

# Plant Tops and Bottoms

## Grade Levels

K - 2

## Purpose

Students will identify where fruits and vegetables belong on a MyPlate diagram and describe the major parts of plants - roots, stems, leaves, flowers and fruits according to if they are produced on the top or bottom of a plant.

## Estimated Time

60 minutes

## Materials Needed

### Interest Approach — Engagement:

- Variety of produce items (asparagus, strawberries, carrots, cabbage)

### Activity 1: Plants = Fruits and Vegetables

- [USDA's MyPlate Diagram](https://agclassroom.orghttps://www.choosemyplate.gov/resources/myplate-graphic-resources) (https://agclassroom.orghttps://www.choosemyplate.gov/resources/myplate-graphic-resources)
- Picture of a plant (the [Dry Edible Bean Card](https://cdn.agclassroom.org//mn/edu/card/drybeans.pdf) (https://cdn.agclassroom.org//mn/edu/card/drybeans.pdf) would be a good example)
- Variety of vegetable and fruits that are roots, stems, leaves, flowers, and fruits. If actual vegetables and fruits are not available use pictures.

### Activity 2: Plant Tops and Bottoms

- *Tops and Bottoms* by Janet Stevens
- [Plant Parts We Eat](https://cdn.agclassroom.org/media/uploads/2015/12/11/Plant_Parts_we_Eat.pdf) (https://cdn.agclassroom.org/media/uploads/2015/12/11/Plant\_Parts\_we\_Eat.pdf) activity sheet

## Essential File (map, chart, picture, or document)

- [Plant Parts We Eat](https://cdn.agclassroom.org/media/uploads/2015/12/11/Plant_Parts_we_Eat.pdf) (https://cdn.agclassroom.org/media/uploads/2015/12/11/Plant\_Parts\_we\_Eat.pdf)

## Vocabulary Words

**flowers:** allow the plant to reproduce by producing seeds; edible examples include broccoli, cauliflower

**fruit:** hold the seeds of a plant; examples include eggplant, tomatoes, pumpkins, squash, cucumbers

**leaves:** soak up the sun's energy and produce food for the plant; examples include lettuce, cabbage, spinach, mustard greens, kale

**roots:** absorb water and anchor the plant; examples include radishes, beets, carrots, parsnips

**stems:** transport water and food throughout the plant; examples include asparagus, celery

## Did You Know? (Ag Facts)

- A good diet and regular physical activity can build strong bones and a strong body. Completing chores such as taking out the trash, walking the dog, and raking leaves can count as physical activity to help strengthen your bones.
- Replacing sodas and sugary drinks with water will help you reduce calories and become fuller to create a healthier diet. Can of 12-ounce sodas can contain as much as 10 teaspoons of sugar.

- Selecting vegetables that are bright in color such as red, orange, or dark green provide more essential vitamins and minerals. Eating foods such as spinach, acorn squash, cherry tomatoes, and sweet potatoes will brighten up your plate with these vibrant colors.

## Background Agricultural Connections

Many foods we eat are plants. Plant-based foods provide essential nutrients including many vitamins and minerals. These plant foods can be an excellent teaching tool for understanding the external parts of a plant – roots, stems, leaves, fruits, and flowers. Farmers grow and harvest many plant-based foods such as carrots, green beans, kale, sweet potatoes, and strawberries which are part of a healthy diet.

Each of these food items are grown from a plant either above or below the surface of the soil. For this lesson student's experience for eating fruits and vegetables that live and grow above ground or underground would be required for helping them gain an understanding for identifying where they belong on the USDA's MyPlate diagram. Teachers should be familiar with the MyPlate graphic organizer, including food categories. If not, please review the information at [www.choosemyplate.gov](http://www.choosemyplate.gov) (<http://www.choosemyplate.gov/>).

**Roots** are usually found underground with the functions of anchoring the plant and absorbing water and nutrients from the soil. In some plants they also serve as a storage area for food for the plant. For some plants, such as rutabagas, radishes, carrots, and sugar beets, the root is the crop.

**Stems** are the main stalk of a plant. Usually stems grow above ground and transport water and nutrients from the roots to the leaves and flower. The leaves produce food (glucose) which is also transported throughout the plant by the stem. You can think of the stem as a passage way for water and food. In addition, the stem serves as a backbone, offering the plant support and structure. Edible stems that grow above ground include asparagus, broccoli, and cauliflower.

The **leaves** of a plant serve as solar panels. They collect sunlight and use this solar energy to power photosynthesis. Photosynthesis occurs in the leaf. The plant takes in water and carbon dioxide. The sun's energy causes a chemical reaction which converts the water and carbon dioxide into glucose (food for the plant) and oxygen. The plant uses the glucose to grow and the oxygen is given off into the environment. Humans eat several plant-based foods with edible leaves such as cabbage, kale, lettuce, and spinach.

The **flower** of a plant is designed for reproduction. The petals, or modified leaves, attract pollinators that transfer pollen so seeds can be produced in the flower. Broccoli and cauliflower flowers can be eaten known as the flowerets.

The **fruit** is the ripened ovary of the flower of a plant. Seeds are contained inside of the fruit. Many seeds can be eaten or also used to grow new plants. Humans enjoy eating the following fruits such as apples, strawberries, watermelons, and grapes, just to name a few.

Vegetables and fruits make up two of the five categories found on the USDA's MyPlate diagram. Each section is color coded and properly sized to help consumers quickly identify where each food item is categorized onto a place setting. The vegetable section is green and is slightly larger than the red colored fruit section. The MyPlate graphic organizer can be found on the website [www.choosemyplate.gov](http://www.choosemyplate.gov) (<http://www.choosemyplate.gov/>) that was developed and maintained by USDA Center for Nutrition Policy and Promotion. In addition to vegetables and fruits, the MyPlate image also includes dairy, grains, and protein. Before sitting down to a meal at home or school, the MyPlate campaign can aid students in making better decisions about the foods they choose to eat.

## Interest Approach - Engagement

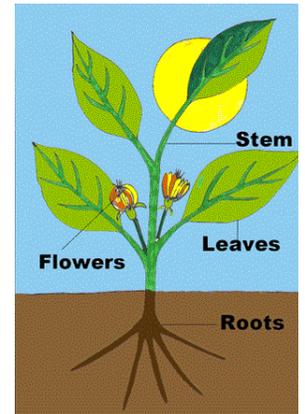
1. Collect a variety of produce that represents different parts of the plant. Items could include asparagus (stem), strawberries (fruit), carrots (root), and cabbage (leaves). More food items are listed in the *Background Agriculture Connections*.
2. Display these vegetables and fruits and ask the following questions.
  - "Where have you seen these items before?" (grocery store, farmers market, gardens, fields)
  - "What fruits and vegetables are your favorite to eat?" (answers will vary)

## Procedures

### Activity 1: Plants = Fruits and Vegetables

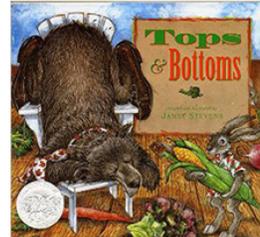
1. Display the vegetables and fruits used in the *Interest Approach – Engagement*. Emphasize that these fruits and vegetables are grown and harvested by farmers.
2. Display the [USDA's MyPlate diagram](http://www.choosemyplate.gov) (<http://www.choosemyplate.gov/>). Ask the following questions
  - "Where do these food items fit on the MyPlate diagram?" (*vegetables and fruits*)
  - "Why should we eat vegetables and fruits instead of candy bars or ice cream?" (*vegetables provide nutrients that help keep us healthy and keep the systems in our body working well. Vegetables can also help us fight disease and illness*)
3. Inform students that vegetables and fruits are plants. Draw or show a picture of the common parts of a plant
  - Note: The dry edible beans card that is part of the [Minnesota Agriculture in the Classroom Commodity Cards](https://minnesota.agclassroom.org/educator/materials_card/) ([https://minnesota.agclassroom.org/educator/materials\\_card/](https://minnesota.agclassroom.org/educator/materials_card/)) is also a good example.
4. Help students understand the major purpose of each part:
  - Roots – absorbs water and nutrients, anchors plant, transports nutrients, & stores food
  - Stem – transports water and food
  - Leaves – soaks up the sun's energy, makes food

- Flower – produces seeds
  - Fruit – holds seeds
5. Go back to your display of vegetables and fruits. Ask for student volunteers or call on students to identify which part of the plant each vegetable or fruit represents. (Example: lettuce is a leaf, beets are roots, etc). Sort the vegetables and fruits into the five clear containers labeled with the major plant parts.
  6. Ask the students how we get all of these different plant parts to eat. (*Farmers plant seeds, provide the seeds with water and sunlight, and the plants grow. Once the plants are fully grown they are picked or harvested. We can buy these plant parts at grocery stores, farmers markets or we can have a garden where we grow them ourselves.*)



### Activity 2: Plant Tops and Bottoms

1. Show students the book *Tops and Bottoms* by Janet Stevens. Tell students that this book is about a rabbit and a bear who decided to grow some plants to eat. The title is *Tops and Bottoms*. Ask the students:
  - "Which vegetables would be tops?" (*stems, leaves, flowers*)
  - "Which vegetables would be bottoms?" (*roots*)
2. Read the book *Tops and Bottoms*. At the conclusion of the book, ask the students:
  - "What are some plants that have good "bottoms" to eat?"
  - "What are some plants that have good "tops" to eat?"
  - "What are some plants that have good "middles" to eat?"
  - "How is the Hare similar to farmers who grow plants that we eat?" (*The hare knows about the different parts of a plant and which ones we eat. He also knows how they should be grown and harvested.*)
  - "What lessons can we learn from the Bear?" (*He is not knowledgeable about plant parts so he does not get as much healthy and tasty food as the Hare. He is also lazy. The story suggests that laziness will harvest little.*)
  - "How do the decisions that the Hare and Bear make impact their lives?" (Listen to students observations!)
3. Have students complete the *Plant Parts We Eat worksheet*. This can serve as an assessment to determine the level of understanding the students gained on plant parts.



### Concept Elaboration and Evaluation

At the conclusion of this activity, review and summarize the following key concepts:

- Roots, stems, leaves, flowers, and fruits of some plants are edible. These plant-based foods need soil, water, and sunlight to produce their delicious and healthy food items.
- Farmers grow and harvest vegetables and fruits for us to eat.
- Eating vegetables and fruits provide a healthy diet labeled on the MyPlate diagram.
- Some plants have edible tops, middles, and bottoms.



We welcome your [feedback](https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2IT) (https://usu.co1.qualtrics.com/jfe/form/SV\_4HhIVpN4L8IC2IT)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

## Enriching Activities

- Wash the vegetables and fruits thoroughly and have the students also wash their hands thoroughly. Prepare a plant parts salad or other healthy snack with the vegetables and fruits used in the lesson.
- Obtain a variety of vegetable seeds representing the parts of a plant and have students plant them in small pots or cups with drainage holes. All that is needed is water and light and the seeds should sprout in one to two weeks.
- Distribute copies of the school lunch menu for the week or month to the students. Ask them to identify the vegetables and fruits being served and determine whether they are a root, stem, leaf, fruit, or a flower.

## Sources

- This lesson was adapted from Oklahoma Agriculture in the Classroom's lesson *Plant Parts we Eat*.
- The plant parts image is from <http://www.zephyrus.co.uk/plantquiz1.html> (http://www.zephyrus.co.uk/plantquiz1.html)
- Ag facts were taken from [www.choosemyplate.gov](http://www.choosemyplate.gov) (http://www.choosemyplate.gov)

## Suggested Companion Resources

- [Edible Plant Game](https://agclassroom.org/matrix/resource/115/) (https://agclassroom.org/matrix/resource/115/)
- [Carrots Grow Underground](https://agclassroom.org/matrix/resource/1003/) (https://agclassroom.org/matrix/resource/1003/)
- [Fruit Bowl](https://agclassroom.org/matrix/resource/1108/) (https://agclassroom.org/matrix/resource/1108/)
- [Grandma Lena's Big Ol' Turnip](https://agclassroom.org/matrix/resource/1055/) (https://agclassroom.org/matrix/resource/1055/)

- [Grow! Raise! Catch!](https://agclassroom.org/matrix/resource/935/) (https://agclassroom.org/matrix/resource/935/)
- [Jack & the Hungry Giant Eat Right with MyPlate](https://agclassroom.org/matrix/resource/286/) (https://agclassroom.org/matrix/resource/286/)
- [Plants Feed Me](https://agclassroom.org/matrix/resource/337/) (https://agclassroom.org/matrix/resource/337/)
- [The Apple Orchard Riddle](https://agclassroom.org/matrix/resource/170/) (https://agclassroom.org/matrix/resource/170/)
- [The Carrot Seed](https://agclassroom.org/matrix/resource/1004/) (https://agclassroom.org/matrix/resource/1004/)
- [The Giant Carrot](https://agclassroom.org/matrix/resource/1011/) (https://agclassroom.org/matrix/resource/1011/)
- [The Reason for a Flower](https://agclassroom.org/matrix/resource/133/) (https://agclassroom.org/matrix/resource/133/)
- [The Vegetable Alphabet Book](https://agclassroom.org/matrix/resource/373/) (https://agclassroom.org/matrix/resource/373/)
- [Tops & Bottoms](https://agclassroom.org/matrix/resource/134/) (https://agclassroom.org/matrix/resource/134/)
- [Food Models](https://agclassroom.org/matrix/resource/29/) (https://agclassroom.org/matrix/resource/29/)
- [Parts of a Strawberry Plant Poster](https://agclassroom.org/matrix/resource/802/) (https://agclassroom.org/matrix/resource/802/)
- [Plant Part Chart](https://agclassroom.org/matrix/resource/804/) (https://agclassroom.org/matrix/resource/804/)
- [What is a Fruit? What is a Vegetable? Bulletin Boards](https://agclassroom.org/matrix/resource/221/) (https://agclassroom.org/matrix/resource/221/)
- [Food Doesn't Grow in the Supermarket!](https://agclassroom.org/matrix/resource/13/) (https://agclassroom.org/matrix/resource/13/)
- [Jr. Sprout - Gardening](https://agclassroom.org/matrix/resource/212/) (https://agclassroom.org/matrix/resource/212/)
- [Jr. Sprout - Healthy Eating](https://agclassroom.org/matrix/resource/214/) (https://agclassroom.org/matrix/resource/214/)
- [Sweetpotato Ag Mag](https://agclassroom.org/matrix/resource/1044/) (https://agclassroom.org/matrix/resource/1044/)
- [Grow it Again](https://agclassroom.org/matrix/resource/359/) (https://agclassroom.org/matrix/resource/359/)
- [Junior Master Gardener Handbook](https://agclassroom.org/matrix/resource/684/) (https://agclassroom.org/matrix/resource/684/)
- [Junior Master Gardener Teacher & Leader Guide](https://agclassroom.org/matrix/resource/689/) (https://agclassroom.org/matrix/resource/689/)
- [Learn, Grow, Eat, and Go!](https://agclassroom.org/matrix/resource/686/) (https://agclassroom.org/matrix/resource/686/)
- [Steps to a Bountiful Kids' Garden](https://agclassroom.org/matrix/resource/678/) (https://agclassroom.org/matrix/resource/678/)
- [Producepedia](https://agclassroom.org/matrix/resource/528/) (https://agclassroom.org/matrix/resource/528/)

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