Grade 2

PROTECTIVE PLANT PARTS

Lesson 2

DESCRIPTION

Students will explore close to the source fruits and vegetables and their protective benefits by playing the plant parts guessing game and organizing themselves into edible plant part groups: roots, stems, leaves, flowers, fruits & seeds. They will have the opportunity to eat a rainbow snack including all six plant parts.

TIME: 45 minutes

SUBJECTS: Health, Language Arts, Science

LEARNING OBJECTIVES

After this lesson students will be able to:

- Identify and name all six plant parts and their purpose.
- Classify examples of edible plant parts.
- Discuss the role edible plant parts have in keeping people healthy.
- Pledge to eat a rainbow of at least 5 servings of vegetables and fruits every day.

ACADEMIC STANDARDS

HE.K-2.1.3, HE.K-2.1.5, HE.K-2.6.2, LA.2.6.1, SC.2.4.1

*A detailed list of the Academic Standards can be found in the Unit Overview document.

LESSON OUTLINE

I. Introduction (5 minutes)

II. Plant Part Guessing Game (8 minutes)
- Define roots, stems, leaves, flowers, fruits, and seeds.

III. Plant Part Groups (10 minutes)
- Team Grouping Activity
- Plant Part Team Presentations

IV. Edible Plant Parts (10 minutes)
- Edible Plant Parts Student Worksheet

V. Close to the Source Snack (5 minutes)
- Bird's Nest Salads

VI. Closing (3 minutes)

KEY TERMS AND CONCEPTS

Flower – The reproductive part of a plant that if pollinated becomes the fruit

Fruit – The part of a flowering plant that contains the seed or seeds

Leaf – The part of the plant that collects the sun's rays and makes its food through photosynthesis

Phytonutrients – Natural compounds that give plants their distinct colors and keep plants healthy; good for human health

Protective Foods – Fruits & vegetables that are high in vitamins, minerals, phytonutrients, and fiber; protect us from getting sick

Root – The part of the plant that acts as its anchor, and collects water and nutrients

Seed – Produced by flowering plants, seeds are capable of growing into another plant of the same type

Stem – The part of the plant that acts like a straw and transports food and water between the leaves and roots

ʻĀINA in Schools
Growing healthy keiki, schools, and communities
A program of the Kōkua Hawaiʻi Foundation

LESSON MATERIALS

Core Supplies:
- ʻĀINA In Schools apron with name tag
- Kōkua Hawaiʻi Foundation cloth bag
- Laminated ʻĀINA Food Guide Poster & magnets
- Copy of ʻĀINA In Schools Student Workbook
- Knife (plastic lettuce knife)*
- Cutting board
- Non-latex gloves
- Napkins
- Garbage/compost bag

Plant Part Sign

Lesson Supplies:
- Vocabulary Cards (7)
- Plant Part Signs (7): carrot/root, celery/stem, cabbage/leaf, broccoli/flower, tomato/fruit, sunflower seeds/seed, kalo
- Plant Part Sorting Cards (30), 5 each of the following: carrot, celery, purple cabbage, broccoli, tomato, sunflower seed
- Plant Part Reading Cards (6)
- Plant Part Description Sign (1)

Teaching Team to Provide:
- Tablecloth
- Serving tray (or use top of bin as tray)
- Snack ingredients (see Advance Preparation)

**Please do not bring metal knives on campus. The only knives allowed are those that are plastic and very well attended by an adult.*

ACCOMPANYING DOCUMENTS
- Student Worksheet: Edible Plant Parts
- Student Worksheet: Eat a Rainbow
- Take Home Letter: Bird's Nest Salad Recipe
- Family Activity: Eating a Rainbow

ADVANCE PREPARATION
- Lead docent to contact teachers to confirm date/time of lessons.
- Review materials needed for lesson.
- Shop for and prepare snack ingredients:
  - purple cabbage** leaves, separated into "cups"
  - carrots, shredded
  - celery, diced
  - grape tomatoes**, washed
  - broccoli, cut into florets
  - sunflower seeds (shelled)
- Ask teachers to have students complete worksheets as a follow-up classwork or homework assignment.
- Plan ahead to have one docent available to assemble the salads during the lesson.

**locally grown

INGREDIENT QUANTITIES NEEDED FOR SNACK

How much to buy	Up to 20 students	Up to 30 students	Up to 40 students
Purple Cabbage	1 large head	1.5 large heads	2 large heads
Carrots	5-6	7-8	10-12
Celery	4 stalks	6 stalks	8 stalks
Grape Tomatoes	40	60	80
Broccoli	1 lb	1.5 lb	2 lb
Sunflower Seeds	1/3 cup	1/2 cup	2/3 cup

BACKGROUND INFORMATION

Protective Foods come from plants. Although it is well known that plants are good for our health, what nutrients in plants make them protective? Fruits and vegetables contain many **vitamins, minerals, and fiber, as well as phytonutrients**–plant substances that are thought not to be required for normal functioning of the body but which have a beneficial effect on health and may prevent disease. Since processing often destroys phytonutrients, eating whole fruits and vegetables in their natural states ensures the greatest benefit.

Fiber is an important substance that comes from plants, and is found in whole grains, fruits and vegetables. An easy way to determine how much fiber a child should have every day is adding 5 to their age ("Age+5" grams/day). Adults should consume 25-35 grams per day.

A 2017 survey found that only 17% of Hawai'i high school students ate fruits or vegetables 5 or more times a day(5). US Dietary Guidelines recommend multiple servings of both fruits and vegetables, the USDA's MyPlate food guide encourages kids and adults to fill at least half of their plate with fruits and vegetables. Regardless of the meal or snack, fruits and vegetables should make up half or more of the plate.

Eating a diet rich in colorful fruits and vegetables has many health benefits. Research shows that individuals who eat a majority of fruits and vegetables have reduced risk of heart disease, stroke, hypertension and obesity. Fruits and vegetables prevent against types of cancer and lower the risk of developing type 2 diabetes. Long-term consumption of fruits and vegetables high in polyphenols is associated with a longer and healthier life.

Getting kids to eat more fruits and vegetables is sometimes difficult. One way to increase the likelihood of kids eating more fruits and vegetables is to offer them more often. Studies show that taste preferences start early in life (as early as in utero) and increased exposure to fruits and vegetables in childhood will likely lead to a life-long preference to healthier food options. Research also suggests that we need to try something 5-10 times before we develop a preference for it. Adults can also act as a role model by eating more fruits and vegetables themselves.

More ideas:

- Provide cut vegetables with dip in an accessible location in the afternoons so that children may "graze" on them. Many kids who won't eat vegetables at dinner will eat them this way.
- In the kitchen, include your child in making fruit and vegetable recipes.
- Plant fruits and vegetables at home with your child. Kids eat what they grow.
- Give your child the opportunity to taste a self-selected fruit or vegetable that he/she is willing to try. If they don't like it, don't give up! Despite repeated refusals, kids may decide to like new foods especially after trying it 5-10 times.

References:

"Dietary fiber intake in young adults and breast cancer risk." doi.org/10.1542/peds.2015-1226

"Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies." doi.org/10.1136/bmj.g4490

"Fruit and vegetable intake and risk of major chronic disease. Journal of the National Cancer Institute." doi.org/10.1093/jnci/djh296

"Hawai'i Health Matters Community Dashboard." hawaiihealthmatters.org/indicators/index/view?indicatorId=1311&localeId=14

"Impacts of in utero and early infant taste experiences on later taste acceptance: a systematic review." doi.org/10.3945/jn.114.203976

"Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: meta-analysis of cohort studies." doi.org/10.1038/sj.jhh.1002212

"Role of parents in the determination of the food preferences of children and the development of obesity." doi.org/10.1038/sj.ijo.0802532

"A Review of the Science of Colorful, Plant-Based Food and Practical Strategies for 'Eating the Rainbow.'" doi.org/10.1155/2019/2125070

"What do we know about dietary fiber intake in children and health? The effects of fiber intake on constipation, obesity, and diabetes in children." doi.org/10.3945/an.111.001362

INTRODUCTION

5 MINUTES

"Hello again, we are…" (State docent names).

"Welcome to your second nutrition lesson as part of the ʻĀINA In Schools program!

"During our last lesson we talked about CLOSE TO THE SOURCE foods. Who remembers if the apple or the Apple Jills cereal was closest to its source?" Desired answer: The apple!

"Right! CLOSE TO THE SOURCE foods are foods that are best for your body. They are foods that have not had much taken away or added to them."

"And who can remember the CLOSE TO THE SOURCE snack that we tasted last time?" Desired answer: Poi Smoothie!

"Our poi smoothie was a special snack because we used ingredients from all of the food categories on the ʻĀINA Food Guide to make it! Who can remember what the ingredients were?" (Spend just 30 seconds on this).

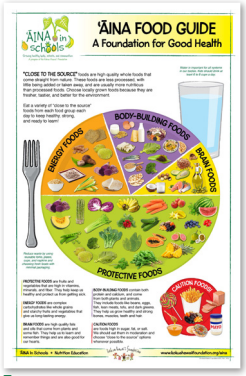
Blueberries and bananas - PROTECTIVE FOODS
Poi -ENERGY FOOD
Soy milk - BODY-BUILDING FOOD
Coconut milk - BRAIN FOOD
Honey - CAUTION FOOD

"Also, we used water in the form of ice to make it cold!"

Plant Part Sign - Kalo

"The poi that we used came from what kind of plant?" Wait for response taro or kalo!, then show the kalo visual aid.

"And if you remember from our last lesson, the kalo plant is the symbol we use in our ʻĀINA In Schools logo. It is important symbol because it reminds us to take care of our earth. If we take care of the kalo plant, it will provide us with food, like poi! If we take care of our earth and our land, it will take care of us by giving us clean water, clean air, and other healthy foods too!"



ʻĀINA Food Guide Poster

"Today we're going to talk about foods that can protect you! Do you remember your ʻĀINA Food Guide?"

"Who can remember where the PROTECTIVE FOODS are located on the ʻĀINA Food Guide?" Have students point to the PROTECTIVE FOODS.

"Right! Fruits and vegetables are PROTECTIVE FOODS. Are fruits and vegetables CLOSE TO THE SOURCE foods as well?" Desired answer: Yes!

*"That's right! Fruits and vegetables are CLOSE TO THE SOURCE because they all come from plants. Fruits and vegetables are PROTECTIVE FOODS because they have lots of important vitamins, minerals, PHYTONUTRIENTS, and fiber that can protect our bodies. PHYTONUTRIENTS give plants their colors and keep them healthy by protecting them from the sun and insects. PHYTONUTRIENTS also help us to stay healthy, so it's important for us to eat a **rainbow** of colorful foods."*

ʻWhat must we do so these colorful fruits and vegetables can protect our bodies?" Desired answer: We must eat them!

"Let's get started talking about CLOSE TO THE SOURCE fruits and vegetables! At the end of our lesson we'll also get a chance to eat some PROTECTIVE FOODS that are really yummy!"

PLANT PART GUESSING GAME

8 MINUTES

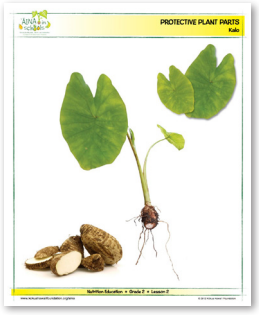
DOCENT NOTES

- Assistant Docent, please hold up the vocabulary cards as the class calls out each new term.
- Use the Plant Part Sign for Kalo in this activity.
- Use the Plant Part Description Sign to read the function and appearance of each plant part and have the students raise their hands once they know the answer. Ask students not to call out the answer until you finish and instruct the entire class to say the answer at one time. Be animated while you describe them!
- One docent can start assembling the Bird's Nest Salads so they're ready at the end of the class.

"Fruits and vegetables come from plants. Plants, just like people, have different parts. What are some of your parts?" Wait for various answers such as arms, legs, fingers, ears, head, etc..

"Plants have six parts and you learned all about them in your ʻĀINA In Schools garden lessons in kindergarten. Does anybody remember one of the six parts of a plant?" Accept a few answers. Correct answers are: Roots, Stems, Leaves, Flowers, Fruits, and Seeds.

"Did you know that it is good for us to eat plants? Of course, not every plant has a part that is edible, but many of them do! Sometimes we eat just one part of a plant, like the root as in the case of a carrot. Other plants offer more than one edible part, such as kalo (or taro). We can eat the root, stems and leaves of kalo." Show the Plant Part Sign for Kalo.



Plant Part Sign - Kalo

"Let's begin talking about all of the different plant parts! I'm going to think of a plant part and tell you all about it, except that I'm not going to tell you what part it is. You'll have to guess! Quietly raise your hand if you know which plant part I am describing. Leave your hand up and when I'm done describing the part the entire class will say the answer aloud all at once. Ready?"

Roots

"I come in many different shapes and sizes. Sometimes I am long and thick. Other times I am short and round. I anchor my plant in the soil and take up water and nutrients and send them up the stems to the rest of the plant. What am I?""

Have the entire class answer at one time, "ROOT!"

Stems

"I am an important part of my plant because I work like a straw. I take up water and nutrients from the roots and send them to the leaves and flowers. I also move food made by the leaves down to the root where it is stored. What am I?"

Have the entire class answer at one time, "STEM!"

Leaves

"I make the food that helps my plant grow. I collect sunlight, air, and water, and turn it into food! You can often tell what kind of plant it is by looking at me; I come in many shapes and sizes. What am I?"

Have the entire class answer at one time, "LEAVES!"

PLANT PART GUESSING GAME CONTINUED

Flowers

"I am usually the prettiest part of the plant and I produce seeds! I am colorful and smell good to attract bees and butterflies, which pollinate me to make the fruits, pods, and seeds form. After I disappear, fruit grows in my place! What am I?"

Have the entire class answer at one time, "FLOWER!"

Fruits

"I have seeds on the inside or outside. I have a lot of natural sugar which is why I can taste sweet. Because of this, I attract birds, animals and humans who like to eat me. I also have other vitamins, minerals, and fiber, things that humans need every day. What am I?"

Have the entire class answer at one time, "FRUIT!"

Seeds

"I am found inside of fruits or on the outside of fruits. I can grow into a new plant if there is soil, sunlight, and water. Sometimes I can be small and one of many or I can be large and the only one. What am I?"

Have the entire class answer at one time, "SEED!"

"Great! Now we're going to explore more about these edible plant parts."

PLANT PART GROUPS

10 MINUTES

Post the Plant Part Vocabulary Cards (roots, stems, leaves, flowers, fruits, seeds) in six locations of the room. Teachers and Assistant Docents can help hold up the words if needed. Distribute one Protective Plant Part Card to each student after giving the directions for the activity.

"We're going to play a game! Each of you will receive a card with a picture of a plant on it. You'll have to think about which plant part yours belongs to and find other students with the same plant part and stand together. For example, everyone who has a picture of a ROOT will stand over here (point); everyone who has a picture of a LEAF will stand over there (point), and so on."

"You'll have one minute to do this, but here's the fun part: you have to do it like a plant, without talking!"

- Pass out Plant Part Sorting Cards – 1 per student.
- Give students 1 minute to form six plant part groups around the room.
- After all students have found their correct group, pass out the Plant Part Reading Cards to each group.
- Give the teams 2 minutes to read the Protective Plant Part Reading Cards quietly in their teams, chose a team leader and decide who is going to read which section on the card aloud to the class.
- Then signal the class to attention and give each team 1 minute to read their Plant Part Reading Card aloud while the entire class listens (6 minutes total).
- Praise the students for great work and have the team leader collect and return the cards as all the students return to their seats (1 minute).

ACTIVITY TIPS AND KEY

Students should sort themselves into the following groups:

- Roots – Carrots
- Stems – Celery
- Leaves – Purple Cabbage
- Flowers – Broccoli
- Fruits – Tomatoes
- Seeds – Sunflower Seeds

Example Protective Plant Part Reading Card:

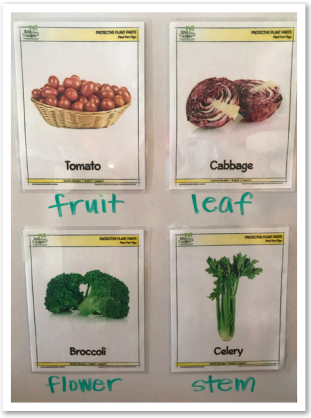
We are the CABBAGE group!
The parts of the CABBAGE plant that we eat are the LEAVES!
Why plants have LEAVES:
Leaves collect sunlight and air, mix it with water from the roots and turn it into food for the plant. This process is called photosynthesis.
More LEAVES we eat:
Basil, bok choi, lettuce, lūʻau leaves, mint, and spinach

EDIBLE PLANT PARTS

10 Minutes

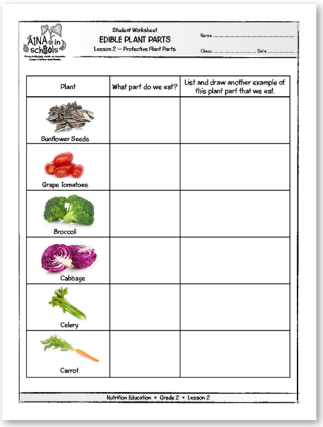
Have students turn to the Edible Plant Parts Student Worksheet in their student workbooks.

On the white board, post each large Plant Part Sign and either write or post its associated edible plant part vocabulary word near or below it.



On the worksheet, have the students look at the pictures on the left and determine what plant part they are. Have them write their answers in the middle column. In the right column, have students draw another edible example of that plant part.

"Nice work everyone. Now let's enjoy your close to the source snack which includes all six plant parts!"


Student Worksheet
EDIBLE PLANT PARTS
Lesson 2 – Protective Plant Parts

Plant	What part do we eat?	List and draw another example of this plant part that we eat.
Sunflower Seeds		
Grape Tomatoes		
Broccoli		
Cabbage		
Celery		
Carrot		

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Edible Plant Parts Student Worksheet

ACTIVITY TIPS AND KEY

This worksheet can be started during the ʻĀINA In Schools lesson and completed as an in-class activity or take-home activity, according to the teacher's preference.

Additional Examples of Edible Plant Parts

- Roots – beets, daikon, ginger, jicama, kalo, radishes, sweet potatoes
- Stems – asparagus, bamboo shoots, broccoli stems, green onions
- Leaves – beet greens, bok choi, cilantro, collard greens, kale, lettuce, watercress
- Flowers – artichokes, cauliflower, nasturtiums
- Fruits – avocado, bananas, breadfruit, eggplant, papayas, squash
- Seeds – almonds, beans, corn, flax seeds, peas, pumpkin seeds

DOCENT NOTES

- Assistant Docent may begin assembling the salads during this activity.
- Once the majority of students have completed the front side of the Edible Plant Parts Worksheet, you can begin serving the snack.

CLOSE TO THE SOURCE SNACK

10 MINUTES

DOCENT NOTES

- Point out that anyone with a known allergy to any of the food items should not touch or sample it. By this age, kids should know this about themselves, but please bring it to the attention of the teacher who can make sure that any students with known allergies or intolerances do not receive snacks.
- You may use the Lesson Supply Bin lid as a serving tray.
- Give a snack to the teacher and any other classroom aides.
- Please refrain from verbalizing your own food preferences and be aware of your body language and facial expressions. These subtle cues have a big impact on a child's willingness to try foods!
- Encourage the students to try the snack. Remind them of the "no yuck" rule: they can choose not to try any foods they wish, but if they do try them, they must keep their personal opinions to themselves.

"You are lucky today because you get to taste a CLOSE TO THE SOURCE snack called a 'Bird's Nest Salad' that includes all six plant parts!"

"These fruits and vegetables have only been slightly "processed" by washing and cutting. They are still in their natural state. The Bird's Nest Salads are CLOSE TO THE SOURCE and very colorful!"

Distribute a "Bird's Nest Salad" to each student. Share the Plant Part name and nutrition facts about each ingredient:

- **ROOTS** – Carrot "nesting material" also contains vitamin A.
- **STEM** – Celery contains important B vitamins that keep our nervous systems healthy.
- **LEAF** – Purple cabbage "nests" contain vitamin A which helps keep our eyes and skin healthy.
- **FLOWERS** – Broccoli contains vitamin C as well as fiber, important in keeping our intestines healthy.
- **FRUIT** – Tomato "eggs" contain vitamin C which helps fight off infections.
- **SEED** – Sunflower seeds contain vitamin E, important for fighting off infections.

SNACK VIDEO

Check out the ʻĀINA Videos for discussions on key concepts and directions to make the ʻĀINA Close to the Source Snacks: kokuahawaiifoundation.org/ainavideos

CLOSING

3 MINUTES

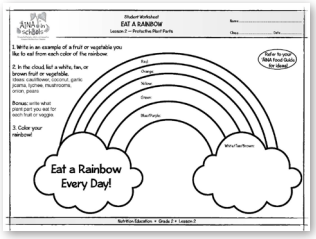
While students are finishing up their snacks, quickly review of the key concepts from the day with the class:

- PROTECTIVE FOODS include a rainbow of fruits and vegetables that are CLOSE TO THE SOURCE and have vitamins, minerals, phytonutrients, and fiber.
- We should eat PROTECTIVE FOODS at every meal, with fruits and vegetables making up half our plate.
- Today's snack included all six edible plant parts in a rainbow of colors. These plant parts are:

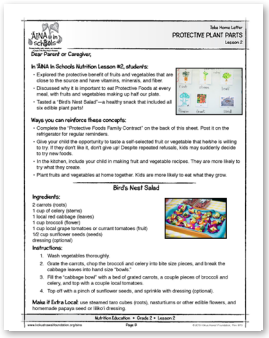
ROOTS – STEMS – LEAVES – FLOWERS – FRUITS and SEEDS!

Describe the Take Home Letter and follow-up activities:

- *"Share the take-home letter with your family and try teaching them how to make a bird's nest salad."*
- Eat a Rainbow Student Worksheet: on the back side of their Edible Plant Parts worksheet, students will identify a fruit or vegetable from each color of the rainbow.
- Eating a Rainbow Family Activity: students will track the colorful fruits and veggies they eat throughout the week.
- Encourage students to create their own recipes using fruits and vegetables from the Protective Foods group. Students may use the ʻĀINA Recipe Challenge form at the end of their ʻĀINA Nutrition Student Workbooks to share their creations. Kōkua Hawaiʻi Foundation will select recipes to feature in future blog posts, newsletters, and cookbooks.



Eat a Rainbow
Student Worksheet



Take Home Letter

Thank the students for doing such a great job!

THANK YOU!

DOCENT NOTES

- **Pack your trash!** Please leave the classroom cleaner than you found it by removing all lesson-based trash. We don't want to add any burden or extra trash for the teachers or custodians so please do not throw away any trash in the classroom garbage. Instead:
  - Collect napkins and any leftovers.
  - Uneaten food may be composted if composting is available at the school.
  - Use the garbage bag in the Lesson Supply Bin to remove all lesson-related food items from the classroom.
- Please do not leave any food in the supply bin. Perishable props have been known to get moldy and smelly when left in the bin after the last lesson.
- Please complete your online docent survey for this lesson. This is valuable feedback that helps to improve our program.
- Please collect any ʻĀINA Recipe Challenge submissions and turn in to KHF staff at the next docent training.

ADDITIONAL RESOURCES

Books

- ***Eat More Colors* by Breon Williams**
  Full of rhymes and beautiful illustrations that teach about the benefits of colorful fruits and vegetables.
- ***The Fruits We Eat* by Gail Gibbons**
  All about the parts of fruits, where and how they grow, harvesting, processing, where to buy them, and how to enjoy them as part of a healthy diet.
- ***The Vegetables We Eat* by Gail Gibbons**
  An exploration of vegetables with illustrations of the many vegetable varieties, how they're grown, and why they're so good for us to eat.

Lesson Plans & Curriculum

- **"Eat a Rainbow" Lesson Plan, Kids Gardening:** kidsgardening.org/lesson-plans-eat-a-rainbow
  Students learn about the health benefits of eating a variety of colorful fruits and vegetables, and that color can indicate different nutrients available.
- **"Meet the Plants" and "Plant Uses, Plant Parts and Life Cycles" sections of *Farm to Keiki* by Tiana Kamen:** farmtokeiki.org
  Farm to Keiki features various locally grown fruits and veggies, their colors, plant parts, and other fun facts. The book includes ʻĀina-based cooking, gardening, and nutrition activities for educators/ʻohana to lead keiki through.
- **"Nā Mea ʻAi O Hawaiʻi" Lessons 9-10, UH CTAHR:** www.ctahr.hawaii.edu/NEW/NaMeaManual.htm
  Explores early Hawaiian and contemporary Protective Foods.
- **"Plants Feed Me Activities," Agriculture in the Classroom:** agclassroom.org/teacher/matrix/resource_print.cfm?rid=337
  Various garden and food activities that complement the book Plants Feed Me by Lizzy Rockwell.
- **"Seeds We Eat," The Edible Schoolyard Project:** edibleschoolyard.org/seeds-we-eat
  In this lesson, students think about seeds they eat, take part in a coloring activity, and learn about the different categories of edible seeds.

Videos

- **"'ĀINA In Schools Close to the Source Snack Bird's Nest Salad," Kōkua Hawaiʻi Foundation:** kokuahawaiifoundation.org/ainavideos
  This short video explores Protective Foods and the plant parts we eat while showing us how to make a colorful bird's nest salad.
- **"Easy Vegetable Prep," Big Green:** youtube.com/watch?v=s1Gi2efoBsc&t=2s
  How to clean and prepare veggies safely and efficiently.
- **"Eat Your Rainbow" (Song), Kids Learning Tube**: youtube.com/watch?v=1u5HOURq7kQ
  A short music video that teaches the importance of eating a rainbow.
- **"How Does it Grow?," True Food TV:** howgrow.org/foods
  This entertaining series tells the stories of our food from field to fork, one crop at a time.

Additional Resources

- **"Fresh Choice Hawaiian Harvest Toolkit":** kokuahawaiifoundation.org/hawaiianharvest
  Celebrates the bounty of produce grown in Hawaiʻi, the toolkit introduces students to local produce items grown by Hawaiʻi's farmers.
- **"Have a Plant,"** fruitsandveggies.org
  Nutrition, storage, and handling information on a variety of fruits and vegetables, as well as recipes, and educational series, and expert advice on produce questions.

Find more at
kokuahawaiifoundation.org/ainalessons