

## Flower Parts

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<b>Strand</b>	Life Processes
<b>Topic</b>	Investigating plant anatomy and life processes
<b>Primary SOL</b>	4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include a) the structures of typical plants and the function of each structure; b) processes and structures involved with plant reproduction.
<b>Related SOL</b>	4.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which a) distinctions are made among observations, conclusions, inferences, and predictions; b) objects or events are classified and arranged according to characteristics or properties; m) current applications are used to reinforce science concepts.

### Background Information

A typical plant has six basic parts: seeds, roots, stems, leaves, flowers, and fruits.

Seeds contain everything a plant needs to grow. Seeds have three basic parts: the embryo, the endosperm and the seed coat.

Roots provide plants with three main functions. They support the plant so it can't be blown or knocked over easily, they absorb nutrients and water out of the soil, and some roots also store sugar and starch, which provide food for the plant. As a seed begins to grow, the first part to appear is the root.

Stems contain tube-like structures that transport water and nutrients from the roots to the leaves. Stems can be either above ground or below ground. If they are above ground, they hold the plant up, so the leaves get more sunlight. If they are below ground, they usually provide food storage for the plant.

Leaves make food for the plant by absorbing sunlight through the process of photosynthesis. Leaves also contain pores that let water and air enter and exit the plant. There are many different shapes and sizes of leaves and; a few plants, such as cacti, do not have leaves as a way to conserve water.

Flowers contain the reproductive parts of the plant where new seeds are formed. Flowers look and smell a certain way to attract insects and bees that will pollinate them. Flowers have male and female parts. One of the male parts, called the stamen, has pollen on it. When this pollen touches the female part, called the stigma, pollination begins.

Some plant species have one flower with just male parts and another with just female parts, while others have both male and female parts within the same flower. The pollen is usually carried from the stamen to the stigma by an insect, bee, animal, or the wind. Animals assist in the pollination of more than 90 percent of the flowers on Earth. Wind and rain assist the rest. In

order to attract pollinators, plants have adapted in many ways: they produce sweet nectar, colorful petals, and attractive aromas. Once fertilization occurs, the ovary bulges and becomes plump or hard to guard the seeds.

The fruit is the portion of the plant that protects the seeds and helps in the transportation and distribution of seeds. Some fruits are a source of food for birds and other animals, which eat the fruits and excrete the seeds elsewhere. Some seeds attach to an animal coat when an animal brushes the plant and are transported to new locations. Some seeds are blown by the wind to other locations.

Seeds can be found inside the fruit, such as in apples or oranges, or located on the outside, such as strawberries. Not all plants produce fruit. Ferns, for example, produce spores instead of seeds.

### **Materials**

- A flowering plant that has roots still attached, has a visible flower, and has fruit with seeds that can be discussed
- Several hand lenses for class observations
- Student journals
- Digital cameras (if available) or drawing paper and colored pencils
- Attached “Parts of a Plant” – one per student

Per group:

- 1 flower
- Hand lens
- Tweezers
- Clear tape
- Attached Flower Dissection worksheet
- Crayons or colored pencils
- White drawing paper
- Variety of fruit with seeds (e.g., cucumbers, tomatoes, squash, green peppers, Valencia oranges)
- Paper plates
- Knife (for teacher to cut fruit)

### **Vocabulary**

*Seed, root, stem, leaf, flower, fruit, sepal, stamen, pistil, ovary, pollen*

### **Student/Teacher Actions (what students and teachers should be doing to facilitate learning)**

*Introduction*

1. Give each student a copy of the student sheet titled Parts of a Plant.
2. Share the plant that has roots, stem, leaves, and flower. Discuss the fruit and the seed for the plant and why they are not currently on the plant.
3. Discuss the function of each plant part.
4. Have each student complete the student sheet Parts of a Plant.

*Procedure – Activity 1 – Making a Class “Plant” Book*

1. Tell the students that they are going to help create a class “Plants” reference book.
2. Divide the class into groups of two or three students.
3. Give each group a digital camera or blank paper and colored pencils.
4. Tell the groups that it will be their job to find examples of at least five different plants. They will either take a picture of each of the plants or they will draw a picture of each. Remind them:
  - a. Do not touch any of the plants, but just bring back a picture of each.
  - b. In order for the class to have a good plant reference book, they need to try to find as many different kinds of plants as possible.
  - c. Make sure they can describe each of the six parts of each plant. If they are not sure where to find each of the parts on a particular plant, let them know they will have an opportunity when they return to the classroom to conduct research about the plants they select.
5. Take the class outside to observe plants on the school grounds.
6. When each group has documented their five plants with a picture, return to the classroom.
7. Give teams an opportunity to conduct any research they need for each of their plants. If teams used digital cameras, print the pictures and mount them on white paper. Have them label each of their plant pictures with the different plant parts.
8. Give each team the opportunity to share the pictures and information about their plants.
9. Put all the picture pages together to create a class “Plants” book.

*Procedure – Activity 2 – Dissecting a Plant to Study Plant Reproduction*

1. Divide the class into groups of two or three students.
2. Give each group a paper plate holding a number of slices of various fruits, making sure that seeds are present in the slices.
3. Ask students what the foods have in common. Some groups will realize that all of the foods have seeds buried inside the fruit.
4. Explain that the fruit is formed from a specialized structure in the plant, which the students will be exploring in their investigation. Fruits contain seeds and a fleshy pulp. Some foods that we call vegetables are actually the fruit of a plant — for example, cucumbers, tomatoes, and peppers.
5. Give each group a fresh flower, tweezers, hand lens, clear tape, and the attached Flower Dissection data sheet.
6. Model for students how to carefully remove the sepal, located at the base of the flower, and carefully tape it to the appropriate box on the data sheet.
7. Then, have students complete the remaining boxes on the data sheet: number, color, and function.

8. Allow time for students to complete the flower dissection by removing and inspecting the other flower parts listed on the data sheet.
9. As the students work on their dissection, move around the room, posing questions such as:
  - Can you locate pollen on the stamen?
  - Is the pistil of your flower well adapted for capturing and holding onto pollen?
  - Is the stamen of your flower positioned higher or lower than the pistil?
  - What function did the sepals perform for the flower before it opened?
  - Can you find the ovary of your flower? What will this become?
  - Open the ovary and count the ovules inside. What will these become?
  - Is the neck of the pistil hollow or solid?
  - Touch the top of the pistil. Is it a bit sticky? Why do you think it is sticky? How would it be helpful for the plant for it to be sticky?

### *Conclusion*

1. Have students complete their group work by presenting the number and color of each flower to the class.

### **Assessment**

- **Questions**
  - Do you think an insect could easily move the pollen from the stamen to the pistil?
  - What characteristics does your flower have that might attract animals?
- **Journal/writing prompts**
  - We know that all of the parts of the flower are important for its survival. In your opinion, which part of the flower is the least important?
- **Other**
  - Have students cut out representations of the different parts of the flower from construction paper. Then, have them assemble the flower and name the various parts and their functions.

### **Extensions and Connections (for all students)**

- If students used a digital camera to collect pictures of plants on the school grounds, the class book about plants could be produced electronically.
- Have students create a flip book with illustrations of the stages of pollination. Give four 3 x 5 inch index cards to each student, and have them cut the cards into quarters, producing a total of 16 small cards. Instruct students to draw on the far right edge of each card a flower in the various stages of pollination. Then have students turn their flip book over and draw the fruit forming from the flower. Direct students to stack their cards in order, holding the left side of the cards firmly with their thumb and forefinger. By flipping through the cards on the right side, students will see the flower become

pollinated. If they turn their flip book over, they can see the ovary swelling and gradually turning into fruit.

- Challenge students to improve upon nature’s delivery of pollen to the pistil. Have the students draw their concept and give a written explanation.
- Create a survey asking members of the class to indicate their favorite flower or fruit. Graph the results using various methods....human graph, line graph, circle graph, etc.

### **Strategies for Differentiation**

- Provide examples of flower parts for students to examine before they dissect their flower.
- Create small groups with assigned roles based on your students’ strengths.
- Provide differentiated sizes of flowers or images from electronic resources to create the flip book.
- Have students create a song, poem, saying, or rap about the parts of a flower and have students share it with the class.
- Provide a rubric for use as they complete their data sheets and drawings.
- Provide printed copies of the procedures to follow.
- Play a “password” game in which one student describes a plant anatomy to another student who attempts to guess the term.

# Parts of a Plant

Names: \_\_\_\_\_ Date: \_\_\_\_\_

Directions: Draw a picture of an apple tree. Be sure to include the roots, stem (trunk), leaves, and apples (fruit with the seeds inside). Label each of the parts. Explain the job(s) of each of the parts.

Explain why you would not have flowers on the apple tree when you have apples on the apple tree.

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What is the job of the leaves?

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# Flower Dissection

Names: \_\_\_\_\_ Date: \_\_\_\_\_

As you dissect your flower, complete the following data table:

<b>Flower Part</b>	<b>Tape each part here</b>	<b>Number (count)</b>	<b>Color</b>	<b>Function</b>
Sepals				
Petals				
Stamen				
Pistil				