MASSACHUSETTS FARM TO SCHOOL
HARVEST of the MONTH in the CLASSROOM

WHAT'S INSIDE A LEAF?

Grades 1-5 | 1 class period

OVERVIEW

In this lesson, students will use kale and collard green leaves to learn about the anatomy and function of a plant leaf. They will explore how the nutrients found in a plant leaf can help us fuel our bodies.

ESSENTIAL QUESTIONS

- What makes leaves green and also makes food for plants?
- What do we have in common with plants and leaves?
- What are the names for the different parts of a leaf ?

MA STATE FRAMEWORKS

Nutrition and Balanced Eating [3.1.NE]

1. Identify principles of balanced eating (i.e., moderation, eating a variety of fruits and vegetables, consuming nutrient-rich foods, limiting processed foods and foods high in added sugar, drinking water, limiting sugary beverages) when making nutrition-related decisions. 2. Discuss the benefits of balanced eating on physical health (i.e., supporting growth and development, ability to engage in physical activity) and emotional and mental health (i.e., ability to manage stress, positive emotions) when making nutrition-related decisions.

Nutrition and Balanced Eating [PK.1.NE]

5. Explain benefits of health-promoting eating choices and habits (e.g., staying hydrated, eating fruits and vegetables, eating nutrient-rich foods, limiting foods high in added sugar).

MATERIALS

- Kale and collard green leaves
- Magnifying glasses
- Paper
- Pencils, regular and colored

PROCEDURE

Activity

Hand each student a kale or collard leaf and ask them to look closely at their leaf. What do they notice? What is inside the leaf? Hand each student a piece of paper and instruct them to title their paper "Parts of the Leaf We Can See." Tell them to draw their leaf and label the drawing with parts they know. After students have had time to draw independently, bring them together and share a completed leaf diagram. Go through each part of the leaf and explain the functions. Ask them to add any missing labels to their drawing.

WHAT'S INSIDE A LEAF?

PROCEDURE, Cont.

Parts of a Leaf Overview

BLADE: The main part of the leaf, not including the stem, veins and petiole. The blade of the leaf takes in sunlight and turns it into food. It is where the plant "breathes."

LAMINA: Scientific word for a blade of a leaf.

STEM: The stem supports the leaf (like our skeleton supports us), and, like our veins, transports (or moves) water, minerals and food energy throughout the plant.

PETIOLE: The stalk of the leaf, which attaches to the stem of the plant and connects the leaf to the rest of the plant.

VEINS (aka vascular bundle): transports water, minerals, and food energy through the leaf to the rest of the plant. The veins in a leaf are similar to the veins in our bodies.

EPIDERMIS: The outer protective layer of a leaf. Sometimes the leaf may feel waxy because the epidermis secretes a protective cuticle for protection. (This layer also helps to protect kale and collard leaves from the cold.)

Ask students to look at their kale or collard leaf to try to identify each of these parts.

After discussing the parts of a leaf that we can see and their functions, ask students to consider "What is in a leaf that we can't see?"

Give students a few minutes to brainstorm. They can flip their paper over to write their list. After they have had some time, collect their ideas.

WHAT'S INSIDE A LEAF?

PROCEDURE, Cont.

PARTS OF A LEAF WE CAN'T SEE

PHOTOSYNTHESIS: A chemical process that occurs in plants, algae, and some types of bacteria when they are exposed to sunlight. During photosynthesis, water and carbon dioxide combine to form carbohydrates (sugars) and give off oxygen. Photosynthesis is how plants create the energy they need to grow and thrive, and it also provides the oxygen we need to breathe.

CHLOROPHYLL: Chlorophyll is a pigment in all green plants and a few other organisms. It is required for photosynthesis.

NUTRIENTS: Nutrients are the parts of food that give us energy. Leaves absorb nutrients and these nutrients fuel our bodies when we eat plants.

VITAMINS: Green leafy vegetables are full of vitamins that support our bodies, brains, skin, and hair. Some of the vitamins found in leafy greens are A, B, C, E, and K.

MINERALS: Minerals in leafy greens support our heart, bones, muscles, and nervous system. Some of the minerals found in leafy greens are calcium, iron, potassium and magnesium.

NUTRITIONAL INFORMATION

Leafy greens are loaded with vitamins and minerals to support the human body.

CALCIUM: Important in the formation of bones, and teeth.
IRON: Necessary for carrying oxygen in the blood
MAGNESIUM: Essential for muscle and nerve function, blood sugar levels, and blood pressure.
VITAMIN A: Helps keep skin smooth and healthy, and protects against colds, flus and infections.
VITAMIN B: Maintains the health of nerves, skin, eyes, hair, liver, mouth, muscle tone, and brain function. It can also help with weakness, irritability and depression.
VITAMIN C: Helps resist infection, strengthen blood vessels, gives us energy, and keeps bones and tissues healthy.
VITAMIN E: Protects against disease, and helps keep skin and hair healthy.
VITAMIN K: Important in blood clotting, and bone function and repair.

Kale and collard green leaves contain all of these important nutrients, which helps our bodies function properly.

WHAT'S INSIDE A LEAF?

PROCEDURE, Cont.

CLOSING

Close this activity by asking students why it is important to eat leaves. Besides kale and collard greens, can they think of other leaves that we can eat? Answers may vary but a few are: lettuce, spinach, arugula, cabbage, and beet greens. Review "What are the things in a leaf that we can see, and what are the things we cannot see?"

EXTENSIONS & VARIATIONS

Do a cooking activity with the students.

MASSAGED KALE SALAD

INGREDIENTS

2 bunches kale – one leaf per child
2 lemons
½ cup extra virgin olive oil
Kosher salt
2 Tbsp honey
2 Tbsp apple cider vinegar
1 apple
1/4 cup toasted pumpkin or sunflower seeds

DIRECTIONS

Give each student their own small bowl and kale leaf and instruct them to tear the leaves from the stem, and then tear it into bite size pieces. Tell them to rub the kale like its getting a massage, and as they massage the kale, have them notice the waxy texture of the leaves. Tell them this coating is the epidermis (the waxy layer that protects the leaf) and rubbing it breaks it down and softens the kale which makes it easier to eat without cooking. While everyone is occupied with massaging their greens, you can invite some students to help prepare the salad dressing, (or save time and make it yourself, showing the class the ingredients). To make the dressing, mix in a medium bowl: the juice of two lemons, olive oil, honey, apple cider vinegar and salt to taste. When the kale is massaged thoroughly, put it on small plates, and pass out the dressing, Add the optional apple slices and a small scoop of toasted seeds.

WHAT'S INSIDE A LEAF?

HANDOUT

LEAF DIAGRAM

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