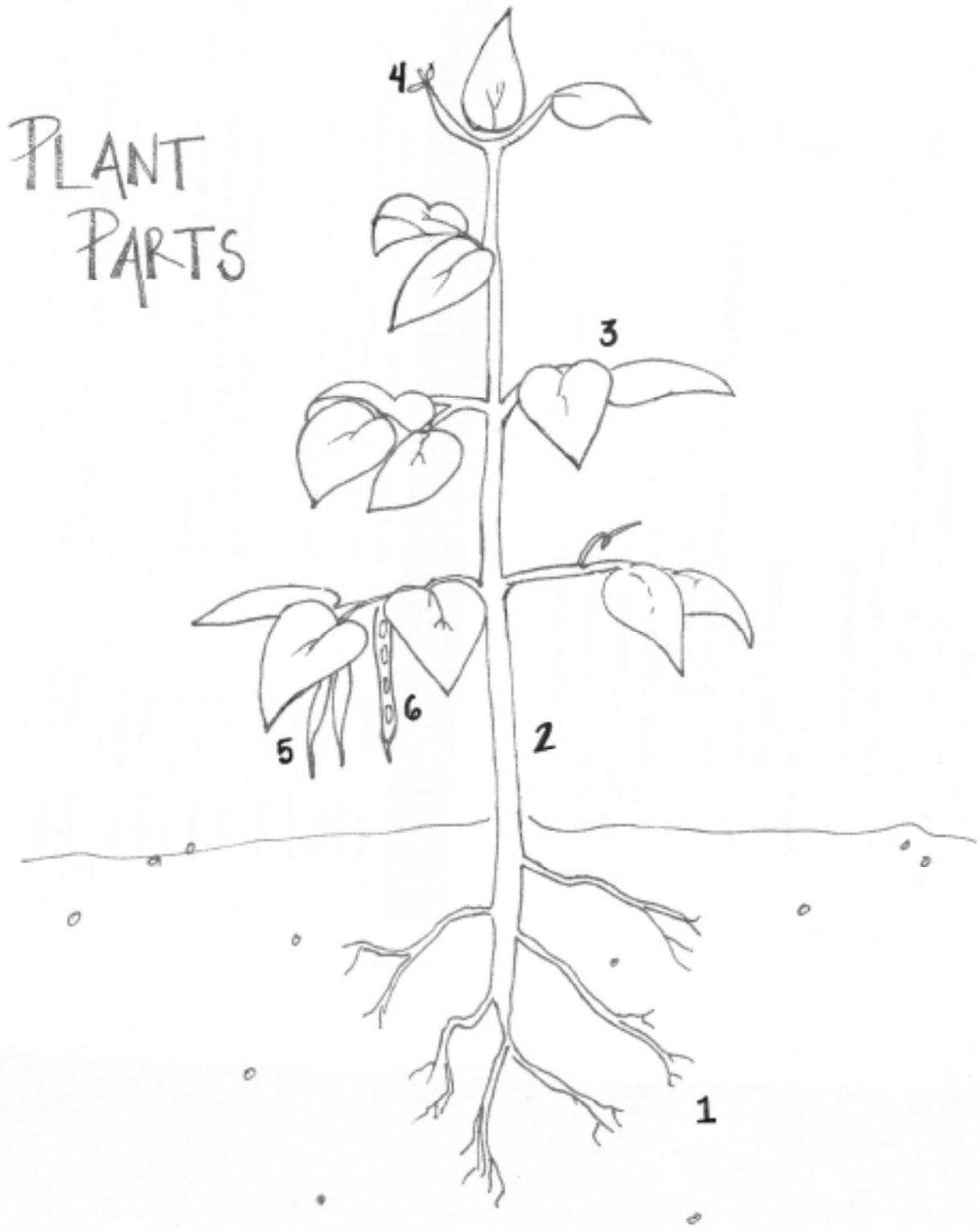
Fruit: The definition of "fruit" can often be confusing. Botanical scientists consider fruits to be the ripened, seed bearing parts of plants. Thus, any food that contains seeds is considered a fruit—apples, pears, oranges—including foods commonly referred to as vegetables—tomatoes, cucumbers, squash. In the culinary world, the term "fruit" is used to describe a plant food with high levels of sugar whereas "vegetable" is used to describe a plant food containing lower levels of sugar. This curriculum uses the botanic definition of fruit.

Method

1. Using the plant part worksheet, lead a short discussion on the parts that compose a plant. Ask students to consider the role each plant part plays in the plant's survival. How does this plant part help the plant survive? Have students brainstorm an object that functions similarly to each part of the plant. Ex: the stem delivers nutrients and waters from the roots to other parts of the plants: straw
2. Discuss visual characteristics that each plant part displays. Leaves are often green, broad, and flat; fruits contain seeds; flowers are bunched with petals and are often brightly colored; stems are long and skinny, roots have leaves or other greens attached at the top; seeds are often small and numerous. Ask students to brainstorm foods that match these characteristics.
3. Tell students that of the six different parts of a plant we are discussing, we eat each one. Ask them if they can name any of the parts of the plant/food we eat.

Extensions

- Research and compare different types of modified stems and roots.
Root crops are simply an edible underground plant structure, such as parsnip, carrot, yam, horseradish, or beets, but some "root crops" are actually part of the stem.
Modified stems are often mistaken for roots as they are part of the edible underground plant structure. There are 4 types of modified stems:
 - Bulbs grow in layers connected by a round, flat, hairy base with the beginnings of roots they reproduce by creating offshoots connected to the larger bulb. Ex: onion, garlic
 - Corms appear to be the same as bulbs but do not grow in layers. As the plant grows, all the energy is used up and the corm shrivels producing new corms alongside the original corm. Ex: taro
 - Tubers have leathery skin and lots of eyes, which appear as tiny buds which are growing points where new plants will emerge. Ex: potatoes, sweet potatoes, yucca, yam, water chestnuts
 - Rhizomes are underground stems that grow horizontally just below the soil's surface with lots of growing points. Ex: hops, asparagus, ginger, calla lilies.
- Gather a variety of seeds and physical examples or images of their corresponding fruits and plants and have students attempt to match them.
- Research: "Why is fungus not a plant?" Have students research distinguishable differences between plants and fungi—appearance, growth, needs, reproduction. What are some other examples of fungi we eat?
- Choose a variety of root crops listed above and provide the students with definitions for each type pointing out that they are actually modified stems. Have the students dissect and determine what type of root/stem each is.
- Introduce students to the parts of a flower and their functions to help illustrate how some plants reproduce (<http://www.chicagogreenteachers.com/documents/Parts-of-a-Flower.jpg>).
- Introduce students to monocots vs. dicots and discuss how to identify each and how their life cycles differ.
- Research different methods (animals, wind, self-dispersal) of seed dispersal and ways that plants are adapted to ensure their seeds are spread. Have students report their findings.



Plant Part Functions

1. Roots _____

2. Stems _____

3. Leaves _____

4. Flowers _____

5. Fruits _____

6. Seeds _____

TEACHER KEY

1. Roots

The roots are the foundation that holds a plant in the ground. Roots also have tiny hairs that soak up water and minerals, and some plants have enlarged roots that serve as storage for the plant's food or sugar. Examples: carrot, radish, jicama, beet.

2. Stems

The stem acts as a support for the plant and contains the plant's vascular system, which transports food or sugar, minerals, and water. The system has two parts: xylem and phloem. The xylem carries the water and minerals up from the roots to the rest of the plant, while the phloem carries food or sugars from the leaves down through the rest of the plant. Examples: celery, asparagus.

3. Leaves

The primary purpose of leaves is to absorb sunlight for making food or sugar in a process called photosynthesis. During photosynthesis, carbon dioxide is also absorbed by the leaves and turned into oxygen, a by-product or waste of the process. Examples: spinach, lettuce, kale, basil.

4. Flowers

The primary purpose of flowers is reproduction. The flower contains the plant's reproductive organs. Their showy appearance is intended to attract insects and other animals to them as part of the seed-producing pollination process. Examples: broccoli, cauliflower.

5. Fruits

The fruit of the plant is the part that holds and protects the seeds. Animals often eat the fruit, helping the plant spread its seed to other areas through waste elimination. Examples: cucumber, tomato, pepper.

6. Seeds

Seeds are composed of three parts: the embryo (a miniature, dormant plant); the endosperm (the built-in food supply); and the seed coat (a protective layer). Examples: sunflower seeds, pumpkin seeds, beans

Sources

"Arizona Master Gardener Manual: Plant Parts and Functions." College of Agriculture and Life Sciences. 14 Mar. 2012. <http://ag.arizona.edu/pubs/garden/mg/botany/plantparts.html>