Science Unit: ***Plants***

Lesson 6: ***Plant Parts and Their Function***

School year:	2004/2005
Developed for:	Queen Alexandra Elementary School, Vancouver School District
Developed by:	Paige Axelrood (scientist) and Janet Vesterback (teacher)
Grade level:	Presented to grade 3; appropriate for grades 2 - 5 with age appropriate modifications.
Duration of lesson:	1 hour and 20 minutes

Objectives

1. Learn why plants are important.
2. Learn the parts of a plant.
3. Recognize the parts of a plant that we eat.
4. Learn the function of different plant parts.

Background Information

Plants are important to ecosystems and to living organisms, including people. Plants generate oxygen in air which many living organisms need to stay alive. Plants are used for food; many plant parts are eaten including fruits, flowers, buds, leaves, stems, roots, and seeds. People use plants (cotton and flax) to weave fiber (cotton and linen) for items such as clothing, sheets and towels. Wood from trees is milled and used to build houses and furniture and to make products such as pencils, chopsticks, toothpicks and musical instruments. Some medicines come from plant extracts. Plants also bring pleasure to people (gardens, parks, and wilderness areas) and provide shelter and a home for insects and animals.

The major parts of a flowering plant are roots, stems, leaves, flowers, fruits and seeds. Non-flowering plants reproduce from the seeds produced in cones (conifers) or from spores (ferns and mosses). The roots support the upper plant parts and absorb water and nutrients from the soil. Roots also store sugars and carbohydrates that the plant uses for growth and development. The stem transports water and nutrients from the roots to the leaves and the stem supports the plant parts above it. The leaves provide the site for photosynthesis (food production for the plant). Leaves also have small openings (stomata) mostly on their lower surfaces to allow air and water vapor to enter and exit from the plant. The flowers have many parts that play a role in fertilization, which results in fruit and seed production. Seeds are the reproductive structures of the plant.

Vocabulary

Annual:	A plant that lives for one year or one season and survives over the winter as seeds.
Perennial:	A plant that has a life cycle of more than 2 years and produces flowers and seeds from the same root system.
Bud:	A swelling of plant tissue that will grow into a leaf, cluster of leaves, or flower.
Bulb:	A modified bud that is underground; it has swollen leaf bases.
Tuber:	Underground stem, usually fleshy and thick.
Vegetable:	A part of a plant that can be eaten.

Fruit: A plant part that is produced from flowers; a fruit contains a seed or seeds.

Materials

Visit the grocery store and buy different fresh fruits and vegetables and seeds that represent different plant parts that we eat. Examples of edible flowers, fruits, seeds, leaves, stems, roots, bulbs and buds are listed below. Also, buy one carrot for each student. The carrot tops will be used to sprout shoots.

- Flower: cauliflower, broccoli
- Fruit: apples, oranges, green beans, tomatoes, snow peas, bell peppers, papayas, cucumbers
- Seed: sunflower seeds, popcorn, pine nuts
- Leaves: lettuce, bok choy
- Stem: asparagus, potatoes (underground stem also called a tuber, look for buds), bok choy, celery
- Root: carrots, radishes, beets, sweet potatoes
- Bulb: garlic, onions (thick basal leaves)
- Bud: asparagus, artichokes (flower bud)
- Zip lock sandwich bags
- Knife
- 1 plastic container and permanent marking pen for each group of students

In the Classroom

Introductory Discussion

1. Ask students why plants are important.
2. Show students different fresh fruits and vegetables (one at a time) and ask the students what plant part each food represents and the function of the plant part. Point out that many vegetables that we eat are really fruits (such as tomato and bean) because they contain seeds.
3. Review vocabulary words that weren't covered during the discussion.
4. Explain the science activities to the students

Science Activity/Experiment

Groups of 3 or 4 students will work together for the science activities.
Activity 1:

5. Place 12-16 small pieces of different types of fresh fruits and vegetables that represent different edible plant parts into a zip lock sandwich bag for each group of students.
6. Ask students to examine each plant part and classify it as a flower, fruit, seed, leaf, stem, root, bulb or bud. Some plant parts can be classified as two different plant parts. For example, an asparagus spear can be classified as a stem and a bud.
7. Write the names of the plant parts on a flip chart or black board. Prepare a two-sided activity sheet for classifying the edible plants that the students will examine. Each side of the sheet will have four large boxes, each with a plant part written at the top of the box (flower, fruit, seed, leaf, stem, root, bulb or bud).
8. Students will write the name of the plant part that they examine in the appropriate box, and draw a picture of the plant part.
9. Buy extra fruits and vegetables so that these can be washed and eaten by the students.

Activity 2:

10. Cut the bottom of the carrot root off leaving the top 1.5 cm of the carrot plus the top of the carrot where the shoot used to be. It is best to buy carrots without the entire shoot present.
11. Give one carrot top to each student and ask students to examine the top of the carrot. Give each group of students a plastic container and permanent marking pen and have them write their names or group number on the container.
12. Students will place the carrot tops in one plastic container per group and add water to reach 0.5 cm below the top of the carrot.
13. Place the containers near a window or under plant growth lights.
14. Ask students to write down their predictions of what will happen to the carrot tops after they are incubated in the classroom for two weeks.
15. Students will check the carrots daily and add water to containers as needed. Observations of the carrot tops, swollen buds, and shoot growth can be recorded once or twice a week for two weeks.
16. Designing an experiment to include assessment of different incubation conditions can extend the carrot top activity.

Closure Discussion

17. Review the parts of a plant that we eat for food. Discuss the function of these plant parts.
18. Review the parts of a plant that are important for reproduction (seeds, tubers and bulbs).
19. Discuss different types of buds (flower and leaf buds) and why they are important.

References

20. Oechsli, Helen & Kelly. 1985. In My Garden. A Child's Gardening Book. Macmillan Publishing Company, New York, USA.
21. http://www.urbanext.uiuc.edu/gpe/index.html University of Illinois Extension, [General information about plants].
22. http://www.apsnet.org/education/K-12PlantPathways/TeachersGuide/Activities/PlantPartsLab/Top.htm American Phytopathological Society, APSnet, K-12 Teachers' Guide to Lessons and Laboratories, [Plant parts and their diseases].

Teacher Assessment of Learning

23. How accurately are students able to classify the edible plant parts?
24. Ask students to give reasons for the similarities and/or differences between their predictions and their results. Can students explain why the carrot top began to put out new leaves? The carrot is a root and the remnant of the carrot top with tiny buds is attached to the root. A main function of the root is to supply water and nutrients to the rest of the plant as it grows.

Extension of Lesson Plan

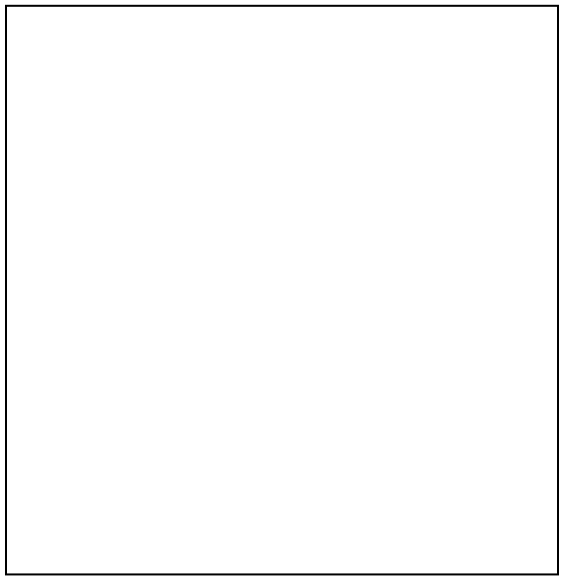
25. Walk around the school grounds and nearby neighborhood and go for a bud scavenger hunt.
26. Design an experiment with carrot tops.
27. Plant bulbs in plant containers and watch them sprout and grow.

Plant Parts

Name of Scientist_____

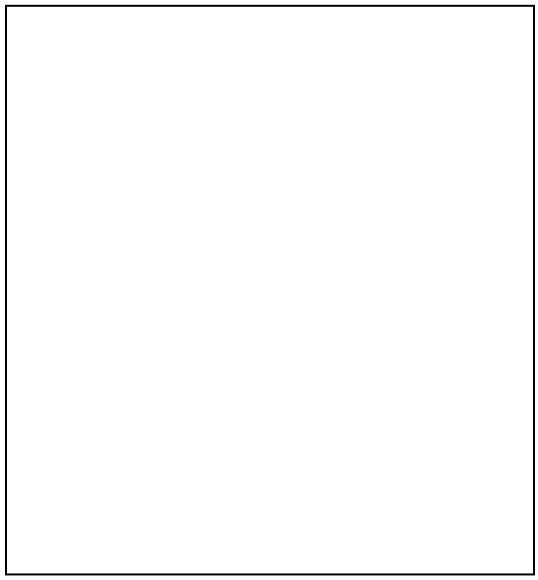
Plant Name_____

Flower



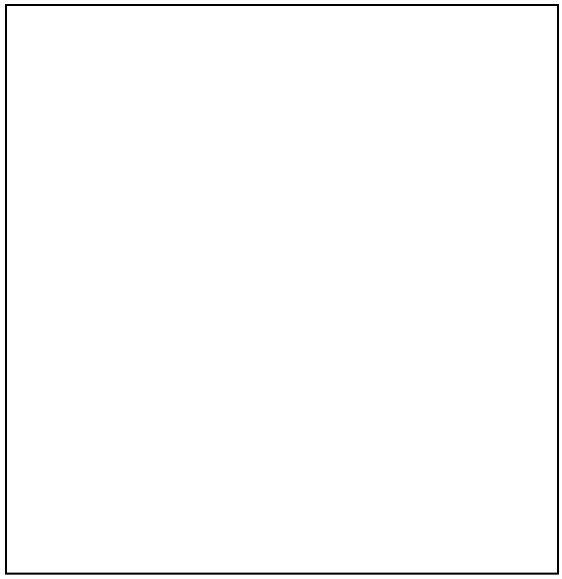
Plant Name_____

Fruit



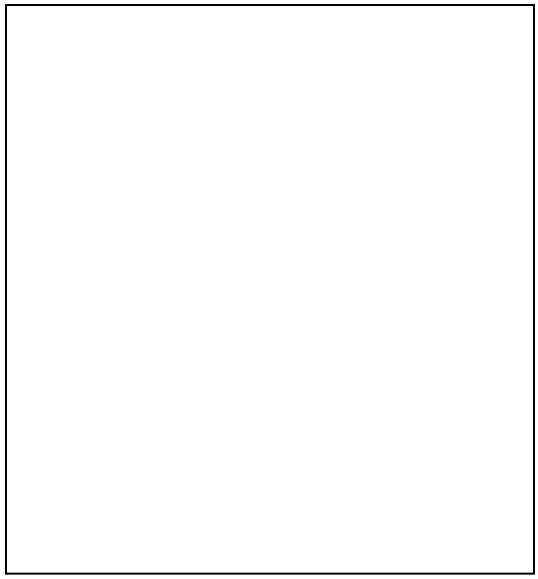
Plant Name_____

Seed



Plant Name_____

Leaf



Plant Name_____

Stem

Plant Name_____

Root

Plant Name_____

Bulb

Plant Name_____

Bud