PLANT PARTS IN THE GARDEN LESSON

3RD THROUGH 5TH GRADES

KEY UNDERSTANDINGS

In this lesson, students will identify and describe each part of a plant and sort Learning Garden crops by plant parts.

- Plants are made up of different parts that we can eat.
- Plant parts serve different functions that all help the plant survive.
- Harvesting should be done with clean hands and tools.

STANDARDS ALIGNMENT

Next Generation Science Standards

- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some less well, and some cannot survive at all.
- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.
- 5LS1-1. Support an argument that plants get materials they need for growth chiefly from air and water.

Common Core – English Language Arts

- SL.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.
- SL.3.3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
- SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
- SL.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.
- SL.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
- SL.4.3. Identify the reasons and evidence a speaker provides to support particular points.
- SL.4.4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly and at an understandable pace.
- SL.5.1. Engage effectively in a range of collaborative

discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
- SL.5.3. Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
- SL.5.4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

MATERIALS & PREPARATION

- Print and cut one set of *Plant Part* cards
- Print and cut one set of *Plants We Eat* cards
- Review *Harvesting Basics* and *Harvesting Plant Parts* documents
- Prepare for harvest and collect harvesting supplies
- Review lesson and familiarize yourself with your Learning Garden
- Optional: supplies for additional Learning Garden activities

TEACHER BACKGROUND

All of the plants that your students will be investigating and observing are considered angiosperms. Angiosperms are a group of plants which include almost every plant you can see outside of your window, except for conifers and cacti! An angiosperm is classified by its ability to produce seeds that are (usually) contained within a fruit. Many times, you may not even know that you are looking at the fruit of an angiosperm because the fruit was designed to fly (dandelions), float (coconuts), stick to passers-by (burrs), or be consumed by animals (tomato, zucchini, and peppers).

Use the table below to help your students understand which of the crops on their worksheets are roots, fruits, seeds, leaves, stems, or flowers – some of these may even surprise you!

Roots	Fruits	Seeds	Leaves	Flowers
Carrot	Pepper	Peas	Lettuce	Broccoli
Beet	Tomato	Corn	Kale	Cauliflower
Radish	Squash	Bean	Spinach	Squash blossom

ROOT: Roots absorb water and nutrients, and along with the stem, provide structural support for the entire plant, anchoring it to the soil. Just like the other parts of the plant, the root can serve as an important food crop.

FRUIT: Fruits hold and protect a fertilized and mature ovule – also

known as a seed. Most seeds are on the inside of the fruit, which gives the seed protection from the surrounding environment. Some seeds can be found on the outside of the fruit, like corn or strawberries. Just like other parts of the plant, fruits can serve as an important food crop.

> *Fun fact!* Botanically speaking, a fruit is anything that has seeds on the inside. In the culinary world, things like peppers and tomatoes are usually referred to as vegetables. For this lesson, we will be looking at fruits from the botanical perspective, which means referring to peppers and tomatoes as fruits.

SEED: Seeds, or mature and fertilized ovules, germinate or sprout into a baby plant. The seed is made up of three distinct parts: the embryo, which will eventually turn into the baby plant itself; the endosperm, which serves as a food storage area for the seed to use as it first sprouts; and a seed coat, which protects the seed from insects, disease and moisture. Most seeds all have the same structure, but there are always exceptions in science; like orchid seeds, which do not have an endosperm.

LEAF: Leaves collect sunlight and turn that sunlight into food or sugar for the plant. This process is called photosynthesis. Photosynthesis is also the reason our plants are green. Chlorophyll molecules (which give plants their green color) absorb the energy or sunlight used in photosynthesis! Leaves have broad, flat surfaces. This allows for more surface area to be exposed to the sunlight and helps support a high rate of photosynthesis.

STEM: Stems support the transportation of water, food and nutrients to the entire plant, in addition to playing a role in overall plant support along with the roots. Stems have three main components: xylem, phloem, and cambium. The xylem and phloem make up the plants vascular system, which does all of the transporting of water, food and nutrients to the plant. The cambium, located between the xylem and phloem, is the site of cell division, which means that this is the site of plant growth. When cells divide, the plant actually gets bigger.

> *Fun fact!* Above, you will see that a potato has been listed as a stem, even though it grows underground! It is a common misconception that the potato is a root instead of a stem. Make sure to point this out to your students, as it can be confusing. Botanically speaking, the potato is a tuber, which is an underground enlarged stem.

FLOWER: Flowers support plant sexual reproduction, which is why a

flower is the showiest part of the plant. The color and fragrance of flowers, while pleasing to us, is to attract pollinators like bees and butterflies. The flower has two main components: the male pollen and/or the female ovule. In addition, there are other accessory parts that support plant reproduction, like the petals (colorful and fragrant) and the sepals (green base part of the plant that protects the bud).

Review your school district's safe handling guidelines and ask your Garden Educator for more information. At a minimum, adhere to the following steps:

- Do not work in the Learning Garden when suffering from vomiting and/or diarrhea.
- Always wash your hands before and after harvesting and handling fresh produce.
- Use clean gloves (that have not been used to stir compost or pull weeds) or clean hands when harvesting.
- Use clean, food-grade containers. Food-grade containers are made from materials designed specifically to safely hold food. Garbage bags, trash cans, and any containers that originally held chemicals such as household cleaners or pesticides are not food-grade.
- All tools used in the Learning Garden must be used solely in the Learning Garden and cleaned regularly.
- Do not each fresh produce while harvesting.

Cleaning and Transporting Tools

- Two food-safe buckets: for cleaning and rinsing produce in potable water
- Food-safe harvest container: used to transport harvested produce indoors or to the cafeteria

Harvesting Tools

- Large shove: used by adults to loosen soil around carrots and potatoes
- Harvest knife or scissors: used by adults to harvest baby greens, pea shoots, squashes, cucumbers, fresh herbs and edible flowers
- Kid-safe scissors: used by students to harvest baby greens, pea shoots, fresh herbs, and edible flowers

Harvesting Basics by Plant Part

Plant Part	Example Crop	Harvest Methods	Post-Harvest Handling	Storage
Roots	Carrots, radishes, beets, turnips	Pull from the ground by hand. You may need a shovel to loosen soil around roots.	Clean off as much soil by hand and then dunk and rinse in the potable water container. Repeat in a second potable water container. Slice roots with a knife and cutting board to share.	Roots will stay crisp if they are washed and refrigerated. They soften in sun and heat.
Stems	Celery, kohlrabi, pea shoots, chard stem	If tender, harvest by hand. Sturdy stems will require a knife or scissors.	Dunk and rinse in the potable water container. Slice stems with a knife and cutting board to share if needed.	Stems will stay crisp if they are washed and refrigerated. They soften if sun and heat.
Leaves	Lettuce, kale, spinach, chard leaf	Harvest larger leaves by hand. Cut leaves from young plants.	Dunk and rinse in potable water container. Rip or tear into tastings.	Leaves will stay crisp if they are washed and refrigerated. They wilt quickly in the sun and heat.
Flowers	Broccoli, nasturtium, cauliflower	Pinch flower stem with hand or cut with harvesting knife or	Dunk and rinse sturdy flowers, such as broccoli, in the potable	Delicate flowers should be eaten immediately. Sturdy

		scissors.	water container. Check flowers for bugs as they provide many hiding places.	flowers, like broccoli, will keep if washed and refrigerated.
Fruits	Tomato, squash, cucumber	Harvest by hand, some may need a harvesting knife or scissors.	Dunk and rinse in the potable water container.	Fruits may vary widely. Most keep well, but many are best eaten raw in the garden.
Seeds	Sunflower seeds, coriander seeds	Harvest easily by hand.	Dunk and rinse in the potable water container.	Seeds keep well if dried or if they have a shell.

LESSON

Welcome students to the garden lesson and spend time discussing the following introductory questions:

1. Who has visited the school Learning Garden?
2. What grows in our Learning Garden?
3. Who uses our Learning Garden?
4. What do you want to learn that relates to the Learning Garden?

During the classroom portion of today's lesson, students will be learning about the plants we eat through the lens of plant parts.

5. Draw a simple picture of a plant on a dry erase board or large piece of paper. Include all six plant parts – roots, fruits, seeds, leaves, stems, flowers – along with a line points to each of the six plant parts. Label the plant parts 1 through 6.
6. Ask your students to raise their hand to identify one plant part. Work through the entire plant.
7. Let your students know that we eat all six of these plant parts. To get your students thinking, ask them to name some fruits, then some seeds. Record student responses.
8. Students will be playing a classroom sorting game. Ask for 6 volunteers to represent the six main plant parts. Pass out the *Plant Parts Cards* to each of these six volunteers and have them stand at different spots throughout the room.
9. Split up the rest of the students (they may have to work in

pairs) and distribute the *18 Plants We Eat* Cards.

10. Let your students know that there are six plant parts and identify each of the six students who have volunteered as plant parts. The rest of the students will have a *Plants We Eat* card. At the end of the activity, there should be three complete plants we eat at each plant part station.
11. Give your students 5 minutes to match their plant to the correct plant part. Some of the cards may be trickier than others.
12. Once everyone has finished moving around, review each plant part, its function, and some examples of each. Ask the students that volunteered as plant parts to describe each plant part's function. Move students around as needed and discuss any questions that arise. (Review the Teacher Background section for more information.

*You may choose to break here if doing two lessons.

13. Transition to the Learning Garden. Welcome your students and line them up along one side of the Learning Garden. Stand on the opposite side so you can address the entire group.
    Ask students if they know what they will be doing in the Learning Garden for the day's lesson. Let them know they will be practicing their harvesting skills and review the plant part(s) they will be harvesting.
14. Ask students if they know what is currently growing in the Learning Garden. Connect student responses to the classroom lesson and discuss the plant parts that we eat from each crop.
15. Introduce the crop(s) to be harvested and review the plant part(s) that will be eaten. Review with students how we know this vegetable is ready to harvest.
16. Choose the appropriate harvest method: student harvest or teacher harvest.
    If every student has the opportunity to harvest: Demonstrate how to harvest the crop safely, focusing on exactly what part of the plant to harvest, how to harvest it, and ways you could harvest incorrectly. Review the steps and ask students if they have any questions. Instruct students to place their crop in a harvest container for that specific crop.

    If not every student has the opportunity to harvest: Harvest within sight of all students, and place harvested crops into a harvest container for that specific crop.
17. Harvest and clean your Learning Garden crops. (Review *Harvesting Basics* and *Harvesting Plant Parts* in the Teacher

Background above.)

18. Once all students have clean vegetables in hand, it is time to taste their produce! Invite students to all try their produce at the same time.
19. Students will typically ask to harvest and taste a second time. If there is enough produce to harvest and time in class, consider allowing students to repeat the activity.

NOTES: Students may or may not like their tasting and could react theatrically (spit their produce out). It is important that their students do not spit their food back into the Learning Garden for food safety reasons, as they could contaminate the produce that is still growing. It may be a good idea to bring the students away from the Learning Garden to taste if you expect students may not like their vegetables.

As the teacher, be aware of poisonous plants and other hazards in and around your Learning Garden and review those concerns with your students. Review any additional rules to the Learning Garden. Query students about known bee/wasp sting allergies before going into the Learning Garden.

CONCLUSION

Have students share key parts of the day's lesson and review the Key Understandings.

Students should clean up the Learning Garden as needed.

ADDITIONAL LEARNING GARDEN ACTIVITIES

Extend your Learning Garden experience and have students participate in any of the following Learning Garden activities as appropriate:

- Planting
- Watering
- Weeding
- Harvesting

Plant Part Cards

(Print these cards before the Classroom Activity.)

ROOT

Roots take up water and nutrients from the soil and make our plants healthy and strong. Roots also help hold our plants in place, so they don't blow over.

FRUIT

Fruits hold and protect the seeds of the plant. Most of the time, the seeds can be found on the inside of the fruit, but sometimes seeds can be on the outside.

SEED

A seed grows into a baby plant (also called a seedling). The inside of every seed has an embryo and endosperm. Seeds are protected by an external seed coat.

LEAF

Leaves absorbs sunlight and turn it into stored energy for the plant. This process is called photosynthesis – which is also what makes our leaves green!

STEM

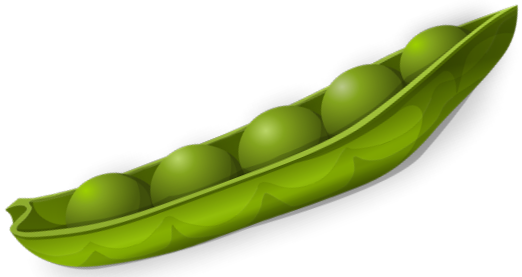
Stems transport water, nutrients, and food to the entire plant. In addition, they help support the whole plant along with the roots.

FLOWER

Flowers turn into fruits, and support plant reproduction by making seeds that grow into baby plants.

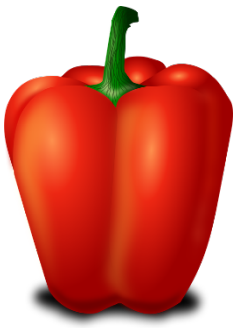
Plants We Eat Cards

(Print these cards before the Classroom Activity.)

CORN 	LETTUCE 
BEANS 	KALE 
PEAS 	SPINACH 

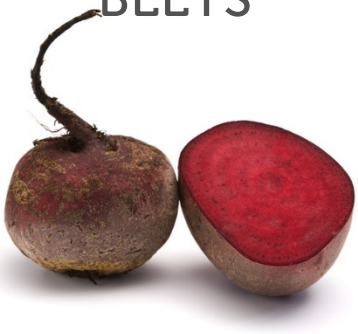
Plants We Eat Cards

(Print these cards before the Classroom Activity.)

PEPPER 	BROCCOLI 
TOMATOES 	CAULIFLOWER 
ZUCCHINI 	SQUASH BLOSSOMS 

Plants We Eat Cards

(Print these cards before the Classroom Activity.)

CARROTS 	CELERY 
BEETS 	ASPARAGUS 
RADISH 	POTATO