



Harvesting and Eating Garden-Grown Popcorn

OBJECTIVES

Students will be able to *identify* plant parts by name, make broad connections between their food and the garden, and connect the ideas of seeds as the start for new plants and part of a *balanced* human diet. Students will learn that the vegetables and fruits that we eat come from one or more of the following plant parts: roots, stems, leaves, flower, fruits, and seeds. Furthermore, each plant part has a specific role to play in the life cycle of the plant.

Students will be able to *practice fractions* and *write step-by-step instructions* for making a popcorn trail mix.

HANDOUTS

- Popcorn Trail Mix Recipe Worksheet

MATERIALS

- Fully mature popcorn plants (or store-bought corn plants and popcorn seeds)
- Corn kernels to pop
- Oil
- Butter
- Salt
- Pot for popping popcorn (or air popper)
- Plug-in stove
- Small folding table
- Napkins/cups for popcorn
- Stapler

KEY TOPICS

- Plant Parts
- Where Food Comes From
- Food as Energy
- Recipe Instructions
- Fractions

BACKGROUND INFORMATION

Like all plants, popcorn (*Zea mays everta*) has parts that serve very important biological functions for the plant and provide a source of food for people. The roots anchor the plant and take in water; the stem provides support and channel for plant-food and water; the leaves are the plant's sugar factories, turning light into food for the plant through photosynthesis; the flower reproduces new plants through a variety of ways, often utilizing living animals in pollination; and the seeds carry the embryo and the nutrients it needs to grow into another

plant. While people categorize and use these plant parts in many ways, ultimately the purpose of the plants' parts is to make more plants.

Biological processes aside, people have a variety of medicinal and cultural uses for plants and their parts. On a farm or in a garden, the majority of plants grown are eaten. Just 15 plants provide 90% of the world's food energy intake. Energy is transferred from the sun into chemical bonds in plants through photosynthesis. The direct product of photosynthesis is simple sugar, a type of carbohydrate. However, through other plant and animal processes, that energy can also be stored in molecules known as proteins, fats and carbohydrates. Humans should eat a variety of these molecules to provide appropriate energy; they also need the accompanying vitamins, minerals and fiber to stay healthy, although these molecules do not provide energy.

LESSON PLAN

1. Looking at Popcorn Plants (20 min)

- a. Remind students that seeds and fruit come in all shapes and sizes. Some seeds are little and many, some are big and alone, some are on the inside, others on the outside.
- a. Prior to looking at the popcorn plants, review the basic needs of all plants. Ask students to point out the roots, stems, and leaves. Then ask students to point out the flowers, fruit, and seeds; brainstorming other types of these parts will be helpful to understand why the popcorn flowers, fruit, and seeds look so different. Tell students, while some flowers have petals, corn has two types of flowers: the tassels and the silk. Like a green bean, the corn carries its seed in a pod-like fruit. Instead of a hard-shelled pod, it has husks!
 - i. When talking about each plant part, connect the role it plays to the needs of the plant and humans. For example, when discussing the roots. The root takes up water, which the plant needs to survive. Do humans need water to survive?
- b. Ask students which plant part of popcorn we eat. The answer: the seeds! Ask students for some examples of other seeds we eat. How about the other 5 parts?
- c. Explain that you've left the fruit (cob) on the plants to dry, so that they will be ready to pop. Harvest one cob, and peel it open by letting students pull one husk-leaf at a time.
- d. Have any of the kernels been eaten? Ask students who they think ate the kernels. Explain that all animals need food, just like people. The food they've grown in the garden might have been shared with other animals and insects that live around their school. What sorts of animals do they think like popcorn? Some examples are squirrels, caterpillars, and maybe some birds.
- e. Harvest cobs and pull entire plant out of the ground.
- f. Show students roots and examine their role.

2. Popcorn Trail Mix (20 min)

Fall Popcorn Lesson – 4th Grade

- a. As you set up, introduce the activity. What part of the plant is popcorn? The seed! In order to eat the seeds, we have to separate it from the rest of the plant. Demonstrate how to separate kernels from the cob and have each student separate kernels from a corncob. Rotating a metal bowl around the class.
 - b. Collect the harvested popcorn seeds.
 - c. Tell students that they have three options for the seeds they harvested: 1) grind them into cornmeal, 2) plant them, or 3) eat them. Ask students to identify other seeds that are part of our diet. Then ask them to identify food from the other five plant parts. Explain that today, they will be making a Popcorn Trail Mix. But before they get to eat it, they'll need to be scientists and figure out the perfect combination of ingredients.
 - d. Hand out the **Popcorn Trail Mix Worksheet**. Briefly overview the six ingredients going to be used and what part of the plant they are. Allow students to complete the worksheet.
 - e. While students are finishing the worksheet, pop the popcorn using a hot air popper or pot and lid.
 - f. Make the Popcorn Trail Mix as a class. Scoop into plastic bags and set aside til the end of class.
3. **Conclusion (5 min)** – Hand out envelopes or bags of un-popped corn and staple them to students' instructions. They may take these envelopes home to make their own popcorn!

AFTER THE LESSON

- Read "Who Will Plant a Tree?" by Jerry Pallotta
- Save popcorn seeds to plant in classroom or in garden during summer
- Compost the remaining parts of the popcorn plants as another lesson

STANDARDS

Next Generation Science Standards

4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Common Core Standards

W.4.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

RI.4.3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

W.4.7: Conduct short research projects that build knowledge through investigation of different aspects of a topic.

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.