Denver Urban Gardens School Garden and Nutrition Curriculum

Leaves Make Food

Lesson

Goals

Students are introduced to the concept of plants being food producers, how leaves make food for the plant using photosynthesis and the connection to healthy eating.

Objectives

Students will begin to understand how leaves make food for the plant and why some leaves are really healthy for you. Students will investigate different varieties of leaves by touching and drawing them and then prepare a recipe using leaves we eat.

Standards

Science: Life Science

GR.2-S.2-GLE.2
GR.5-S.2-GLE.1

Total Time – 60 minutes

Did you know?

Spinach is best eaten straight from the garden. Half of the major nutrients are lost by the eighth day after harvest.

Materials

- Variety of leaf and plant samples (real are much more effective)—use cuttings from houseplants, ask a nursery for a few leaf samples and/or collect any from outside
- Magnifying glasses
- Journals

Method

Introduction (20 minutes)

1. Review with the class the different parts of a plant (roots, stems, seeds, flowers, fruit and leaves). Go over any part that you have discussed in previous lessons. Remind the class that different parts of the plant all work together to make the plant grow and be healthy, just like in a community—all the different people in a community work together to make a community healthy and happy.

2. Acting like a plant, ask the class: *How would you eat if your feet were stuck to the ground? Would you stretch your tongue and catch a passing snack? Could you capture the sun's energy and turn in into food? While we get our energy from food we eat, plants have the ability to make their own food and use if for energy. All living things run on energy they obtain from food. Green plants are food producers. Humans and other animals are food consumers.*

3. Have the class list the different functions of leaves.
    a. Manufacture food through photosynthesis
    b. Gas/air exchange (CO2 to Oxygen)
    c. Protect vegetative and floral buds
    d. Transport water
    e. Store food during germination (cotyledons)
    f. Collect water for roots (funnel shaped)

g. Provide shade for roots and stem
h. Flat to provide a lot of surface area for photosynthesis, gas exchange and water transportation

4. Explain to the class: *Plants make their own food and leaves are the food-making machines (autotrophs) during the process of photosynthesis. They are able to turn water, carbon dioxide and sunlight into a nutritious substance called glucose, which in turn provides sustenance for plants and trees. This sugar, glucose, is the source of food used by most plants and then by all other consumers (heterotrophs) like us when we eat the plants.*

   Chlorophyll is the green pigment in plants that traps the light's energy when light strikes the plant. Water molecules are taken up by the roots and transported to the leaves, split into hydrogen and oxygen, using the captured light energy.

   With photosynthesis, plants take in carbon dioxide and release oxygen. How do you think this affects humans? (Without plants there would not be enough oxygen replaced in the environment to support life. Make a connection to global warming and the importance of not cutting down all the forests.)

5. Once the class understands the basics of photosynthesis, make the connection to healthy eating. Have the class think of different leaves we eat (lettuce, spinach, kale, herbs, cabbage, etc).

6. Emphasize why leaves are healthy (they contain high levels of minerals, vitamins and phytochemicals) and how this relates to photosynthesis (leaves are nutrient rich because this is where the food is being produced). If you have covered vitamins and phytochemicals, here is a great time to make a connection. Remind the class that the healthiest leaves are the darkest ones (spinach, kale, red leaf lettuce, etc).

Activity (25 minutes)

1. Have your leaf cutting examples in a non-see through bag. Pull each sample out individually so each leaf you pull out surprises the students.

2. Identify the plants the leaves belong to. It is helpful to show and discuss why different plants have different leaves.

3. Give each student or group a leaf sample. Have them examine the leaf—looking at the veins under a magnifying glass. Have them draw the leaf and write a few sentences about why the leaf is neat or special.

Snack & Conclusion (15 minutes)

1. Have a snack that includes leaves, such as Lettuce Wraps. Discuss the different parts of the snack and which part of the plant each item is. See if the class is able to identify all the plant parts.

2. Have the class write in their journals two new facts they learned about leaves. Have a few students share their insights.

Assessment Tools

- Participation
- Journals

Possible Modifications and Extensions

- You could easily do this lesson in the fall and connect it to the changing of the leaves.
- Consider extending the lesson and discussing how leaves can be used for propagation.
- Have a leaf taste test with different edible leaves. You may want to try some cooked and some raw or try them both ways. Ideas include: spinach, lettuces, swiss chard, cabbages, arugula, endive, watercress, kale, mizuna and radicchio.

Vocabulary Words

- *photosynthesis* – the process that occurs inside plants, which converts light energy (sunlight), carbon dioxide, chlorophyll and water into sugar and oxygen
- *chlorophyll* – green pigment in plants that traps the light's energy
- *autotroph* – a food producer (plants)
- *heterotroph* – a food consumer (animals)

Lettuce Wraps

This is a great recipe to follow up the leaf lesson and can help reinforce other plant parts we eat. Below are two different options for fillings.

- Large lettuce leaves, washed and dried
- Toothpicks

Southwest Filling

- Black beans
- Corn, fresh or frozen kernels
- Tomatoes, chopped
- Cilantro, chopped
- Cheese, grated
- Salsa

Asian Filling

- Veggies of choice (carrots, cabbage, snow peas, etc)
- Cilantro, chopped
- Peanut sauce (store bought or mix peanut butter soy sauce, sugar and chili sauce)

Preparation (10 minutes): Mix all ingredients together in a bowl. Spoon a couple of tablespoons into each lettuce leaf. Wrap and secure with a toothpick.

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