Lesson Plans: Plant Parts

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Visit www.gotdirtwisconsin.org for more information
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Description
This unit covers five topic areas that explore each part of a plant: seeds, roots, stems, leaves, flowers and fruit. Experiments and activities will investigate the function of each plant part and identify plants that we eat.

Each topic contains basic background information to assist in leading each activity. Feel free to go more in depth with your students. Activities accompany each topic area to further explain and explore the ideas presented. Activities may also be adapted to reflect the age and grade level of your students, either by simplifying or expanding the activities.

Supplementary materials, worksheets, and information can be found on the Got Dirt? website (www.gotdirtwisconsin.org) under the Teaching Tools section.

In particular, for several of these lessons, students will use a Got Dirt? Journal. The Got Dirt? Journal can either be several pieces of paper stapled together or it can be an actual notebook. Students will record responses to each of the activities in the journal. If your students are too young to write responses in the journals, you can ask them to include drawings or other age appropriate responses to the activities. Visit the Got Dirt? website for printable journal pages.

Gardening Connections
As you plant your microfarm, container garden, cold frame or outdoor garden, have students identify the parts of the plants as they grow. Have them keep a journal of their garden, recording each element of the plant as they grow.

The microfarm grows relatively quickly, depending on the microgreens you choose to plant. This unit would work well over several school days.

Feedback
Upon completing these lesson plans, we would love your feedback. Please send comments, questions and suggestions to Bill Wright at (920) 391-4658 or Wright_WP@co.brown.wi.us
Topic 1: Seeds

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

The embryo develops into the new plant. The endosperm stores the food used to nourish the embryo. The seed coat protects the embryo until the right conditions exist for the plant to grow.

Some, but not all, types of seeds are edible. Examples of edible seeds include: almonds, Brazil nuts, cashews, peas, pumpkin seeds, and sunflower seeds.
Overview
Students will learn to sort and describe seeds according to various characteristics, including size, shape, color and texture.

Materials
- Four or five different types of seeds.
- Try to find seeds and beans that vary in size, color, texture, and shape. The more variety, the better! [Examples: Bird seed or dried beans]
- Got Dirt? Journal

Activity
1. Have each student retrieve their Got Dirt? Journal and label the page “Seeds” or turn to the corresponding page.
2. Give each student an assortment of seeds. Remind students to not eat the seeds.
3. Allow the students to have a couple of minutes to play with the seeds. Tell students to examine them, make patterns, or make shapes and pictures with their seeds.
4. Explain to students that we will now organize our seeds or create different categories for the seeds. Tell them to create piles of seeds that are the same color.
5. While students are sorting, on a board or chart paper, create four columns with the headings: color, size, shape, texture
6. Ask students to describe the piles of seeds they created. Remind students that there is not one correct answer to these questions and that students may have decided to sort their seeds differently.
   - How are the groups similar and how are the groups different?
   - What do each of the piles look like?
   - Write the responses under the “color” column. Examples: red, brown, dark, light
   - Have students write the descriptive words in their journal or draw and color a picture of their seeds.
7. Repeat, asking students to sort and describe seeds according to their size, shape or texture.
8. Conclude with students recording the function of seeds and writing or drawing examples of seeds that we eat in their Got Dirt? Journal.

Extension
- Using the seeds from this activity, have students complete the addition/subtraction or division seed worksheets from www.gotdirtwisconsin.org. For each math problem, students should place the seeds on the worksheet to visualize the problem and reach a solution.
Overview
In this activity, students will explore the inside of the seed and identify its parts.

Materials
- Seeds (Lima beans work well)
- Paper towels
- Parts of a Seed worksheet from www.gotdirtwisconsin.org (optional)
- Got Dirt? Journal

Preparation
Soak beans in water 24 hours before the activity. This will make it easier for students to examine the inside of the seed. Soak a few extra beans to allow room for error.

Activity
1. Have each student retrieve their Got Dirt? Journal. Instruct students to label the page “Seeds” or turn to the corresponding page.
2. Have students review the function of a seed.
   - What does a seed do?
   - What grows from a seed?
   - What do seeds need to grow?
3. Tell students that we will now explore what the inside of a seed looks like.
   - Ask the students what they think is inside of the seed. Record the predictions on the board.
4. Give each student a lima bean and paper towel.
5. Demonstrate how to gently open the seed to see what is inside.
6. Instruct the students to gently open their seeds.
7. Have students compare with their peers to make sure they are seeing the same thing.
8. Have students describe what they see. Students can record their answers or draw a picture of the seed in their journal. The teacher can also record the answers on the board.
Background
Roots provide plants with three main functions: anchor the plant, provide support, and absorb nutrients and water. Some roots also store sugar and starch, which provide food for the plant.

As a seed begins to grow, the first part to emerge is the root.

Some, but not all roots are edible. Examples of edible roots include: beets, carrots, cassava, horseradish, lotus roots, parsnip, rutabagas, sweet potatoes, and turnips.
Overview
Students will observe the roots of a lima bean begin to grow.

Materials
- Zip-lock bags
- Paper towels
- Spray bottle with water
- Masking tape
- Marker
- Lima Beans
- Got Dirt? Journal

Activity
1. Have students retrieve their Got Dirt? Journal. Instruct students to label the page “Roots” or turn to the corresponding page.
2. Explain the function of roots.
3. Pass out materials to the students.
4. Have students write their names on the bags or on a piece of masking tape to be placed on the bag.
5. Instruct students to fold the paper towel so that it will fit into the plastic bag. Then spray paper towel so that it is damp.
6. Place the damp paper towel inside the bag so that it lays flat.
7. Place the seeds in the bag against the paper towel so that you can see them through the bag.
8. Zip up the bag and tape it to the window.
9. Depending on your students’ age, have students either write a prediction of what they think will happen to the seeds or have students draw a picture of their seed and record its progress each day.
10. Each day, observe the seeds’ progress and water the seeds with the spray bottle. The seeds should begin to sprout and grow roots fairly quickly. When the plants have gotten too big, they can be planted in pots or in a garden.

11. Conclude with students recording the function of roots and writing or drawing examples of roots that we eat in their Got Dirt? Journal.

Alternative

You can also plant a seed in a clear plastic cup or the bottom portion of a water bottle. Plant the seed along the edge of the cup so that students can watch the roots growing in the soil.

Left: Lima beans on window sill.
Right: Roots starting to form.

Left: Lima bean planted along the edge of plastic cup.
Right: Lima bean starting to grow. Roots visible along edge of cup.
Topic 3: Stems

Background
Stems contain tube-like structures that carry nutrients and water from the plant’s roots to its leaves.

Stems can be either above ground or below ground. Above ground stems provide support for the plant and allow the leaves to reach the sunlight they need to grow. Above ground stems will actually allow the plant to bend toward the light. Below ground stems typically provide food storage for the plant.

Some, but not all, stems are edible. Examples of edible stems include: asparagus, celery, garlic, ginger, and white potatoes.
Topic 3: Stems
The Celery’s Blushing!

Overview
Students will observe how a stem works.

Materials
- Stalks of celery, including leaves
- Cup
- Water
- Red food coloring
- Got Dirt? Journals

Preparation
Cut or trim the bottoms of the celery stalks.

Activity
1. Have students retrieve their Got Dirt? Journal. Instruct students to label the page “Stems” or turn to the corresponding page.
2. Explain the function of stems. Have students imagine little straws inside the stems that the plant uses to “drink” water.
3. Tell students that we will now see what it looks like when a plant “drinks”
4. Fill a cup with water and put food coloring in the water. Use enough food coloring to make the water dark so that the results will be more dramatic.
5. Put the celery stalks in the water.
6. Ask students what they think will happen. Have them record their predictions in their journal or write the predictions on the board.
7. Throughout the day, monitor the celery stalk. The stalk and the leaves should begin to change color.
8. Conclude with students recording the function of stems and writing or drawing examples of stems that we eat in their Got Dirt? Journal.

Extension
- Cut the celery in half lengthwise about 3/4 of the way up the stalk. Place one half of the stalk in a cup with red food coloring and the other half of the stalk in a cup with blue food coloring. Observe what happens!
Topic 4: Leaves

Background
Leaves make food for the plant by absorbing sunlight through the process of photosynthesis. Leaves vary in shape, allowing for easy classification of plants.

Some, but not all, leaves are edible. Examples of edible leaves include: cabbage, collards, kale, lettuce, mustard, parsley, and spinach.
Overview
Students will participate in a skit to learn that leaves make food for a plant.

Materials
- Images of the sun, water, and air (available at www.gotdirtwisconsin.org)
  - You may choose to substitute props for the images
- Soup pot
- Large spoon
- Got Dirt? Journals

Activity
1. Explain that leaves help plants make food through the process of photosynthesis. Explain that humans have to eat food to get energy but plants can make their own food. If humans could make their own food, it would be like making a piece of lasagna in their arm.

2. Perform the following skit to illustrate what a plant needs to make food.
   - Holding your soup pot and spoon, introduce yourself as Chef Chlorophyll. Tell your students that you live inside the leaves of a plant and are making food to help the plant grow.
   - Taste the soup in your pot and explain, “It tastes okay, but it needs a few ingredients.”
   - Ask the students what ingredients the plant needs to grow.
     - Each time a student answers a correct ingredient (sun, air, and water) give the student the image of the ingredient and allow them to place it in the pot.
   - Repeat until all of the ingredients are in the pot.
   - Tell students that the soup tastes just right and now the plant can grow big and strong!

3. Have students retrieve their Got Dirt? Journal. Instruct students to label the page “Leaves” or turn to the corresponding page.

4. Have students write down or draw the things that leaves need to make food.

5. Conclude with students recording the function of leaves and writing or drawing examples of leaves that we eat.

Extension
- Have students measure the area of a leaf. Trace a leaf onto graph paper. Have students count the number of complete squares and estimate the number of partial squares to calculate the total area.
- Do a leaf rubbing. Place a leaf, vein side up, on a piece of paper. Put another piece of paper on top and gently rub it with a crayon.
Background
Flowers contain the reproductive parts of the plant where new seeds are formed.

Some, but not all flowers are edible. Examples of edible flowers include: borage, broccoli, calendula, chive blossoms, garlic blossoms, nasturtiums, squash blossoms, and violets.

Unlike the common usage of the word, the scientific term for fruit refers to the part of the plant that surrounds and protects the seed. Fruits help in the transportation of seeds.

Some, but not all fruits, are edible. Examples of edible fruits include: apples, cucumbers, grapes, peaches, pears, peppers, pumpkins, string beans and tomatoes.
Topic 5: Flowers and Fruit
Tomato, Tomahto

Overview
Students will practice estimating, comparing and contrasting, and basic addition and subtraction. The activity will also demonstrate that seeds are located within a fruit.

Materials
- Cherry tomatoes (enough so each student gets 1/2 of a tomato)
- One large tomato
- Paper towels/napkins
- Paper and pencils
- Knife
- Got Dirt? Journals

Preparation
Cut cherry tomatoes in half so that each student receives 1/2 of a tomato.

Activity
1. Have students retrieve their Got Dirt? Journal. Instruct students to label the page “Flowers and Fruit” or turn to the corresponding page.
2. Review the functions of flowers and fruits, emphasizing that seeds are found in fruits.
3. Explain to the students that today we are going to guess or estimate the number of seeds inside of a fruit.
4. Show the students a cherry tomato half and have them estimate how many seeds are in it. Have them record their answer in their Got Dirt? Journal.
5. Hand out ½ of a cherry tomato and paper towel/napkin to each student. Make sure that the students do not eat the tomato before completing the exercise.*
6. Instruct students to count the seeds in their tomato.
7. Have students record the actual number and figure out how close they were to their guess, allowing them to practice subtraction. Find out who was the closest.
8. Have students compare the number of seeds in their tomato with a partner.
   - Who has more seeds?
   - How many seeds do they have all together?

*Estimated Prep Time: 20 min.
9. As a class, calculate the total number of seeds from all of the tomato halves. You can also calculate:
   - How many seeds one half of the room has compared to the other?
   - How many seeds the girls had compared to the boys?

Each time students can either calculate the totals together as a class or do the addition on their own and then together as a class.

10. Ask students to guess how many seeds are in one large tomato. Record answers on the board or chart paper.

11. Have students count the number of seeds in the tomato.

11. Compare the number of seeds in the large tomato to the number of seeds in the cherry tomato halves and to the classes’ total number of cherry tomato seeds. Which has more?

12. Conclude with students recording the function of fruits and flowers and writing or drawing examples of fruits and flowers that we eat in their Got Dirt? Journal.

**Extension**

- Do the same activity with a different fruit/vegetable (ex: pumpkins, apples, peppers, watermelon, etc.)

- Have students calculate the mean (average), median (middle number), and mode (most frequent number) for the classes’ cherry tomato seeds

*Note

Although student could eat their tomato halves, they probably shouldn’t since they will be playing with them and counting the number of seeds. It is probably best to advise your students that although tomatoes are a yummy snack, it is best that we don’t eat them after playing with them.
Additional Activities

Inventing a Plant
After learning all the parts of a plant, have students invent their own plant. In their Got Dirt? Journals, students can draw a picture or write about their creation. Make sure they include all of the parts of the plant and a name for their new plant.

Plant Explorers
Assign or have each student choose a fruit or vegetable. Have students research their plant and write an essay or a list of interesting facts. Students can also trace the history of the plant, how it arrived in America, where it typically grows, and its nutritional benefits. Have students draw a picture of their fruit or vegetable and identify all of the parts of the plant and what it needs to grow. Have the students share their paragraph and/or pictures with the class.

Tops and Bottoms
Read the book, *Tops and Bottoms* by Janet Stevens. This trickster tale features the “tops” (fruit) and “bottoms” (roots) of plants. Read the story and discuss the types of plants and whether it is a top or a bottom.

Memory
Select a variety of fruits and vegetables that represent parts of the plant that we eat. Place them on the table and review the names of the fruits and vegetables and what part of the plant they represent. Next, cover the fruits and vegetables with a cloth and carefully remove one or several items from the table. Have students identify what item is missing and what part of the plant it represents. (Note: if actual fruits and vegetables are not available, pictures of fruits and vegetables can work just as well.)

Grab-and-Go
Visit the Got Dirt? website (www.gotdirtwisconsin.org) for worksheets, including
- A-Maze-Ing Plant Parts: Plant part maze
- Word Scramble
- Plant part drawing
For more information about the **Got Dirt? Garden Initiative** or for comments and suggestions about lesson plans, please contact:

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