American Heart Association
TEACHING GARDENS PROGRAM

Lesson Plans

American Heart Association
TEACHING GARDENS

Dear Educator,

Welcome to the Teaching Gardens Activity Guide! The following activities are designed to engage you and your students in fun, educational, hands-on investigations of nutritious fruits and vegetables both in and out of the garden.

Your American Heart Association Teaching Gardens program can be as simple or as elaborate as you choose, and the scale of your program will depend upon your time, experience, resources and preferences. Therefore, we have included a wide variety of activities, ranging from simple matching games and scavenger hunts to more elaborate planting and cooking projects. If this is your first experience with a school garden, we suggest that you start small. Enjoy some successful garden experiences as you establish clear expectations with your students around the space, then branch into some of the more elaborate lessons when you are ready.

Written for the American Heart Association by Whitney Cohen and Margo Crabtree, Life Lab Science Program. Life Lab gratefully acknowledges to the following contributors: Cara-Alexandra Sundell, Katie Gadsby and Rachel Brand.

Each lesson includes the following sections:

The recommended grade levels, season and setting (indoor or outdoor) for each lesson will be listed at the top of the page.

Description: This section provides a brief overview, or snapshot, of the lesson.

Background: This section varies according to what the lesson calls for. It may include relevant background information on the concept addressed or important tips to consider when planning.

Materials: This section includes a list of materials for the lesson. Some of the materials lists are simple, while others (most notably, the cooking lessons) are quite extensive and may include items not typically found on a school campus. Many schools across the country, from all economic brackets, are finding creative ways to incorporate cooking into their classrooms. Two very successful models include: (a) raising funds together to invest in one shared cooking cart (see the School Garden Manual for equipment suggestions); or (b) asking parent or community volunteers to bring in specific cooking equipment and/or ingredients for special cooking events. With regard to kitchen knives, we recommend that you work within your district's policy on sharp objects, as you would with classroom scissors; that you use the tips found in the School Garden Manual when selecting knives; that you only use knives with students in third grade and up in groups of eight or fewer at a time; and that you demonstrate and/or review knife safety procedures every time before handing knives out. You can find detailed information on knife safety in the School Garden Manual.

Preparation: This section includes a list of steps necessary to prepare for the lesson.

Activity: This section includes a list of steps for conducting the activity with students. We know that you will be incorporating the garden throughout various stages of your students' learning processes. Therefore, some of these lessons are designed to introduce students to new concepts, while others are designed to reinforce concepts already introduced to students. In every case, we suggest that you read through an entire lesson before you begin to teach it, and that you reference the School Garden Manual for any specific questions around gardening or cooking how-to's.

Tying it Together: This section provides discussion questions or wrap-up activities to help students synthesize what they learned during the lesson.

Digging Deeper: This section includes ideas for extending the lesson further, either during class or with a homework assignment.

National Standards: This section includes the National Content Standards addressed in the lesson.

TABLE *of* CONTENTS

RECOMMENDED GRADE LEVEL	LESSON
The 5 Fantastic Food Groups	
K-1	ABC Fruit and Vegetable Matching Game
1-5	ABC Fruit and Vegetable Book
3-5	The 5 Fantastic Food Groups
3-5	Planting the Food Groups
3-5	It's All in the Balance
4-5	Fabulous Fruits
All the Colors of the Rainbow	
K-2	Searching for Garden Rainbows
K-2	Rainbow Fruit Salad
K-4	Garden Mosaic on a Cracker
3-5	All the Colors of the Rainbow
3-5	Super Green Smoothies
Celebrating Food from Around the World	
2-5	Food Festival
3-5	Food Around the World
4-5	Flatbread from Scratch
3-5	Celebrating Family Food Traditions
3-5	Snack Historians

Recommended Grade Level:
K-3

Season:
Summer, Fall

Outdoor

Salad Roll Ups

Description:
Students practice addition, subtraction and — if they're ready — multiplication and division as they walk around the garden harvesting items for a small, hand-held salad.

Materials:
For each group of 6-8 students:

- 1 cutting board
- 1 knife, for adult use
- 1 harvest basket or colander
- Access to clean drinking water
- *Optional: "Singing in Our Garden"* CD by the Banana Slug String Band

Preparation:

1. It is ideal to have an adult with each group of 6-8 students for this activity. Recruit parent or community volunteers ahead of time, if possible. If not, it is also possible to do this activity in one large group with a teacher.
2. Take a walk around the garden and make sure you have at least one large lettuce leaf for each student. If not, supplement with lettuce from a farmers' market or grocery store.
3. While walking in the garden, find all the produce that is ready to harvest and might be good in a raw salad. Possible examples include carrots, beets, edible-pod peas, cherry tomatoes, radishes, broccoli, kohlrabi, celery, green beans, bell peppers, cauliflower, corn or cucumbers.

Activity:

1. Walk into the garden and invite each student to harvest one large lettuce leaf by breaking it off of the plant at the base. Collect them in the basket and ask a student to carry it.
2. As you continue to walk around the garden, have students point out things that might be good in a salad. As they find things, invite different student volunteers to harvest a few of each item. Gather in the basket and continue until all salad items have been harvested.
3. Head to a sink and demonstrate how to wash hands and produce thoroughly. You can find a detailed description of safe produce handling in the School Garden Manual.

4. After you have demonstrated, have students wash their hands and all of the produce while you watch, ensuring thoroughness.
5. Gather students in a circle and sit down. Hand each student a lettuce leaf. Then take out one of the produce items and chop it into enough pieces for each student. Use this as an opportunity to practice the math skills your students are currently working on. For students learning addition and subtraction, you might say: *I have 1 beet and 1 carrot. That makes 2 vegetables. Now I'll add the broccoli. How many vegetables do I have now?* If your students are working on multiplication and division, you might say: *I have 3 peas and 9 students. How many pieces should I cut these peas into? Or I have 18 peas and 9 students. How many peas will each of you get?*
6. Each time you chop a vegetable, hand out the pieces and have students place them on top of their lettuce leaves.
7. Once they have all of their vegetables in there, ask students to count how many there are total. *How many are orange? How many are green? How many are roots? etc.*
8. Have students wrap up their vegetable pieces inside their lettuce and enjoy.

Tying it Together:

How did that salad roll up taste? Do you remember planting any of these vegetables? What did we give these vegetables to help them grow? (Water, compost, etc.) Now that we have harvested these vegetables from the garden, how can we give something back to the garden (put our waste in the compost pile, water a plant, weed a garden bed, etc.)

Digging Deeper:

- Write a class recipe for your salad roll ups.
- Have students think about their favorite vegetables in the roll ups and create their own roll ups with just the things they like best.
- The CD to teach students "Dirt Made My Lunch" by the Banana Slug String Band.

National Standards:

NCTM: Understand meanings of operations and how they relate to one another.

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

Recommended Grade Level:
K-5

Season:
Fall

Indoor or Outdoor

My Apple Planet

Description:

Students use their senses to make detailed observations about an apple. Once students have made their observations, the apples are placed in a basket and students are challenged to recall what they observed to find their apple.

Background:

None needed.

Materials:

- 1 apple for each student. Ideally the apples will be similar, but not uniform in color, texture or size.
- 1 large basket or bag.

Preparation:

Wash all the apples.

Activity:

1. Have all students wash their hands. Then seat students in a circle and give each student an apple.
2. Have students use all of their senses except for taste to explore their apple. They can look at it, smell it, feel for bumps or rough patches, knock on it and listen to the sound it makes, etc.
3. Tell them to imagine that their apple is a whole planet. Give an example by using your own imagination and describing your world on an apple. *This green area is a great big forest, where I like to go hiking, and this yellow area is a wheat field so we can have bread and cookies and pasta, and this hole is a lake where I go swimming, and this spot is my house, and this bumpy area is where we grow lots of fruits and vegetables. This dark spot over here is a big city full of all my friends, etc.*
4. Have them look at their apples as you ask them questions, such as: *If you lived on this planet ... Where would you live? Where would you hide? Where would you plant a garden? Where would you sit to see far away?* Give them some time to imagine.
5. Go around the circle and have everyone describe his or her apple planet.

6. Tell students you are going to collect the apples and mix them up and then challenge them to recognize their apple from the group. Give them a few minutes to memorize the details of their apple.
7. Collect all of the apples in a basket or bag and mix them up. Spread them back out and have students try to find their apple again.
8. Go around the circle one more time and have students tell how they recognized their apple.
9. Eat the apples together.

Tying it Together:

What did our apples have in common? How were they unique? What do we all have in common? How are we each unique?

Digging Deeper:

- Plant an apple tree with your students.
- Cook applesauce. You can find a recipe in the September Parent Newsletter.
- Do a comparative tasting with three or more different apple varieties. You can find more information on setting up comparative tastings in the Winter Squash Comparative Tasting lesson.

National Standards:

NSES: K-4: Properties of Objects and Materials

NCTE: Students use spoken, written and visual language to accomplish their own purpose (e.g., for learning, enjoyment, persuasion and the exchange of information).

Recommended Grade Level:
K-5

Season:
Fall/Winter

Indoor or Outdoor

Winter Squash Tasting

(adapted from *Sowing the Seeds of Wonder* by Life Lab Science Program - Published by National Gardening Association, www.kidsgardening.org)

Description:

Students use all of their senses to compare and contrast three varieties of winter squash. After observing the raw squashes, they taste the three varieties and describe the unique flavors. Finally, they vote for their favorite one. Students tally and graph votes to determine class preferences.

Background:

Comparative tastings are a great way to encourage kids to try new fruits and vegetables. Interestingly, children who may say "no thank you, I hate vegetables" when asked to try something new will often jump at the opportunity when asked to taste varieties in order to weigh in with an opinion on which variety is best.

Materials:

- 2 each of several types of winter squash, such as delicata, butternut, acorn, red kuri, pie pumpkin or blue hubbard
- 1 large, sharp knife, large spoon, and fork (for adult use only)
- 1 copy of the Comparative Tasting Chart reproducible handout for each student
- Baking pans or microwave-safe dish
- Oven or microwave
- 1 spatula
- 3 clean toothpicks for each student
- Chart paper or whiteboard and markers

Preparation:

1. Photocopy the Comparative Tasting Chart reproducible for each student.
2. Create an empty bar graph on chart paper or a whiteboard. Label the X-axis "Type of Winter Squash" and write the name of every type they will be sampling. Label the Y-axis "Number of Students Who Prefer Each Type of Winter Squash."
3. Copy the Comparative Tasting Word Bank onto a piece of chart paper and post where all students can see it.
4. Reserve one squash of each type that you'll be tasting to show children what it looked like originally.
5. Roast the second squash of each type. Preheat an oven to 350° F. Cut each squash in half, scoop out the seeds and stringy innards, and poke the skin a few times with a fork. Place the squash, cut sides down, on a baking pan. Bake until squash is soft and easy to dent when pressed, about 45 minutes. Let squash cool slightly. Squash is best warm; if roasting ahead of time, you can reheat the squash in an oven or microwave. If an oven is not available or you are unable to prepare your squash ahead of time, you can cook most varieties in a microwave. Follow cutting and de-seeding instructions above and microwave 7-10 minutes or until tender.

Activity:

1. Introduce each squash by showing the raw vegetable and asking for descriptions of color, shape and texture. Show what the same type looks like after roasting. *How are they similar? How did they change? Is there anything we could do to return this cooked squash to its raw state?* (the answer to this is no, because when it was cooked it went through an irreversible chemical change).
2. Use toothpicks to hand each student a spoonful or chunk of the cooked squash to taste. As they taste each kind of squash, ask them to share how it tastes and feels in their mouth. They can use the Tasting Word Bank for ideas. Have them record ideas on their Comparative Tasting Chart.
3. After they have tried each variety, ask students to vote for their favorite one. Have student volunteers help you tally votes and record on the bar graph.

Tying it Together:

Make a bar graph tracking the popularity of each winter squash.

National Standards:

NSES: K-4: Properties of objects and materials

NSES: 5-8: Properties and changes of properties in matter

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

Name: _____ **Date:** _____

Comparative Tasting

Fruit or Vegetable _____

Variety	Color	Taste	Texture

My favorite variety is: _____

Digging Deeper:

- Try comparative tastings with other fruits or vegetables. The chart in this lesson will work with any fruit or vegetable. You can also download tasting charts in English and Spanish for a variety of fruits and vegetables at *www.cookingwithkids.net.*
- Roast the seeds of the winter squash for another comparative tasting or just for a snack. Simply separate the seeds from the stringy innards (kids with clean hands can help), place seeds on a cookie sheet and spray lightly with fat-free cooking spray. Place in the oven at 350° F. Check every 5 minutes, stirring each time, until the seeds are slightly brown and crispy. Cool and enjoy.

Comparative Tasting: Word Bank

Looks	Smells/Tastes	Textures
Colors: Red, orange, etc. *Shapes:* Round, oblong, oval, pointy, etc. Striped Solid Shiny Dull Symmetrical Asymmetrical	Sweet Tart Sour Delicious Like something else Tangy	Smooth Rough Bumpy Creamy Crunchy Crisp Sticky Chewy Juicy Seedy

Recommended Grade Level:
2-5

Season:
Any

Indoor or Outdoor

Where Does Pizza Come From?

Description:

Students investigate the parts of a pizza — and trace them back to their source. They play a game and learn that the food we eat can be traced back to plants.

Background:

Learning about what we eat and where it comes from provides us with important knowledge for developing healthy lifelong habits. This knowledge is critical in a world where problems of obesity and associated diseases are on the rise. The garden connects us with agriculture — the cultivation of food. Students may be surprised to discover that pizza doesn't really come from a store or restaurant — the ingredients all start with plants.

Materials:

- Chart paper
- Markers
- Pizza Parts reproducible handout for each student
- Heavy string or yarn
- Scissors
- Hole punch

Preparation:

1. Make enough copies of the Pizza Parts reproducible handout so each student will have one card. Cut out the cards along the dotted line and punch a hole in each card.
2. Cut enough string or yarn to make a "necklace" for each student. Thread the string through each card and tie a knot at the end.

Activity:

1. Invite students to share some of the foods they like to eat. Record them on chart paper. If students don't mention pizza, add it to the list. Explain that the foods we eat come from plants and animals. Tell students they are going to investigate where pizza comes from.
2. Engage students in a discussion of pizza. *Does pizza grow in a garden or live on a farm? Where does pizza come from? Does anyone know how to make pizza?* Guide students to recognize that pizza has different parts: crust, sauce and topping. Each part is made from different kinds of raw ingredients.
3. Tell students that they are going to play a game. Give each student a card with a string necklace. Have them wear the card. Challenge them to match the raw ingredients to the crust, sauce or topping. When an ingredient and a pizza part are matched, have them stand together quietly until all the parts are matched. If any students have difficulty making the match, give them hints.
4. Draw the lesson to a close by having the matched parts and ingredients say what they are. For example, *I am the pizza sauce. I am the tomato that is part of the sauce. I am the basil that flavors the sauce*, and so forth.

Tying it Together:

Think about what you have learned. Where does our food come from? Were you surprised to learn that plants are a major source of what we eat? Did anything else surprise you?

Digging Deeper:

- Tomatoes are harvested as whole food, but tomato sauce is a processed food. Help students understand the difference between raw, harvest food and harvested food that becomes part of a processed food. Bring in a fresh tomato and a jar of tomato sauce, bottle of ketchup and/or a can of tomato paste and compare them.

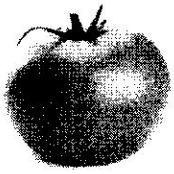
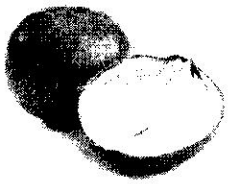
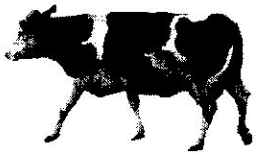
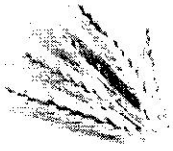
National Standards:

NSES: K-4: Science in Personal and Social Perspectives

Literature Connection:

Read *The Tortilla Factory* by Gary Paulse

Pizza Parts

 Crust	 Cheese
 Tomato	 Basil
 Onion	 Garlic
 Sauce	 Cow
 Wheat	 Milk
 Oregano	 Grass/Hay

Recommended Grade Level:
4-5

Season:
Spring/Summer

Outdoor

Pizza Pi

Description:

Students are introduced to the radius, diameter and circumference of circles. They apply what they learn to solve a garden design problem. They then turn the circular garden bed into a "Pizza Bed" by planting all the ingredients they need to harvest and make their own pizza.

Background:

In this activity, students explore the relationship between a circle's diameter and circumference. Through a hands-on activity, they learn that the circumference is about 3 times the diameter: (Circumference of a circle) = (Pi) x (Diameter of the circle), or $c=\pi d$. With this knowledge, students will calculate the circumference of their pizza garden based on the bed's diameter.

Materials:

- Pizza Garden Plan reproducible handout
- 1 cylinder-shaped object for each pair of students (oatmeal box, hat box, vegetable juice can, etc. — the larger it is, the easier it will be for students to manipulate the string)
- String or yarn
- Hammer
- Garden stake
- Scissors
- Tape
- Tape measure
- Seed packets or seedlings (peppers, onions, tomatoes, garlic, oregano, basil, peppers and wheat, if you have room)

Preparation:

- Buy seedlings to get a head start on the pizza garden.
- Invite students to help you prepare the garden bed. Refer to the School Garden Manual for information.

Activity:

1. Have students work in pairs. Give each pair a length of string or yarn that is longer than the circumference of the cylinder-shaped object.
2. Have student pairs carefully wrap the string around the object. Tell students they are going to measure the circumference of the object. To do this, tell them to carefully wrap the string around the object. Tell them to cut the string when it is exactly the same length as the circumference.
3. Next, have students cut the string into the three equal lengths.
4. Invite students to discuss their findings. *Does anyone know what the equal lengths represent?* If students are puzzled, have one student pair use their cylinder-shaped object to cut length of string that is the same length as the first string they cut. Tell them to use this string to form a circle on a desk or other flat surface. Challenge students to investigate the relationship between the three equal lengths and the circumference. *Does one of the three equal lengths fit inside the circle? (yes, it's the diameter).*
5. Next, tell students that they are going to apply what they have learned to solve a garden design problem. *If we want to make a circular pizza garden bed and we have a garden bed that is 10 feet across, how can we calculate what the circumference of the bed will be?*
6. Go into the garden and set up a circular pizza garden bed. Hammer a stake in the center of the garden bed. Attach a string to the stake and measure from the stake to the outside of the bed. Have students measure the length. This is the radius. *If the radius is 5 feet, how long will the diameter be?* If students are puzzled, have them measure the width of the garden bed from one side to the other. *Now that we know the radius and the diameter, what is the circumference? How can we use this information to make a circular garden bed that has a diameter of 10 feet?*
7. Stake out the circular garden bed. Use the Pizza Garden Plan to plant the bed.

Tying it Together:

Tell students that they have been exploring the relationship between the diameter and circumference of a circle. *Did anyone have a little string left over after making the three equal lengths?* Tell students that the formula for the circumference of a circle is Pi, or 3.1416, times the diameter. Students do not need to know the formula. In this activity, the emphasis is on the relationship between the diameter and the circumference so students can solve a garden design problem.

Digging Deeper:

- Have students explore fractions as they design the bed. Will they divide the garden bed into quarters, eighths or some other fraction? Will each bed be an equal size?
- Celebrate Pi Day: March 14.

National Standards:

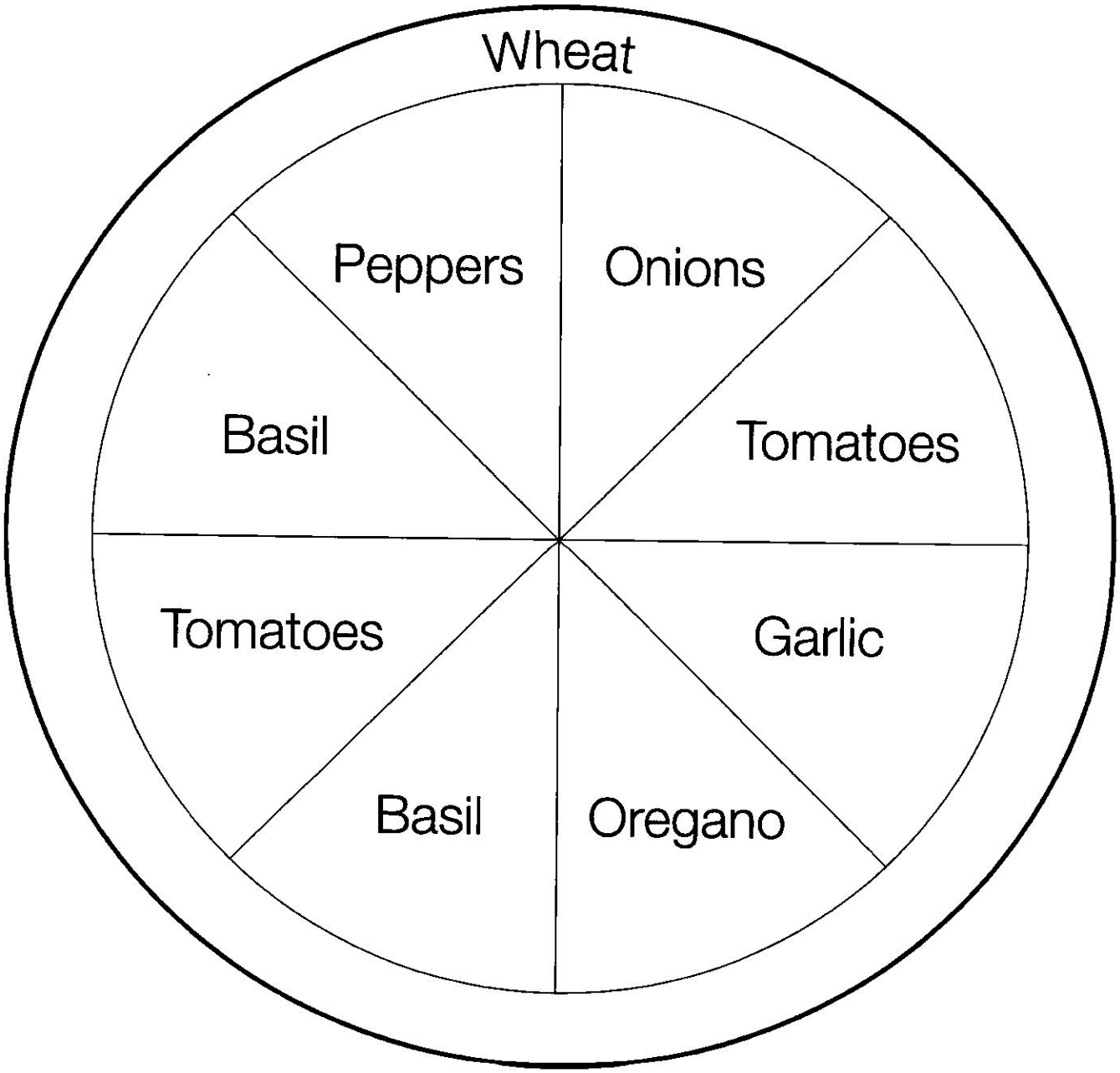
NCTM: 3-5: Problem Solving

Literature Connection:

Sir Cumference and the Dragon of Pi by Cindy Neuschwander

Pizza Garden Plan

Use the diagram below to plant a pizza garden. Or, be creative and come up with other kinds of toppings to plant!



Recommended Grade Level:
4-5

Season:
Summer/Fall

Indoor or Outdoor

One-Bite Salsa

Description:

In this lesson, students listen to a story about cherry tomatoes. They then make a simple salsa and talk and write about the inputs (from sunlight and soil to hard work and laughter) that went into their snack.

Materials:

- *Little Yellow Pear Tomatoes* by Demian Elaine Yumei
- 1 whole wheat cracker for each student
- 1 small onion
- 1 knife, for adult use only
- 1 lemon
- 1 cherry tomato per student
- 1 sprig of cilantro per student
- 2 bowls
- 2 spoons
- 1 copy of One-Bite Salsa reproducible for each student

Preparation:

1. Check the garden to make sure there is at least one cherry tomato and one sprig of cilantro per student growing.
2. Dice an onion and place in a bowl.
3. Cut a lemon in half and place both halves in a bowl.

Activity:

1. Gather students and read aloud *Little Yellow Pear Tomatoes* by Demian Elaine Yumei.
2. Discuss: What were some of the "not-a-tomato things" in her tomatoes?
3. Tell students they will be heading out to the garden to harvest their own cherry tomatoes to use in a one-bite salsa.

4. Once in the garden, demonstrate how to make a one-bite salsa: Take one cracker, use a spoon to add a very small piece of onion. Walk in the garden and add a cherry tomato and a leaf of cilantro. Top with a drop or two of lemon juice. Remember to wash produce before eating.
5. Show students your finished product and then invite them to make their own and eat it.
6. While students are making salsa, station yourself or another adult at the lemon bowl to help them get just one or two drops of juice on their cracker.
7. If there is enough, invite students to enjoy seconds and thirds.
8. Once everyone has tried the one-bite salsa, return to the classroom and hand out the graphic organizer. Following the example from *Little Yellow Pear Tomatoes*, help students brainstorm what went into their salsa. As the class discusses, have them take notes on their graphic organizer.
9. Give students time to use ideas from the brainstorm to write and illustrate a short story about some of the things that went into their salsa.

Tying it Together:

Have students share their stories with the class and then discuss. *So much went into our tomatoes! What other foods do we eat? What goes into our milk? Our cereal? Our dinner salad? Who can we thank for our foods? (our parents, farmers, the school's food service staff, the sun, the earthworms, etc.)*

Digging Deeper:

- Grow a variety of cherry tomatoes. Tip: Keep different colored cherry tomatoes in separate beds, so that students can easily tell which ones are ripe (i.e., *in this bed, any orange cherry tomato you see is ripe*).
- Write thank-you cards to one or more people who provide us with food: a local farmer, a local butcher, a school food service director, etc.

National Standards:

NCTE: Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.

NCTE: Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw upon their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).

NCTE: Students participate as knowledgeable, reflective, creative and critical members of a variety of literacy communities.

What Went Into Our One-Bite Salsa?

Graphic Organizer

Just like the tomatoes in *Little Yellow Pear Tomatoes* by Demian Yumei, there are a lot of "not-a-tomato things" in the cherry tomatoes in our school garden. Use this graphic organizer to brainstorm.

What "not-a-tomato things" are in our tomatoes?

People

People	How did they help our tomatoes grow?
Example: 4th grade class	Made compost to feed the tomato plants

Animals

Animals	How did they help our tomatoes grow?

Other "not-a-tomato" things

"Not-a-tomato" thing	How did they help our tomatoes grow?

Recommended Grade Level:
4-5

Season:
Spring/Fall

Outdoor

Breakfast ... Or Lunch! Or Dinner! ... in Bed

Description:

Students use a planting guide to find plants' spacing requirements. They use this information to create a planting map. Finally, they plant all of the plants and seeds needed for one meal into a garden bed.

Materials:

- 1 copy of the Planting Chart from the School Garden Manual (page 37) for each student
- Hand trowels for each student
- Chopsticks, pencils or sticks to mark where you'll be planting things
- Rulers for each student
- Seeds or seedlings for the theme bed of your choice. Here are some options:
  - Salad Bed: Lettuce, sugar snap peas, carrots, radishes
  - Stir Fry Bed: Chard, kale, carrots, broccoli
  - Stone Soup Bed: Potatoes, beets, carrots, chard, winter squash
  - Salsa Bed: Tomatoes, onions, cilantro, peppers

Preparation:

1. Using the information in the School Garden Manual or in a conversation with a local garden center, identify plants that will grow this season in your region. Choose 3-5 of these plants to plant together in a theme bed. You can choose one of the examples listed above or plan your own theme bed.
2. Gather seeds and seedlings for the theme bed of your choice. For lettuce, chard, kale, tomatoes, peppers and broccoli, you'll want seedlings (baby plants). For sugar snap peas, carrots, radishes, beets, cilantro and winter squash, you'll want seeds. For potatoes, you'll want "seed potatoes," which are little pieces of potato good for planting. For onions, you'll want onion sets. You can find information on growing your own seedlings ahead of time in the School Garden Manual.
3. Photocopy the Planting Chart from the School Garden Manual (page 37) for each student.

   Note: If you're not able to be outside in the garden, use chart paper or the white board to create a blueprint.

Activity:

1. Tell the students that they will be planting a theme bed including ingredients to be used in a meal together. Show them the seeds and/or seedlings they will be using.
2. Together with your students, prepare a bed for planting.
3. Hand out the Planting Chart and have the students find the plants they will be planting.
4. Explain that tall plants should be on the north side of the bed, so they don't cast a shadow over the other plants.
5. Guide students through a mapping process for the bed, sticking chopsticks or other markers into the bed to mark where each plant will go. *How far apart do lettuce plants need to be? Okay, let's use these sticks to mark places for lettuce along this edge of the bed. Now, how deep do the carrot seeds go?* (for small seeds like carrots, you can simply make a furrow to the planting depth, sprinkle the seeds all the way along the bottom and cover. Once they grow, you'll thin them out to the desired spacing). Continue until your students have marked a space for each vegetable.
6. Stand back and double check that your garden bed, now fully mapped out with plant markers, looks good.
7. Divide the class into teams and give each team a set of seeds or seedlings to plant. Demonstrate how to plant.
8. Make a sign for your garden bed, identifying the theme.

NOTE: You can find detailed instructions for preparing, planting and maintaining your garden bed in the School Garden Manual.

NOTE: If you want to harvest all of the plants in your bed at the same time, you will need to stagger your plantings based on the Days to Harvest, which are also listed in the Planting Guide. For example, if you want to make a salsa with all of the ingredients listed above, you'll want to plant the peppers and tomatoes first (they take approx. 90 days), then onion sets and cilantro about 40 days later (they take approx. 50 days).

Tying it Together:

There is no better way to support students in learning how food goes from seed to table than by having them plant, harvest and prepare the ingredients for a common meal. Have a harvest party and then enjoy a salad, stir fry, soup, salsa or other meal together using the ingredients you grew. While they're eating, ask them to recall the day that you first planted those foods.

Digging Deeper:

- Have teams of students choose different crops and use the spacing information to design and plant their own garden beds.

National Standards:

NCTM: 3-5: Use visualization, spatial reasoning and geometric modeling to solve problems.

Recommended Grade Level:
4-5

Season:
Fall/Winter

Indoor or Outdoor

Stone Soup

Description:

This lesson begins with a read aloud of a classic Eastern European folktale, *Stone Soup* by Heather Forest. Student teams then harvest and prepare one or two items to add to a class soup. One group at a time works on the soup while the other groups work on a related writing assignment. Finally, the entire class enjoys the soup together.

Background:

This is a wonderful activity for a special event on a cold day, such as the last day of school before a Fall or Winter Break. It can be helpful to announce Stone Soup Day ahead of time and request support from parent or community volunteers who can bring in some of the ingredients and cooking equipment, and/or help with the food preparation.

Materials:

Ingredients for a class of 20-30 students:

- 20 cups low-sodium vegetable broth
- 12-16 cups of garden vegetables such as chard, kale, carrots, broccoli, spinach, beets, beet greens, kohlrabi, potatoes or celery
- 2 delicata squash or 1 package of pre-cubed butternut or other winter squash
- 1 large onion, any color, chopped
- 3 cloves of garlic, minced
- 2 teaspoons olive oil
- 2 teaspoons fresh thyme, sage or oregano
- 2 cups dried lentils
- Spices (pepper, cumin, garlic powder, etc.)
- 1 can low sodium beans

Cooking equipment:

- Stove or hot plate
- 2-3 colanders
- Extra-large soup pot

- Measuring spoons
- Measuring cup
- Wooden spoons
- 8 pairs of scissors for harvesting herbs and greens, if applicable
- 1 cutting board and sharp knife for each pair of students
- 1 bowl and spoon for each student

Writing Assignment Materials:

- *Stone Soup* by Heather Forest
- 2 copies of Folktale Graphic Organizer reproducible handout for each student

Preparation:

1. Note what vegetables are ready for harvest in your school garden and purchase other ingredients if needed.
2. Pre-roast 2 delicata squashes. For roasting instructions, see Winter Squash Tasting lesson. Alternately, you can purchase raw, cubed winter squash.
3. Chop onions.
4. Place a big soup pot over medium heat and add the olive oil.
5. Just before the lesson, sauté the chopped onion until clear, stirring often.
6. Add the broth and (if you're using it) 1 bag of raw, cubed winter squash. Put the lid on. Leave heat on low.

Activity:

1. Read *Stone Soup* to the class. Ask: *Did any one person in the story have everything necessary to make a soup? How did they work together? What purpose did the stone serve in this soup? (It gave people a sense of hope for the soup in store. Then they became motivated to contribute to this great soup instead of hoarding their vegetables.)*
2. Tell students that they will also be making a soup together today, with each person contributing something. *I'll be working with one group at a time while the rest of you work on a related writing assignment.*
3. Hand out the graphic organizer and have students use it to take notes on the folktale they just heard. If they finish, they can use the second graphic organizer to brainstorm ideas for their own folktale featuring a fruit or vegetable.

4. While they are working, call up one group at a time to contribute to the soup. Wash hands and review knife safety with each group, as described in detail in the Super Green Smoothie lesson and the School Garden Manual (page 81). Each group will work on their soup task for approximately 20 minutes, as follows:

1st Group:

- Harvest longer-cooking vegetables such as carrots and beets.
- Wash hands, wash vegetables.
- Chop vegetables and add to soup.
- Clean up station and take scraps to compost.

2nd Group:

- Harvest quicker-cooking vegetables such as broccoli, chard and other greens.
- Wash hands, wash vegetables.
- Add lentils to soup.
- Chop vegetables and add to soup.
- Clean up station and take scraps to compost.

3rd Group:

- Harvest one handful of herbs, such as sage and oregano.
- Wash hands, wash herbs.
- Pull off leaves, tear up and add to soup.
- Test a few vegetables by piercing with a fork. If it's easy to poke them, the soup is done. If not, continue to cook on low heat until done.
- If you're using pre-roasted delicata squash, scoop it out of the skin with a spoon and add to the soup.
- Drain the beans and add to the soup.
- Turn off the heat.
- Let students taste with clean spoons and add spices (pepper, cumin, garlic powder, etc.), one pinch at a time, as needed.

Tying it Together:

Ladle soup into bowls and enjoy together. Ask students: *Did you enjoy the soup? Could you taste or see the vegetables your group added to the soup? Do you remember planting any of those vegetables? How did each of you contribute to our soup? How is this like the soup in the story?*

Digging Deeper:

- Have students use the second graphic organizer to create their own folktales centering around the fruit or vegetable of their choice.

National Standards:

NCTE: Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

NCTE: Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.

NCTE: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

Folktale Organizer

Title:	
Author:	
Setting:	
Problem:	Solution:
What makes this story unique? A clever twist? Magic? Explain.	What is the lesson learned?

Recommended Grade Level:
3-5

Season:
Any

Indoor or Outdoor

Chlorophyll: The Tiny Green Magician

Description:

Student volunteers perform a brief play about how plants make food and oxygen from four key ingredients: sun, soil, water and air. They then use a graphic organizer to take notes on the process of photosynthesis. Finally they discuss ways to give back to the plants by watering them and building healthy soil.

Background:

Photosynthesis is a chemical process by which plants use energy from the sun to convert carbon dioxide and water into sugar and oxygen. Chlorophyll is the substance in plants that allows them to photosynthesize. It is also the reason plants are green. Since humans cannot photosynthesize, we rely on food, in the form of plants and animals, for our energy.

Materials:

- 4 copies of the "Chlorophyll: The Tiny Green Magician" script reproducible handout
- 1 copy of the Photosynthesis Note-Taking Guide reproducible handout for each student
- *Optional props for the skit: A green sheet or robe and wand for Chlorophyll, a big pot and spoon, and some small garden tools for the gardeners*

Preparation:

1. Make 4 photocopies of the script.
2. Photocopy the Photosynthesis Note-Taking Guide for all students.

Activity:

1. Ask for 4 volunteers to act out a short garden skit of the class.
2. Give volunteers their scripts and props, and guide them through performing the skit.
3. Discuss the story with the class. *Who remembers from the play where Chlorophyll said that she or he lived? (inside the leaves of plants) Does anyone know what chlorophyll is? Chlorophyll is a*

chemical that makes all plants green. It also does something else. Who remembers what Chlorophyll was making in the play? (sugar and oxygen). Why are these important for us? What did Chlorophyll need to make these things (Carbon dioxide, water and sunlight). Where do plants get these things?

4. Explain to students that this process is called photosynthesis. Have them repeat the word back. Distribute the Photosynthesis Note-Taking Guide and give students some time to record their answers.
5. Collect their Photosynthesis Note-Taking Guides to assess student understanding. Then go over the answers together.

Tying it Together:

What would happen if plants didn't photosynthesize? Why is photosynthesis important for us? Since plants give us so much, how can we give back to the plants? (Watering, weeding, feeding them with compost, etc.)

Digging Deeper:

- Adopt a plant. Give each student or pair of students the chance to walk around the school garden and choose one plant they want to care for. Every time you head out to the garden, give them a chance to check on their plant, breathe some carbon dioxide onto the leaves, give it some water, weed around it, remove any snails or pests, and give it a big "thank you" for making sugar and oxygen for us.
- Plant a tree! As a class, you can plant and care for a tree that is native to your area. Make sure to consider how tall it will grow and which direction the shadow will fall when selecting a location. Trees provide shade, moderate climate, improve air quality, conserve water and harbor wildlife. On average, one tree produces nearly 260 pounds of oxygen per year. That means that two mature trees can provide enough oxygen for a family of four (Source: Canada's National Environmental Agency).

National Standards:

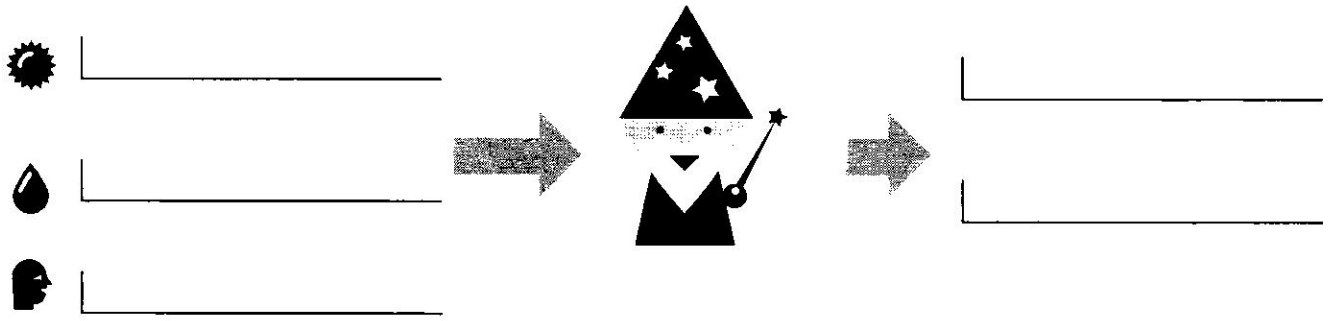
NSES: K-4: The Characteristics of Organisms

NSES: K-4: Organisms and Their Environments

Photosynthesis Note-Taking Guide

What goes in?

What comes out?



Where does photosynthesis happen?

Why is photosynthesis important?

Skit Script:

Chlorophyll: The Tiny Green Magician

Cast of Characters: 4 actors: 1 Narrator, 1 Chlorophyll, 2 Gardeners

Setting: A garden

(Optional) Props: *Green robe or cape for Chlorophyll; a big pot and spoon for Chlorophyll; Garden tools for Gardeners; Watering can for Gardener 1.*

Narrator: It is a sunny day in the garden. A tiny green magician named Chlorophyll is sitting inside of a green leaf, soaking up the sun and stirring something in a cauldron.

[Action: Chlorophyll stirs something in a pot]

Chlorophyll: Hello everybody. My name is Chlorophyll and I am a tiny green magician! I live inside plants. I only know one trick, but it is a great one! In fact, you couldn't survive without it! First I'll need some carbon dioxide from people and other animals.

Narrator: Here come two gardeners. They are talking to each other and can't see Chlorophyll because (s)he is so tiny and hidden inside the green leaves of the plants.

[Action: Gardeners walk on stage together, talking]

Gardener 1: Hi there! How are you?

Gardener 2: Enjoying the beautiful day! What are you up to?

[Action: Chlorophyll reaches out to catch the carbon dioxide from the air and stir it into the pot]

Chlorophyll: Ha! While those people were talking, I captured the carbon dioxide they were breathing out. Now I just need some water and some sunlight.

[Action: Gardener 1 pours some water into Chlorophyll's cauldron]

Gardener 1: I'm just watering my plants. How about you?

Gardener 2: Just out enjoying this sunny day.

[Action: Chlorophyll reaches up to the sky]

Chlorophyll: Hooray! Now I have sunlight and water too. That means I have everything I need to make sugar for the plants and oxygen for the animals.

[Action: Gardener 1 takes a big, deep sigh.]

Gardener 1: Ah, the air is just so nice and fresh out here in the garden.

[Action: Gardener 2 picks a pea off a plant.]

Gardener 2: Yeah, and have you tried these sugar snap peas? They're so sweet!!

Gardener 1: How in the world do these fruits and vegetables get so delicious?!

Gardener 2: I guess we'll never know.

[Action: Chlorophyll takes a deep sigh and rolls his/her eyes]

Chlorophyll: Well, you're WELCOME!

Recommended Grade Level:
3-5

Season:
Any

Outdoor

Compost Cake

Description:

Students build a layered compost pile and discuss the nutrient cycle. They monitor the pile over time and, later, feed their garden plants with finished compost.

Background:

Composting is the process of recycling garden waste into fertile soil for the garden. You can find detailed information on composting in the School Garden Manual (page 59).

Materials:

- A 3' X 3' bare patch of ground for a compost pile
- Enough sticks or branches to cover the 3' X 3' compost area
- 2 or more wheelbarrows full of fruit and vegetable scraps
- 2 or more wheelbarrows full of dry, brown yard waste (leaves or grass clippings) or straw
- ½ a wheelbarrow full of soil
- 4 shovels
- 1-2 hayforks or rakes
- 4 garden shears
- 1 empty wheelbarrow
- Water access and a hose with a fan spray nozzle
- Meter stick
- Compost thermometer
- Trowels
- Old newspaper
- Magnifying glasses
- *Optional: Gardening gloves for all students*
- *Optional: "Singing in Our Garden" CD by the Banana Slug String Band*

Tip: You can collect fruit and vegetable scraps over time from your school cafeteria or you can go to a local grocer or restaurant and ask for some of their fruit or vegetable waste for a compost pile.

Preparation:

1. Select a 3' X 3' area for a compost pile in your garden (make sure to check with a school administrator and/or Facilities personnel). Mark the area by dragging a shovel in the soil along each edge.

Activity:

1. Discuss the purpose of compost with students: *When we harvest from our garden, we are removing nutrients from the garden. When we eat the produce, we take in those nutrients. That's why fresh garden produce is so nutritious! But what do you think will happen if we keep planting and harvesting from the same garden bed season after season? (it will run out of nutrients). Compost is one way we can replenish nutrients in the soil.*
2. Explain to students that they will be making a compost pile to turn kitchen and yard waste into a nutrient-rich soil amendment for their garden. They'll be layering ingredients, just like a layered cake.
3. Divide class into 6 even teams: The Carbon Team; the Nitrogen Team; the Soil Team; the Chopper Team; the Edge Monitors; and the Water Monitors.
4. Have the Carbon Team lay sticks and branches over the ground in the compost area.
5. Have the Chopper Team use garden shears to start chopping up all of the fruit and vegetable scraps and straw or yard waste into smaller pieces. The other teams will be building the pile while the Chopper Team continues preparing materials for each layer.
6. Have the Nitrogen Team shovel a 4-6 inch layer of chopped fruit and vegetable scraps on top of the sticks and branches.
7. Have the Carbon Team shovel a 4-6 inch layer of chopped, dry, brown yard waste or straw on top.
8. Have the Soil Team sprinkle about 1 inch of soil on top.
9. Have the Water Team water the pile until it appears about as moist as a wrung-out sponge.
10. Have the Edge Monitors use hayforks or rakes to pull outward on each top corner, creating what looks like a large nest on the top of the pile. This will prevent the pile from flattening when it rains. Then have them pull each side inward so that all the materials remain within the designated composting area.
11. Repeat steps 4-8 until all green and almost all brown materials are used.
12. Cover the entire pile in a 4-6-inch layer of dry, brown yard waste or straw, and have the Edge Monitors straighten up the pile one last time.
13. Clean and replace all tools, and have all students wash their hands.
14. Insert a compost thermometer into the center of the pile and measure the temperature. Record.
15. Measure the temperature of your pile each day at around the same time. Record and graph the results as a class. As the decomposers become more active, it should heat up considerably.
16. Water your pile when it starts to dry out and cover it in big rainstorms. Maintaining moisture helps keep the decomposers active. In about 4-6 months, your pile should look more or less like a pile of fertile soil.

Tying it Together:

Why do we compost? (it gives us good, fertile soil amendment to add to our garden beds; it reduces waste by keeping our food scraps and yard waste out of the landfill). Do you know who lives in the compost pile, doing the hard work of changing our food scraps into nutrient-rich soil? (fungus, bacteria, and invertebrates, also known as "The Garden's FBI!"). Why do you think your teams were called the "Carbon and Nitrogen Teams"? (These materials are high in those elements, both of which are good for the garden.)

Digging Deeper:

- A week or more after building your compost pile, have students take a trowel full of waste from the pile and spread it onto some old newspaper. Give them magnifying glasses and sticks to look through and see if they can find members of The Garden's FBI (see above reference) in there.
- Once the compost pile has decomposed, have students sift the big chunks out and add the sifted, finished compost to the garden bed of their choice. You can use it all when preparing a new bed, or sprinkle it around plants in a growing bed to give them a boost.
- Use the CD to teach students "FBI" and "Decomposition" by the Banana Slug String Band.

National Standards:

NSES: K-4: Life Cycles of Organisms; Properties of Earth Materials

NSES: 5-8: Populations, Resources, and Environments

Recommended Grade Level:
3-5

Season:
Any

Indoor or Outdoor

Paper Pots

Description:

In this lesson, students discuss the value of recycling and then make pots for seeds out of recycled newspaper. Students then fill these pots with seed starting mix and plant seeds.

Background:

Since the Industrial Revolution, our everyday supplies (from forks to water bottles, from carpets to automobiles) have become easier to come by. With this increase in "stuff," discarded waste has also increased dramatically. About 40 years ago, in an effort to prevent all of this waste from heading to our landfills, the recycling movement began. Since 1970, recycling has become more and more commonplace, and many cities have institutionalized it with curbside recycling. Still, every day, millions of tons of recyclable goods head to our landfills unnecessarily. By teaching our students to recycle, we can help change this trend.

Materials:

- 1 pair of scissors
- 1 newspaper
- 1 six-pack of full 5.5-ounce juice cans
- 1 bucket of seed-starting mix
- 6 packets of seasonal seeds
- 1 shoebox for every 8 students

Preparation:

1. Cut the newspaper into 4" X 10" strips. Make at least one for each student plus 10 extras.
2. Wrap tape around each juice can about ⅔ of the way up.
3. Make a paper pot yourself before showing kids how to do it. To watch a video on making paper pots, visit: *http://www.youtube.com/user/lifelabvideos#p/c/3299B838956E2A94/4/D5N2eRidQFo*

Activity:

1. Tell students that you are going to use recycled materials to make pots for the garden. Ask them, *Why is it a good idea to make pots from an old newspaper rather than buying new, plastic pots? (Possible answers include: The newspaper won't take up space in the landfill; they won't have to make more plastic, which uses natural resources and also takes up space in the landfill; and it's free!)*
2. Demonstrate how to make a paper pot (you may want to review the video referenced in the Preparation section above). To do this, place a newspaper strip on a flat surface with one short end toward you. Place a juice can on the paper with the tape lined up with the left edge of the paper. Keeping the can on the table, roll it away from you, wrapping the paper around it as you go.
3. Fold the paper hanging off of the right edge of the can in on itself. This is the bottom of your pot.
4. Turn the can upright and press down on the table. Now remove the paper from the can gently. You should have a paper pot.
5. Fill the paper pot to the top with seed starting mix.
6. Plant seeds in the seed starting mix. The seed packet will tell you how deep to plant your seeds.
7. Water lightly and watch your seeds sprout! When the seedlings are ready to be transplanted outdoors, you can either (a) plant the entire pot, paper and all, in the ground; or (b) peel the paper pot off of the root ball, and plant as you would a transplant from a plastic container. If you choose to leave the paper pots on, make sure that you bury them entirely, with no newspaper above ground. This will prevent the newspaper from wicking water away from the seeds.

NOTE: You can find more information on selecting seasonal seeds, starting seeds indoors, transplanting, and caring for your plants in the School Garden Manual.

Tying it Together:

By using newspaper for our pots, we saved natural resources, saved space in the landfill and saved ourselves some money! What other opportunities do we have to reuse everyday items in the garden? (Possible answers include: mulching the pathways with old cardboard boxes, planting in old milk cartons or other containers, etc.) How about in the classroom? (Using the back of paper, poster boards and chart paper before discarding; etc.) How about at home? (refilling and reusing water bottles, bringing lunch to school in a washable, reusable container; etc.)

Digging Deeper:

- Have a recycling competition. Challenge teams of students to make something useful or artistic from a bag full of otherwise disposable garbage.
- Have students create presentations to encourage another class of students to recycle. Have students talk to a school administrator or district staff person about their school's recycling program.

National Standards:

NSES: 5-8: Populations, Resources, and Environments

Recommended Grade Level:
4-5

Season:
Spring

Indoor or Outdoor

The 3 Sisters

Description:

In this activity students explore the foods and customs of Native Americans. They listen to and discuss the Legend of the 3 Sisters. They learn about the way these three crops complement each other in the garden and as a meal. Next, they perform a skit that helps explain why Native Americans planted these three crops together. For homework, the students think about fruits and vegetables that they eat and create their own legend or custom.

Background:

Farmers and gardeners who intercrop, or plant different crops together to the plants' mutual benefit, mimic a natural system. The 3 Sisters (corn, beans and squash) are an example of crops that can be planted together. The corn stalks serve as poles for the beans to climb. The beans harbor nitrogen-fixing microorganisms in their roots that supply nutrients to the soil and make it available to the corn and bean plants. Squash leaves shade the soil, helping to conserve moisture and block the growth of weeds. The spines on the squash leaves also protect the plants from pests.

The three foods also were part of a healthy diet for Native Americans in North and Mesoamerica. The corn is a source of carbohydrates. The beans and corn provide essential amino acids, and the different kinds of squash provide vitamins, including vitamin A.

Materials:

- 3 Sisters Skit reproducible handout
- The Legend of the 3 Sisters (included with this lesson)

Preparation:

1. Make copies of the 3 Sisters Skit reproducible handout for the narrator and each actor. Read through the skit.
2. If possible, do this activity in the school garden. If the garden isn't available, do this activity on a playing field or in the gymnasium. Students will need space to act out their parts.
3. Read through The Legend of the 3 Sisters.

Activity:

1. To begin this activity, read The Legend of the 3 Sisters to students. Engage the students in a discussion of the meaning of the legend. Explain that many Native American tribes believed that three plants — corn, beans and squash — kept them alive. These plants were considered special gifts from the Creator and each crop was protected by one of the 3 Sister Spirits. Native Americans wove legends around the 3 Sisters. For these Native Americans, the sisters were planted together, eaten together and celebrated together. They were never apart.
2. Ask the students to brainstorm a list of customs, celebrations, folktales or legends that they may know that feature a food. If students need help, ask if they have heard the story of The Gingerbread Man or Johnny Appleseed, or if they have attended a harvest celebration or an apple or pumpkin festival.
3. Next, explain to the students that they are going to put on a skit that will help them learn about why Native Americans planted the Three Sisters together. Tell them that you are going to be the narrator and that there are two acts. Each act requires nine actors. Ask for volunteers to act out the parts as you narrate.

Act One actors:

- 6 volunteers play the corn plants
- 2 volunteers play the raccoons, and
- 1 volunteer plays the farmer.

Act Two actors:

- 2 volunteers play corn plants,
- 2 volunteers play squash plants,
- 2 volunteers play bean plants,
- 2 volunteers play raccoons, and
- 1 volunteer plays the farmer.

4. Give each of the actors a copy of the skit.
5. Assist the volunteer actors in performing the skit for the rest of the class.

Tying it Together:

How did the 3 Sisters help each other? What happened when the farmer only planted one crop? Which farm had more diversity? Which was healthier? Just like in our human communities, diversity in a garden community can help keep plants healthy.

Think about what you have learned about the 3 Sisters. What evidence do you have that they were important to Native American tribes? Discuss the importance of food in our lives. Food does more than nourish our bodies. It also carries messages about our relationships with one another and to life.

Digging Deeper:

- For homework, have the students choose a food (fruit or vegetable) that is important to their lives. Challenge students to think of food as a form of communication — a kind of language that carries a message. It can be a link between generations, a family recipe. It can be a way of remembering, like pan de muerto for Day of the Dead celebrations. Ask them to write a folktale, write about a family recipe or tradition related to food, or describe or create a festival that celebrates the food that is important to them. Have the students share their work with the class.

National Standards:

NCTE: Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

NSES: K-4: Organisms and their Environment

NCSS: Culture: Human beings create, learn, share and adapt to culture; People, Places, and Environment: The study of people, places and environments enables us to understand the relationship between human populations and the physical world.

Literature Connection:

In the 3 Sisters Garden: Native American Stories and Seasonal Activities for the Curious Child by Joann Dennee

While these books are written for younger children, they provide examples of food represented in folklore.
Johnny Appleseed by Steven Kellogg
The Gingerbread Man by Jim Aylesworth, illustrated by Barbara McClintock
Paul Bunyan 20th Anniversary Edition by Steven Kellogg

The Legend of the 3 Sisters

(an adaptation of an oral account compiled by students at Centennial College and found in "Indian Legends of Eastern Canada.")

Long, long ago there were 3 sisters who lived together in a field. These sisters were very different from one another. They were different sizes and they wore very different kinds of clothing. The little sister was so young that at first, all she could do was crawl. She was dressed in green clothes. The second sister wore a bright yellow dress. When the sun shone, she would run off by herself. Standing alone, she could feel the soft wind blowing on her face. The third, and eldest, sister always stood very straight and very tall above her other two sisters. She tried to protect them. She wore a pale green shawl and she had long, yellow hair that tossed about her head in the breeze. Although they were very different, the three sisters also were alike. They loved each other and always stayed together. This made them very strong.

Then, one day a stranger visited the 3 Sisters' field. He was a Mohawk boy. The sisters watched as the boy talked to the bird and other animals. Late that summer, the first sister, the youngest and smallest, disappeared. Her other two sisters were very sad.

The Mohawk boy visited the field again and gathered reeds at the water's edge. The two remaining sisters watched the trail his moccasins left. Later that night, the second sister, the one in the yellow dress, disappeared. Now, there was just one sister left ... the eldest one. She continued to stand tall in her field, but she was very sad. She missed her sisters. When the Mohawk boy saw how lonely she was, he brought them all back together again. Reunited, they became stronger, together again.

3 Sisters Skit

Setting: a large open field, surrounded by woods.

Act One

Players: 9 students: 6 corn plants; 2 raccoons; 1 farmer

Narrator: One day, Farmer Lauren decided to plant a whole garden of corn. She planted six corn seeds.

[Action: Farmer enters the stage and plants the seeds. Corn plants enter the stage and curl up like seeds.]

Narrator: Over time, the corn seeds felt the soil above them getting warm in the sun. The farmer watered the soil, which soaked through and made the corn seeds start to swell. Eventually, the seeds began to grow.

[Action: The farmer waters the garden. Corn seeds soak up the water and begin to swell. Slowly, they poke through the soil and begin to grow.]

Narrator: In the warm sun, the corn seedlings grew taller and taller. Weeks later, they began to grow ears. The corn was almost ready for Farmer Lauren to pick. But then, one night, two raccoons crept into the garden.

[Action: The corn continues to grow. Small ears form. Raccoons creep into the garden and sniff around.]

Raccoon 1: Oh boy, look! Here's some corn.
Raccoon 2: I love corn! Let's eat all these corn plants!

[Action: The raccoons pretend to eat the corn. The corn plants fall down dramatically and die.]

Narrator: The next day, Farmer Lauren goes out into her garden and sees what the raccoons have done.
Farmer Lauren: Oh no! Those pesky raccoons ate all my corn. Winter is just about here and I won't have any corn to store. I worked so hard! Those raccoons had plenty to eat, but now I won't have anything.

End of Act One

Act Two

Players: 9 students: 2 corn plants; 2 squash plants; 2 bean plants; 2 raccoons; and 1 farmer.

Narrator: Farmer Lauren woke up hungry! All her corn had been eaten. She decided she would plant something again. But this time, she knew she had to figure out a way to keep the raccoons from eating her crop. She had read about a 3 Sisters garden, where all the plants helped each other grow. She decided to give it a try. So, Farmer Lauren planted two corn seeds. Next, she planted bean seeds right next to the corn and squash seeds around the corn and beans.

Action: [Corn, beans and squash enter and curl up. This represents the seed stage. Farmer Lauren waters the field.]

Narrator: Farmer Lauren watered the field. The heat from the sun began to warm the soil. After about a week, the seeds began to germinate.

[Action: Corn plants begin to grow — they get up to their knees.]

Narrator: The beans were weak. They needed support to grow tall. They held on to the corn.

[Action: Corn plants stand and put their arms up over their heads. The bean plants hold onto the corn plants' arms for support.]

Narrator: The ground-covering squash plants spread out.

Action: [The squash plants grow, spreading out their arms and legs, low to the ground.]

Narrator: All of the plants began producing. There were ears of corn, squash and beans. About this time, the hungry raccoons returned to Farmer Lauren's garden. They saw that there was a lot of food. They decided to go get some.

[Action: The raccoons enter the stage on all fours. They head for the 3 Sisters garden plot. When the raccoons get to the squash plants, they stop and squeal. The squash is prickly and pokes the raccoons (gently!).]

Raccoon 1: Ouch, ouch, ouch! Something is sticking into me!

Raccoon 2: Ouch, ouch! Me, too! I can't get to those ears of corn or the beans. What shall we do? It looks so good.

Raccoon 1: Ouch! This squash is very prickly. It hurts! We can't get to the beans and corn because of this squash. It hurts to grab it, so we can't pull it out!

Raccoon 2: Let's go. I've had enough!

Narrator: And so it was that the squash protected the beans and corn. The beans gave an invisible gift to the corn and squash. Does anyone remember what special invisible gift the beans provide for other plants in the soil?

[Action: Narrator calls on volunteers from the audience to answer.]

Narrator: That's right! Nitrogen! The beans used the corn as a ladder and climbed up. And together, the 3 Sisters provided lots of food for Farmer Lauren and her family.

The End

Recommended Grade Level:
4-5

Season:
Spring

Outdoor

Planting a 3 Sisters Bed

Description:

In the spring, students apply what they have learned about the three sisters as they design and plant a Native American garden as a gift to the next year's incoming class. In the fall, incoming students harvest and make measurements of the crops' yields.

Background:

It is best to lead your students through the 3 Sisters lesson (page 45) before engaging them in this planting lesson. This lesson involves planting crops in the spring for harvest in the fall. If your school has a long summer vacation, then work with students to develop a summer maintenance plan for the garden. Invite students' families to sign up and take care of the garden over the summer. In this way, students can share their knowledge with family members. Consider inviting community members to get involved, too.

Note: Depending upon the amount of available garden space, your class may plant one Native American garden plot or several.

Materials:

- Native American Garden Plot template (included with this lesson)
- 1 packet popcorn seeds – We use popcorn because fresh eating corn has to be harvested soon after it ripens, whereas popcorn can dry in the field, like winter squash and shelling beans, for harvest any time in the fall.
- 1 packet winter squash seeds
- 1 packet shelling bean seeds
- 1 garden bed, prepared for planting
- Garden tools
- Ruler for each student group
- Watering hose
- Class journal
- (Optional) compass

Preparation:

1. Prepare a 4' garden bed for planting. (See School Garden Manual for more information.) You may wish to have students help you.
2. Arrange for adult volunteers or older students to help in the garden.
3. Make a class journal. It can be as simple as sheets of lined paper stapled together, or something more substantial, like a student composition book.

Activity:

1. Encourage students to share what they have learned about the ways in which the "3 Sisters" help each other.
2. Tell students that they are going to plant a 3 Sisters garden to pass on to next year's class. They will plant the seeds now for incoming students to harvest in the fall. They also will pass on a class journal that tells the incoming students about this project.
3. Encourage students to share their knowledge of what plants need to grow. Hand out the Native American Garden Plot template and stimulate discussion by asking questions. *In what kind of soil do our crops grow best? How far apart should we plant our seeds? How often do they need to be watered? How much sunlight do they need?*
4. Take the class to the garden to plant the seeds. Be sure to take along the Native American Garden Plot template. Have students work in small groups.
5. Review seed planting depths and spacing with students. Have the student groups share rulers and trowels to space and plant the seeds.
6. Water the beds after planting. Return to the classroom.
7. Ask students what information they would like to include in the class journal that they will pass on. *What scientific information can we include in our journal? How can we pass on information about plant growth? What ideas do you have for sharing the legend of the 3 Sisters?* Develop a plan for creating the journal. You may find it helpful to create teams: scientists who keep a record of observations, writers who tell the legend of the 3 Sisters, artists who illustrate the journal and so forth.

NOTE: You can find detailed information on preparing a garden bed, planting seeds, caring for plants and harvesting in the School Garden Manual.

Tying it Together:

As a class, discuss student ideas for taking care of the garden over the summer. Record students' ideas on the board. Using these ideas, have students write a class plan for summer garden maintenance. Be sure students consider moisture and weed control. *Do you think intercropping will help with summer maintenance?* Have students explain their answers.

Digging Deeper:

1. Ask students to research other companion planting schemes. Set up an experiment with students to see if intercropped beds produce more or healthier crops than single-cropped beds. Consider growing carrots with peas, lettuce with red cabbage and radishes, cantaloupes with lettuce or chives, and cauliflower with broccoli with aromatic herbs.
2. Have students research whether Native Americans in your area grew corn, beans, and squash or pumpkins.

National Standards:

NSES: K-4: The Characteristics of Organisms; Organisms and their Environments

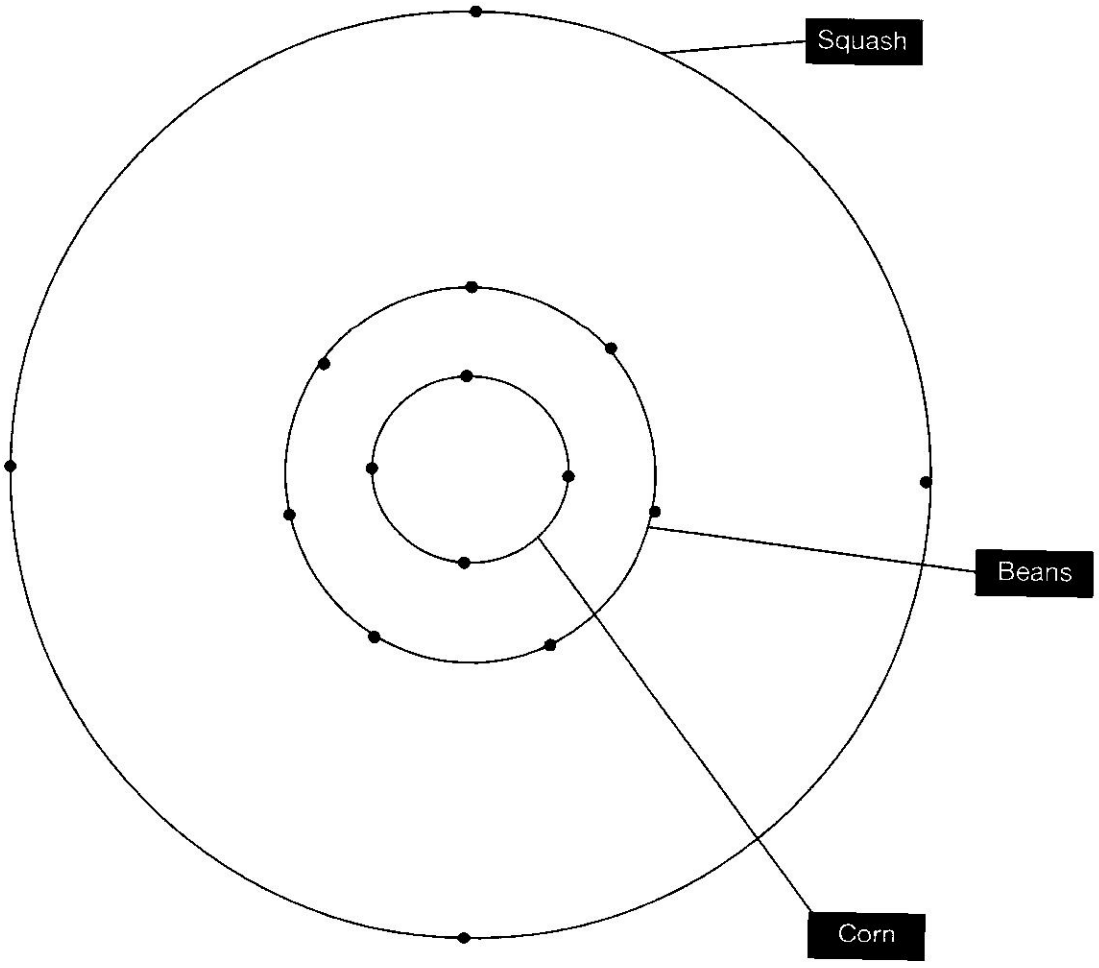
NCSS: People, Places, and Environment: The study of people, places and environments enables us to understand the relationship between human populations and the physical world.

Literature Connection:

In the 3 Sisters Garden: Native American Stories and Seasonal Activities for the Curious Child
by Joann Dennee

Native American Garden Plot

1. Mark off a plot for your 3 Sisters garden. Prepare the garden bed. Build a mound of soil about 1' high and 2' in diameter.
2. Flatten the top of the mound. Plant four corn seeds in the center of the mound, about 4 inches apart. Explain that some Native Americans planted the seeds to the north, south, east and west as a way of honoring the Four Directions. Use a compass if you wish to follow this tradition.
3. Water the seeds each day until the seedlings emerge. Once the corn plants are about 4" tall, plant the bean seeds in a circle around the corn, about 4" apart and 6" from the corn.
4. Plant 4 squash seeds around the other edge of the mound, about a foot away from the bean seeds.
5. Water the plants and watch them grow together.



Recommended Grade Level:
4-5

Season:
Fall

Outdoor

Cover Cropping

Description:

In this lesson, students discuss ways that farmers replenish nutrients in the soil. They learn about the ability of bell bean plants to capture nitrogen from the air and sequester it in the soil. Finally, they clear out a garden bed and plant bell beans.

Background:

Planting cover crops is an all-natural way to return nutrients to the soil at the end of a growing season. Cover crops are plants that sequester nutrients in the soil naturally as they grow — a sort of living manure or compost. Bell beans (also known as fava or horse beans) are a great example. Bell bean plants are high in nitrogen, in part because they form a symbiotic relationship with a bacteria that you can find growing in nodules on the plants' roots. In a process called nitrogen fixation, these bacteria convert nitrogen gas from the atmosphere into a mineral nitrogen that is available to plants.

Materials:

- A garden bed ready to be cleared out
- ¼ pound bell beans
- Hand trowels for all students
- A rake
- *Optional: Gardening gloves for all students*

Preparation:

None

Activity:

1. Explain how nutrients cycle in a garden: *As you probably know, when we eat fruits and vegetables from the garden, we are taking in nutrients. That's why fruits and vegetables are so nutritious. But this also means that when we harvest produce from the garden, we are removing nutrients. In order to keep the garden growing year after year, it is important to put nutrients back into the soil.*
2. Ask students: *Does anyone know how farmers replenish nutrients in their soils? (possible answers include adding chemical fertilizers, compost, manure and cover crops).* Tell students that today they are going to clear out spent plants from the garden and sow cover crop in order to feed the soil for the next growing season.

3. Head out to the garden and review tool rules (see School Gardening Manual for more details).
4. Gather around one or two garden beds, pull out all spent plants, and prepare the bed for planting (see School Gardening Manual for more details).
5. Give each student a handful of bell beans to broadcast over the soil. Broadcasting simply means scattering somewhat evenly. Bell beans should be roughly 6 inches apart. Demonstrate and then have students do the same. Continue until the entire bed is covered with beans.
6. Have students push the seeds into the soil with their fingers to a depth of about 1 inch. Cover all of the seeds with soil.
7. Water the bed until evenly moist to a depth of 1 inch or more.
8. Keep the beans watered and watch them grow. Once they begin to produce their first bean pods, it's time to cut the plants down. Cut each one at the base and add to compost pile.
9. Allow the roots to decompose in the bed for a week or two, and then you are ready to prepare and plant the bed anew. Your bed should now have plenty of nitrogen for your new plants.

Tying it Together:

When you plant your bed again, ask students to remember back to when they planted the cover crops. *What did those bell beans do for our soil? (added nitrogen; also protected the soil from weeds and erosion).* If another class is now planting that bed, have them write a thank-you card to the group that sowed the cover crop.

Digging Deeper:

- Plant different cover crops in different garden beds. Fava beans, clover, vetch and rye are all examples. Use a soil test kit before and after to measure the changes in nutrient levels in each bed.
- Soak some bell beans overnight. The next day, have students split them in half and look for the baby plant inside.
- If you have a lot of space, plant a bell bean maze. Simply plant bell beans over an area large enough to take a walk through. When the plants are about a foot tall, map out a maze or labyrinth with string. Then dig out the plants in the walkways. Allow the other plants to grow until they are more than head high to make a maze or labyrinth.

National Standards:

NSES: K-4: Life Cycles of Organisms; Properties of Earth Materials

NSES: 5-8: Populations, Resources, and Environments

Recommended Grade Level:
K-2

Season:
Summer/Fall

Outdoor

Tops and Bottoms Scavenger Hunt

Description:

This lesson introduces students to vegetables that grow underground and above ground. It begins with a whole class reading of *Tops and Bottoms*. Next, the class goes out into the garden to search for examples of tops and bottoms. They use position words to describe the plants' location.

Background:

With this activity, students become more familiar with the plants that grow in your school garden. They discover which vegetables are "tops" and which are "bottoms." After they find a top or bottom, they describe where they found it, using position words such as on, under, above, up, over, down, behind, below, top, bottom, in front of, next to, beside, far, near. This is a great way to explore simple spatial relationships.

Make sure students understand they are not to collect the tops and bottoms, just check them off the list.

Materials:

- Large sheet of poster board
- Marker
- Scavenger Hunt Cards reproducible handout
- Glue
- *Tops and Bottoms* by Janet Stevens
- Art materials
- *Optional: Examples of turnips, beets, carrots, celery, lettuce, broccoli*

Preparation:

1. If possible, bring in examples of the tops and bottoms mentioned in Janet Stevens' book, *Tops and Bottoms*. Have at least three tops and three bottoms (Tops include broccoli, lettuce, celery, corn and tomato. Bottoms include carrot, radish, turnip and beet.)
2. Use a marker to divide the poster board into eight equal sections.
3. Make 1 copy of the Scavenger Hunt Cards reproducible handout and cut out each card along the dotted line.

4. Glue a Scavenger Hunt Card in each of 6 sections on the poster board.
5. Label the two remaining sections "other top" and "other bottom."

Activity:

1. Read and discuss *Tops and Bottoms*.
2. Discuss. *How did Rabbit trick Bear the first time? What bottoms did Rabbit grow in the garden?* Hold up the poster board and invite a student to show the class the plants that Rabbit grew the first year. *What did Bear say when Rabbit had all the food? What did Rabbit say he would do the next year? Did Rabbit trick Bear again? Did Bear get the tops or the bottoms? Why do you think he wanted the bottoms? What plants did Rabbit grow the second year?* Invite a student to point out all the tops that Rabbit grew.
3. (Optional) If you brought in examples of tops and bottoms, invite students to look at them. *What do you observe about the bottoms? Do the tops and bottoms look alike? Have you ever eaten any tops or bottoms?*
4. Invite students to go on a tops and bottoms scavenger hunt in the garden. Bring along the poster board.
5. When you are in the garden, invite students to look at the poster board. Tell them that they are going to search in the garden to find matching items. Before they begin, make sure students understand they are not to collect the tops and bottoms. Tell them just to report back to you when they find the plants. Encourage students to talk about the plants and to use position words to describe where they found them (on, under, above and up). Record their observations by each plant. If the plant they describe is not one of the cards, ask them whether it is a top or bottom. Record the information in the "other top" or "other bottom" section.

Tying it Together:

Return to the classroom. Have them draw a picture of one of the plants they found and dictate a sentence that describes where they found it. Be sure they use a position word in their description.

Digging Deeper:

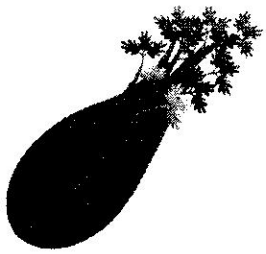
- Students brainstorm a list of tops and bottoms based on what they have learned. Over a week, they chart the number of tops and bottoms that they eat. At the end of the week, they tally the results and find out whether they ate more tops or bottoms.
- Plant a "tops and bottoms" garden bed. Have students create illustrated labels for each row of plants.

National Standards:

NCTM: Pre-K-2: Geometry: Specify locations and describe spatial relationships using coordinate geometry and other representational systems.

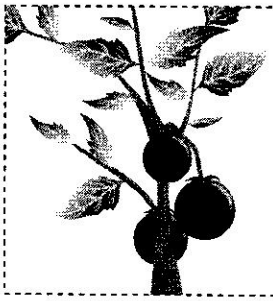
Literature Connection:

Tops and Bottoms by Janet Stevens



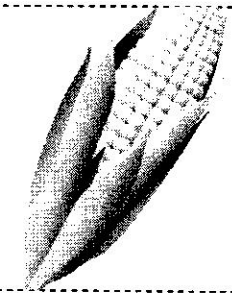
Celery

Beet



Tomato

Turnip



Corn

Radish

Recommended Grade Level:
K-2

Season:
Spring or, in mild climates, Fall

Indoor or Outdoor

Pondering Plants

Description:

In this activity, students plant seeds, observe the growth and record what they observe.

Background:

Children delight in watching the transformation of a seed to a green shoot pushing its way out of the soil. You can find detailed information on starting seeds in the School Garden Manual. For this activity, use large seeds, such as lima beans or peas.

You may find you have the most success by starting with seedlings, or baby plants. In this case, either start them yourself a few weeks before this activity, or buy them at your local nursery.

Materials:

For the teacher:

- Making Root View Cups instructions (included with this lesson)
- Nail
- Potting soil mix
- Several spray bottles full of water for students to share

For each pair of students:

- 1-2 spoons
- 2 seeds (lima beans or peas)
- 2 root-view cups or 2 3-inch planters from a nursery
- 2 labels or 2 strips of masking tape
- Art supplies: paper, markers, crayons
- Sheet to record ideas and graph paper to graph the growth

Preparation:

1. Use the Making Root View Cups instructions and make one root view cup for each student. Or, purchase 3-inch dark planters from a nursery.
2. Prepare the cups by carefully poking a hole in the bottom using the nail and filling them with seed starting mix.

Activity:

1. Introduce this activity by brainstorming what students already know about how plants grow. *What is a seed? What does it need to grow? How do you plant a seed? How does it change after it has been planted?* Make a KWL chart, listing what they know, want to know, and — after the lesson — what they have learned about how plants grow.
2. Tell students that they are going to be scientists. Explain that scientists observe things to find answers to their questions. They record their observations. Tell students that they, too, will be watching and recording in this activity.
3. Have students work in pairs. Distribute the cups to each pair. Have students write their initials on the tape and put it on their cups.
4. Plant the seeds. Demonstrate how deep to plant the seeds. The rule of thumb is to plant the seed at a depth that is twice the seed's diameter. Use the spray bottle to mist the soil. It should be wet, but not soaked. Place the seeds in a well-lighted area where they can be observed.
5. Engage students in a discussion. What do you think will happen to the seeds in the cups? Record students' predictions on the board.
6. Have students gather data every few days. Tell them to draw or describe the plant's growth. Remember to revisit students' predictions.

Tying it Together:

Ask pairs to reflect on their experience. What do you think will happen to your seeds? What do you think the seeds need to grow? What can we do for the plants to help them grow?

Digging Deeper:

- Describe and illustrate the life cycle of a bean plant.
- Create a bulletin board display of the life cycle of a garden plant.

National Standards:

NSES: K-4: Employ Simple Equipment and Tools to Gather Data and Extend the Senses;
The Characteristics of Organisms

Making Root View Cups

Materials:

- 1 clear plastic drinking cup to serve as a template
- 1 clear plastic drinking cup for each student
- Nail
- Black construction paper
- Scissors

What to Do:

1. To make the paper sleeve template, cut straight down one side of a cup. Next, cut off the bottom of the cup and the top rim. This will give you a curved shape that you can lay flat and trace onto construction paper. Trace the shape onto the black construction paper, adding a little extra onto the end. You will be wrapping this piece of construction paper around the cup and the ends need to overlap. This paper will keep the light out.
2. Take one cup and use the nail to poke a hole in the bottom. This will be your root view cup.
3. Wrap the paper around the cup. You now have a root view cup!
4. Fill the cup with seed-starting mix.

Recommended Grade Level:
3-5

Season:
Any

Indoor or Outdoor

The 6 Plant Parts

Description:

Students use clues to identify each of the six plant parts (roots, stems, leaves, flowers, fruits and seeds) during a presentation in which one student volunteer is dressed up, part by part, in a plant costume. As each new part is added, students are introduced to the function of that plant part, and then they share edible examples.

Background:

In culinary terms, we define sweet crops as fruits and less sweet ones as vegetables. In botanical terms, however, the word fruit has another definition: It is the part of the plant that contains the seeds. This means that, botanically speaking, cucumbers, zucchinis, green beans and tomatoes are all fruits. Just as you can have a root vegetable, such as a carrot, you can also have a fruit vegetable, such as a zucchini or a green bean.

Materials:

- One plant part costume, which includes:
  - 1 green sheet, large coat or robe
  - 1 old mop head or ball of brown yarn
  - 1 headband
  - All of the pieces of the Costume Template (provided in this lesson) cut out of colorful cardstock and made into a costume.
- *Optional: "Singing in Our Garden" CD by the Banana Slug String Band*

Preparation:

1. Have a student or parent volunteer create the Plant Part Costume by cutting out all of the template pieces from colorful paper and following the directions on each sheet.

Activity:

1. Ask for one volunteer who will get dressed up as a plant. Bring the volunteer to the front of the class.

2. Give the students clues about the first plant part you will place on your volunteer. *I'm going to start by adding the part of the plant that grows underground. This plant part soaks up water and nutrients from the soil and holds the plant in place when the wind blows.* Use your hands to wave your plant from left to right. *Raise your hand if you think you know which plant part I'm talking about.* Call on a volunteer to answer: *Roots!*
3. Place the old mop head or brown yarn messily on the feet of your volunteer. These are the plant's roots.
4. Now brainstorm some edible roots. *Now we know what the roots do for the plant. But roots are good for us too. Who can think of a root that we eat? (Carrots, radishes, beets, etc.)* Call on volunteers to share answers.
5. Continue in this fashion for each plant part, giving students clues until they guess the part, then adding that piece of the costume on your volunteer, and finally brainstorming examples that we eat. Make sure to emphasize the following functions for each plant part:

Plant Part	Function	Edible Examples
Roots (Mop head or yarn)	Hold the plant in place; Gather water and nutrients from the soil	Carrots, beets, radishes
Stem (green robe)	"The elevator of the plant;" carries water up from the roots and sugar down from the leaves	Asparagus, broccoli stems, sugar cane
Leaves (cardstock cut-outs, one for each hand)	Collect sunlight and carbon dioxide and turn it into sugar and oxygen	Lettuce, kale, chard, spinach
Flower (Headband decorated with cardstock petals)	Attract pollinators and spread pollen for reproduction	Broccoli, cauliflower, nasturtiums
Fruits (Cardstock cut-outs on a necklace)	Protect and carry the seeds safely to their destination (often in the belly of an animal!)	Apples, oranges, tomatoes, cucumbers, squash, green beans, peppers
Seeds (Cardstock cut-outs on a necklace)	Hold baby plants for the next growing season	Sunflower seeds, rice, wheat, beans

Tying it Together:

Once your volunteer is all dressed up, thank him or her with a round of applause. In an optional, musical extension, you can use your CD to teach your class "Roots, Stems, Leaves" by the Banana Slug String Band. You can turn this into Plant Part Aerobics, similar to "Heads, shoulders, knees and toes," by having students create a movement for each plant part (i.e., touch their toes when they say roots) whenever it is mentioned in the song. Sing it slowly at first and then speed up as students become adept with the movements.

Digging Deeper:

- Ask the students to look in their refrigerators and pantries at home for examples of each plant part. Have them share results the following day in class.

National Standards:

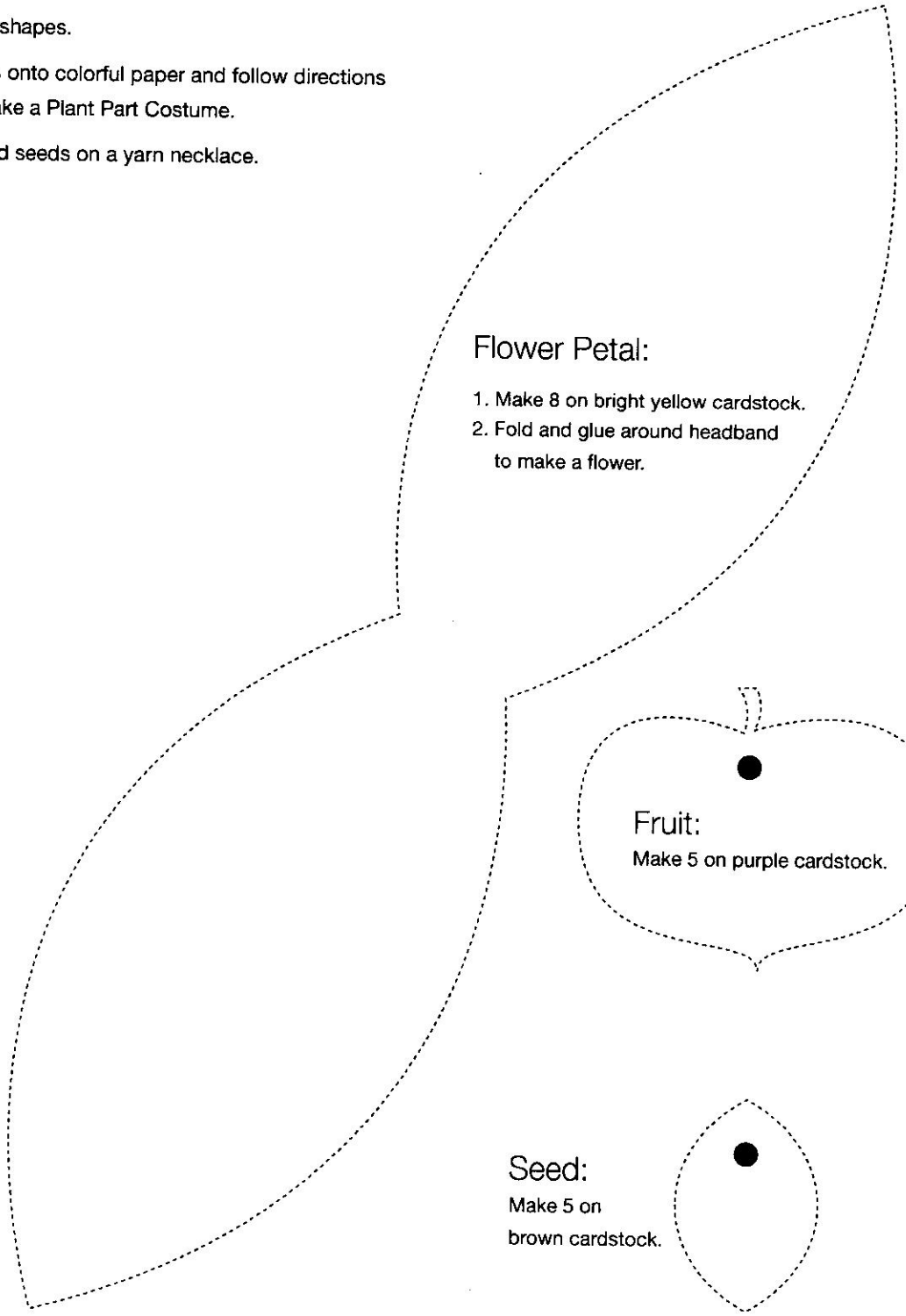
NSES: K-4: The Characteristics of Organisms

NSES: 5-8: Personal Health: Food provides energy and nutrients for growth and development.

NSES: 5-8: Structure and Function in Living Systems

Flower Costume Template:

1. Cut out these shapes.
2. Trace cut-outs onto colorful paper and follow directions for each to make a Plant Part Costume.
3. Hang fruits and seeds on a yarn necklace.



Flower Petal:

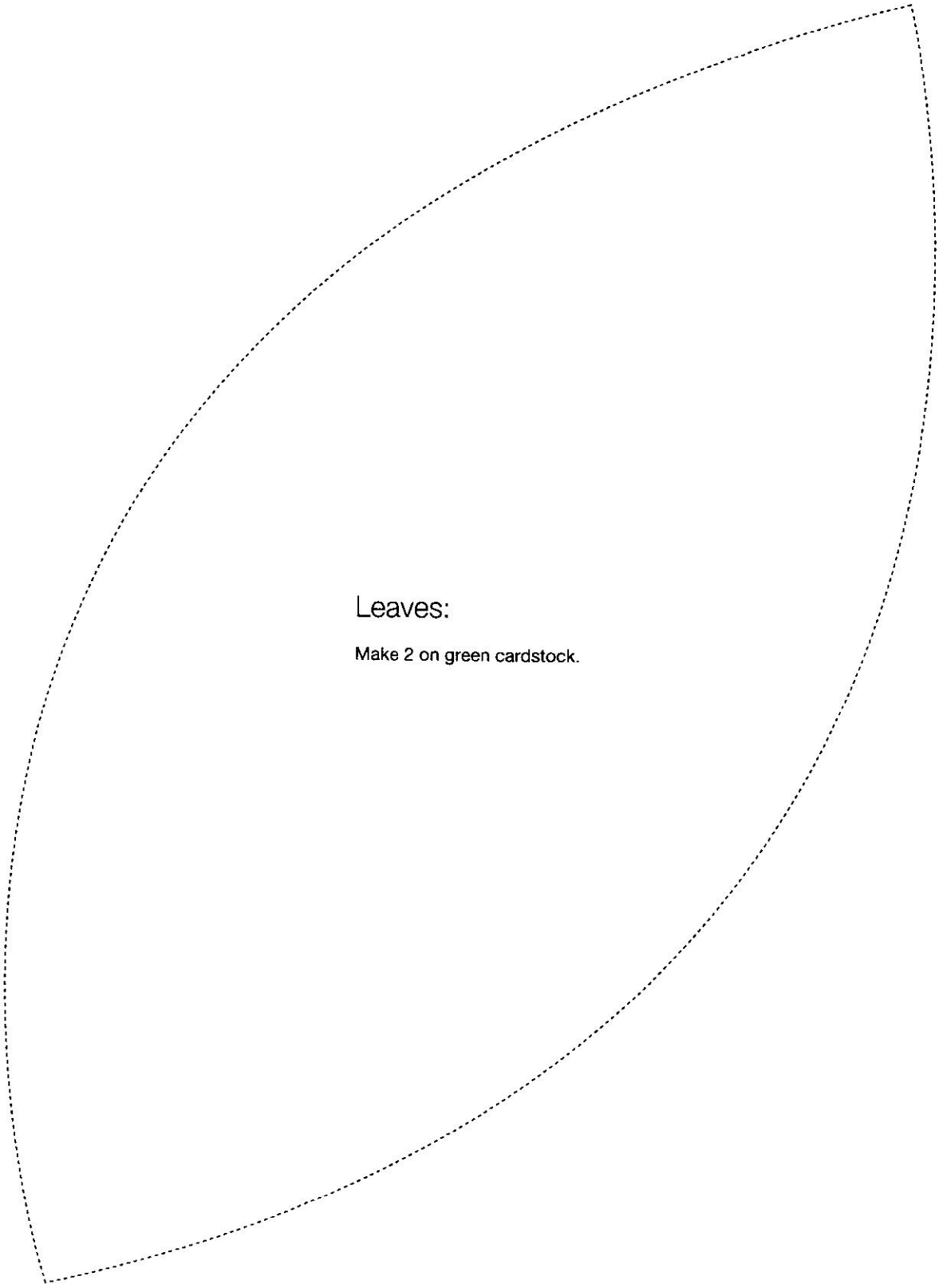
1. Make 8 on bright yellow cardstock.
2. Fold and glue around headband to make a flower.

Fruit:

Make 5 on purple cardstock.

Seed:

Make 5 on brown cardstock.



Leaves:

Make 2 on green cardstock.

Recommended Grade Level:
3-5

Season:
Fall

Outdoor, then Indoor

The 6 Plant Parts Salad Bar

Description:

Students review what they have learned about plant parts. Next, students prepare a Plant Parts Salad Bar. Students design labels for each plant part and include a brief description of the function of each plant part.

Background:

See Six Plant Parts lesson for background information.

Materials:

- 5 large bowls or colanders
- 5 cutting boards
- 5 knives (review knife safety in the School Garden Manual)
- 1 cup each of edible roots, stems, flowers, fruits and seeds (see 6 Plant Parts lesson for examples)
- 2 large heads of lettuce
- 1 jar of low-fat or fat-free salad dressing
- 1 plate and fork for each student
- Clean-up supplies (sink, dish soap, sponge, towels)

Preparation:

1. Take a walk around your school garden and note which plant parts you have ready to harvest. Refer to the 6 Plant Parts Lesson for examples. If you're missing anything, supplement with produce from a farmers' market or grocery store.

   NOTE: For seeds, you can just use tomatoes, zucchini, green beans or the like and explain that when students eat that food, they are eating fruits and seeds.

2. Prepare 5 cooking stations, each with a cutting board and a large bowl or colander (you'll hand out

Activity:

1. Demonstrate and review hand washing and safe knife handling with your students. You can find a detailed description of kitchen safety and how to demonstrate it in the School Garden Manual and the Super Green Smoothie lesson.
2. Divide the class into five teams: roots, stems, leaves, flowers and fruits/seeds. Have each team bring their bowl or colander out to the garden and guide them in harvesting their plant part. Demonstrate how to harvest (refer to School Garden Manual for detailed harvesting instructions).
3. Return to your cooking stations and have each team wash their hands and their produce. Monitor to ensure thoroughness.
4. Once teams are at their stations with clean hands and produce, hand out a knife to each group. Have students take turns chopping their vegetables into a size that would work in a salad. Have the Leaf Team wash and tear or chop the lettuce and place in a large bowl. Then lightly dress the salad yourself (you don't need more than a few tablespoons of dressing for the entire salad) and have the Leaf Team toss it.
5. Once all vegetables are prepared, have students clean their cooking materials and then return to their stations to create labels for their dish. Labels should include the name of their plant part, the name of the fruit or vegetable it came from, and a picture illustrating the function of the plant part (e.g., a root holding a plant in the ground or a flower attracting a pollinator).
6. Have students place each of the bowls on one long table with the labels in front.
7. Hand out plates and forks and allow students to build their own 6 Plant Part Salads, adding lettuce onto their plates and topping with pieces of roots, stems, flowers, fruits and seeds from the Salad Bar they have just created.

Tying it Together:

What is your favorite vegetable? What plant part is it? What is your favorite root, stem, leaf, flower, fruit and seed?

Digging Deeper:

- Have students describe a recent meal in terms of plant parts. For example, a peanut butter and jelly sandwich would be ground-up seeds (peanut butter), crushed fruit (jelly), and ground, baked seeds (bread).
- Plant a 6 Plant Parts Bed (see Planting the 6 Plant Parts lesson)

National Standards:

NSES: K-4: The Characteristics of Organisms

NSES: 5-8: Personal Health

NSES: 5-8: Structure and Function in Living Systems

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

Recommended Grade Level:
3-5

Season:
Any

Indoor

Plant Part Data Crunch

Description:

In this two-part lesson, students collect and tally real-world data about the number of plant parts they eat. Part 1 uses data that students recall from the day before. They practice categorizing fruits and vegetables into the appropriate plant parts. Then they tally and graph class results. In Part 2, students make mini-books. For homework each night for five days, students record their plant part consumption. They tally the daily results in class. At the end of the five days, they graph the class results and pose questions about the data that can be answered from the graphs.

Background:

While it may seem obvious that fruit and vegetables help promote good health, most people need to increase the amount they currently eat to get the recommended amount. This lesson will help your students track the amount, and kinds, of fruits and vegetables they eat over a one-week period. By discovering how much they currently eat, they can set goals to increase that amount.

Materials:

- Plant Part Data reproducible handout
- Sample Plant Part Graph (included with this lesson)
- Scissors

Preparation:

1. Make 2-sided copies of the Plant Part Data reproducible handout for each student.
2. If you have not already done so, teach the 6 Plant Parts lesson.
3. Review the sample plant part graph.

Activity: Part 1

1. Remind students that eating whole grains, fruits and vegetables is an important way to stay healthy. Ask students to think about what grains, fruits and vegetables they ate yesterday. Invite them to share what they ate. Keep a list on the board.
2. Engage students in a discussion of plant parts. *What are the six plant parts that we eat?* Assign student pairs to look at the class list of fruits and vegetables and to classify them according to plant part. As they are working, draw a tally chart with several rows on the board.

3. When students have completed their task, invite volunteers to call out the six plant parts. Write each one along the bottom of the tally chart.
4. Read the name of a grain, fruit or vegetable from the class list. Invite student groups to share how they categorized it. If student pairs disagree, engage in a discussion and reach a consensus. Place a tally after the appropriate plant part.
5. When all the items have been listed, ask students how many times each plant part was listed. Record that numeral at the end of the row. *What can we learn from this data? Which plant part received the most mentions? Which received the least? Which two plant parts were eaten the most often? Which two were eaten the least often? How can we graph this data?* Set up a graph similar to the sample graph.

Activity: Part 2

6. Distribute the Plant Part Data mini-book reproducible handout to each student. Assemble the books.
7. Explain that over the next five days, students will use these mini-books to record the plant parts they eat each day. Demonstrate how students will record their data. Point to the "Roots" page. *If I eat two carrots today, where will I record my data?* (Write: Day 1: 2 carrots or ½ cup chopped beets.) If students need more help, repeat with other plant parts. Bring this discussion to a close.
8. Tell students that their goal is to eat more whole grains, fruits and vegetables by the end of the five days than they did at the beginning. *How will we know if you have eaten more whole grains, fruits and vegetables by the end of the five days?*
9. Each day, have students tally their data. Invite volunteers to share how many plant parts they ate. Next, have students determine how many of the plant parts were fruits and how many were vegetables.
10. After five days, have students count their tally marks. Demonstrate how to place a diagonal line across every four tallies to mark the fifth tally. Explain that this way they can quickly count the number of tally marks.

Tying it Together:

1. *How can we display the data?*
2. *How can we use our data to find out which plant part was the class favorite? Which two plant parts were eaten the most often? Which plant part was eaten the least amount?*
3. *Did the class eat more fruits or vegetables?*
4. *Did this tracking exercise help you eat more fruits and vegetables each day?*

Digging Deeper:

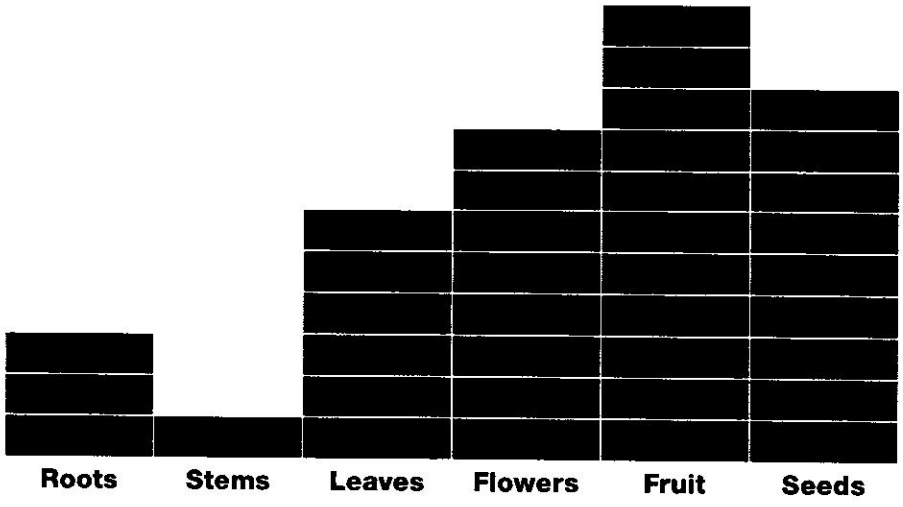
1. Use the results of this activity to encourage students to eat more fruits and vegetables the following week. Have them record the data. Tell students to graph the results for each week and compare the graphs. Engage them in a discussion of what they learned from their data.

National Standards:

NCTM: 3-5: Data Analysis & Probability: Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them.

NSES: K-4: Characteristics of Organisms; 5-8: Structure and Function in Living Systems

Sample Plant Part Graph



Flowers

Leaves

[Back Cover]

[Cover]

Plant Part **Data**

Name _____

Stems

Fruit

Roots

Seeds

Recommended Grade Level:
K-1

Season:
Any

Indoor

ABC Fruit and Vegetable Matching Game

Description:

In this lesson, students play a memory game. They practice what they know about the alphabet and identify different kinds of fruits and vegetables.

Background:

This lesson uses a game of concentration to give children an opportunity to learn, or review, the names of some fruits and vegetables. At the same time, students practice the alphabet letters and sounds. Research has shown that children learn the alphabet letters and sounds more successfully if they are associated with a picture or image. We also know that the more letters children know, the more quickly they learn to read words.

If possible, invite other adults to help you with this lesson, especially if you have students work in small groups. With an adult working with each group, the adult can say the letter out loud, point to the image, and say the name of the food item. If you don't have volunteers to help, consider reading the cards with the class before they begin to play concentration.

Materials:

- Fruit and Vegetable Cards reproducible handout
- Scissors

Preparation:

1. Copy the Fruit and Vegetable Cards reproducible handout onto card stock. If you plan to do this as a whole class activity, you will need two copies of the cards. If you want students to work in groups, each group will need two copies of the cards.
2. Cut out the cards along the dotted lines. Laminate the cards to make them last longer (optional).
3. Make sure you have a large, flat surface for students to play this game.

Activity:

1. Ask students if they have ever played Concentration (also known as Memory). If students are not familiar with the game, demonstrate how to play it.

2. Tell students that they are going to play a game of Concentration. They will try to match two cards. The cards have a letter of the alphabet, a picture of a fruit or vegetable that begins with that letter, and the name of the fruit or vegetable.
3. Divide the class into several small groups. Give each group a set of the cards. Put the cards face down.
4. Have students take turns turning over two cards at a time. If the cards match, have the student say the letter out loud. Challenge them to identify the fruit or vegetable on the cards. Have them say the name out loud. Then the student puts the matched pair aside and takes another turn. If the student does not make a match, turn the cards back over. Repeat this process until all of the cards have matching pairs.
5. When all of the cards have been matched, the game is over. The students count up the number of cards they have. The one with the most cards is the winner.

Tying it Together:

Did you learn the names of any new fruits or vegetables? What letter does it begin with?

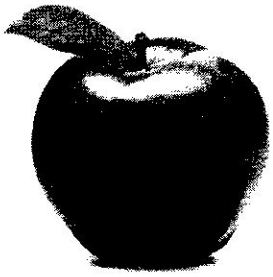
Digging Deeper:

- Take an alphabet walk around the school or neighborhood. Look for letters that you have been studying. You can also have children identify objects that start with specific letters that the children have recently learned.
- Start a letter chart where children can put pictures they find that begin with the featured letter.

National Standards:

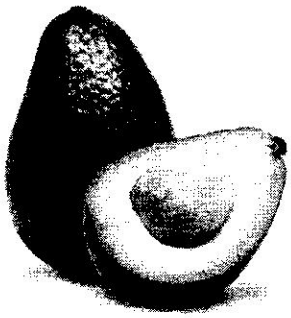
NCTE: Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).

A a



apple

A a



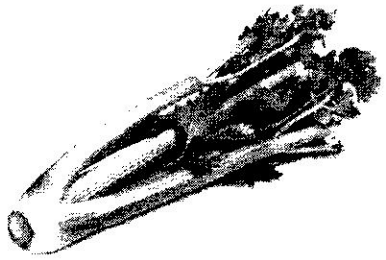
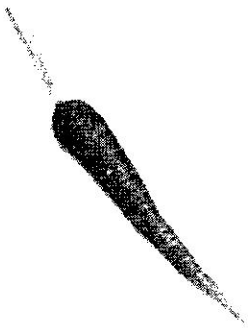
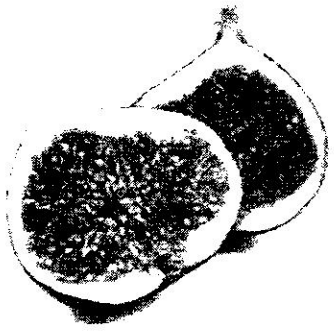
avocado

B b

banana

B b

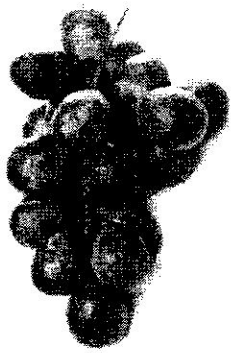
beans

C c  celery	C c  carrot
F f  fennel	F f  fig

G g

garlic

G g

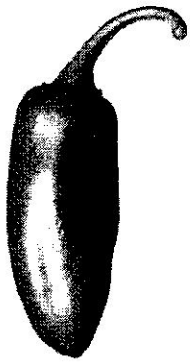


grapes

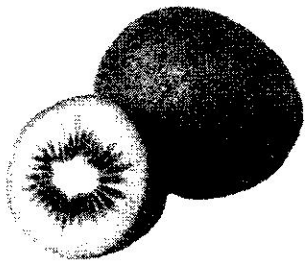
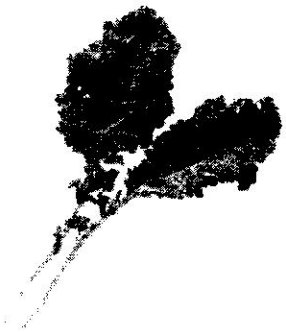
J j

jicama

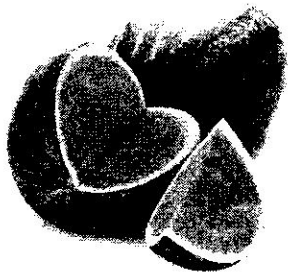
J j



jalapeño

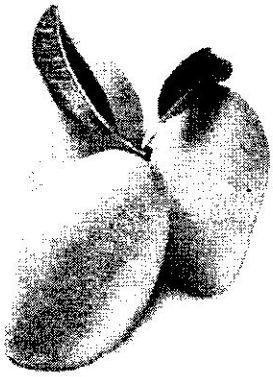
K k  kiwi	K k  kale
L l  lettuce	L l  lime

M m



melon

M m

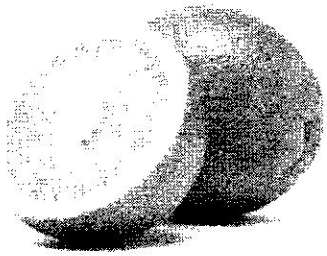


mango

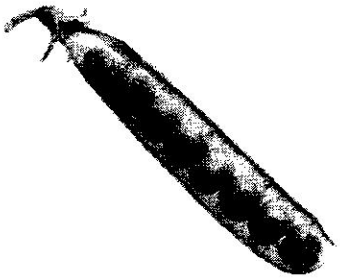
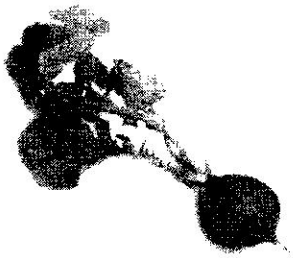
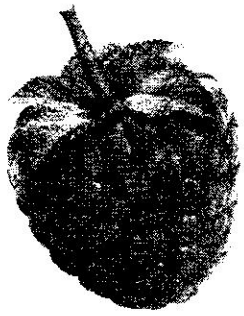
O o

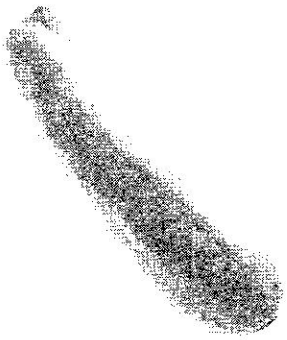
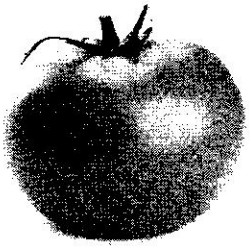
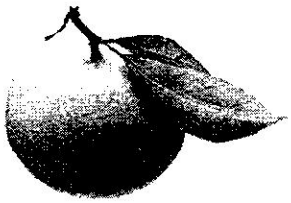
onion

O o



orange

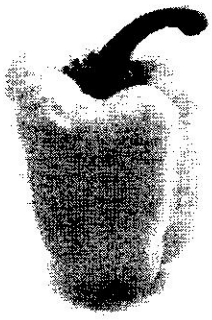
P p  pea	P p  papaya
R r  radish	R r  raspberry

S s  squash	S s  starfruit
T t  tomato	T t  tangerine

Y y

yams

Y y



yellow pepper

Recommended Grade Level:

Recommended: 1-3; can be adapted for 4-5

Season:

Any

Indoor

ABC Fruit and Vegetable Book

Description:

This alphabet activity helps students learn about fruits and vegetables from A-Z. Students make a classroom A-Z fruit and vegetable "book." Each day, students report which "letters" they ate and record it in the book under the appropriate letter.

Background:

This lesson offers an opportunity for students to develop their understanding of the alphabet at the same time that they learn the names of fruits and vegetables and are challenged to eat from A-Z in one week. This lesson can be adapted for use in grades 4-5. See suggestion in Digging Deeper, at the end of this lesson.

Materials:

- A-Z Fruit and Vegetable Chart (included with this lesson)
- 15 sheets of chart paper
- Markers
- Student Data Collection Sheet reproducible handout
- Illustrated seed catalogs, old magazines, clip art
- (Optional) drawing paper, markers, crayons or colored pencils
- Scissors
- Glue/tape
- Stapler
- Sample A-Z book page (included with this lesson)
- Sample Our Class Data chart (included with this lesson)
- 13 small pieces of paper
- Container or hat

Preparation:

1. Make enough copies of the Student Data Collection Sheet for each student to have one copy.
2. Use a piece of chart paper to make an Our Class Data chart. Follow the sample included with this lesson.

3. Cut out examples of the various fruits and vegetables from A-Z (you can use the vegetable cards from the ABC Fruit and Vegetable Match lesson for ideas).
4. Make an A-Z alphabet book with the chart paper. Label "A" on one side of the first sheet and "B" on the other. Continue through the alphabet using the 13 sheets. See the sample A-Z book page included with this lesson.
5. On 13 small pieces of paper, write a letter combination: A and B, C and D, E and F, and so forth through Z. Fold each piece of paper and place in a container or hat.

Activity:

1. Read a favorite alphabet book to students, such as *Dr. Seuss's ABC: an amazing alphabet book.* Engage students in a discussion of fruits and vegetables. *Were you surprised to learn that there are fruits and vegetables for each letter of the alphabet?* Tell students that the class is going to make an alphabet book about fruits and vegetables.
2. At the top of one sheet of chart paper, write "Fruits and Vegetables from A to Z." Explain to students that each pair will pick a piece of paper from the hat. Each piece of paper will have the letters of the alphabet that the pair will work on. Depending on the size of your class, some student pairs may need to choose multiple letters.
3. Have students work in pairs. Provide each pair with pictures of fruits and vegetables, as well as art materials to create drawings, a sheet of chart paper from the A-Z fruits and vegetables book, and a copy of the ABC Fruit and Vegetable Chart. Tell students that they can illustrate their letters of the alphabet with examples of fruits and vegetables that begin with their letters. For example, the pair with letters "A" and "B" might use apples, apricots, bananas, broccoli and beets.

   Note: for younger children, you may wish to have drawings on each page for the children to color. Alternatively, have students work in small groups with an adult volunteer to guide them.
4. After students have finished illustrating their pages, staple the pages together to make a book.
5. Distribute the A-Z Student Data Sheet to each student. Tell them that their homework is to keep a record of all the fruits and vegetables they eat each day. Explain that the next day, they will each record what they ate. The goal is to eat as many letters of the alphabet as possible.
6. Hang the Our Class Data chart on the board. Collect student data each day. Save this sheet. This will be helpful in assessing the impact of the American Heart Association Teaching Gardens on student consumption of fruits and vegetables.

Tying it Together:

Read the class A-Z Fruit and Vegetable book to students. *What are some of the names of the fruits and vegetables we just read about? What letter does that fruit (or vegetable) begin with? What are some fruits and vegetables that you eat at home?*

Digging Deeper:

- Make a fruit and vegetable picture dictionary.
- Grades 4-5: Have students make a fruit and vegetable alphabet book to read to a first grade class. Tell students to pick a letter out of a hat. Depending on the size of your class, some students may have more than one letter. Tell them to use the Internet to research fruits and vegetables. Have them use appropriate language for a first grade level. Tell students to make illustrations for the book. Have the class publish it and read it to a first grade class.

National Standards:

NCTE: Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

Literature Connection:

Eating the Alphabet by Lois Ehlert

Our Class Data

Student's Name	Monday	Tuesday	Wednesday	Thursday	Friday
Mary	apples, broccoli	cucumber, celery, xuxu	peach, zucchini	watermelon, potato, turnip	carrots, grapes
Jose					
Etc...					

Name _____

Student Data Collection Sheet

Ask an adult to help you with this worksheet. For each day, write the names of the fruits and vegetables that you ate that day. Bring this sheet to class each day.

Monday _____

_____

_____

Tuesday _____

_____

_____

Wednesday _____

_____

_____

Thursday _____

_____

_____

Friday _____

_____

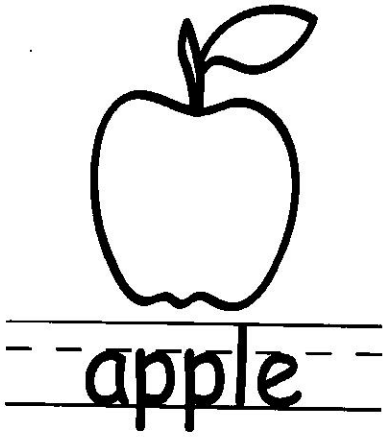
_____

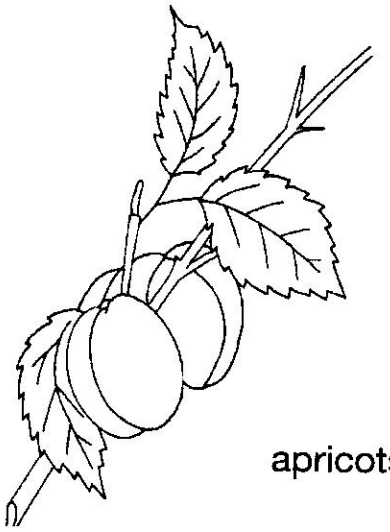
A-Z Fruit and Vegetable Chart

Apples
Apricots
Artichokes
Arugula
Asparagus
Avocado
Banana
Beans
Beets
Blueberries
Broccoli
Brussels sprouts
Cabbage
Cantaloupe
Carrots
Celery
Chard
Cherries
Chickpeas
Cranberries
Cucumber
Dates
Eggplant
Endive
Fennel
Figs
Grapefruit
Grapes
Green beans
Green pepper
Greens
Green tomatoes
Honeydew melon
Hot peppers
Iceberg lettuce
Jicama
Kale
Kiwi
Kohlrabi
Leeks
Lemons
Lettuce
Lima beans
Mangoes
Nectarines
Nopales
Okra
Onions
Oranges
Palm hearts
Papaya
Parsley
Parsnips
Peas
Peaches
Pears
Peppers
Persimmons
Pineapple
Plum
Pomegranate
Popcorn
Potatoes
Pumpkins
Quince
Radish
Raisins
Raspberries
Rhubarb
Red cabbage
Romano beans
Runner beans
Spinach
Star fruit
Strawberries
Summer squash
Sweet corn
Sweet peppers
Sweet potatoes
Tangerines
Tomatoes
Tomatillo
Turnips
Turnip greens
Ugli fruit (Jamaican tangelo)
Voavanga (Spanish tamarind)
Watercress
Watermelon
Winter squash
Xigua (pronounced she-gwah) is a Chinese name for watermelon
Xuxu (chayote)
Yams
Yucca root
Zucchini

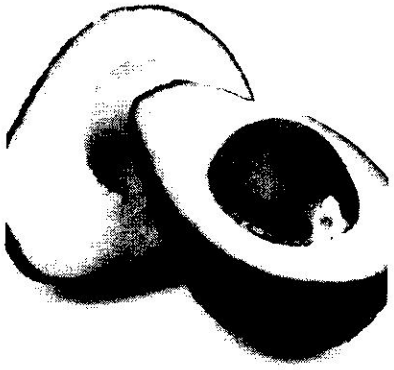
Sample A-Z Book Page

Aa





apricots



avocados

(staple along edge)

[Note: This is one sheet of chart paper, reverse side is for "B." Next sheet is for "C" and "D" and so forth.]

Recommended Grade Level:
3-5

Season:
Any

Indoor

The 5 Fantastic Food Groups

Description:

In this lesson, students learn to categorize foods into the five food groups: vegetables, fruits, grains, dairy and proteins (meat/beans). Then students are each given a card depicting a food item and they sort themselves into balanced meals. Finally, students draw a balanced meal full of foods they would like on a dinner plate divided proportionally according to how much of each food they should consume.

Background:

The American Heart Association's dietary recommendations emphasize balancing foods from the five food groups: vegetables, fruits, grains, milk and milk products, and meat/beans. Each of these food groups performs unique functions in our diet, as seen in the Food Group Worksheet below.

Materials:

- 1 copy of the Food Group Pictures reproducible handout with each card cut out
- 1 copy of the Food Group Worksheet reproducible handout for each student
- 1 copy of the Food Group Dinner Plate reproducible handout for each student

Preparation:

1. Copy Food Card Pictures and cut out each one. Copy on cardstock or laminate for durability.
2. Make a photocopy of the Food Group Worksheet and Dinner Plate for each student.

Activity:

1. Ask students if they know the five food groups. Help them identify all five. As you name each one, use the information from the Food Group Worksheet to tell students what that food group does to support our health.
2. Ask a volunteer to share what he or she had for breakfast, and have students discuss which food groups were in it.
3. Shuffle food pictures and hand out to students. Have students walk around the room and sort themselves into ingredients for one balanced meal (e.g., apple, zucchini, rice, chicken and yogurt).
4. Once they've grouped themselves, have them brainstorm a meal that would include those five things (e.g., sliced apples and zucchini on a salad, yogurt dressing, chicken and rice). Have each group share out their balanced meal.

5. Hand out the Food Group Worksheets and have students brainstorm at least five foods under each food group. They can work together with examples from the Food Cards they were just using. This will serve as a reference for the Dinner Plate exercise.
6. Hand out the Dinner Plate reproducible and review it with students. *Which sections are biggest on this plate? (Grains and vegetables, then fruits.) Why do you think that is? (a healthy diet is high in vegetables, whole grains and fruits).*
7. Give students time to design their own, ideal balanced meals. *Your job is to design a meal that you would like using appropriate amounts of food from each group. For example, I love cheese ravioli, which are grains and dairy, so I'll draw those in these sections. Now I'm going to add a salad with lots of beets, because they are my favorite vegetable. I'll add sliced apple for my fruit, and a piece of fish for my meat.*
8. Give students time to design and illustrate their own ideal, balanced meals. As they share, review why each food group is important in a healthy, balanced diet.

Tying it Together:

Have students share their ideal, balanced meals.

Digging Deeper:

- Have each student plan a day or week's worth of meals that includes all of the food groups.
- Grow fruits, vegetables, grains and beans together with students in the garden and include them in classroom snacks. See the Planting the Food Groups lesson for more detail.

National Standards:

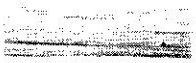
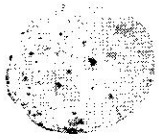
NSES: K-4: Systems, Order, and Organization; Personal Health

NSES: 5-8: Systems, Order, and Organization; Personal Health

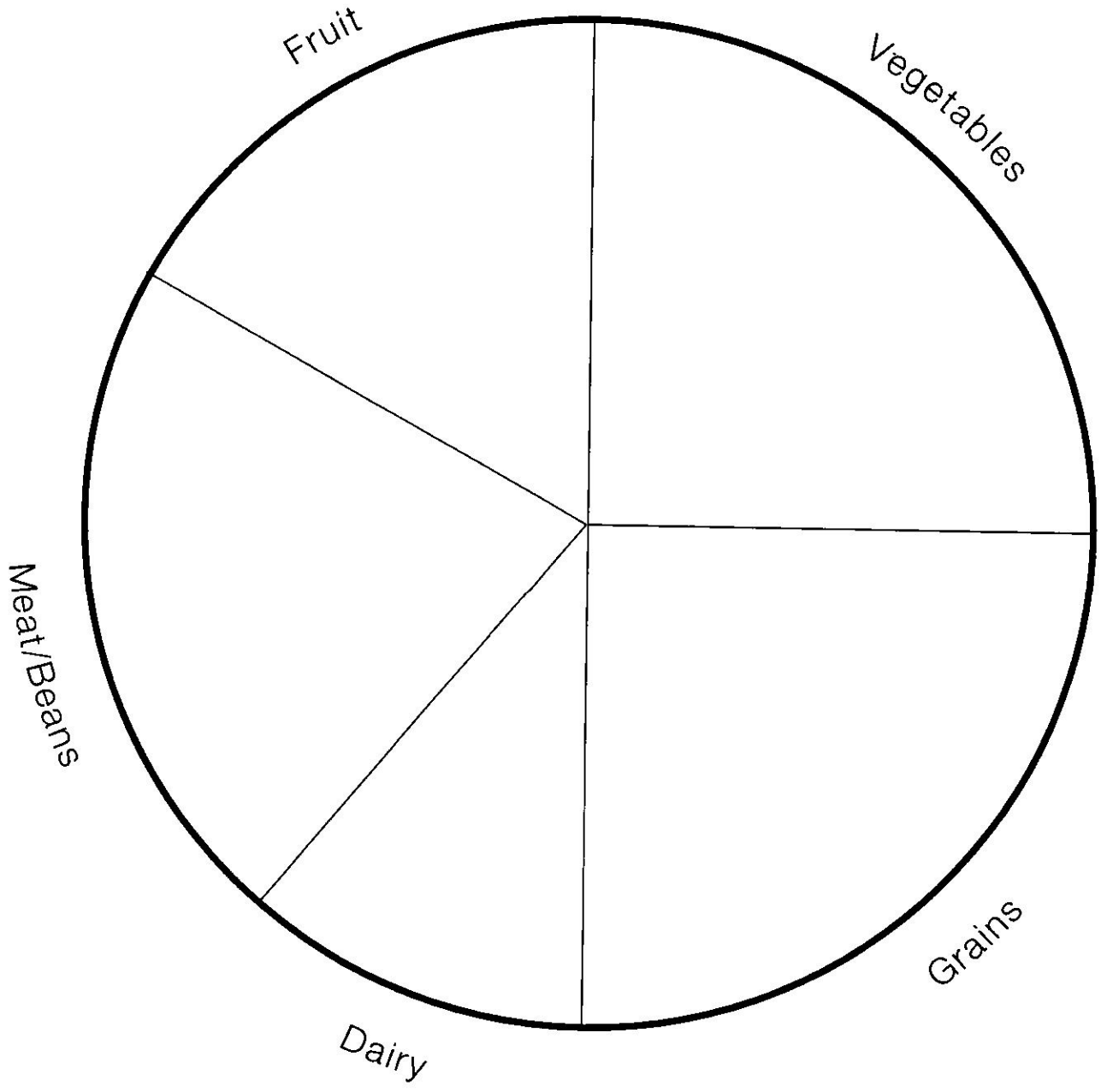
5 Fantastic Food Groups: Worksheet

Fruits	Vegetables	Grains	Meat/Beans	Dairy (fat-free or low-fat)
Provide nutrients to keep us healthy	Provide nutrients to keep us healthy	Give us energy and help us digest food	Helps us build strong bones, muscles, skin and blood	Helps us build strong bones and teeth

5 Fantastic Food Groups: Food Group Pictures

 Glass of 1% or skim milk	 Low-fat or fat-free cheese	 Low-fat or fat-free yogurt
 Lean meat	 Chicken (no skin)	 Bowl of beans
 Whole wheat bread	 Whole wheat pasta	 Whole wheat tortilla
 Apple	 Orange	 Grapes
 Tomato	 Green beans	 Lettuce
 Carrots	 Candy	 Bell pepper
 100% Fruit juice	 Oil	 Strawberry
Rice	 Walnuts	 Peanut butter

5 Fantastic Food Groups: Dinner Plate



Recommended Grade Level:
3-5

Season:
Spring

Outdoor

Planting the Food Groups

Description:

Students plant a circular garden bed with three food groups. They then choose a way to represent the dairy and fruit food group. They might plant grass as animal feed or place a drawing of a strawberry, goat or cow in the garden.

Background:

It can be difficult for adults, let alone children, to memorize recommended serving sizes and daily dietary requirements. In this activity, students create a visual to help them remember a few fundamental concepts that support healthful eating. Cover about half your plate with fruits and vegetables, and a quarter with whole grains. The rest can include protein such as lean meats or beans.

Materials:

- 1 empty circular garden bed, at least 4' wide, ready for planting. You can find detailed information on bed preparation in the School Garden Manual. (If you don't have space in your garden for a round bed, you can do this in a traditional rectangular bed as well.)
- 1 packet of seeds or seedlings (baby plants) for a locally, seasonally appropriate crop in each of the following categories:
  - Grains: For example, wheat or grain corn
  - Vegetables: For example, tomatoes, cucumbers or zucchini
  - Beans/Legumes: For example, dry shelling beans
  - Dairy: Of course, we can't grow a dairy plant! Seeds for animal feed, such as oats
- 1 plastic, wooden, or ceramic cow/fruit, or a laminated picture of a cow/fruit
- 1 ball of string
- 7 stakes
- 10 rulers

Preparation:

1. Prepare a circular garden bed, at least 4' wide, for planting. You can find directions in the School Garden Manual.
2. Review Planting Food Groups: Planting Options (included in this lesson)
3. Use string and stakes to mark out proportional slices of this garden bed, as seen in the illustration below.

Activity:

1. Review the 5 food groups with your students: *What are the 5 food groups? (Grains, vegetables, fruit, meat/beans, dairy). We're going to plant all of the food groups we can into a garden bed! What won't we be able to plant? (Dairy, meat, fruit) Where do those come from? (Livestock/plants) So, in the dairy section, we'll plant a grass that cows, goats and other animals eat. What could we plant in the other sections? What grains grow around here? Vegetables? Fruits? Beans?*
2. Show students the garden bed, with sections already marked by string and stakes. Explain the size of each section to students: *In this first big section, we'll plant our grain. This is one of the biggest sections because it is one of the food groups that we need a lot of for a healthy, balanced diet. Who remembers what grains provide for us in our diets? (energy, fiber for digestion). Who would like to guess what the other largest section is for? (vegetables)* Continue reviewing the benefits of each food group until all 5 sections have been discussed.

1. Divide the class into 5 teams, one for each food group.
2. Have students use the back of the seed packet, their plant label (for seedlings), or the Planting Guide from the School Garden Manual to determine how far apart and how deep their seeds should be planted. Have each group share their findings.
3. Using rulers, have students place the seeds or seedlings on the top of the soil where they think they should be planted according to the plant's spacing requirements.
4. Check their work before they dig in. At this time, also review how deep they will plant the seeds *(e.g., for ¼ inch, sprinkle soil over the top until the seed is completely hidden, or for a 1-inch planting depth, push each seed down to your second knuckle).* For detailed information on planting, see your School Garden Manual.
5. When students have finished planting, have them step back and look at the garden bed that they planted. Each group can then make a label for their section. Information on the label can include: Plant name, date planted, food group represented and the names of students who planted that section.

Tying it Together:

What will we need to provide our plants for them to grow? (They should get sunlight and air by being out here, and we prepared the soil with good compost, but we'll need to keep giving the plants water) Make a schedule with your students for watering the plants. For information on watering, refer to the School Garden Manual.

Digging Deeper:

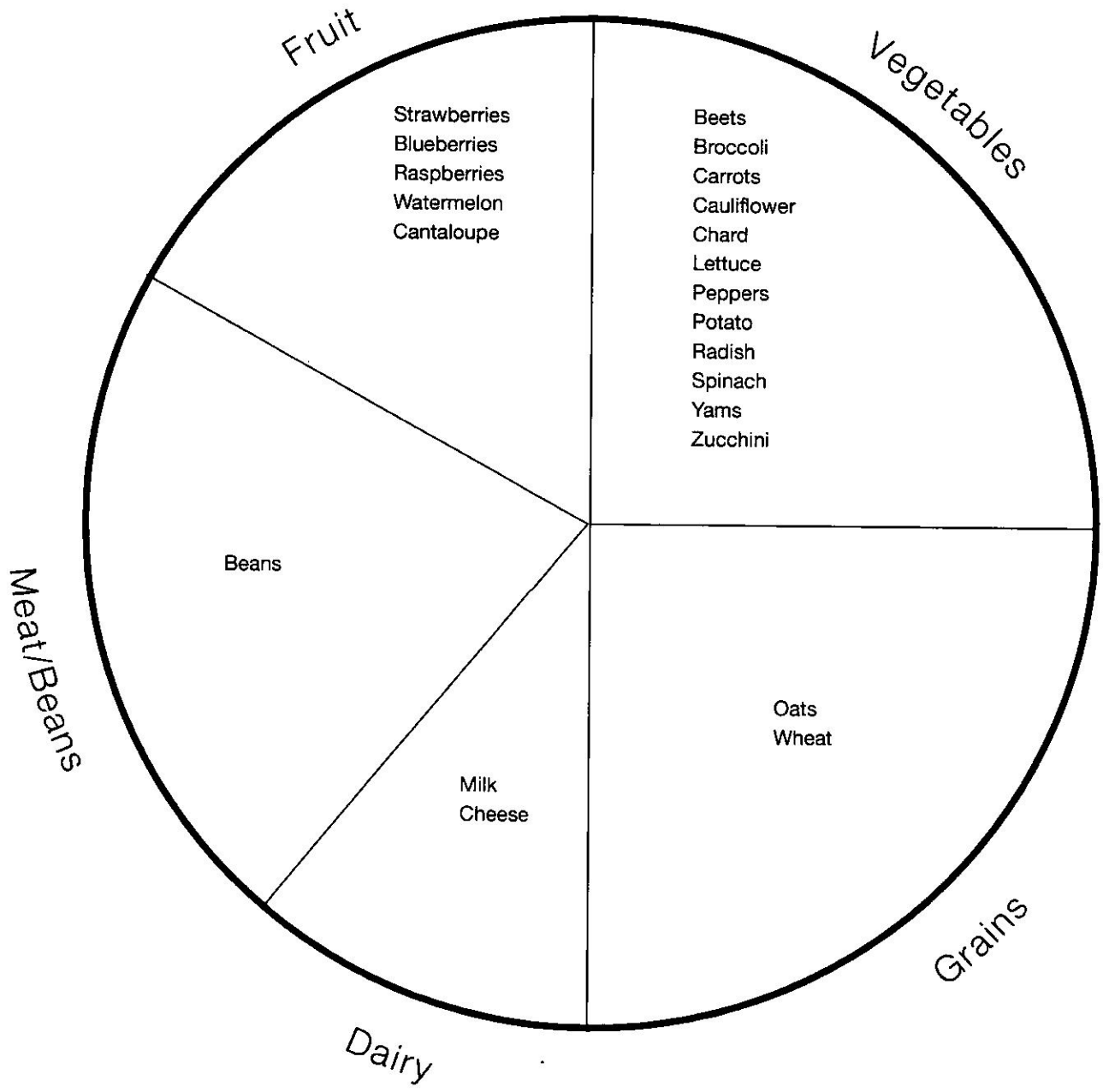
- Visit the garden bed at least once a week to observe the growth of the plants. Students can record plant height and other observations. Measure days to harvest for each plant. When the plants are ready to harvest (different plants will take different amounts of time), prepare and enjoy the fruits of your labor together (for tips on harvesting and eating with kids, refer to the School Garden Manual).

National Standards:

NSES: K-4: Life Cycles of Organisms; Personal Health

NSES: 5-8: Personal Health

Planting the Food Groups: Planting Options



Recommended Grade Level:
3-5

Season:
Summer/Fall

Indoor or Outdoor

It's All in the Balance

Description:

Students prepare a salad that contains at least one ingredient from each of the five food groups, incorporating garden produce and herbs.

Background:

As discussed in the 5 Fantastic Food Groups lesson, each of the food groups provides us with necessary nutrients for growth and maintenance of our bodies. While it is not essential to include each of the five food groups in every meal, it is recommended that we balance them throughout the course of each day.

This lesson is designed for 3 stations of 8-10 students each. If possible, recruit parent or community volunteers to help lead stations. If not, have the class work on an independent project while you call up one group at a time to do some cooking with you.

Materials:

Station 1:

- 4 large tomatoes
- 1 large green apple
- 12 green scallions
- 1 large bunch parsley
- Cutting boards for each student

Station 2:

- 4 small lemons
- ¼ cup olive oil
- 4 sprigs of mint
- 1 teaspoon (more or less) of salt & pepper to taste
- 1 cutting board
- 1 lemon juicer, if available
- 1 large bowl
- 1 whisk or fork

Station 3:

- 1 cup cracked wheat (bulgar)
- 1 small block of fat-free feta cheese
- 1/4 cup pine nuts or crushed walnuts
- 1 small frying pan
- Access to a stovetop (if you don't have access to a hot plate or stove, you can purchase toasted nuts and skip this station)

Preparation:

1. Approximately 1 hour before salad will be eaten:
   - Measure 1 cup of cracked wheat (bulgar) and pour into a bowl.
   - Boil 2 cups of water in the microwave.
   - Pour boiling water over cracked wheat and let soak.
2. Set out the materials listed above at each of 3 stations in your kitchen classroom or classroom.

Activity:

1. Explain the activity: *Today we are going to make a salad that includes each of the 5 food groups. What food groups are normally represented in a salad? (vegetables, sometimes fruits or nuts.) Has anyone ever had a dairy product in their salad? What are some examples? What about a grain? This salad recipe comes from Lebanon. (Show Lebanon on a map or discuss its location.) It includes at least one food from each of the five food groups.*
2. Have students wash their hands with soap and warm water. Refer to the School Garden Manual for more information on hand washing and food safety.
3. Review Knife Safety Rules. Refer to the School Garden Manual and Super Green Smoothies lesson for more information on knife safety and how to demonstrate for students.
4. Demonstrate the following cooking tasks for the entire class, emphasizing knife safety techniques when relevant:
   - Wash well: Place a vegetable under running water and scrub all sides until the entire vegetable is clean.
   - Dice: Chop into approximate ¼" cubes
   - Slice: Make parallel cuts to create slices to your preferred thickness
   - Mince: Chop into tiny little pieces, often by chopping repeatedly until desired size is achieved.
5. Run the following stations with adult supervision, as described in Background section.

Station 1:

1. Wash all vegetables well.
2. Dice tomatoes.
3. Dice apple.
4. Slice scallions into thin slices.
5. Mince parsley.

Station 2:

1. Cut 4 lemons in half.
2. Remove seeds.
3. Squeeze lemon juice into a bowl.
4. Use a fork to remove any remaining seeds from juice.
5. Measure ¼ cup olive oil.
6. Add oil to lemon juice and stir.
7. Mince mint.
8. Add mint to oil and lemon juice.
9. Measure 1 teaspoon of salt and add to dressing.
10. Measure 1 teaspoon of pepper and add to dressing.
11. Stir and cover until salad is ready.

Station 3:

1. Distribute pine nuts or chopped walnuts in an even layer in a pan.
2. Put the pan over medium-high heat.
3. Shake or stir nuts constantly for 5-7 minutes, or until nuts are golden.
4. Remove from pan and allow to cool.

All together:

Once all of the ingredients are prepared, gather together to complete the Tabouli Salad:

1. Drain any excess water from the cracked wheat (bulgar). What food group does this wheat represent? (Grains) What will it give our bodies?

2. Add all of the chopped vegetables to the wheat. *What food group do these tomatoes, onions and parsley represent? (Vegetables) What about the apple? (Fruit) What will these give our bodies?*
3. Pour dressing over the entire salad and stir. *What food group does this oil-based dressing represent? (Oils, not one of the Fantastic 5, but important nonetheless in small quantities) What does oil provide for our bodies? Why is it important to limit our consumption of oils?*
4. Add toasted nuts and crumbled goat cheese to salad. *What food groups do these nuts represent? How about the cheese? (Dairy) What will these provide for our bodies?*

Tying it Together:

Use a large spoon to serve each student a small dish of the Tabouli Salad. Give students some time to enjoy their salads. Afterwards, ask them to share their impressions of the salad. *What did you like? What might you add or change if you made it again?* Demonstrate how students will clean up their dishes when they finish their salad.

Digging Deeper:

- Have students write a recipe for the salad they made.

National Standards:

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

NSES: K-4: Personal Health

NSES: 5-8: Personal Health

NCTE: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

Recommended Grade Level:
4-5

Season:
Any

Indoor

Fabulous Fruits

Description:

Students design an advertising campaign by selecting a fruit and trying to influence younger students to eat more of it.

Background:

In this lesson, students create an advertising campaign to promote eating fruit as a healthy snack. Students analyze ads, evaluate them and then create their own. By putting together their own campaign, students explore how advertisers package products to entice us to buy them. Review the tips for comparative tastings in the Winter Squash Comparative Tasting lesson. You may find it helps motivate students to conduct a fruit tasting before you begin this activity. It may inspire them as they develop an ad campaign around a fabulous fruit.

Materials:

- Samples of the fruit to be advertised
- Art supplies
- Examples of magazine or Internet advertisements that target children (include some food ads)

Preparation:

1. Arrange for a test class. Ask another teacher to allow the ad campaign to be presented to his or her class. The campaign should last for at least one month. If possible, have students run their campaign in the hall, the cafeteria and any other place that the test class frequents, as well as in the test class.
2. Prepare the fruit tasting.

Activity:

1. Begin the class by conducting the fruit tasting. Engage students in a discussion. *How would you describe this fruit to someone who has never tasted it? How would you describe the taste? The texture? What does it look like? Does it have an aroma?* Record students' observations and descriptions on the board. Bring this discussion to a close.
2. Tell students that their assignment is to create an advertising campaign. The goal is to persuade a second-grade class to eat fruit as a healthy snack. If possible, try to choose a type of fruit that the second graders are not familiar with or do not often eat.

3. Share the examples of ads with students. Choose one ad for discussion. *What do you think or feel about this? What do you like about this? Is there anything you dislike? Is this trying to sell you something?* Encourage students to talk about ways that advertising has influenced their own decision-making. *Can you remember an ad that you have seen recently? What product was being advertised? What made you remember that ad? Have you ever been persuaded to buy something because of an advertisement? Have you ever bought or tried something that you didn't think you would like because of an advertisement? How does advertising convince people to buy products such as food, clothing or games?*
4. Have students review different kinds of fruit and choose their product. Next, have them design the ad campaign. Describe types of campaigns. Explain that a successful campaign involves making ads and creating items like posters, buttons and flyers. Explore different kinds of food ads that target children. Discuss what students like and don't like about these ads. You may wish to divide the class into different groups and have each group be responsible for a different aspect of the campaign. For example, you could have artists, writers, video producers, musicians and so forth.
5. Write these questions on the board: *Who is the audience? What do you want the audience to do? How can you get their attention so they eat the fruit? What is the message? What are some words that you want to include in the ad?* Think about words that will persuade a second grade student to eat the fruit for a healthy snack. Have students include information about why their fruit is a nutritious choice.
6. Next, select techniques that students want to use to convince more people in the test class to eat the fruit. Some examples are: free samples, posters in the classroom, designing a logo, music videos, slogans, skits, commercial for television and so forth.
7. Establish a timeline for the project.
8. Have your class poll students in the test class about their previous experiences with the fruit —have they ever, never or frequently eaten it?
9. Supply the fruit and use students' campaign to advertise it.
10. After one month, poll the test class again. Discuss the results.

Tying it Together:

What techniques worked best with the test class? Do companies use those same techniques to try to influence the food choices that you make? If you were selling the fruit you advertised, would your sales have increased or not? Is there anything you would change? Why?

Digging Deeper:

- Have students keep a checklist of all the ads they see for fresh fruits and vegetables in one day. Then have them keep a checklist of all of the ads they see for soda, candy or junk food in one day. Discuss their findings. Did anything surprise them?
- Have students choose one food advertisement and discuss the techniques that are used to convince someone to buy that food.

National Standards:

NCTE: Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language and genre to create, critique and discuss print and nonprint texts; Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information).

Recommended Grade Level:
K-2

Season:
Any

Indoor or Outdoor

Searching for Garden Rainbows

Description:

Through this activity, students are introduced to the variety of plant-based foods in the garden. First they search for specific colors as a way to introduce them to different-colored fruits and vegetables in the garden. Then they discuss all the different shades they discovered and learn about diversity. The lesson closes with a discussion of the different kinds of food that are growing in the garden and the importance of variety in our diet.

Background:

Eating a variety of fruits and vegetables provides our body with a wide range of nutrients needed for good health. This activity introduces young students to the concept of variety in the garden and establishes a foundation for learning about the importance of variety in their diets.

Materials:

- Rainbow Chips story (included with this lesson)
- At least 2 paint chips of different colors for each student (these are free at most stores that sell paint)
- One bag
- Colored markers
- Easel
- Chart paper

Preparation:

1. Write "rainbow chips" on the outside of the bag
2. Place the paint chips inside the bag
3. Review the Rainbow Chips story (below)
4. Set up the easel in the garden. Put your chart paper here for the garden part of the activity.

Activity:

1. Have students sit in a circle and listen to the Rainbow Chips story. You may wish to use props and sound effects.
2. Invite students to look in your rainbow chip bag. After students have had a chance to see the chips, assign each student a partner. Give each pair a "rainbow chip" from your bag. Have them try to find the exact color somewhere in the garden. Make sure students match up with natural objects in the garden and not human-made objects like painted signs. With younger students, you may wish to have a brief discussion about the kinds of natural objects they will find in the garden or which human-made objects to avoid.
3. Tell partners they have to agree on the color match. Once they have found a match, they report their findings to you, return the chip and get another. Write or draw the object students find on the chart paper. Repeat the activity for about 4-5 rounds per student pair.
4. Gather students around you and the chart paper listing what they found. *Did any of you have a color that you couldn't find in the garden? Did you find a color in the garden that surprised you? How many different shades of green do you think are in this garden? Let's count. How many different colors did you find in the garden? How many different fruits, vegetables, flowers and leaves did you find in the garden?* Point out that there are lots of different kinds of fruits, vegetables and plants in the garden. Introduce the term "variety." Tell students that what they found demonstrates how much variety there is in the garden.
5. Ask students to think about all the fruits and vegetables they found. *Which of these foods do you eat? If we only ate red or orange foods, what would we eat? What about green foods? Are there any purple garden plants that you eat?*

Tying it Together:

Do you think it's important to have variety in your diet — to eat lots of different kinds of fruits and vegetables? Point out that we get different nutrients from different foods. A healthy diet includes eating a variety of different foods.

National Standards:

NSES: K-4: Properties of Objects and Materials; the Characteristics of Organisms

Rainbow Chips

(Feel free to embellish this story.)

One day I was walking in the garden looking at all the different fruits and vegetables that were growing there. I saw tomatoes and green beans and pumpkins and lettuce and berries.

All of a sudden, it got DARK! I looked up and saw HUGE, DARK clouds gathering in the sky. Before I knew it, I couldn't see the sun anymore.

Then ... it began to rain! First, it was a gentle rain that splattered on the ground. But then, the sky got darker and darker and the rain began to come down harder. Before I knew it, I was caught in the middle of a HUGE rainstorm! Giant raindrops were falling all around me ... and on me! My hair and my clothes got so wet that they were soaked. There were puddles everywhere!

All of a sudden, I saw a small break in the clouds, a spot where the sunlight was breaking through those dark, gray clouds. Just as quickly as the storm had started, it was over. Soon the rain slowed down. It was more like a mist than rain. Sunlight was beating down on the garden. The birds began to sing.

Then, I saw a huge double rainbow over the hills nearby. The colors of the rainbow were so vivid and bright. I saw shades of red, orange, yellow, green, lime, peach, pink, purple, maroon, blue, turquoise and cobalt. There were colors in that rainbow that I had never seen before.

Just as I was enjoying all those beautiful colors, I head a loud, cracking sound. Right before my eyes, the rainbow shattered in the sky. All the pieces of the rainbow fell from the sky and crashed down on the ground. I dashed over to where they fell and began picking them up. I put them all in a bag so that I could share them with you. Would you like to see the rainbow chips?

Recommended Grade Level:
K-2

Season:
Any

Indoor

Rainbow Fruit Salad

Description:

Students explore numbers and make a salad that includes all the colors of the rainbow. They follow a recipe to make a salad made up of multiples of fruit. Through engaging in a food experience, students experience the benefits of eating colorful, fresh fruit.

Background:

We get high levels of vitamins and minerals from colorful fruits and vegetables. By eating a rainbow assortment of fresh fruits and vegetables on a regular basis, our bodies will get the nutrients they need to be healthy and strong. This activity introduces children to one way to make sure they get plenty of color in their diet. When you make the fruit salad, be sure to cut up the fruit in front of the children. Treat it like a cooking show. Students will love it!

Materials:

- Rainbow Fruit Chart (included with this lesson)
- 1 large bowl
- 1 knife to cut fruit (for adult use only)
- 1 large serving spoon
- 1 cup or bowl for each student
- 1 spoon for each student
- Clean-up materials (paper towels, wipes, etc.)
- Whole fruit from each of the color groups (2 from each of the 5 color groups)

Preparation:

1. Gather the materials to make a fruit salad. Refer to the Rainbow Fruit Chart to make sure you have fruit from all the colors.

Activity:

1. Show the class five different kinds of fruit. Ask a volunteer to count the number of pieces of fruit that you have. Write the number on the board. (5 pieces of fruit)
2. Remove one piece of fruit. Ask another student to count how much fruit you now have. Write that number on the board. (5-1=4 pieces of fruit)
3. Hold up the piece of fruit that you removed from the group and ask how much you are holding. Write that number on the board. (1 piece of fruit)
4. Next, put all five fruits back together. Now remove four pieces of fruit. Ask another student to count how much fruit is left. Write that number on the board. (5-4=1 piece of fruit)
5. Next, tell students that you are going to make a fruit salad. Show them two pieces of yellow fruit. Add one piece of red fruit and ask how many pieces of fruit there are. Add a second piece of red fruit. Now how many pieces are there? Continue adding each color 2 at a time so the class counts 2, 4, 6, 8 and then 10.
6. Bring this part of the lesson to a close.
7. Next, tell students that you are going to make a rainbow fruit salad that uses all of the fruit. Use a dramatic flair as you cut up the fruit. Engage students in a discussion as you cut. What color shall I add now? How many slices of banana can we get from this banana? And so forth. Stir the salad. Close by serving the rainbow fruit salad.
8. When students are finished, have them clean their bowl and spoon.

Tying it Together:

If we have 5 pieces of fruit and another class has 2 pieces of fruit, how many pieces of fruit will there be? How many more pieces of fruit does our class have? Are 5 + 2 and 2 + 5 the same sum?

Digging Deeper:

Give students fruit salad riddles to solve. Here are some examples:

- *This salad has 12 pieces of fruit. It contains strawberries, bananas and cherries. The number of bananas is double the number of strawberries. What could be in the salad?*
- *This salad has 15 pieces of fruit and contains strawberries, bananas and cherries. The three different fruits have the same number. What could be in the salad?*
- *This salad has 18 pieces of fruit and contains strawberries, bananas and cherries. One half of the pieces are cherries. What could be the numbers of the other pieces of fruit?*

- *There are seven pieces of fruit. There is one more strawberry piece than banana piece. How many pieces of each kind of fruit are there?*
- *This salad is made only of strawberries and bananas. There are 12 pieces of fruit. Half of the pieces of fruit are strawberries. How many are bananas?*

National Standards:

NCTM: preK-2: Understand numbers, ways of representing numbers, relationships among numbers, and number systems; Understand meanings of operations and how they relate to one another

Literature Connection:

Oliver's Fruit Salad by Vivian French.

Rainbow Fruit Salad: Rainbow Fruit Chart

Red Fruit	Orange/Yellow Fruit	Blue/Purple/Black Fruit	Green Fruit	White/Tan/Brown Fruit
strawberries	oranges	black currants	green apples	bananas
red apples	papayas	blackberries	green grapes	white peaches
red grapes	peaches	blueberries	green pears	white nectarines
cherries	persimmons	dried plums	honeydew	
dried cranberries	apricots	grapes	kiwifruit	
pomegranates	cantaloupe	plums		
red pears	tangerines	prunes		
rhubarb	yellow apples	purple figs		
watermelon	yellow figs	purple grapes		
guava	yellow pears	raisins		
pink grapefruit	yellow watermelon			
	golden kiwifruit			
	grapefruit			
	mangoes			
	nectarines			
	pineapples			

Recommended Grade Level:
K-4

Season:
Any

Indoor or Outdoor

Garden Mosaic on a Cracker

Description:

Students use five cut-out triangles or triangle pattern blocks to create shapes. To celebrate all that they have learned about gardens, rainbow colors and food, students use vegetables and herbs to create miniature, triangle-shaped "garden mosaics" on a cracker.

Background:

In this lesson, you have an opportunity to go beyond simply naming shapes. As students work with triangles to create new shapes, they will have opportunities to describe what they are doing.

Materials:

- *The Greedy Triangle* by Marilyn Burns
- Triangles reproducible handout (included in this lesson)
- (Optional) Pattern blocks
- Crayons/colored pencils (red, orange/yellow, blue/purple/black, green, white/tan/brown) for each student
- Scissors for each student
- A variety of fresh herbs from the garden (or store) such as: oregano, basil, rosemary, sage
- A variety of vegetables (at least one from each of the five colors) such as: broccoli, cucumber, carrot, lettuce, bell pepper (red, yellow, purple, orange or green), cherry tomatoes (red, yellow or orange)
- Sunflower seeds
- Sharp knife for chopping (for adult use only)
- Cutting board
- 5 serving bowls or plates, one for each station
- 5 spoons, one per station
- 1 plastic knife per student
- 1 plate per student
- Paper towels (for clean-up)
- Large whole-grain crackers, such as Ak Mak or Ryvita (one or two per child)
- Hummus or low-fat/fat-free cream cheese
- Butter knife for spreading

Preparation:

1. If you are using herbs and vegetables from your garden, ask some or all students to help you harvest beforehand.
2. Set up five stations, one for each color: red, orange/yellow, blue/purple/black, green, white/tan/brown. Slice the herbs and vegetables into very small pieces and arrange them at the appropriate station so all students can reach them. Include a bowl of sunflower seeds at the white/tan/brown station.
3. Spread a small amount of hummus or cream cheese on each cracker.
4. Make copies of the Triangles reproducible handout for each student. The triangles will be colored the rainbow colors. Either have student volunteers help color them before class, or have students color them in class.

Activity:

1. Tell students that they will be working with triangles in this lesson. Invite them to share what they know about triangles. Look around the classroom for examples of triangles. Put your hands on your hips to provide one example. Accept all answers.
2. Read the class *The Greedy Triangle*. Engage students in a discussion of what happens when the triangle gets more sides. Tell students that in this activity, they will be investigating ways to combine triangles to make new shapes.
3. Distribute the Triangle reproducible handouts, scissors and crayons/colored pencils to each student. Tell them to cut out the five triangles and to color each triangle one of the rainbow colors. On the board, demonstrate the rule that students must follow: when the triangles touch, the sides must completely match one another.
4. Have students explore the number of shapes possible with five triangles. (There are four possible shapes. Do not share this with students. The point is to have them explore the different possibilities.)
5. Have students trace their shapes (or paste the paper cut-out shapes) onto a sheet of paper. If students traced the shapes, ask them to color each of the five triangles red, orange, green, yellow and blue.
6. When students have completed their investigation, invite them to share their work.
7. Have students wash and dry their hands.
8. Distribute one cracker, one plate and one plastic knife to each student. Tell students to celebrate what they have learned about shapes and what they know about eating a rainbow assortment of foods. Tell them that they are going to make the shape on the cracker using the herbs, vegetables and flowers from the garden.

9. Have students use the knives to draw shapes made from triangles in the cream cheese. Then have them use the vegetables, herbs and flowers to make each triangle one of the rainbow colors.
10. As students are creating their shapes, stop by and ask questions. Encourage them to describe what they are doing. Check for student understanding of the importance of "eating a rainbow."
11. Enjoy your crackers.

Tip: Make and eat these outdoors for easy clean-up.

Tying it Together:

Invite students to show and describe what they used to make their shape.

Digging Deeper:

- Repeat this activity, however this time students will be investigating symmetry. Tell students to create another cracker that demonstrates mirror symmetry.
- Repeat this activity. This time replace the triangle with five squares.
- For homework, have students make a list of all the shapes that they see at home. Tell them to include some examples of fresh fruits and vegetables. Demonstrate by holding up an orange or a pear and asking what shapes students see.
- Go on a shape scavenger hunt in the garden.

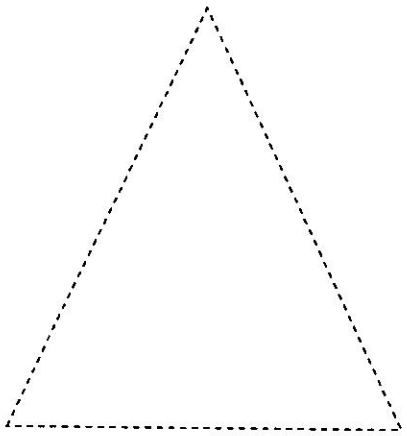
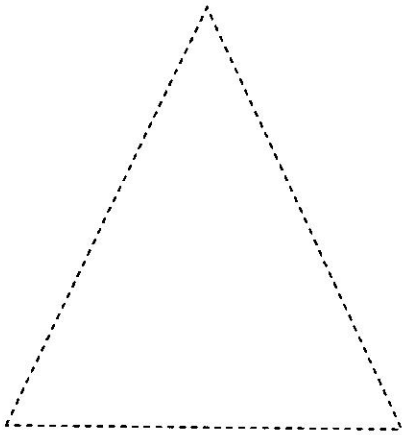
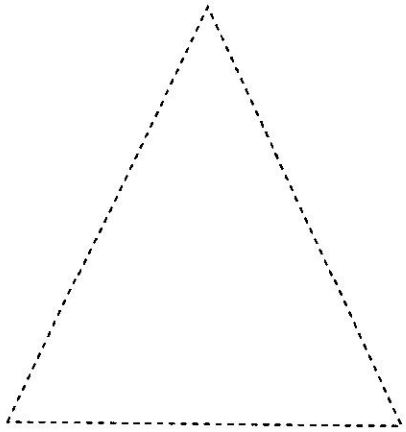
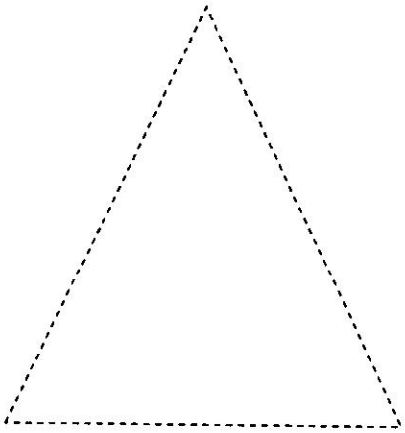
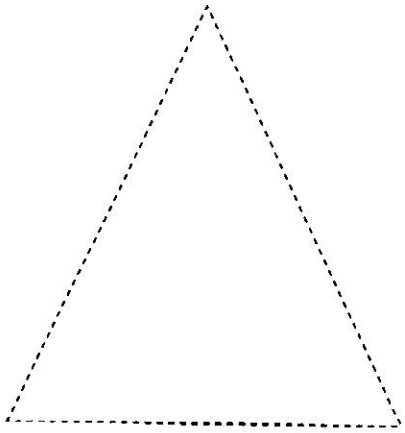
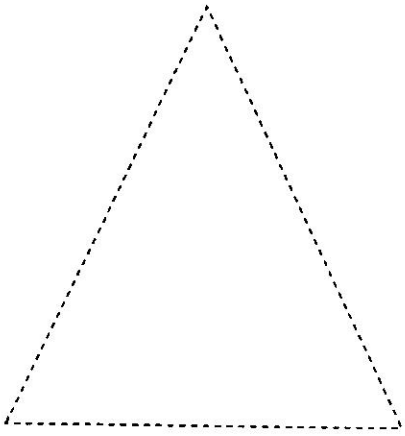
National Standards:

NCTM: pre-K-2: Geometry: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships; 3-5: Geometry: build and draw geometric objects.

Literature Connection:

The Greedy Triangle by Marilyn Burns

Triangles

Recommended Grade Level:
3-5

Season:
Any

Indoor

All the Colors of the Rainbow

Description:

In this lesson, students discuss and illustrate what fruits and vegetables of every color do for the body.

Background:

All fruits and vegetables contain different combinations of nutrients. In addition, they contain phytonutrients, which give fruits and vegetables their vibrant colors and also play a wide range of roles in keeping our bodies healthy. Because different fruits and vegetables have different concentrations of nutrients and phyotonutrients, "eating a rainbow" of fruits and vegetables can support the body in all-around health.

Materials:

- Butcher paper long enough to trace a human body
- Markers
- Clipboards
- 1 copy of All the Colors of the Rainbow reproducible handout for each student
- Markers/colored pencils for students
- Fruits or vegetables of each color (out in the garden if possible)
- 1 copy of Rainbow Card reproducible handout, with each card cut out

Preparation:

1. Photocopy All the Colors of the Rainbow worksheet for each student.
2. Photocopy and cut apart the color cards from the Rainbow Card reproducible.
3. Take a walk around the garden with the Rainbow Card reproducible and look for produce you can harvest and eat from each color group. If you're missing any colors, supplement with produce from a farmers' market or grocery store. Pick one sample of each fruit or vegetable you'll be eating.

Activity:

1. Ask students to brainstorm: *What is nutrition and why is it important?* Write up the different responses where everyone can see them. *(Nutrition is the effect of food on the health, growth and development of the body. It is important for better performance in school, work, sports, etc. You feel good, don't get sick, have energy to do things, etc.)*

2. Put the butcher paper on the floor and ask a volunteer to lie on the paper. Have another volunteer trace the outline of the person lying down. Once the body is traced, put it up where everyone can see it. Pass out worksheets and markers or colored pencils.
3. Divide the class in half. Hand each person or pair in the first group a whole fruit or vegetable or picture of one that you'll be sampling. Hand each person or pair in the second half a color card.
4. Explain that the students' job is to group themselves so that each fruit or vegetable is matched with the correct color card. Then they will prepare, as a team, to convince the rest of the class that their fruit or vegetable is the most important one to eat.
5. Give the groups 5-10 minutes to prepare their arguments.
6. Have each group share out why they think their vegetable is the most important for us to eat. You can do an example with a fruit or vegetable they aren't using. *(I am going to talk to you today about kale. Kale is a green vegetable, so it is good for strong bones and teeth. And you need teeth to eat all the other vegetables! So eat your kale!)*
7. After each short presentation, summarize why the color is good for you by coloring in parts of the body with that color. *(Okay, so green is good for bones, so I'll draw in some bones and teeth with green marker.)* Note: Allow students to help you come up with creative ways to represent each fact. For example, you might draw a shield in yellow or orange to represent a strong immune system.
8. As you draw on the butcher paper, have each participant do the same on their own worksheet. Have them include a brief written explanation of why fruits and vegetables of each color are good for our health (For example, red is good for healthy heart and memory.)
9. Head out to the garden with your class and harvest and enjoy as many of the colors as you can find. As you eat each one, review how it will support your health.

Tying it Together:

So, which color is the most important to eat? If I want to stay healthy, which color should I eat? (All of them! We should eat a rainbow!)

Digging Deeper:

- Cook meals that use a rainbow of colors.
- Have students write down what they ate yesterday and list the colors they ate in each meal. Have students reflect on their lists and ask them to think of ways they can incorporate missing colors.

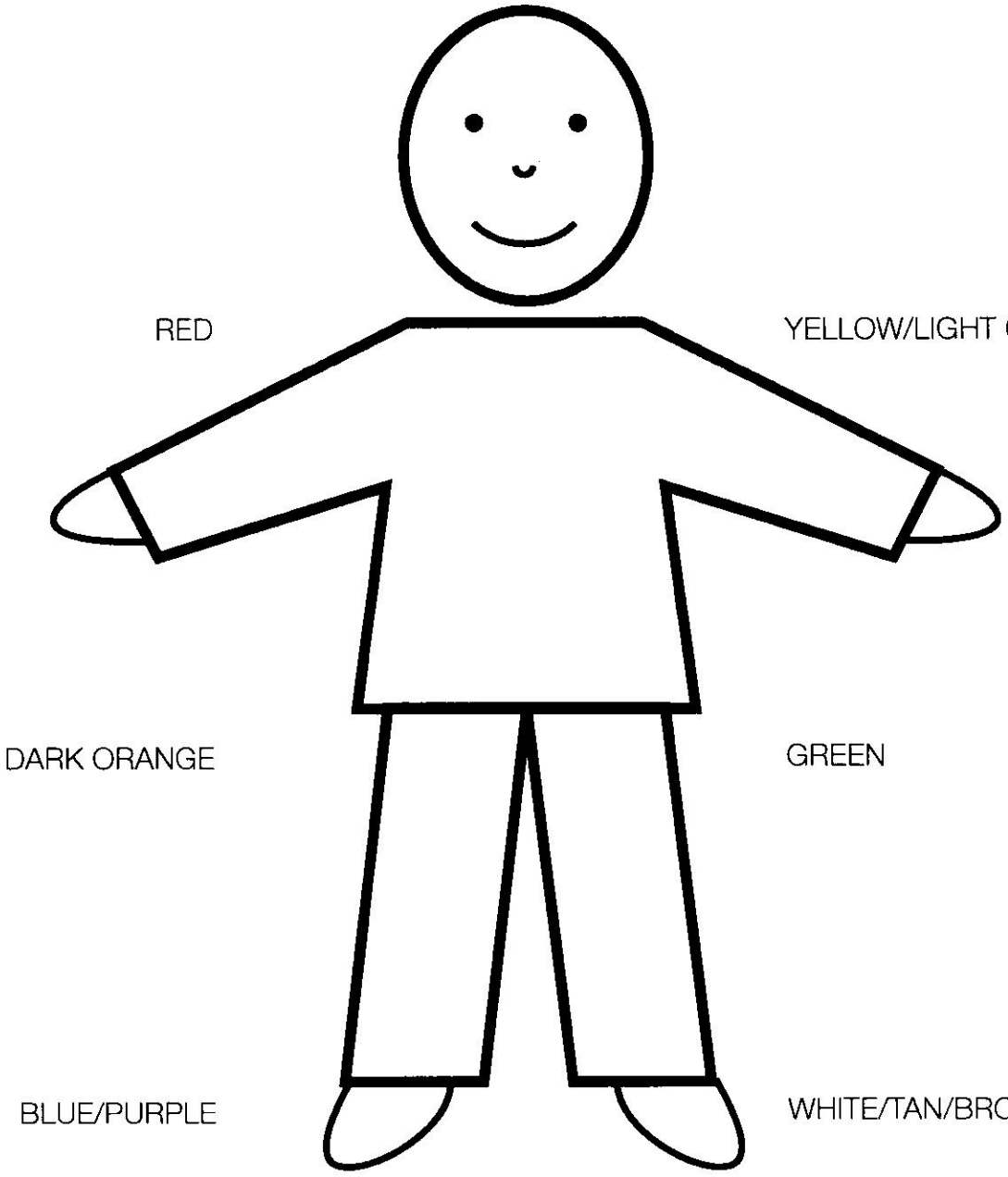
National Standards:

NSES: K-4: Personal Health; 5-8: Personal Health

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

Color Card Master

What do fruits and vegetables of each color do for us?



Common Fruits and Vegetables Categorized by Color

(Helpful for a Rainbow Meal Challenge)

Red	Yellow/Light Orange
Normally high in health-promoting lycopene and anthocyanins (the darker the tones typically the more of these nutrients). Antioxidants, which may improve heart health, and lower risk of some cancers. *Examples: apples, tomatoes, strawberries, watermelons, beets, cherries, cranberries, red pepper*	Tend to be high in antioxidants, such as vitamin C and beta carotene (vitamin A) Nutrients can contribute to a strong immune system, strong vision, healthy skin and heart health. *Examples: oranges, grapefruit, corn, yellow peppers, yellow apples, mango, apricot, squash, carrots, sweet potatoes*
Blue/Purple	**Green**
Dark-colored fruits and vegetables are usually good sources of anthocyanins. May help with heart health and prevention of some cancers (from antioxidants). *Examples: Purple grapes, raisins, purple cabbage, eggplant, plums, blueberries, blackberries, purple potatoes*	Green is a signal for chlorophyll, and green vegetables are full of folate and such phytonutrients as carotenoids. Darker, leafy greens (like spinach and kale) tend to have more of these nutrients. Can help brain health, good vision, and promote growth and healthy pregnancy. High fiber for healthy intestinal tract and lower cholesterol. *Examples: Leafy greens, broccoli, cabbage, lettuce, avocado, kiwi, asparagus, zucchini, peas*

Recommended Grade Level:
3-5

Season:
Any

Indoor or Outdoor

Super Green Smoothies

Description:

In this lesson, the teacher describes the benefits of eating greens, and students brainstorm how these benefits could be important in their lives (e.g., "I need strong bones to help support my body when I'm playing soccer.") Using a cooking-show format, student volunteers help the teacher blend a large batch of green smoothies for the class. This lesson also provides the teacher with the opportunity to demonstrate safe food handling, including safe knife use. To wrap up, students say a toast to greens, including one reason they are an important part of our diet, before drinking their smoothies.

Background:

Dark, leafy greens are an essential part of a healthy diet. The vitamins, minerals and other nutrients help us with strong bones, strong teeth and good vision. Smoothies are a great way to incorporate greens into a delicious, kid-friendly beverage. Ask students to contribute one piece of food each to create a collaborative smoothie to which you can add your garden greens!

Materials:

Smoothie ingredients for 1 full blender, which will provide up to 30 small cups:

- 1 bunch kale, spinach or chard (ideally from your garden)
- 1 cup 100% apple juice
- ¾ cup plain fat-free or low-fat yogurt
- 3-4 cups fresh or frozen fruit: good options include bananas, berries, peaches, nectarines, oranges, tangerines, apples and pears
- ¼-½ cup water
- (Optional) 1-2 tablespoons nut butter
- (Optional) ⅛ cup flax seeds, freshly ground, for each 12 oz. serving

Cooking Equipment:

- 1 cutting board
- 1 kitchen knife (review knife safety in step 4 of the Activity section of this lesson)
- 1 blender
- 1 wet rag

Other Materials:

- 1 copy of Super Green Smoothie reproducible handout for each student.
- 1 piece of chart paper
- 1 marker

Preparation:

1. *At least 3 days before the activity:* Tell students that they will be making a Super Green Smoothie together and tell them when. Hand out the Super Green Smoothie reproducible and ask students to sign up to bring one piece of fruit each on Smoothie Day.
2. *On the day of the activity:* Set out all materials onto clean work surface in an area where all of your students can see you at once.

Activity:

1. Gather fruit from all students. Harvest 1 handful of kale, spinach or chard from the garden.
2. Have students observe while you wash your hands to prepare for cooking. Demonstrate thorough washing with soap and warm water. Have them sing the ABC's while you wash, and explain that it is important to wash vigorously for as long as the song goes to ensure that you get all the germs off.
3. Take the produce to a sink and wash thoroughly, showing students how to scrub each piece of fruit or leaf thoroughly on all sides using just water. You can find detailed information on safe produce handling in the School Garden Manual.
4. Gather students for a brainstorm on knife safety: *To make this smoothie, I am going to use a sharp knife and may invite some of you to chop some fruits as well, using knives. As you know, knives can be dangerous, and students will only be allowed to use these knives if they agree to use them properly. Knives are tools in the kitchen, but they are not toys to be played with, even jokingly. What can knives help us do in the kitchen? (chop vegetables, slice fruit, etc.) Of course, if we are not careful with knives, we can cut ourselves or others. Who here has ever used a sharp knife? Keep your hand up if you can tell us one tip for using a knife safely?*
5. Create a Safe Knife Use procedures list, and make sure it includes the following tips:
   - Elbow Room: Only use a sharp knife when you know that no one else is within an arm's reach of you.
   - Eyes on Your Work: If someone calls your name, for example, you can stop what you're doing to look up and respond to them.
   - Claw and Saw: Keep your fingers out of the way of the blade. Make a claw with your hand and suggest that students hold their fruit or vegetable with a "claw" rather than with straight fingers. Holding the knife in the other hand, away from the claw, you can "saw" your fruit.
   - Cut away from yourself, rather than towards yourself. Keep the knife point aimed at the center of the table and the blade pointed down.
   - Never leave the table with your knife. When students are finished with their knives, they can wipe them down with a wet towel on the table and place them in the bucket for cleaning later.
6. Ask for a volunteer to cut one piece of fruit. Have that volunteer go wash their hands while you demonstrate safe chopping with the greens.
7. Remove stems from greens. Coarsely chop greens and fill the blender.

8. Blend the greens with apple juice until smooth, about 1-2 minutes.
9. Have a second student volunteer go wash his or her hands while the first one comes up and chops a piece of fruit to add to the smoothie.
10. Continue in this fashion, with one student chopping and another "on deck," washing hands, until the blender is ¾ full. If this happens before you've used all the fruit, you can save the rest for a second batch of smoothies.
11. Add yogurt, water, and – if desired – nut butter, and flax seeds.
12. Blend until smooth.

Note: If you used paper cups without wax coating, you can add them right into your compost pile! Have students tear them up for quicker decomposition.

Tying it Together:

Invite some student volunteers to come up and pour the smoothie into cups to distribute to the class. Explain that we won't drink until everyone has a cup. While cups are being distributed, tell students that the greens in these smoothies will give them strong bones and teeth, and good vision. Ask them to think of something they will use these strengths for in their lives. Once everyone has a cup, invite students to make toasts to greens (for example, "Here's to chard for giving me healthy bones, which will help me play soccer for years to come!") Listen to a few toasts, have students "clink" cups, and enjoy your smoothies!

Digging Deeper:

- Try different smoothies in the different seasons. For example, a great winter smoothie might include apple or pear (cored and sliced, with skin still on), citrus fruit (peeled, sectioned and seeded) and frozen strawberries. Combining a tart-tasting fruit, such as berries or citrus, with milder fruits such as apples or persimmons, complements the greens and yields a tasty smoothie.
- Experiment with other greens. Beet greens, escarole and bok choi are all great in smoothies.

National Standards:

NHES: Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.

NCTE: Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

Super Green Smoothie Recipe

Ingredients:

1 bunch kale, spinach or chard

1 cup 100% juice

¾ cup plain fat-free or low-fat yogurt

3-4 cups fresh and/or frozen fruit

¼-½ cup water

(Optional) 1-2 tablespoons nut butter

(Optional) ⅛ cup flax seeds, freshly ground, for each 12 oz. serving

Steps:

1. Remove stems from greens. Coarsely chop greens or tear them into pieces. Fill blender.
2. Blend the greens with juice until smooth, about 1-2 minutes.
3. Add yogurt, fruit, water and — if desired — nut butter, and flax seeds.
4. Blend until smooth. Drink right away or keep refrigerated for up to 24 hours.

Good Fresh or Frozen Fruit Options Include:

Bananas

Berries

Nectarines

Peaches

Oranges

Tangerines

Apples

Pears

I will bring _____

Fruit

for Smoothie Day on _____

Date

Recommended Grade Level:
2-5

Season:
Any

Indoor

Food Festival

Description:

In this activity, students choose a fruit or vegetable and plan a festival to celebrate all that they have learned.

Background:

In traditional societies where a particular food holds a prominent place, celebrations, festivals and rituals have grown up around the crop to honor it and give thanks. Anthropologists who study how people manage the environment study celebrations for insights into resource management. In the Maya culture, ceremonies are an opportunity to teach. Children learn about the world through ritual. They learn that food is the product of interactions between themselves and the natural world. In this way, they learn to treat resources with respect and not to use everything up.

Sometimes festivals help organize a community by creating a common purpose within that community — for example husking bees where the community gathers to shuck corn, or the county fair. Harvest celebrations also involve the practice of saving seed and storing it for the next planting.

Your food festival complete with guests can be held any time of the year. It can be in the spring to celebrate planting in the garden. Or, it can be held in the autumn to celebrate the harvest. You may wish to use this lesson as an opportunity to teach families about the importance of eating fresh fruit and vegetables. You can make this an annual community-wide event. It's a great way to fundraise to help keep your Teaching Garden program going!

Materials:

- Food Festival Ideas (included with this lesson)
- Food Festival Invitation reproducible handout
- Chart paper
- Markers
- (Optional) brochures from food festivals

Preparation:

1. Decide the scope and size of the festival you wish to create. If you decide to make this a school-wide event, get together with other teachers and develop a plan.
2. Review the Food Festival Ideas. Collect brochures for different kinds of food festivals. Some quick Internet searches will provide a wealth of information, including some international festivals.

Activity:

1. Engage students in a discussion of different kinds of festivals. *Have you ever gone to a pumpkin festival or a harvest festival or a county fair? What kinds of things did you see and do?* Invite students to describe some of the festivals or fairs that they have attended. Encourage students to discuss what they were celebrating. Record students' responses on chart paper.
2. Invite students to suggest different kinds of foods that the class can celebrate. Accept all ideas. Next, take a vote. Encourage students to think of a food that is in season and available. Alternatively, discuss having a festival that celebrates the garden as a source of plant-based foods.
3. Next, brainstorm a list of ideas for the festival and record them on chart paper. Stimulate the discussion with questions such as:
   a. Whom would you like to invite to our festival?
   b. What information would you like to share with them?
   c. How could we show our guests what we have learned about this fruit (or vegetable or garden)?
4. Work with students to organize a schedule and a "things to do" list. Be sure to include:
   a. When the festival will be
   b. Who to invite
   c. What will be needed
   d. What activities will be part of the festival
   e. Will we include crafts?
   f. What is needed for the activities
   g. What food will be served? Remind students that they will need to make their own materials list for any recipes or crafts.
5. As preparations proceed, help students check off items on the list.
6. Help students compose the invitations to the festival. Be sure they include date, time and location. Ask students if there is any other information that they want to include. Students may wish to make individual invitations, or make a class design and photocopy it.

7. You may want to set up stations within the classroom so students can work on their festival projects over the next few days or weeks. Here are a few ideas:
   a. Students make crafts related to the food they are celebrating.
   b. Students prepare simple recipes that celebrate the food. Look through the lesson plans, parent newsletter inserts and school garden manual for ideas.
   c. Students plan and practice activities and entertainment. Have students prepare brief narrative presentations or read poems or prose.
8. The day before the festival, go over the list of things to do for the last time. Make sure that everything is checked off.
9. Review the schedule for the festival. Be sure volunteers are scheduled to help with the clean-up.
10. On festival day, celebrate!

Tying it Together:

After the festival, have the class reflect on the festival.

National Standards:

NCTE: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

NCSS: Culture: Human beings create, learn, share and adapt to culture.

Food Festival Ideas

Festivals are a great way to promote your Teaching Gardens activities, promote fruits and vegetables, and offer family-oriented activities that educate and enlighten! In addition, festivals offer an opportunity to raise funds to keep your garden growing.

Examples of Festivals

- **Apple Festival:** Apples have a long history and are an important agricultural crop in many regions of the United States.
- **Berry Festival:** Celebrate strawberries, blueberries, raspberries, native berries: or just celebrate berries! Look at the National Blueberry Festival in Michigan or regional strawberry festivals for ideas.
- **Pumpkin Festival:** If you grew pumpkins in your garden, this is an ideal back-to-school celebration. Carve or paint pumpkins, serve roasted pumpkin seeds, pumpkin soup, etc.
- **Cucumber Festival:** In Russia, cucumbers, onions, carrots and cabbages are eaten daily. The cucumber is considered the most important and nutritious. For the Cucumber Festival, everyone decorates their houses with cucumbers, people wear cucumber masks, and there's a cucumber-eating contest.

Check out these other festivals on the Internet or just make up you own!

- Artichoke Festival
- Broccoli Festival
- Grape Festival
- Garlic Festival
- Potato Festival
- Carrot Festival

Ideas for Festival Activities:

- Celebrity Chef demonstrations that star your students. Have the students prepare recipes they've tried at school, or family favorites. Invite parent volunteers to assist, but make sure the student is the Celebrity Chef!
- Mixologists can stir up some fruit or vegetable smoothies.
- Start seedlings and share them with festival participants.
- Have a craft section. Look for crafts that relate to the star of the festival. For example, make dried-apple people or strings of dried apples. Make class quilts that feature student drawings of the food being celebrated.
- For activities, try potato sack races; carving and/or weighing pumpkins; make large cut-outs for frames and take photos of participants smiling through a strawberry, pumpkin, apple or potato!
- For entertainment, have students tell the story of Johnny Appleseed or retell other food-related stories.
- Set up an informational exhibit. Have the students create posters that highlight what they have learned.
- Have copies of recipes to hand out to festival participants. Make a festival cookbook.
- Hold a parade. Invite participants to come in costume.

[school logo]

Food Festival Invitation

[insert class name]

invites you to attend a

[insert name of festival].

[Space to insert information about the festival.
Include information about why you are celebrating the food/harvest/garden.
Describe some of the activities the guests will find at the festival.
Be sure to say whether it's indoors or outdoors/rain or shine.]

Date:

Time:

Location:

R.S.V.P.

Recommended Grade Level:
3-5

Season:
Any

Indoor

Food Around the World

Description:

Students work in small groups and research different kinds of bread that are made from different kinds of grains. They develop an understanding of how foods around the world reflect a country's geography, culture and climate.

Background:

Cultivating grains, or cereal grains, is one of the hallmarks of early agriculture. Grains are grasses that are grown for their edible parts. The three grains that most often come to mind are corn, wheat and rice. They are considered staple foods, which means they are the most common food in people's diets. However there are other grains that are used, including barley, oats, rye, millet, spelt, teff and amaranth. The staple crop in a region depends on the soil, topography and climate.

Grain, straight from the plant, is too hard to eat. It had to be processed. The obvious solution was to grind it into flour. Flour was mixed with a liquid to make porridge, like oatmeal, or to make a batter, which could be baked into flatbreads. The grains may be different, but the process of making flatbread is the same: Batter is cooked on a hot surface. The world is full of grain and it's full of flatbreads. The kind depends on where you are in the world. In short, what we eat says a lot about where we live and who we are.

Materials:

- World map
- Chart paper
- Markers
- Bread Worksheet reproducible handout
- Flatbreads Around the World reference sheet (included in this lesson)
- Research materials (books, encyclopedia, Internet)
- (Optional) examples of different kinds of grains

Preparation:

1. Make copies of the Bread Worksheet for each student.
2. Review the Flatbreads Around the World reference sheet.

Activity:

1. Post the world map. Engage students in a discussion of bread. Remind them that all over the world, people eat bread. Start a class list of different kinds of bread that students are familiar with. *Can you name some breads that are eaten in different countries? What are some breads that we eat in the United States? What's the name of a bread that's eaten in Mexico? Can you think of a bread that's eaten in the Middle East? In India?* Find out how many students have eaten bagels, tortillas, chapatti, challah, pita bread and so forth.
2. Tell students that they are going to work in small groups to research different kinds of flatbread. Assign each group a grain: wheat, barley, millet, corn, oats, rice and rye. Tell them to research where the grain is grown, flatbread that is made from that grain, and how the flatbread is eaten. Distribute the Bread Worksheet to each student.
3. Have students begin their research. Once they find out where the grain is grown and what flatbread is eaten in that part of the world, have them put a piece of paper on the map that identifies the grain and the flatbread. Allow students to work at their own pace. If they don't complete the work in class, have them complete it as homework.

Tying it Together:

Have student groups make presentations to the class. Encourage the other students to ask questions.

Digging Deeper:

- Make a book with the class to document what they have found out about flatbreads.
- Have students research the national origins of their favorite foods. They can research a dish, or the origin of the ingredients used in the dish.

National Standards:

NCTE: Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

NCSS: Culture: Human beings create, learn, share and adapt to culture.

NSES: K-4: The Characteristics of Organisms

Literature Connection:

Bread, Bread Bread by Ann Morris

Bread is for Eating by David and Phillis Gershator

Flatbreads Around the World

Africa

- Injera (Ethiopia, Somalia, Eritrea)
- Khubz (Morocco)
- Ngome (Mali)

India/Sri Lanka

- Bhakri
- Chapati
- Dosai
- Naan
- Pappad
- Paratha
- Puri
- Roti

Mediterranean/Middle East

- Aish Mehahra (Egypt)
- Baladi (Egypt)
- Barbari bread (Iran)
- Lavash (Armenia)
- Matzo (Israel)
- Pita
- Sangak (Iran)

China

- Green onion pancakes
- Sanchuisanda

Southeast Asia

- Khanom buang (Thailand)
- Roti canai (Malaysia)

Europe

- Blintz/blini (Russia)
- Ciabatta (Italy)
- Crêpes (France)
- Crisp Bread (Scandinavia)
- Flatbrod (Norway)
- Focaccia (Italy)
- Lefse (Norway)
- Oatcakes (Scotland)
- Pane Carasau (Italy)
- Pannekoek (The Netherlands)
- Pfannkuchen (Germany)
- Piadine (Italy)
- Pizza (Italy)
- Waffles (Belgium)

North America

- Pancake

South & Central America

- Arepa
- Tortilla

Bread Worksheet

Find out the answers to the questions below by going to the library, using the Internet and/or interviewing a member of your family or someone in the community.

Name _____

1. What is the name of the grain that are you researching?

2. What region of the world is the grain associated with? What does the grain need to grow? *(climate, type of soil)*

3. What is the name of the flatbread that is made from this grain?

4. Who usually makes the flatbread?

5. What are the key ingredients in the flatbread?

6. How is the flatbread eaten? Are vegetables and/or meat or fish put on top of the bread or inside the bread? Do people wrap the flatbread, like a tortilla or a crepe? Do they hold the bread, like a pita? Or does it serve as a base for other food to be placed on top of it, like a pizza?

7. Is the flatbread eaten at every meal?

8. Additional information:

Recommended Grade Level:
4-5

Season:
Any

Outdoor, then Indoor

Flatbread from Scratch

Description:

In this activity, students will discuss wheat as an example of a food in the grain group, learn about the difference between whole- and white-wheat flour, and then process wheat into flatbread.

Background:

Most home gardeners do not grow wheat, because it takes up a lot of space for a small yield. Wheat is, however, a fantastic crop for school gardens because it allows students to observe how a common food goes from seed to table.

Wheat is one important grain in our diets. Grains provide us with dietary fiber, vitamins and minerals. In addition, grains — and especially whole grains — help us digest food and give us energy. Whole-wheat flour is distinct from white flour in that it is made from the bran, germ and endosperm of the plant, whereas white flour is made exclusively from the endosperm. Because it contains more parts of the wheat plant, whole-wheat flour contains more calcium, fiber, protein and other minerals than white flour.

Unlike other produce, grains can be stored over long periods of time. Also unlike most other crops, grains have to be processed in some way before they can be eaten. Therefore, people have been grinding grains into flour or meal for thousands of years. Every great culture has had a reliable source of food and that food was often a grain or grass. Rice was the first grain that people grew for food. Today, it is still central to the diet of six out of 10 people in the world. The others depend primarily on corn, wheat, barley and oats.

It is ideal to do this lesson in conjunction with the Food from Around the World lesson.

Materials:

If you have dry wheat plants from your garden, you can thresh and winnow it. To do this, you will need:

- 1 large tarp for each group of 8 students
- 1 handful of dried wheat plants for each group of 8 students (drying instructions in Preparation Section)
- 1 old garden hose cut into 3 foot-long segments for each group of 10 students
- 2 large, clean buckets
- *Optional: Traditional winnowing baskets or photos of them (found in antique stores or online)*

If you threshed wheat, you now have wheat berries. If not, you can purchase wheat berries in the bulk bin of most natural food stores and start the lesson with grinding. To grind wheat and bake flatbread, you will need:

- 1 copy of Flatbread Recipe reproducible handout
- 3 cups of wheat berries (makes approx. 2 cups whole-wheat flour)
- Flour or coffee grinder, blender or food processor, or a hand wheat grinder
- 1 large bowl
- 1 tablespoon yeast
- 2 cups warm water
- 2 teaspoons salt
- 1/4 cup olive oil
- 2-3 cups white flour, as needed
- *Optional: 2-3 tablespoons fresh herbs from the garden (e.g., rosemary, thyme, sage, basil, oregano)*

Preparation:

Prior to Lesson

Grow wheat in your garden and let it dry out in the field. Once fully mature and dried, cut the stalks, bundle and store in a pest-proof container, such as a garbage can with a lid, in a dark, cool place. You'll know your wheat is dry enough when the wheat berries, found in the head at the top of each stalk, shatter when hit with a hammer.

NOTE: If you did not grow wheat in your garden skip to step 11 of the Activity.

The Day of the Lesson

1. Set up a wheat-threshing station for each group of 8 students. To do this:
   a. Lay each tarp on the ground and stake or weight the edges.
   b. Place the buckets, hose segments and a bundle of dry wheat on or near each tarp.
   c. Place the grinder or blender near an electrical outlet, if needed.

Activity:

1. Tell students that they will be turning wheat into flatbread. *Today we are going to work with a specific grain, called wheat. Who remembers, from our Food Group Lesson, what grains give us or help us do? (They give us energy and help us digest food.) Who here has eaten something that has wheat in it? Share examples (bread, pasta, flour tortillas, baked treats, etc.) Does anyone know where that wheat flour comes from? (Wheat plants)* Hold up a wheat stalk. *Which part of this plant do you think we use to make wheat flour?* Raise your hand as I point to the plant part you think we use: *Root? Stem? Leaf? Seed? We use the seed. Today we'll learn how to get these seeds out.*
2. Give every student in your group a wheat stalk and have them take one seed out by hand. Invite them to eat the seed, if they want to. *How long do you think it might take us to take all of the seeds out of all of this wheat if we did it this way?*

3. Have one group of students place all of their wheat stalks, along with the rest of the bundle for the group, on a tarp. *Another way we can separate the wheat from the chaff is to hit it. This is called "threshing."* Have students step back from you, hold one end of a 3' hose segment in each hand, and demonstrate how they can hit the wheat with the hose segment. Emphasize that they need only lift their hose segments to their knees in order to avoid hitting other students. Divide students into groups of 8 or fewer, gather each group around a tarp, hand out hose segments and have students thresh all of the wheat on the tarp.
4. Once most of the wheat seeds look separated, have students stop, put down the hoses, and look at what is on the tarp. They should see many seeds and many empty wheat chaffs. Ask them to start separating the seeds out and placing them into a bowl. *How long do you think it might take for us to pick out all of the wheat seeds?*
5. Once students have hand-separated the wheat for a minute or two, show them a quicker way to do this. First, have students remove all the long stalks from the tarp.
6. Have students pick up a handful of wheat seeds and chaffs. Have them gently toss the seeds up and catch them while blowing over their hands. The chaffs should blow away as they do this, leaving just the seeds in their hands. This is called winnowing.
7. Optional: If you have a winnowing basket, you can show them the same process with many more seeds and chaffs using the basket.
8. To winnow all of the seeds at once, pour all of the remaining contents (seed and chaff) from the tarps into one large, clean bucket.
9. Pick the bucket up about 2 feet over the other bucket and slowly pour the wheat seeds and chaff into the other bucket. As you pour, any light wind will start to blow the chaffs away. If there is no wind, have students blow on the stream of wheat and chaffs as they pour from one bucket to the other. You may also use fans.
10. Have students continue to pour the wheat from one bucket to another and back, taking turns to pour and blow on the pouring stream of wheat until almost all that you have left in the bucket are wheat seeds. Have students pick out the few remaining chaffs by hand to get completely cleaned wheat seeds. These are also known as wheat berries. **If you did not grow wheat in your garden, you can start the lesson here.**
11. Show students wheat berries and where on a wheat plant (you can also use a picture of the plant) these wheat berries grow.
12. Measure 3 cups of wheat berries in a measuring cup.
13. Ask students how we might turn the wheat berries into flour. Give them a moment to try out their ideas.
14. Ask what kind of machine they might use. Encourage them to indentify machines that grind other things.
15. Show students the grinder or blender. Allow them to take turns grinding the wheat berries into flour. Have students inspect the wheat berries when they are only partly ground, and again after they are completely ground. Give them a little to taste.
16. Have students estimate how many cups of flour they will have made from the 3 cups of wheat berries. Measure the flour after the wheat has been ground. Discuss results *(there will be less than 3 cups because there is less air space in between the ground grains of flour than there was between the wheat berries).*
17. Using the flour you have made, have students take turns following the steps for the flatbread recipe.

Tying it Together:

How did the wheat berries change when we ground them? How did the flour change once it was cooked into flatbread? What are some other grains we could use to make flour? (corn, rice, etc.) What foods can you think of that are made from other grains? (Tortillas from corn flour, spring roll wraps from rice flour, etc.)

Digging Deeper:

- Read *Bread is for Eating* by David and Philis Gershator.
- Have students write and illustrate their own storybooks about making bread from wheat.

National Standards:

NCSS: Young children learn how science and technologies influence beliefs, knowledge and their daily lives.

NCTE: Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

Flatbread Recipe

Ingredients:

- 3 cups whole-wheat flour
- 1 tablespoon yeast
- 2 cups warm water
- 2 teaspoons salt
- ¼ cup olive oil
- 2-3 cups white flour, as needed
- Optional: 2-3 tablespoons fresh herbs, chopped (e.g., rosemary, thyme, sage, basil, oregano)

Cooking Equipment:

- Baking sheet
- Oven

Steps:

1. Mix yeast and warm water together in a bowl until yeast is completely dissolved.
2. Add salt, oil and whole-wheat flour that you just ground.
3. Gradually add white flour until dough is no longer sticky.
4. Knead on a flour-covered cutting board, adding flour as needed.
5. Clean bowl; sprinkle bowl with oil and set dough inside. Cover with towel. Place in a warm location to rise for 45 minutes.
6. Preheat oven to 400° Farenheit.
7. Grease baking sheet.
8. Give each student a ball of dough to form into a shape about ½" thick. If desired, let students pick herbs in the garden, chop them and add them into their dough.
9. Bake for 25-30 minutes. Enjoy!

Tip: Keep hand-ground flour in the fridge or freezer if you're not using it right away.

Recommended Grade Level:
3-5

Season:
Any

Outdoor or Indoor

Celebrating Family Food Traditions

Description:

Students plan a celebration of family food traditions using fresh foods from the garden. They take home a reproducible recipe "card" and record a favorite family recipe that features a food from their school garden or some other seasonal fruit or vegetable to share with the class. Students design invitations and plan a menu.

Background:

This lesson celebrates family tradition and starts a class tradition — celebrating the school garden by using fresh fruit and vegetables for a class potluck that features family recipes. The lesson culminates with a class family feast.

This activity can be as simple or as grand as you want it to be. What you do will depend on how many volunteers you can recruit, how much time you have and what you have growing in the garden. Whatever you choose to do, make the atmosphere celebratory. This is your students' chance to celebrate family recipes and a new class tradition. Involve students in the preparation as well as the celebration. Have students make table decorations, write invitations, design the menu and help prepare the food.

Materials:

- Teaching Gardens recipe card reproducible handout
- Construction paper for book covers
- Food ingredients for the meal, including fresh foods from the garden
- Cooking and serving utensils
- Table decorations
- Plates and eating utensils
- Napkins
- Compost bucket to collect scraps

Activity:

1. Conduct a whole class discussion about traditions. *What is a tradition? What are some examples of family traditions? Do we all share the same family traditions? Do you think that special meals are a tradition? Can you think of any holiday meals that might be traditional?* Make sure students understand that all families have different traditions that are handed down from one generation to another. Check to make sure students understand that it's important to respect the differences in family traditions.
2. Tell students that the class is going to start a class tradition. Explain that for homework, each student will bring in a favorite family recipe that uses at least one of the fruits or vegetables they are growing in the school garden. Before you hand out the Teaching Garden recipe card, invite student volunteers to describe a favorite family recipe that includes fruit or vegetables. Explain that the class is going to make a class book that includes their recipes. They will leave one copy of the book in the classroom for the next year's students to enjoy.
3. Make a list of the fruits and vegetables that are available in the garden. You may wish to supplement the list with other local, seasonal produce. Have students copy the list to take home with the recipe card. Distribute the recipe cards. Invite students to illustrate the recipe, but tell them that it is not required.
4. As a class, decide on your guest list. You may wish to include parents, a buddy class, the principal, custodian or other school staff members.
5. Discuss invitations and table setting, and plan the menu. Divide students into interest groups or committees to manage the various jobs more easily. If possible, you can have an adult helper work with each group to help students complete their tasks.
6. Schedule time to prepare for the class potluck.
7. Next, invite the class to share ideas about polite behavior when eating.
8. Gather all the ingredients.
9. On the day of the event, assemble adult volunteers. Have them work in small groups with students to prepare the meal, set the table, make the decorations, clean up and so forth.
10. Have students greet guests as they arrive and seat them. Let the feast begin!

Tying it Together:

1. After the event is over, invite students to discuss their class tradition. *What are we passing on to next year's class? Is sending invitations part of our class tradition? Is eating fresh fruits and vegetables part of the tradition? Is there anything you would like to tell them about our class tradition?*

2. Assemble the class recipe book. Collect all the recipes and make enough copies so each student will have a recipe book and one extra to leave for the next year's incoming class. Have students use construction paper for book covers.

Digging Deeper:

- Have students research traditions in other lands.

National Standards:

NCTE: Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information).

NCSS: Individual Identity and Development: Personal identity is shaped by an individual's culture, by groups, by institutional influences and by lived experiences shared with people inside and outside the individual's own culture throughout her or his development.

Literature Connection:

Family Pictures/Cuadros de Familia by Carmen Lomas Garza

American Heart Association
TEACHING GARDENS

My Heart. My Life.™

Teaching Gardens Recipe Card

From the kitchen of:_____

Recipe:_____

Ingredients:

Directions:

Makes_____ servings

Recommended Grade Level:
3-5

Season:
Any

Indoor

Snack Historians

Description:

Students investigate a popular snack — popcorn. They conduct interviews to discover more about popcorn as a food.

Background:

Popcorn has been a food crop for a very long time. When Columbus landed in the West Indies on his first trip to the New World he found the Arawak Indians who lived there were selling popcorn and wearing it on necklaces. In Mexico, the Aztecs used popcorn as a decorative item in ceremonial headdresses. Popcorn even had a place at the first Thanksgiving. The colonists loved the popcorn and looked for new ways of eating it. They even ate popcorn for breakfast, with cream poured over it.

While popping corn was common practice throughout the Americas, the methods for popping it differed greatly. Some Native Americans pushed a stick through the popcorn cob and popped the entire ear over the fire. Others threw the kernels on the fire and caught the popped morsels as a test of skill. Still others popped the corn by placing it in a large clay vessel filled with heated sand.

In the 1880s, with the invention of a steam-powered machine that popped the kernels, popcorn became a street food. In 1907, the electric popcorn popper made popcorn even more accessible. With the advent of the television, popcorn appeared in the living room and popcorn consumption shot way up. According to the Popcorn Institute, a trade organization in Chicago, "Americans consume some 16 billion quarts of this whole grain ... That's 52 quarts per man, woman and child."

Materials:

- World map
- Notebooks or journals
- *Optional: Bag of popcorn kernels*
- *Optional: Air popcorn popper*

Preparation:

1. Post the map on the wall.

Activity:

1. Challenge students to think of a plant-based food native to the Americas that has been eaten for thousands of years. Continue to give students clues until they can name the food — corn. Tell students that this lesson focuses on a specific kind of corn — popcorn.

2. Engage students in a discussion of popcorn. Discuss early uses of popcorn — from Columbus to the Aztecs to the first Thanksgiving. Invite student volunteers to locate the West Indies, Mexico and Massachusetts on the map. Point out that popcorn has been eaten as a food and used for decorations for thousands of years. Encourage students to think about how they can find out if popcorn has always been the same kind of snack. *Do you eat popcorn? How do you prepare it? Do you buy it already-made? Do you think popcorn has always been prepared the way we eat it today? How can we find out more about the history of popcorn? Who can we ask to find out more about what popcorn was like before you were born?*

3. Tell students that the class is going to investigate the history of how popcorn is prepared and eaten. Engage them in a discussion of primary sources. *What's the difference between a primary and secondary source? If we research information in a book that was written by a person traveling with Columbus, is that a primary or secondary source? Why? If we read about popcorn in an encyclopedia, is that a primary or secondary source? Why? If we interview a person about his or her experience, is it a primary or secondary source? Why?*

4. Tell students they are going to conduct interviews to find out what adults living today can tell them about popcorn. Brainstorm a list of questions to ask. Direct students to think about the question or questions they want to answer and the information they need to know in order to answer the question. Have them write their questions in the notebook or journal. Here are some sample questions:

   a. Do you eat popcorn today?

   b. Did you eat popcorn when you were a child?

   c. When you were a child, where did you live?

   d. When you were a child, did you own a popcorn popper? What did it look like?

   e. Did you use a microwave oven to pop corn? How do you pop popcorn today?

   f. Did you buy popcorn already popped and in a bag?

   g. Did you eat popcorn at home?

   h. Was there a special time for eating popcorn?

5. Ask students how they eat popcorn today. Some might eat it with cheese, some with caramel coating, some with salt, and some with nothing at all. Invite students to add questions about the flavorings that their parents and grandparents put on their popcorn. Have students conduct their interviews as homework.

6. After students have completed their interviews, invite them to share what they have learned. Use chart paper to record popcorn popping facts that the class has learned.

Tying it Together:

Did the people you interviewed pop popcorn in the same way? Did they use the same tools to pop corn? Describe what you found out. *Did people use different flavorings for their popcorn? If so, list them on the chart paper. Do you pop popcorn the same way that any of your interviewees did?* Describe any differences. Think about your interviews, why are they described as primary sources?

Optional: Make and enjoy some air-popped popcorn together.

Digging Deeper:

- The word "popcorn" comes from Middle English "poppe" meaning "explosive sound." This is an example of onomatopoeia. Ask students if "pop" sounds like the noise that popcorn makes when it's popping. Then ask if they can think of other words that sound like the natural sound associated with the object or action they are describing (drip, creak, buzz, etc.).
- Research popcorn recipes in old cookbooks. Andrew F. Smith, the author of *Popped Culture: A Social History of Popcorn in America*, discusses *Nelson's Pop Corn Recipes* written by Mary Hamilton Talbott, published in Grinnell, Iowa, in 1916. The book includes recipes for Pop Corn Roast, Pop Corn Cutlet, Pop Corn Rolls, and much more.
- Read *The Popcorn Book* by Tomie de Paola. The author recounts the legend of why popcorn pops. Point out that some folktales, myths or legends arise from a need or desire to explain an event. Challenge students to write their own folktale to explain something.

National Standards:

NCSS: Time, Continuity, and Change: Through a more formal study of history, students in the middle grades continue to expand their understanding of the past and are increasingly able to apply the research methods associated with historical inquiry.

NCTE: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.