

Plant Parts Go To Work

Summary: Students become familiar with the five basic parts of plants and learn that each part has a specific job to do for the plant.

Objectives:

The students will:

- Identify the five parts of plants.
- Describe the function of each of the five parts of plants.
- Name some common agricultural-related plants.

Materials:

Activity #1:

- one whole plant with all of the parts (which can be torn apart) or each of the five parts of a plant
- pictures or examples of common agricultural plants (corn, potatoes, tomatoes, hay)

Activity #2:

- "Little Brown Seeds" poem (included in lesson)
- two paper plates or two cut out circles per student
- one brass fastener per student
- markers, crayons
- dramatic/happy music to "act" to

Activity #3:

- seeds from several different plants (different shapes, sizes, colors, etc.)
- math flash cards

Activity #4:

- one potato, 3-4 toothpicks, clear plastic cup, water, red food coloring
- one stalk of celery, clear plastic cup, water, red food coloring
- one small potted plant, one large glass jar (in which the plant will fit), petroleum jelly, piece of cardboard (approx. 8"x 8")
- dried, large lima beans (2 per student and soaked overnight), one toothpick per student, paper towels, hand lenses and diagram (optional)
- knife
- paper and pencils

Getting Started:

- Activity #1 requires one whole plant that can be torn apart or the individual parts of several different plants that clearly illustrate each part.
- Activity #4 requires some grocery shopping ahead of time (potato, celery, dried lima beans) and you will need to soak the lima beans overnight before they are dissected (but for no longer than 30 hours or they will begin to rot). A small, potted plant that a clear glass jar can fit over is also needed. The potato, celery, and transpiration experiments also take from one to three days to complete. Some could be done ahead of time or just done in front of the students and monitored until ready. This helps to build suspense...



Grade Level: K-6

Topic: Plant parts, Agricultural plants

PA Environment & Ecology Standards Addressed:

Agriculture and Society:
4.4.4.B: Identify the role of the sciences in Pennsylvania agriculture.

- Identify the parts of important agricultural plants (i.e., corn, soybeans, barley).

Teaching Methods:

- Lecture/Discussion
- Hands-on Activities
- Demonstration
- Experiments/Observations

Multiple Intelligences Utilized:

- Naturalistic
- Logical/Mathematical
- Visual/Spatial
- Interpersonal
- Verbal/Linguistic
- Bodily/Kinesthetic
- Musical



Background:

Plants have the same basic parts---roots, stems, leaves, and flowers/seeds. Each individual part has a specific job that it performs in order to help the plant grow. Here are some facts about each of the parts and the roles that they play.

Roots are the part of the plant that grows underground. They are very important to plants because they help the plant stand up and stay anchored in the ground. Roots get water to the rest of the plant and store extra food for the plant.

Stems can be found between the roots and leaves of a plant. Some stems are very hard, like the trunk of a tree, and others are soft, like the stem of a tulip. The stem also helps the plant stand up and also holds the leaves up to the sunlight. Water travels up the stem from the roots to the leaves and back down again.

Leaves grow on the stem of a plant. All leaves make food for the plant using air (carbon dioxide), water, and sunlight through the process of photosynthesis. This occurs when water rises up from the roots, air comes in through the tiny holes in the leaves (stomata), and sunlight hits the leaves. Only green plants (which have chlorophyll in them) can make food in this way. Some leaves change colors in the autumn. When this happens the leaves drop off the stems and no more food is made. When spring comes, new green leaves grow and the plant can start making food once again.

A **flower's** main job is to make **seeds**. Once seeds are produced they fall to the ground and can grow into new plants (ex.=daisy seeds will grow new daisy plants and corn seeds can only make new corn plants). Seeds have many different shapes, sizes, and colors. Some flowers make a covering for their seeds called fruit. The fruit helps to protect the seeds so that new plants can be produced. Some fruits have many seeds inside and others have only one inside.

Fun Facts!

Potatoes grow underground, but while we might think of them as roots, they are actually a specialized part of the plant's stem.



Activity #1: Plant Inspection

By inspecting the individual parts of plants, students will become familiar with their appearance and review each part's job.

- Divide the class into four groups.
- Tear a plant into the four parts (roots, stem, leaves, flowers/seeds) and give each group one part on a paper plate or newspaper to minimize the mess.
- Ask the students to examine the plant part using their senses and determine which part of the plant it is.
- Once each group has identified which part they have, ask each group to stand up and introduce their plant part to the rest of the class, explaining its job (*ex.=These are the roots. They hold the plant in the ground and send water and food up to the rest of the plant.*)
- Rotate the activity until each group has had a chance to inspect and present each part.
- Next, show some pictures or examples of common agricultural plants (such as corn, potatoes, tomatoes, or hay). Ask the students if they know what they are. Why are they grown (*for people and animals to eat*)? How many of them have eaten at least one of these items? Do people eat hay? Talk about why these plants are grown in large amounts on large farms, as well as in small gardens (*They are common foods, people like to eat them, animals eat some of them so that we can raise them for other food sources, etc.*). See where the discussion takes you!

Activity #2: "Little Brown Seeds"

Using poetry and drama can be a fun way to integrate language skills and the arts while learning about science. This activity will utilize the poem "Little Brown Seeds" to illustrate the process of seed germination and sprouting.

- Read the poem "Little Brown Seeds."
- Talk about the sequence of the story and how the different factors affect the seeds. You may want to illustrate the different steps together to give them an idea of what is happening in the story.
- After the students are familiar with the poem help them create story wheels with two paper plates (or cut out circles of paper) and a brass fastener that fastens in the center so that the front plate spins around and only reveals one frame of the story at a time. Divide the bottom plate into six different segments and number them, then ask the students to draw the six different steps of the story in proper order (clockwise). The title can be drawn on the front plate.
- Have the students practice telling the story, in their own words (or poem), to each other with their story wheels.

- Next, ask the students to help you think of how you could act out the poem to dramatic music. Go through each sequence and encourage them to be creative. Then, play some music, read the verses, and let them act! If you have a range of age groups in your classroom you might ask an older student to narrate while a younger student acts. Students could also rap or come up with other creative ways to present the poem to the class.

"Little Brown Seeds"

Little brown seeds so small and round
Are sleeping quietly underground.
Down come the raindrops
Sprinkle, sprinkle, sprinkle.
Out comes the rainbow
Twinkle, twinkle, twinkle.
Little brown seeds way down below
Up through the earth they grow, grow, grow.
Little green leaves come one by one.
They hold up their heads
And look at the sun.

---Author unknown



Activity #3:

Seed Ciphering & Seed Sorting

Strengthen mathematical and sorting skills with these activities involving typical, untreated seeds that you might buy in packets at your local home and garden store.

- **Seed Ciphering:** Give students flash cards and a group of seeds to use as visual aids to practice math facts.
- **Seed Sorting:** Mix several different varieties of seeds together in a container (different colors, sizes, shapes, etc.) and ask students to sort them into like groups. You may need to explain the concept of categorization to some students. You can also do patterning activities. The possibilities are endless.

Activity #4:

Plant Part Experiments

These four experiments help to illustrate the inner-workings of plant parts. Take a closer look at roots, stems, leaves, and seeds.

How Does Water Get Into A Plant?

- Grow potato roots in a clear plastic cup of water by cutting off the end of a potato. Stick toothpicks out of either side so that the toothpicks rest on the edge of the cup and the cut end of the potato is submerged in the water-filled cup.
- Mix red food coloring into the water once roots are growing.
- Wait a few days. Did the potato change?
- Cut the potato in half. What do you see? (*The inside should be red.*)
- How did it happen? (*The newly grown roots took the water up into the potato, thus turning it red.*)
- What is the job of the roots?

How Does Water Get To The Leaves?

- Mix red food coloring into some water in a clear plastic cup.
- Take one celery stalk, trim the bottom so that there is a clean cut, and place the celery stem in the water with the bottom submerged.
- Wait a day.
- How do the celery leaves look?
- Cut off a piece of the stem. What do you see? (*The inside should be red.*)
- What is the job of the stem?

Does A Leaf Give Off Water?

- Put a small potted plant on a piece of cardboard (make sure soil is not dried out).
- Place a large, clear glass jar over the plant.
- Put petroleum jelly around the lip of the jar to make a seal between the lip and the cardboard (to prevent air from escaping from the inside of the jar).
- What do you think will happen?
- Wait a few days.
- What is inside the jar? (*It is condensation--moisture that the plant gives off.*)
- Where did it come from? (*Through tiny openings---called stomata---in leaves. They play a large role in photosynthesis.*)

Lima Bean Dissection

A seed has a tiny plant inside of it that is waiting to come out and start growing. It is called the embryo. The embryo is made up of tiny leaves, roots, cotyledons (where food is stored to help the tiny plant start to grow), and the seed coat (the outer layer that protects the seed). All of these features can easily be seen inside a lima bean, so this is a great way to sneak a peek at a plant in its infancy. Refer to diagram in Appendix.

- Soak large, dried lima beans in water overnight (no more than 30 hours or they will begin to rot). Allow for at least two beans per student since they are delicate.
- Explain that lima beans are an example of a seed and that they will be able to find the different parts of a tiny plant inside each one if they look closely.
- Ask students to carefully rub the seed between their fingers. What do they see on the outside of the seed? Peel off carefully. What part is this and what is its function? (*The seed coat---it protects the seed.*)
- Explain that the large, rounded, fleshy structures you see next are the cotyledons. They store food for the plant to eat before it begins to grow above ground.
- Carefully split the seed in half lengthwise. What can you see tucked inside along the inner curve of the cotyledon? (*A tiny plant, or the embryo, made up of the first leaves and roots.*)
- Can use hand lens to inspect more closely (optional).
- Ask students to make a drawing of their seed and label the five parts (embryo, leaves, roots, cotyledons, seed coat).



Evaluation:

Rubric: Plant Parts Go To Work

3	2	1	0	The student can identify all five plant parts.
3	2	1	0	The student can describe each plant part's function.
3	2	1	0	The student can name some common agricultural plants.
3	2	1	0	The student can correctly draw and label the parts of a dissected lima bean.
12	8	4	0	Total Score: /12

Resources:

Carle, E. (1987). The tiny seed. Aladdin Paperbacks: NY.

Gibbons, G. (1991). From seed to plant. Holiday House: NY.

Jordan, H. (1992). How a seed grows. Harper Collins Publishers, Inc.: NY.

Plant Poetry: www.tooter4kids.com/Plants/poetry.htm

The Flower Fields (Plant Poetry): <http://visit.theflowerfields.com/plant%20.pdf>

