The Great Garden Detective Adventure

A Standards-Based Gardening Nutrition Curriculum for Grades 3 and 4

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Available at: *http://www.teamnutrition.usda.gov*

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Welcome

Welcome to The Great Garden Detective Adventure

Dear Teacher,

The *Great Garden Detective Adventure* is a standards-based curriculum that integrates gardening experiences and nutrition education messages into lessons designed to teach English/language arts, mathematics, science, and health to third and fourth graders. The U.S. Department of Agriculture, Food and Nutrition Service is providing this curriculum under its Team Nutrition initiative to support national efforts to empower children to make healthful food choices and develop an awareness of how fruits and vegetables are grown.

We offer you these interactive and exploratory lessons as a creative way to teach traditional subjects while providing students with the opportunity to discover fruits and vegetables. Garden-based learning opportunities are a promising way to boost academic achievement as well, especially when it comes to science (Klemmer, Waliczek, & Zajicek, 2005). Helping to increase children's acceptance of fruits and vegetables can also improve their overall diets. Not only does this have significant benefits for their health, children with healthful eating patterns also tend to do better in school (Florence MD et al., 2008; Fu ML et al., 2007; Kim HY et al., 2003; Sigfúsdóttir et al., 2007). In summary, these lessons are designed to engage kids in learning and developing healthy habits.

You can implement these lessons even if your school does not have a large outdoor garden or long growing season. Many schools use container gardens, grow light systems, raised beds, cold frames, hoop houses, and other techniques to provide their students with gardening experiences. So whether your garden is large or small, we look forward to hearing how your students become garden detectives and discover how to make fruits and vegetables part of their daily food choices.

Sincerely,

Your Friends at Team Nutrition

Kids Need Your Help!

- *The Dietary Guidelines for Americans* recommend that we fill half our plates with fruits and vegetables (USDA & DHHS, 2010), but only 26 percent of kids aged 6-11 eat the recommended amounts of fruits and only 16 percent eat the recommended amounts of vegetables (Lorson, Melgar-Quinonez, & Taylor, 2009).
- One in five children aged 6-11 is obese (Ogden et al., 2010). Weight-associated diseases that were once mainly diagnosed in adults are now being observed in children. For example, one-third of children born in the year 2000 are expected to develop Type 2 diabetes in their lifetime (Narayan et al., 2003).

Their future starts now. Small steps, like using this curriculum, can make a healthy difference.

Getting Started

The Great Garden Detective Adventure focuses on the following important activities:

- **Growing fruits and vegetables** so that students understand where food comes from and how it grows
- **Learning about fruits and vegetables** so that students comprehend the important role that they play in helping people grow and stay healthy
- **Harvesting the fruits and vegetables** so that students experience the satisfaction of seeing the fruits of their labor
- **Preparing simple recipes** as a tactile way to explore fruits and vegetables and engage students in sampling the garden produce in their own tasty creations
- **Tasting the fruits and vegetables** so that students sharpen their sensory appreciation of these foods and develop a willingness to try new tastes
- **Creating a healthy school environment** that involves the principal, parent organization (e.g., Parent Teacher Association, Parent Teacher Organization), school food service, and other members of the school community
- **Bringing the information home** via the family newsletter with activities designed to increase the accessibility and availability of fruits and vegetables

These activities and others are designed based on social cognitive theory. Appendix A shows the relationship between elements of the theory and the curriculum activities.

Garden Requirements

The curriculum is designed to be flexible based on the type and size of garden that is feasible at your school, including container gardens, raised beds, and traditional in-ground gardens. It is built around five "easy to grow" vegetables and two perennial fruits that can be grown in both the fall and spring to give you flexibility about when to implement the learning activities. You may choose to plant all featured fruits and vegetables at the same time in the fall or spring or choose to plant some in the fall and others in the spring.

Time Requirements

The time from planting to harvest for the featured fruits and vegetables is approximately 70 days or less. Thus, you may choose to teach the lessons on a weekly basis over the growing season to address them all or space the lessons at longer intervals if you are planting some in the fall and others in the spring.

Educational Standards

The 11 lessons, suitable for both 3rd and 4th grades, are tied to educational standards in science, English/language arts, mathematics, and health. These standards include the Common Core State Standards in English/Language Arts and Mathematics (National Governors Association & Council of Chief State School Officers, 2010), the National Science Education Standards (National Research Council, 1996), and the National Health Education Standards (The Joint Committee on National Health Education Standards, 2007).

In addition, lesson extensions in many of the lessons provide an opportunity to expand learning opportunities for students and to meet additional educational standards through gardening-related activities. Table 1 on page 10 shows the curriculum and its academic foci at a glance. A more detailed list of standards by lesson appears in Appendix B.

Lesson Structure

Each lesson begins with an overview that summarizes the key content in the lesson and how it may be connected to the garden, to school food service, to other elements of the school, and to the home. Next, each lesson plan lists the learning objectives, time required, materials needed, teacher preparation required, standards addressed, and the instructional process.

About the Theme

The Great Garden Detective Adventure utilizes a mystery and detective theme to engage students in discovering how fruits and vegetables grow, how to prepare them, and the tasty results. The overall message to students is:

> Be a Garden Detective! Discover what fruits and vegetables are sweetest, crunchiest, and juiciest. Share what you learned with your family.

This message was tested in focus groups with students in different parts of the country.

Curriculum Overview

Your garden detectives will:

- Plant a class garden and care for it.
- Grow, harvest, prepare, and taste fruits and vegetables.
- Develop a class cookbook.
- Conduct research to learn about a fruit or vegetable.
- Track their fruit and vegetable consumption.
- Create Public Service Announcements (PSAs) about fruits and vegetables.
- Share what they learn with the rest of the school and their families.

The curriculum culminates with a grand Sleuths' Mystery Dinner where the entire school is invited to share in the bounty of the garden and the garden detectives share what they have learned about gardening and their fruits and vegetables.

Five vegetables and two fruits are featured in *The Great Garden Detective Adventure.* These include leaf lettuces, carrots, spinach, Swiss chard, beets, strawberries, and raspberries/blackberries. These fruits and vegetables are ideal for school gardens because they are typically grown during the early fall and spring. They include some fruits and vegetables that may be familiar to most students (e.g., lettuce and carrots) as well as some that are less commonly consumed (but equally delicious). Even if your class does not grow all seven fruits and vegetables, you can still utilize all of the lessons in this curriculum.

Involve the Home, School, and Community

Make the Home Connection. One tool to help students to share what they learned with their families is the *Garden Detective News.* This family newsletter updates parents and caregivers on what the students are learning in class. Each one contains an activity that families can do together to reinforce the content of the curriculum. These newsletters should be distributed to students to take home to their families at the end of every lesson (except for Lesson 7, where the newsletter is sent home in advance).

Encourage parents and caregivers to read the family newsletter and complete the home activities with their child. They can make the recipes in the family newsletter with their child. Let parents know how much the children enjoyed tasting the foods in class. Parents can be good role models for healthy eating behaviors at home.

Encourage students to talk about what they learned about gardening, cooking, and tasting experiences in school. Their enthusiasm can be infectious at home.

The Garden Detective News appears at the end of each lesson in the curriculum and is included on the provided CD-ROM. Schools participating in the Child Nutrition programs may order free copies of the newsletters. Ordering information is available on the Team Nutrition Web site at *http://www.teamnutrition.usda.gov*.

Invite parents to be volunteers in the classroom when the garden is being planted and tended to, on taste testing and food preparation days, or to be chaperones on field trips.

Engage the School and Community. Gather support by meeting with other teachers, school food service staff, administrators, school board members, school staff such as the librarian and grounds/facility manager, and parents, including the Parent Teacher Association/Parent Teacher Organization (PTA/PTO). For example, the librarian can help with the fruit and vegetable case report research (Lesson 3) and may be helpful in identifying age-appropriate garden and nutrition books to augment the curriculum. The PTA/PTO can encourage volunteerism in helping with the gardening and food preparation activities, and can be helpful in fund-raising for needed supplies. Emphasize the link between nutrition and improved academic performance and behavior. Engage them and solicit ideas for planning and implementing the program in your class.

Coordinate with the Cafeteria. Meet with the school food service director to discuss options for food preparation activities and in promoting spinach, Swiss chard, leaf lettuce, carrots, strawberries, and raspberries/blackberries in the school cafeteria. A letter and planning form that you may use to engage the participation of the school food service director appears on page 15. Review the curriculum and the fruits and vegetables included. Food preparation activities are found in Lessons 8-11, but you may choose to do them when they work best for your class schedule.

Ask the school food service director to print the curriculum's key messages on the school menu and/or post the messages in the cafeteria.

Select a date for the Sleuths' Mystery Dinner and get it on the school calendar. You may need to reserve the cafeteria.

There are also valuable resources in the community that can help you with both gardening and food preparation. These include Master Gardeners, the local Cooperative Extension Service, local farmers, farmers markets, AmeriCorps volunteers, and local chefs. The Community Connections section of each lesson provides suggestions for when to use these resources.

Spread the Word. Make contact with the local media. Share details about your class garden, tasting and food preparation activities, and about any special events you have planned (e.g., guest speakers, field trips). You can contact your school district to find out if it has a Public Information Officer or a Public Affairs department. If so, contact the appropriate person for suggestions, tips, and steps to connect with the media. Be sure to have signed parental permission slips if students are going to be interviewed or photographed.

Use school Web sites and social media to help spread the news.

Plan Your Garden

- **Decide what you are going to plant in the garden.** The Grow Sheets in Appendix C: Gardening Resources contain helpful information about the fruits and vegetables featured in the curriculum. Go to your local Cooperative Extension Service office or local Master Gardeners organization to find the variety of seeds and plants that grow best in your area. Check with your local nursery center to see if the seeds or seedlings you need will be available when you need them. You may have to order some seeds or plants in advance and/or start seedlings in the classroom if your spring season is short.

- **Work with your Master Gardener or garden coordinator about when to plant different vegetables in order for them to be ready to harvest for the Mystery Dinner.** The fruit and vegetable plants mature at different times. For example, spinach takes less time to grow and mature than beets and carrots. It is very motivating to the students to be able to prepare and eat the fruits and vegetables they are growing. Therefore, plan the timing of planting and harvesting the fruits and vegetables, so the garden produce will be ready to be used in the food preparation lessons (depending upon local/district health department policies) and the Mystery Dinner.
- **Use community resources, such as Master Gardeners, Junior Master Gardeners, and 4-H clubs.** They can work with students in the garden, show them how to plant, what to plant, and how to work with seedlings in a greenhouse. They can also teach basic gardening in the classroom. Following their training, Master Gardeners are required to give back service time to schools and community gardens, so they may welcome your request for help.
- **When planning a garden, start small and don't overextend the resources.** The garden should have an overall vision and can be built in phases.
- **When choosing a garden location, consider the following:**
  - **Space:** Evaluate how much space is available. If space is limited, container gardening could be an option.
  - S**oil:** The soil should be well-drained and loose. If drainage is not good or the soil is poor, raised beds are a solution. Raised beds with quality soil are very easy to work with. However, do not use pressure-treated wood for raised beds, because the chemicals can leach into the soil and be hazardous to the vegetables. **Soil should be tested for lead and other potential contaminants.**
  - **Sunlight:** Fruit crops need 8 hours of direct sun, and leaf crops and herbs need 6. A way to determine if a place is sunny enough is to place a sheet of paper in the garden area and check to see how long it remains bright, without shade.
  - **Water**: A source for water must be very convenient. Watering ideally takes place very early in the day to reduce evaporation. Consider mulching to reduce the need for water.
  - **High Visibility:** It is good when the garden can be viewed and admired. A school courtyard or a securely fenced area is ideal.
  - **Location:** The garden should be convenient and easily accessed by students and teachers. The location should be planned for protection from active recreation and vandalism.
- **Before launching the school garden project, make a list of the resources you need to get started.** Consider what funds, goods, expertise, and services do not come from within the school community.
- **Be flexible about gardening-related curriculum activities.** Mother Nature is not always cooperative. Some plants may fail to thrive. If you have assigned a small group of students to each fruit or vegetable, you may need to reassign students whose plants have failed to other small groups working with different plants.
- **Use the Web sites listed in Appendix C** for more information and tips on successful school gardening.

Adapt the Curriculum to the Needs of Diverse Learners

The *Great Garden Detective Adventure* was designed to meet the Common Core standards for English/ Language Arts and Mathematics in Grades 3 and 4. As you review the curriculum and plan instruction, you may find that some activities appear too challenging for some students in your class. Here are some suggestions for meeting the needs of these students:

Reading Assignments: If some students find the reading assignments in the curriculum too difficult, you may wish to read them aloud. An example of where this may be helpful is in Lesson 5: *Trace the Fruit and Vegetable Trail.* It contains a student handout (***Student Handout 5.1***) entitled *Terry and Sam Solve the Mystery of Where Fruits and Vegetables Come From,* which is a story about a class that makes a field trip to a farm. ***Student Handout 5.2*** contains *Reading Comprehension Questions* about the story. Review the reading comprehension questions with challenged readers before you read the story aloud. This will help them listen for clues in the story to answer the questions.

Research Assignments: Lesson 3: *Investigate Like a Super Sleuth*, requires students to prepare and write a research report about a fruit or vegetable of their choosing. The information they uncover also provides the basis for the development of a poster and Public Service Announcements. If your students have not yet acquired research and report writing skills, you may use this lesson as a vehicle for teaching them. An optional graphic organizer is included in ***Student Handout 3.1*** (pages 2-3) to help students organize their reports. Alternatively, you may choose to have students do a more limited search for information about their fruit or vegetable and then develop a poster or oral presentation.

Mathematics Handouts: There are two versions of ***Student Handout 5.3*** in Lesson 5 entitled *Farmer Brown Does the Math* that contain mathematical exercises. ***Student Handout 5.3.1*** contains an easier version of mathematics (e.g., word problems with only one step). A more challenging version of the handout (e.g., two-step word problems) is numbered ***Student Handout 5.3.2***.

Lesson 1

Use Your Five Senses

Lesson Summary

Overview

Garden detectives use their five senses to give them clues about fruits and vegetables that will be grown in the garden. As part of this lesson, the garden detectives taste fruits and vegetables featured in the curriculum and identify adjectives that describe them, as well as discover the edible parts of plants.

Lesson Extensions

A science-oriented lesson extension gives the detectives the opportunity to examine seeds to learn more about how plants grow.

Key Messages

Be a great garden detective! Discover what fruits and vegetables are sweetest, crunchiest, and juiciest. Share what you learned with your family.

Fruits and vegetables are parts of plants that we eat. What are some leaves, roots, seeds, stems, and taproots that you eat?

Garden Connection

Have the class vote on the fruits and vegetables they want to grow in the class garden based on the tasting activity.

School Food Service Connection

Collaborate with school food service to obtain and prepare fruits and vegetables featured in the curriculum for the tasting activity. Serve prepared fruits and vegetables in the classroom or in the cafeteria.

Home Connection

Send the family newsletter home to parents/caregivers. It contains a parent volunteer form. Encourage parents to prepare a fruit and/or vegetable dish with their child and to complete the activity sheet together.

Community Connection

Invite the Cooperative Extension Service to visit your classroom to talk about school gardens.

Main Lesson: Use Your Five Senses

Standards Addressed

Science
Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

English/Language Arts
Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.*

Learning Objectives

Students will be able to:

1. Identify leaf lettuce, spinach, Swiss chard, beets, carrots, strawberries, and raspberries/blackberries.
2. Describe the sensory characteristics of selected fruits and vegetables.
3. Explain which part of the plant each fruit/vegetable represents.

Time Required

100 minutes

- 50 minutes instruction
- 50 minutes taste-testing

Materials

- An example of each Garden Detective fruit and vegetable in its complete form, i.e., head of leaf lettuce, bunch of Swiss chard, bunch of spinach, whole carrots, beets with stems, strawberries, and raspberries/blackberries
- Samples of each of the following, rinsed under running water and prepared:
  - Spinach
  - Leaf lettuce (2-3 varieties such as romaine, red leaf)
  - Carrots, cut into sticks
  - Swiss Chard, wilted/sautéed with oil and garlic (see recipe in Teacher Background Information)
  - Beets, roasted, peeled, and sliced (see recipe in Teacher Background Information)
  - Strawberries
  - Blackberries/raspberries
- Low-fat or fat-free salad dressing(s), e.g., low-fat ranch or Caesar dressing
- Low-fat or fat-free vanilla yogurt
- Several plastic spoons for serving
- Paper plates and napkins
- Plastic forks
- Index cards
- ***Fruit and Vegetable Flash Cards*** (in Appendix D and on CD-ROM)
- Masking tape to secure ***Fruit and Vegetable Flash Cards*** to the board
- *Garden Detective Journal* cover (in Appendix D and on CD-ROM), one per student
- Two-pocket folders with prong fasteners for *Garden Detective Journals*, one per student
- Glue

- Overhead projector or computer with Liquid Crystal Display (LCD) projector and screen
- ***Overhead/Slide 1.1, Parts of the Plant***
- ***Overhead/Slide 1.2, The Garden Detectives' Tasting Code***
- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!***
- ***Student Handout 1.2, The Garden Detectives' Tasting Code***
- ***Student Handout 1.3, The Five Senses***

Preparation

- Prepare selected fruits and vegetables by cleaning them and cutting them into bite-size pieces. See if your school food service or a local chef or grocery store could assist you with this task.
- Prepare to quickly set up tasting table of featured fruits and vegetables (see Step 5).
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Write the name of each featured fruit and vegetable to be tasted on individual index cards.
- Print ***Garden Detective Journal*** covers and glue covers to pocket folders.
- Duplicate a copy of ***Student Handouts 1.1, 1.2***, and ***1.3*** on three-hole-punched paper for each student.
- Prepare a transparency of ***Overhead/Slide 1.1***, if needed. Prepare a transparency of ***Overhead/Slide 1.2***, if you prefer to project ***The Garden Detectives' Tasting Code*** instead of duplicating ***Student Handout 1.2***.
- Prepare ***Fruit and Vegetable Flash Cards*** (Appendix D) by separating them; laminate the ***Flash Cards***, if desired.
- Write the following headings on the board: Root, Stem, Leaf, Flower, Fruit, Seed.

Instructional Process

STEP 1 **Introduce students to the Garden Detective Fruits and Vegetables (spinach, leaf lettuce, Swiss chard, etc.).** Explain that today the class is beginning an exciting new gardening unit. We will all become garden detectives and search for clues that help us understand where fruits and vegetables come from and how they help us grow and stay healthy.

Tell students:

Some of the things we'll be doing are:

- Planting and taking care of a garden
- Preparing and tasting fruits and vegetables that we grow
- Learning more about fruits and vegetables and sharing what we learn with family and the rest of the school
- Putting together a class cookbook of favorite fruit and vegetable recipes
- Creating commercials (Public Service Announcements) about the fruits and vegetables we're growing for the whole school
- Sharing what we grow with our families at a harvest celebration called the Sleuths' Mystery Dinner

Distribute the ***Garden Detective Journals*** to students. Review the message on the cover:

- **Be a garden detective!** Discover what fruits and vegetables are sweetest, crunchiest, and juiciest. Share what you learned with your family.

Explain that the ***Journal*** is the place where students can keep all their garden detective papers in one place.

We are going to get started by learning something more about fruits and vegetables that we may grow in our garden.

Hold up the individual fruits and vegetables (in the following order) and ask students to tell you what the name of the fruit or vegetable is. As each fruit/vegetable is identified, write its name on the board:

- Leaf lettuces (2-3 varieties)
- Carrots
- Strawberries
- Spinach
- Swiss chard
- Beets
- Raspberries/blackberries

STEP 2 **Discuss fruits and vegetables as plant parts.** Explain to students that when we eat fruits and vegetables, we eat specific parts of the plant that grows in the garden.

Project ***Overhead/Slide 1***, ***Parts of a Plant*** onto a screen. Review pertinent characteristics of each plant part, referring to the parts of the plant you have written on the board:

Root: Grows underground; can be a fleshy taproot that we eat (e.g., carrot, turnip) or a diffuse set of roots; transports water from the soil to the stems to the leaves

Stem: Aboveground; attaches to root and leaves; carries water from roots to leaves

Leaf: Usually green, grows aboveground

Flower: Aboveground; attached to stem

Fruit: Aboveground; attached to stem; contains seeds

Seed: What you plant; contains food for the plant

Note that some plant parts are not edible.

Distribute the ***Fruit and Vegetable Flash Cards***, one per student. As you call on each student, he or she should bring his or her card to the front of the room and hold it up. The student should announce the name of the fruit or vegetable and what part of the plant it comes from. Then the student should place the card on the board in the correct category. Continue until every student has placed his or her ***Fruit/Vegetable Flash Card*** on the board.

Your completed chart should look something like this:

Root	Stem	Leaf	Flower	Fruit	Seed
Carrot	Celery	Spinach	Broccoli	Tomato	Beans (all types—green and dried)
Beet	Asparagus	Leaf Lettuce	Cauliflower	Apple	Peas (green and black-eyed)
Radish		Swiss Chard		Strawberry	Corn (kernels)
Turnip		Kale		Cucumber	Lima Beans
Potato		Collard Greens		Raspberry	Lentils
Sweet Potato		Romaine Lettuce		Banana	
Parsnips		Bok Choy		Blackberry	
Onion		Cabbage		Orange	
		Brussels Sprouts		Peach	
				Pear	
				Kiwi	
				Cantaloupe	
				Mango	
				Grapes	
				Squash (all types)	
				Okra	
				Peppers	

Tell students:

- **Today they will have a chance to taste some of these fruits and vegetables. Circle the fruits and vegetables that they will taste and point out which part of the plant each one represents.**

STEP 3 Distribute *Student Handout 1.1, Stay Healthy: Wash Your Hands!* Review the following key points with students.

Ask the students:

- **How many seconds should we wash our hands for?** (20 seconds, or the time it takes to sing one verse of "Old MacDonald Had a Farm.")
- **Why should we wash our hands for 20 seconds?** (To be sure we get them thoroughly clean.)
- **Why should we turn off the faucet with a paper towel, if one is available, after we have washed our hands?** (So that we don't pick up new germs from the faucet.)
- **What should you not do after washing your hands?** (Actions such as rub eyes, sneeze, cough, touch door knob, touch face, touch your friend's arm, etc.)
- **What should you do when you touch something else?** (Wash your hands again.)

Have all students wash and dry their hands, according to the guidelines.

STEP 4 Distribute *Student Handout 1.2, The Garden Detectives' Tasting Code* to students. You may also wish to project ***Overhead/Slide 1.2, The Garden Detectives' Tasting Code,*** onto the screen so that it is easy for everyone to see. Review the elements of the code with the class.

STEP 5 Set up tasting table of featured fruits and vegetables. Place clean and cut-up versions of each fruit and vegetable on paper plates (one fruit or vegetable per plate) on a table at the front of the classroom or in the cafeteria. Put the index card on which you're written the name of the fruit and vegetable in front of each plate. Put plastic forks, paper plates, and napkins on the table at the beginning of the row of plates.

STEP 6 Invite students to taste the featured fruits and vegetables. In small groups, have students approach the table, take a fork, paper plate, and napkin, and place one piece of each fruit and each vegetable on their plate, then return to their seats. Tell students not to taste anything until told to do so.

When all students have filled their plates, distribute *Student Handout 1.3, The Five Senses,* to each student. Review the five senses—taste, touch, look, sound, and smell. Our sensory organs (mouth, skin, eyes, ears, and nose) help us learn about the world. Explain to students that they will taste each fruit and vegetable and then think of some adjectives to describe it. Write the following terms on the board: Taste, Feel, Sight, Sound, Smell.

Ask the students:

- **Ask students to suggest some adjectives that might describe the sensory qualities of food, e.g.:**

Taste	Feel	Sight	Sound	Smell
Sweet	Firm	Color (green, orange)	Crunchy	Fresh
Sour	Soft	Shiny	Squishy	Earthy
Salty	Rough	Skinny	Crackly	Sweet
Bitter				

Have students taste each fruit and vegetable in the following order:

- Leaf lettuces (2-3 varieties)
- Carrots
- Strawberries
- Spinach
- Swiss chard
- Beets
- Raspberries/blackberries

Ask the students:

Before tasting each fruit/vegetable, ask students:

- **What is the name of this fruit or vegetable?**
- **What part of the plant is it?**
- **Who has eaten _____ before?**
- **How do you think this fruit/vegetable is normally eaten? In a salad? On a sandwich? In lasagna or pasta? On a taco? With rice?**

Have students taste the fruit/vegetable and then complete the portion of ***Handout 1.3, The Five Senses*** that corresponds to it. Before continuing to the next fruit or vegetable, ask for volunteers to share some of the adjectives that they wrote on the handout.

Now have an adult circulate around the room with a container of salad dressing and a container of yogurt. Give each student who desires them a teaspoon of dressing and a teaspoon of yogurt into which they can dip their remaining portions of vegetables and fruits.

Remind students that they are garden detectives and are in the process of discovering what fruits and vegetables are sweetest, crunchiest, and juiciest. Ask them to share what they learned in class today with their family.

Remind students to put all the handouts from this lesson in their ***Garden Detective Journals***.

STEP 7 **Vote on fruits and vegetables to grow.**

Have students vote on which fruits and vegetables they would like to plant in their class garden.

Teacher Background Information

Welcome to the Tasting Table

Vocabulary

Detective: A person whose business is solving mysteries and gathering information that is not easy to get.

Flower: The part of a plant that forms fruits with seeds inside after it has been pollinated and fertilized.

Fertilization: The physical union of male and female parts of the plant to create a seed.

Fruit: The fleshy part of a plant that forms from the flower and contains seeds.

Garden: A plot of earth used to grow vegetables, fruit, or flowers. Gardens come in many forms, including containers, raised beds, and in-ground.

Leaves: The food-making factory of a plant. Leaves are usually green, flat to catch light, and attached to a stem.

Pollination: The spreading of pollen from the male parts to the female parts of a flower, resulting in the production of seeds and fruits. Wind, water, and insects can help pollination occur.

Root: The part of the plant that grows underground and anchors the plant. It moves nutrients and water from the soil to the leaves. It can store food that is produced by the leaves.

Seed: The part of the plant found inside a fruit. Seeds are planted to grow new plants.

Senses: The ways our bodies receive information about the environment. The five senses include sight, hearing, touch, smell, and taste.

Stem: The main structure of a plant that holds up the limbs, leaves, and flowers. Stems carry water and nutrients up through the plant. They can carry food throughout the plant to where it is needed.

Taproot: The main root of a plant which grows vertically in the ground. It may have secondary roots growing from it. In some vegetables, e.g., carrots and turnips, the taproot is the edible part of the plant.

Vegetable: The edible part of a plant, which may be a leaf, root, or stem. Many vegetables we eat are actually fruits because they contain seeds.

Many of the students you teach may never have tasted fruits or vegetables fresh from the garden. Many may have only very limited exposure to fruits and vegetables. Some may think they don't like vegetables very much at all!

Giving children opportunities to taste fruits and vegetables is the key to getting them to enjoy them. It may take several tastings for children to learn to enjoy the taste of vegetables, but research shows that children that taste a fruit or vegetable on many occasions start to like it over time. Therefore, it is important to continue to provide these opportunities for tasting unusual flavors. Most likely children will begin to include more fruits and vegetables in their diet as they have opportunities to taste them.

Tasting Guidelines

There are some things you should keep in mind when preparing your classroom for tasting. First, establish some general guidelines or class rules for tastings with your students. Both ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** and ***Student Handout 1.2, The Garden Detectives' Tasting Code***, should be reviewed with students before tasting activities begin. You may also wish to post a hand-washing poster (e.g., *http://www.fightbac.org/storage/documents/kids_activities/6steps_handwashingposter.pdf*) in the classroom and by the sink.

Second, be sure to collaborate with school food service. In addition to possibly helping with obtaining and preparing foods for tasting, they can help you comply with your district's food handling requirements for classrooms.

Why Is Your Role So Important?

Teachers are important role models for students. As a role model, you are a person whose behavior is imitated by others. This curriculum provides many opportunities for you to taste and like fruits and vegetables, both in the classroom and in the cafeteria. Your students will be more willing to taste and like nutrient-packed fruits and vegetables when they see you modeling these behaviors. So let your students see you enjoy fruits and vegetables. Participate in classroom tastings. Bring fruits and vegetables in your lunch and snacks. Visit students in the school cafeteria and point out how delicious the fruits and vegetables being served look.

Recipes

Wilted Swiss Chard

Preparation Time: 10 minutes
Cooking Time: 20 minutes

Ingredients:

2 ½ pounds Swiss chard
1 medium onion, chopped
3 cloves garlic, finely chopped
1 cup lower sodium chicken stock
⅛ teaspoon salt
⅛ teaspoon pepper

Preparation:

1. Wash hands and clean your work area.
2. Trim the Swiss chard stems to within 2 inches of the leaf.
3. Rinse the leaves and attached stems under running water and put them in a colander to drain.
4. Roughly chop the greens.
5. In a large Dutch oven over medium heat, cook the onion and garlic for about 2 minutes.
6. Add the greens in batches, stirring each batch as it wilts, before adding more.
7. Add 1 cup chicken stock and cook, covered, stirring once or twice, until tender, about 10 minutes.
8. Sprinkle with the salt and pepper.

Yield:

30 1 tablespoon servings

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Roasted Beets

Preparation Time: 15 minutes
Cooking Time: 30 minutes

Ingredients:

15 medium-sized fresh beets
1 tablespoon olive oil

Preparation:

1. Wash hands and clean your work area.
2. Preheat oven to 375° F.
3. Scrub beets with a vegetable brush under running water and cut off tops (beet greens could be used in place of Swiss Chard in the Wilted Swiss Chard Recipe, if desired).
4. Put beets on a large piece of aluminum foil.
5. Drizzle the beets with 1 tablespoon of olive oil before roasting. For even roasting of the beets, fold the foil over them and crimp the sides closed. Place beets on a rimmed baking sheet or in a baking pan.
6. Roast beets until tender—about 30 minutes for small beets and up to an hour for large beets. Check for tenderness.
7. Using oven mitts, remove beets from oven when tender.
8. Let sit until cool enough to handle. When beets are cool enough to handle, unwrap from the aluminum foil. Slip off beet skin by rubbing with your fingers or use a small paring knife.
9. Cut beets into wedges for tasting.

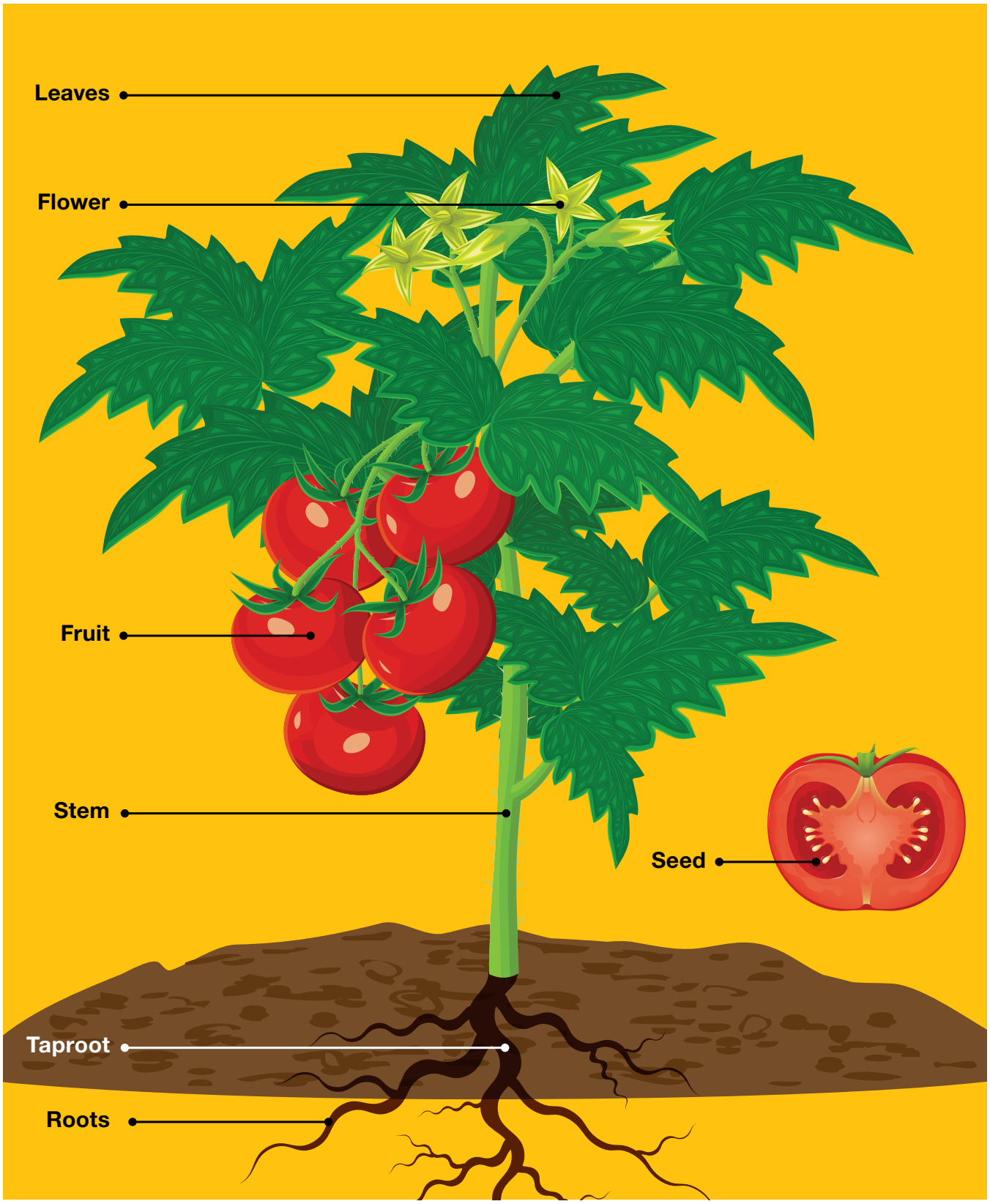
Yield:

30 servings, 1/2 beet each

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Overhead/Slide 1.1

Parts of the Plant



Overhead/Slide 1.2

The Garden Detectives' Tasting Code

The Garden Detectives' Tasting Code

- As garden detectives, we encourage everyone to try a small taste. If you do not like something today, try it again another day. Sometimes preparing foods in different ways will change how it tastes. Sometimes you learn to like a new food.
- You do not have to swallow something that you don't like.
- If you don't like the taste of something:
  - Remove the food politely from your mouth with a napkin.
  - Quietly put the napkin in the waste can.
- Since everyone needs to make his or her own decision about how something tastes, please do not make faces or say unpleasant things about food. Remember that the faces you make or the words you say may hurt the feelings of the person who prepared the food or of someone else who likes the food.

Student Handout 1.1

Stay Healthy: Wash Your Hands!

Name: _____ Date_____

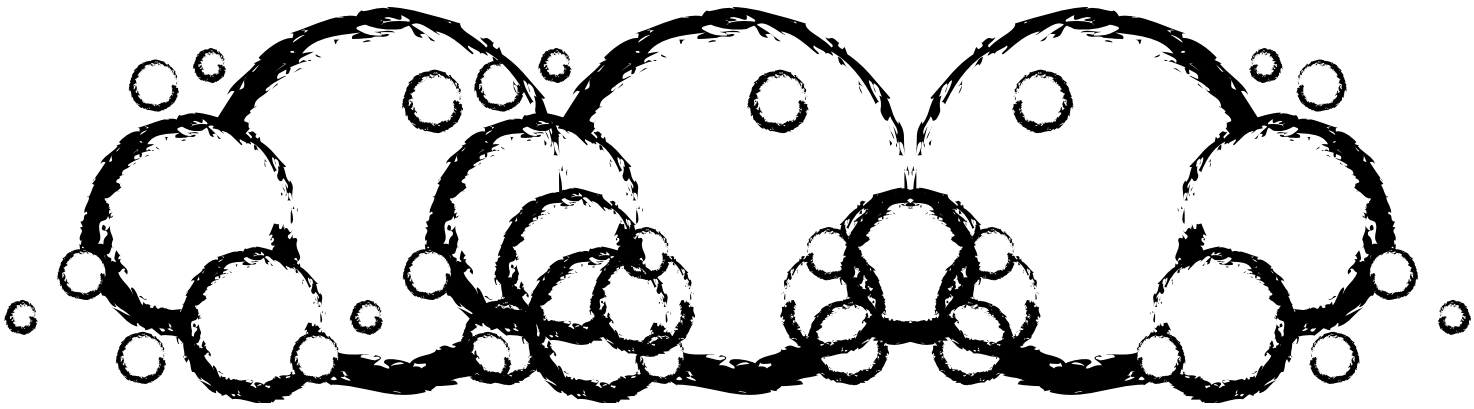
Washing your hands helps keep you healthy by keeping germs from spreading from one person to another.

Always wash your hands before:

- Preparing food
- Eating
- Harvesting fruits, vegetables, or herbs in the garden

Always wash your hands after:

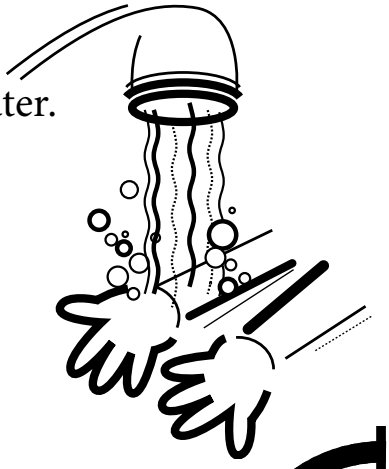
- Preparing food, especially raw seafood, meat, chicken, turkey, or eggs
- Using the toilet
- Touching an animal or animal toys, animal feed, leashes, or waste
- Blowing your nose, coughing, or sneezing into your hands
- Touching a sick or injured person
- Handling garbage or anything that could be dirty, such as a cleaning cloth or soiled shoes



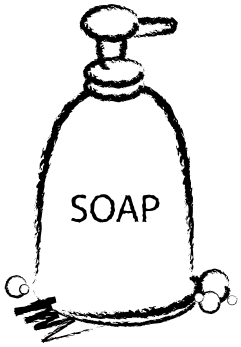
How to Wash your Hands

Wash your hands with soap and water. Follow these simple steps:

- Wet your hands with warm running water.



- Apply liquid, bar, or powder soap.

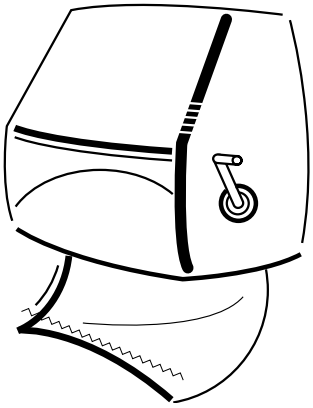


- Lather well.

- Rub your hands vigorously for at least 20 seconds or about how long it takes to sing a verse of "Old MacDonald Had a Farm." Remember to scrub all surfaces, including the backs of your hands, wrists, between your fingers, and under your fingernails.

- Rinse well under running water.

- Dry your hands with a clean or disposable towel or air dryer.



- If possible, use your towel to turn off the faucet and to pull/push open any doors.

Student Handout 1.2

The Garden Detectives' Tasting Code

The Garden Detectives' Tasting Code

- As garden detectives, we encourage everyone to try a small taste. If you do not like something today, try it again another day. Sometimes preparing foods in different ways will change how it tastes. Sometimes you learn to like a new food.
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- Since everyone needs to make his or her own decision about how something tastes, please do not make faces or say unpleasant things about food. Remember that the faces you make or the words you say may hurt the feelings of the person who prepared the food or of someone else who likes the food.

Student Handout 1.3

The Five Senses

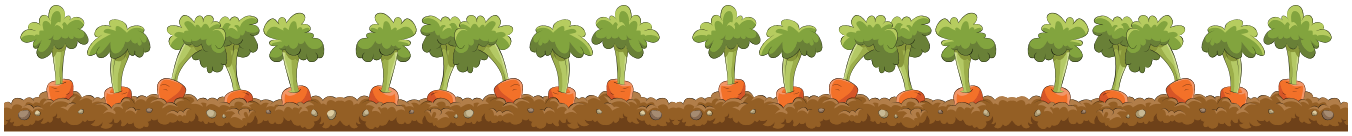
Name: _____ Date_____

Our body gives us important clues about the world around us:

- Our eyes tell us what things look like.
- Our nose tells us what things smell like.
- Our ears tell us what things sound like.
- Our skin tells us what things feel like.
- Our mouth tells us what things taste like.

Fill in the table below with adjectives that describe the experience of tasting fruits and vegetables.

Vegetable/Fruit	Taste	Sight	Feel	Sound	Smell
Leaf Lettuce _____					
Leaf Lettuce _____					
Leaf Lettuce _____					
Carrots					
Strawberries					
Spinach					
Swiss chard					
Beets					
Raspberries					
Blackberries					



Now write a sentence about each fruit and vegetable, using one or more of the adjectives that you wrote down. For example: "I like apples because they are red, crisp, and sweet."

Leaf Lettuces:

Carrots:

Strawberries:

Spinach:

Swiss chard:

Beets:

Raspberries:

Blackberries:

Be a great garden detective! Discover what fruits and vegetables are sweetest, crunchiest, and juiciest. Share what you learned with your family.

Garden Detective News

Grow Healthy Habits With Your Children

In both the class garden and at your table, your child can learn about fruits and vegetables. This month, give them chances to try Swiss chard, carrots, and spinach.

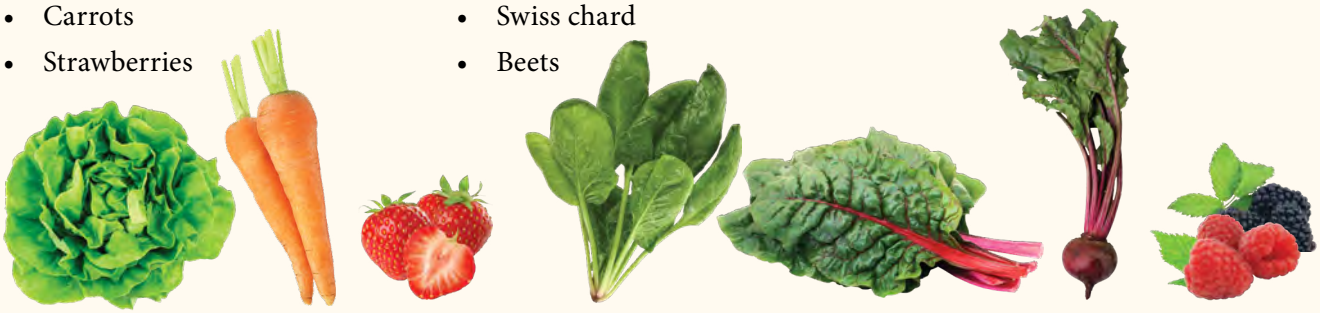
USDA United States Department of Agriculture

Dear Parents:

Our class is about to embark on a *Great Garden Detective Adventure!* Over the next couple of months, we will be exploring fruits and vegetables through gardening, classroom, and school cafeteria activities. By the end of the unit, your child will have used math, science, and English/language arts skills to learn more about where fruits and vegetables come from and why they are good for us.

This week, we tasted some fruits and vegetables that we may grow in our garden. Ask your child to tell you how these fruits and vegetables taste:

- Leaf lettuces
- Carrots
- Strawberries
- Spinach
- Swiss chard
- Beets
- Raspberries or blackberries



Here are some ways you can help make our garden adventure a success:

- Send two large T-shirts or smocks to school by _____ to cover your child's clothes while working in the garden and while cooking.
- Volunteer to help us plant and maintain the garden (return the attached form).
- Volunteer to help in the classroom with our cooking activities (return the form).
- Volunteer to help us put a class cookbook together (return the form).
- Contribute a favorite family recipe featuring fruits or vegetables to our class cookbook (more details to follow).
- Come to school on _____ when we celebrate our garden harvest with a Sleuths' Mystery Dinner (more details to follow).
- Read the *Garden Detective News* when it comes home with your child, and help him or her complete the activities.
- Try serving some of the fruits and vegetables we are learning about at home. Frequent issues of the *Garden Detective News* will share ideas.

We look forward to sharing our adventures with you in the weeks to come!

Sincerely,

WANTED

Parent Volunteer Form

Yes, I'd like to help with The Great Garden Detective Adventure. I can:

_____ **Help plant the garden on** _____

_____ **Help out in the garden occasionally in the next 10 weeks (e.g., watering, pulling weeds). My best time is:** _____ **(day/times)**

_____ **Help out in class for cooking activities**

_____ **Help with the class cookbook**

The best time to reach me is _____

By _____**(telephone) or** _____**(email)**

Signed: _____

Print name: _____

Student: _____

Thank you! Please return this form to _____

by_____.

Family Activity 1

Cook Together This Week

Try making a recipe with fruits or vegetables with your child this week. Then help your child answer the following questions:

Name of recipe: _____

Where did this recipe come from? _____

_____

_____

What fruits and/or vegetables were in the recipe? _____

_____

_____

What part of the plant did these fruits and/or vegetables come from?

Fruit/vegetable	Part of Plant?
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Write 1-2 sentences about how the recipe was prepared and what you thought about it. For example: *I chopped up green peppers and carrots and added them to the tomato sauce. We put it on the spaghetti and it was delicious.*

_____

_____

_____

Lesson Extension: How Plants Grow

Standards Addressed

Science:
Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

Learning Objectives

Students will be able to:

1. Describe the interior of a seed.
2. Identify the parts of a seed.
3. Explain where young plants get their food.

Time Required

20-30 minutes

Materials

- Lima beans (seeds)—at least one lima bean per student
- Shallow container for soaking seeds
- Hand-held magnifying glass

Preparation

- Soak the seeds overnight in about 1 inch of water.
- Drain off the water prior to the lesson.

Instructional Process

STEP 1 Explain to students that every seed contains a new plant and a food source to keep the plant alive until it is big enough to make its own food. Today they will have the opportunity to examine what is inside a seed.

Not only are seeds essential to the continued life of plants, but they also provide us with food.

Ask students:

- **What are some examples of the seeds of fruits and vegetables that we eat?**

Add to responses, which may include:

- The little seeds on the outside of strawberries
- The seeds in cucumbers, tomatoes, kiwis, pumpkins, and squash
- Corn kernels
- Beans

STEP 2 **Distribute seeds to each student.**

STEP 3 **Have students pull off the loosened seed coat.**

Ask students:

- **What do you think the seed coat does for the seed?**

(Protects the new plant from cold or wet or from drying out before it is ready to grow.)

STEP 4 **Instruct students to carefully split the seed in two** from the side AWAY from the indentation. It should split open like a book. Opening the two halves of the seed exposes the embryo, i.e., the plant in its very earliest stage of development.

STEP 5 **Have students find the plant's leaves and roots** by looking through the hand-held magnifying glass at the opened seed.

STEP 6 **Ask students:**

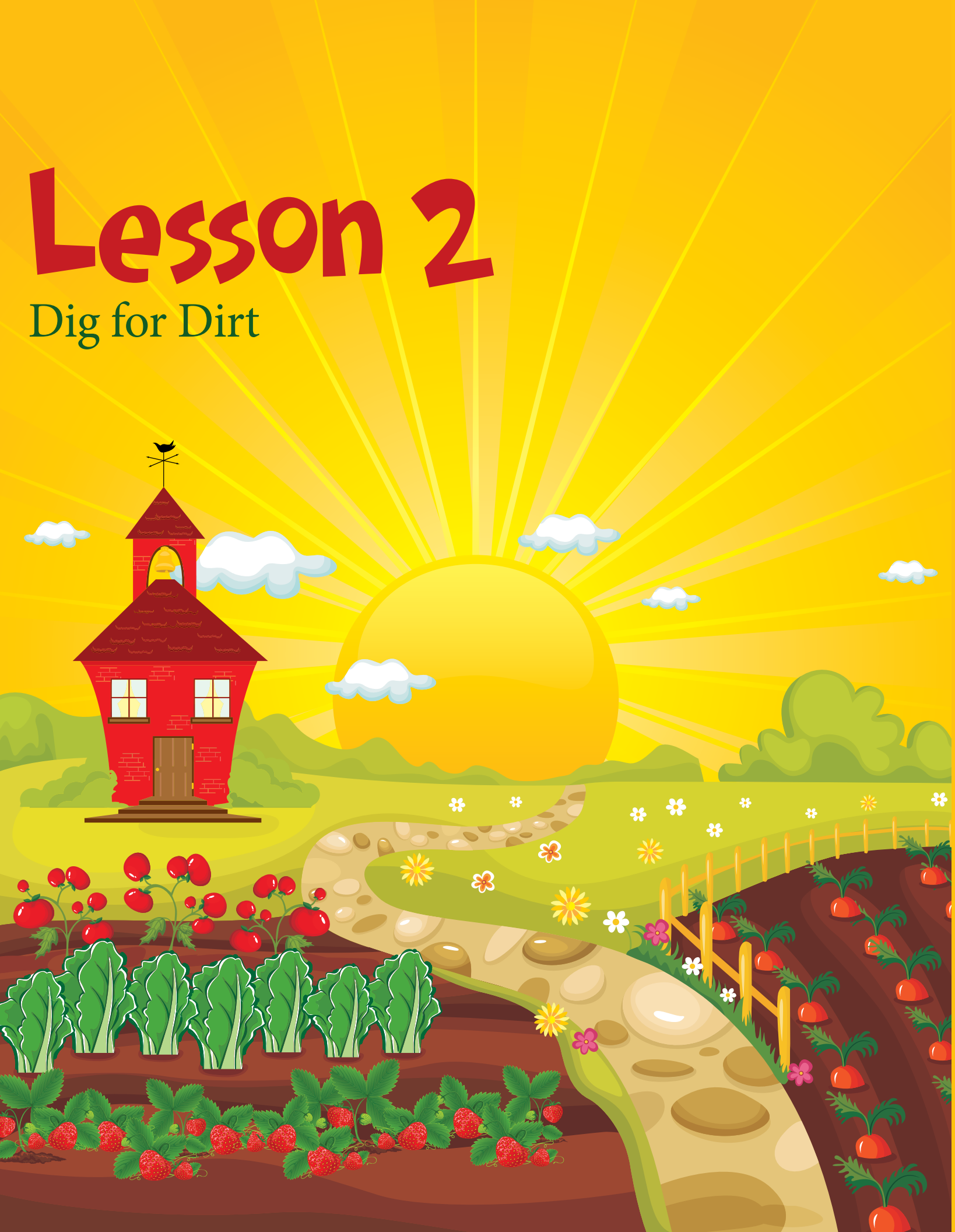
- **Besides the leaves and roots, what do you think the rest of the material in the seed is?** (Food for the new plant. The food store is larger than the small plant.)

STEP 7 **Have students draw the seed parts they have observed.**

Source: Adapted from *Biology of Plants*, © 2006, Missouri Botanical Garden, reprinted courtesy of Missouri Botanical Garden.

Lesson 2

Dig for Dirt



Lesson Summary

Overview

In this lesson, the garden detectives plant the garden and learn what plants need to grow and thrive.

Lesson Extensions

In the lesson extensions, the detectives monitor weather conditions and how they affect plant growth, as well as conduct an experiment to learn more about the conditions that seeds need for germination.

Key Message

Fruits and vegetables grow in the garden. Plants in the garden need food, water, and warmth to grow, just like people do.

Garden Connection

This is the core gardening lesson in the curriculum. Students will need to tend the garden—weeding and watering—on a regular basis throughout the unit. You may wish to invite parents, Master Gardeners, or Cooperative Extension representatives to help maintain the garden.

Be flexible with planting the garden. Ask your Master Gardener or garden coordinator about when to plant different vegetables in order for them to be ready to harvest for the Mystery Dinner. The fruit and vegetable plants mature at different times. For example, spinach takes less time to grow and mature than beets and carrots. See the Grow Sheets in Appendix C: Gardening Resources to estimate the growing time needed for each of the plants.

It is extremely motivating for the students to be able to prepare and eat the fruits and vegetables they are growing. Therefore, plan the timing of planting and harvesting the fruits and vegetables, so the garden produce will be ready to be used in the food preparation lessons (depending upon local/district health department policies) and the Mystery Dinner.

If the timing of the plant maturation does not allow for mature fruits and vegetables to be prepared for the Mystery Dinner or food preparation lessons, students may be able to take mature fruits and vegetables home and prepare them with their families later.

School Connection

If you are planting an outdoor garden on school grounds, put up a sign that explains to others what you are growing in your class garden. If you are planting an indoor garden in your classroom, invite other classes to visit your garden throughout the unit.

Have students prepare and deliver an announcement about your class garden for the school's morning announcements.

Home Connection

Have parent volunteers assist with planting the garden. Have a volunteer take photographs of the students planting their garden (check district photography policies and follow required guidelines). Send unidentified extra seeds home for students and families to plant in a pot. They can have fun solving the mystery of what kind of vegetable their plant will grow into. Send the *Garden Detective News* home to parents/caregivers; encourage students to complete the Eating From the Garden word search with their families.

If you have a digital camera, take a photograph of the students planting the garden to include in the family newsletter and/or in the classroom cookbook. (Again, check district photography policy.)

Community Connection

Invite a Master Gardener to help you plant the garden. Check with your local Cooperative Extension Service to find a Master Gardener near you.

Media Connection

Invite local media (newspaper, TV stations) to report on your class garden. Help them make the connection between the garden and encouraging students and their families to eat more fruits and vegetables.

Main Lesson: Dig for Dirt

Standards Addressed

Science

Standard C, Life Science: D*evelop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

English/Language Arts

Standard 7, Reading Informational Text, Grade 3: *Use information gained from illustrations and the words in the text to demonstrate understanding of the text.*

Standard 7, Reading Informational Text, Grade 4: *Interpret information presented visually, orally, or quantitatively and explain how the information contributes to an understanding of the text in which it appears.*

Learning Objectives

Students will be able to:

1. Demonstrate planting, watering, and weeding skills in the garden.
2. Explain what plants need to grow and thrive.

Time Required

90 minutes

- 45 minutes pre-gardening instruction
- 45 minutes in the garden

Materials

- White paper and glue
- Masking tape
- Seeds and/or seedlings
- Soil
- ***Overhead/Slide 2.1, The Garden Detectives' Code of Conduct***
- Index cards, one per student
- Hand trowel(s)/hoes
- Plant markers or flat sticks for identifying the location and type of seeds planted (can use white plastic paddles available from nurseries; or flat paint stirrers from the paint store)
- Waterproof markers
- Digital camera, if available
- Graph paper, if digital camera is not available
- Seed packet for each fruit and vegetable you are planting
- Rulers for measuring how deep and how far apart to plant seeds
- Computer and LCD projector, if using ***Overhead/Slide 2.1*** as a slide, or overhead projector and screen, if using it as an overhead
- Screen or blank wall

Preparation

- Glue seeds for each vegetable on individual sheets of white paper. Number each sheet clearly on the seed side. Write the name of each seed lightly on the back of each sheet so you can correctly identify the seeds.

- Prepare garden bed for planting. Plan where each fruit/vegetable will go.
- Decide how to divide the class into small groups, one per fruit/vegetable.
- Make copies of seed packets/plant instructions so that each member of each small group has a copy for the fruit/vegetable assigned to them, plus one extra copy for the bulletin board.
- Prepare ***Be a Garden Detective!*** bulletin board (see Appendix D and CD-ROM).
- Make a transparency of ***Overhead/Slide 2.1***, if needed.
- Remind students to bring a large T-shirt or smock to class on planting day to protect their clothes from getting dirty.

Instructional Process

STEP 1 **Introduce the gardening activity.** Tell students that vegetable gardening is a popular activity. In cities, there are community gardens where people can sign up to grow their own plants in a designated space within a large garden plot shared by other people. The United States Department of Agriculture helps communities establish "People's Gardens" around the country. There have even been vegetable gardens at the White House!

Explain to students where your class garden will be (e.g., outdoors as part of a larger school garden, indoors in containers, etc.) and that you will be growing the fruits and vegetables chosen by popular vote in Lesson 1. Remind students that these fruits and vegetables grow from seeds. [If you are starting plants from seedlings, explain that seedlings are young plants started from seeds.]

Tape the white sheets of paper with glued-on seeds to the walls in different places around the room. Tell students that their task, as garden detectives, is to figure out which seeds go with which fruit or vegetable. Distribute an index card to each student. Have students write the numbers 1 to the highest number on a numbered seed sheet (i.e., if you are planting five vegetables, you should have five numbered seed sheets and students should write 1 to 5 on their cards). Working in small groups, have students visit each location where you have taped the seed sheets. Ask students to guess what vegetable will grow from this seed and to write their answers next to the number represented by the seed sheet. Give students an opportunity to examine all of the seed sheets.

Ask students:

- **Can you tell from looking at the seeds what plant will grow from them?** (Sometimes we can, because we can see the seeds in the fruit or vegetable as we eat it [e.g., oranges, cucumbers]. But in other cases, you can't really tell unless you have planted the fruit or vegetable before and become familiar with the seeds. Carrot seeds, for example, are tiny. They are produced by tiny flowers in the stem after the plant has matured.)

STEP 2 **Show the students the *Be a Garden Detective!* bulletin board.** Explain to students that the bulletin board will be where they will track the growth of their plants over time. The bulletin board lists [number of] fruits and vegetables [you plan to plant]. These are the fruits and vegetables that the class will plant in its class garden. Glue the corresponding fruit/vegetable seed next to the name of the fruit/vegetable on the bulletin board background paper and a copy of the seed packet (instruction side) for that fruit/vegetable in the Week 1 column.

The bulletin board also has 10 columns, representing the 10 weeks or so that it will take these fruits and vegetables to grow from first being planted to being harvested, i.e., ripe and ready to be picked.

Tell the class:

- **When we harvest the fruits and vegetables from our garden, we will have a special mystery dinner for our families and feed them a delicious meal from our garden.**
- **We will also be making some recipes using these fruits and vegetables over the weeks to come. We're going to put them together in a class cookbook that you will take home to your families to share tasty ways to eat these fruits and vegetables.**

Explain to students that they will each be assigned to a small group that will be responsible for one of the fruits and vegetables listed on the board.

STEP 3 Explain to students what plants need to grow.

Tell the class:

- **Before they can plant their garden, they need to understand something about how plants grow. Plants are living things, just like they are.**

Ask students:

- **What do you need to grow strong and healthy?** (Food, water, sleep, air, exercise)

Plants need some of the same things people need. But, they also need some different things. Ask students:

- **What do you know about what plants need to grow?** (Water, light, food [nutrients], right temperature, air, space)

Ask students:

- **Where do plants get water from?** (Rain, irrigation)
- **Where do plants get light to grow?** (Sun, artificial lights)
- **Where do plants get food or nutrients from?** (Seed, soil, compost, plant food called fertilizer)
- **What kind of temperature do plants need?** (Most like warmth; some grow in cooler fall or spring temperatures. That's why most fruits and vegetables grow best in the summer months in most areas of the country. Things like greenhouses and artificial lights can extend the growing season.)

Explain to students that seeds contain enough nutrition for the plant until the plant has leaves. The leaves of the plant then become the food-making factory of the plant using a process called *photosynthesis*.

Ask students:

- **What color are leaves?** (Usually green [red in the case of red leaf lettuce])

The green color in leaves is chlorophyll (red leaf lettuce also contains *chlorophyll*). In photosynthesis, chlorophyll makes food for the plant from carbon dioxide (a gas in the air), water, nutrients, and energy from the sun (light).

The roots of the plant also help feed the plant. They push down into the soil to anchor the new plant and to absorb water and minerals from the soil. The plant's stem with new leaves pushes up toward the light.

Summarize the discussion by telling students that the fruit and vegetable plants in the school garden need food, water, and warmth to grow, just like people do.

STEP 4 **Prepare students for working in the garden.** ***Project Overhead/Slide 2.1, The Garden Detectives' Code of Conduct*** on the screen and review the rules by reading them aloud. Point out to students that they will be working in the garden at least twice a week and they must abide by the safety rules in the Code of Conduct. Have students wash their hands so that they are not transmitting any pests to the garden. Have students put smocks or T-shirts they have brought from home over their clothes to keep them clean.

STEP 5 **Walk students to the garden.** Introduce the steps in planting the garden.

- **Soil Preparation:** The soil should be firm, but not compacted. Compost or other materials that enrich the soil may need to be added. Work the soil with a hoe or hand trowel (depending on the size of the garden) to turn over the soil and prepare it for planting. Refer to the information on safety practices and garden resources in Appendix C.
- **Plant seeds or seedlings:** Hand out copies of the seed packets. Read the copy and carefully follow the instructions for how deep to plant the seeds and how far apart the rows should be.
- **Mark the rows:** Write the name of the plant using a waterproof marker on a flat stick (e.g., white plastic paddles available from nurseries; flat paint stirrers from the paint store). These labeled plant markers can be placed at the end of each row so that you know what plants will be growing in that row.
- **Water plants:** Plants need water to grow. Carefully water the garden. Check the seed packet and/or check the Grow Sheets in Appendix C for instructions on how often to water.
- **Fertilize plants:** Plants need food to grow. If compost or fertilizer was not added during the soil preparation phase, you may need to add commercial fertilizer to the garden to give seeds a good head start.

STEP 6 **Plant the garden.** Assign each small group an area of the garden space to plant their seeds, seedlings, and/or starter plants. Review with each group the specific planting instructions for their fruit or vegetable before planting, i.e.:

- **Leaf Lettuce:** Sow 10 to 20 seeds per foot in rows 8 to 12 inches apart. Sow seeds evenly, cover lightly with fine soil (¼ inch), and use hands to gently firm the soil over the seeds.
- **Spinach:** Space seeds 3 inches apart in rows, or scatter seeds evenly in wide rows or beds. Spread soil with your fingers, barely covering the seeds and then pat down the soil with hands to ensure good soil to seed contact.
- **Carrots:** Plant seeds about ½ inch apart in rows that are 12 inches apart or scatter seed evenly in wide rows or over a bed. Cover seeds with ¼ to ½ inch of soil and then pat down the soil with hands to ensure good soil to seed contact.

- **Beets:** Space seeds 1-2 inches apart in rows, or scatter seed evenly in wide rows or beds. Cover seeds with about ½ inch of fine soil and then pat down the soil with hands to ensure good soil-to-seed contact.
- **Swiss Chard:** Space seeds 2 inches apart in rows, or scatter seed evenly in wide rows or beds. Cover seeds with about ½ inch of soil and then pat down the soil with hands to ensure good soil-to-seed contact.
- **Raspberries/Blackberries:** Dig a hole large enough to set the crown (the spot just above the roots from where the growth starts) halfway into the ground. Cover the plant and use hands to firm the soil around it.
- **Strawberries:** Plant June-bearing varieties 12 inches apart in rows 2 feet apart. Plant day-neutral varieties (those that flower and produce fruit when temperatures are between 35° F and 85° F, rather than just in June) 6-8 inches apart in rows 3 feet apart.

Detailed information about the planting and care of these fruits and vegetables is available in the Grow Sheets in Appendix C.

Water the garden thoroughly when planting is completed.

Optional: Have each student group take a photo of its area of the garden. Print photos for the bulletin board or journals.

Students should wash their hands again after the garden is planted. Remind students that washing your hands before and after they garden is part of the Garden Detectives' Code of Conduct.

STEP 7 **Return to the classroom and write today's date on the first column of the bulletin board on the background paper below the Week 1 heading.** If using a digital camera, post a photo of each section of the garden next to the name of the fruit/vegetable to show what the initial planting looks like.

Each week, students should take a photo of their plant and post it on the bulletin board to follow the pattern of growth of the garden plants. If a camera is not available, have each group draw a picture of their plant to scale using graph paper. NOTE: You will need to determine how large photographs or drawings should be, based on the size of the bulletin board in your classroom. Cut graph paper to the appropriate size and guide students in creating drawings that are scaled to the size available (e.g., 1 inch = 5 squares).

Each week, compare the growth of the different plants in the garden.

Invite students to look at other groups' seeds and seed packets during their free time.

STEP 8 **Review the steps in maintaining the garden after it's been planted.** (See the Grow Sheets in Appendix C for detailed instructions on how to care for each fruit/vegetable in the garden.)

- Water regularly.
- Thin seedlings as they appear according to directions on the seed packet so that plants have the room they need to grow well.
- Pull weeds so that plants don't have to compete with weeds for nutrients.

Each small fruit/vegetable group should visit the garden at least twice a week to care for the group's plants. Select 2 days per week for the garden care activity, and stick to the schedule. Remind students that they must abide by the Garden Detectives' Code of Conduct every time they visit the garden.

Teacher Background Information

How Does Your Garden Grow?

Vocabulary

Chlorophyll: The green color in plants that is necessary for photosynthesis to take place.

Compost: A mixture of decaying vegetation and manure that is added to soil to provide more nutrients to plants.

Fertilizer: Food for plants that helps them grow. Fertilizer contains nutrients, such as nitrogen, phosphorus, and potassium.

Garden Bed: A plot of earth or a raised bed that contains cultivated plants.

Germinate: To start to grow.

Harvest: Picking the fruits and vegetables when they are ripe.

Leaves: The food-making factory of a plant. Leaves are usually green, flat to catch light, and attached to a stem.

Photosynthesis: The process that plants use to make food from light, water, nutrients, and carbon dioxide.

Plant Nutrients: What living things need to grow. Plant nutrients include nitrogen, phosphorous, and potassium.

Root: The part of the plant that grows underground and anchors the plant. It moves nutrients and water from the soil to the leaves.

Soil: Earth, dirt.

Sowing: Planting seeds.

Thinning: Removing seedlings from the garden to give other plants more room to grow and more access to nutrients.

Gardens are a source of relaxation and pleasure for many in our contemporary world. In times past and in many parts of the world today, people's survival depends on their ability to grow food. Learning about plants and how to grow them is a fundamental survival skill for these populations. Yet for many of our students today, food comes primarily from the supermarket and they may give little thought to how or where it is grown or how it travels from the farm to the market. Teaching students about growing their own food gives them a closer connection to the earth.

What Do Plants Need To Grow?

Six basic things are the key, as shown in the picture on page 52: Air, water, nutrients, light, space, and warmth. Let's take a look at each one of these.

Air. Plants take carbon dioxide out of the air during *photosynthesis* to produce food for their growth. Photosynthesis is the process by which plants make food from light, water, nutrients, and carbon dioxide.

During photosynthesis, plants release oxygen into the air.

Water. Water carries nutrients and minerals from the soil up the plant's roots and into the leaves. Different plants need different amounts of water.

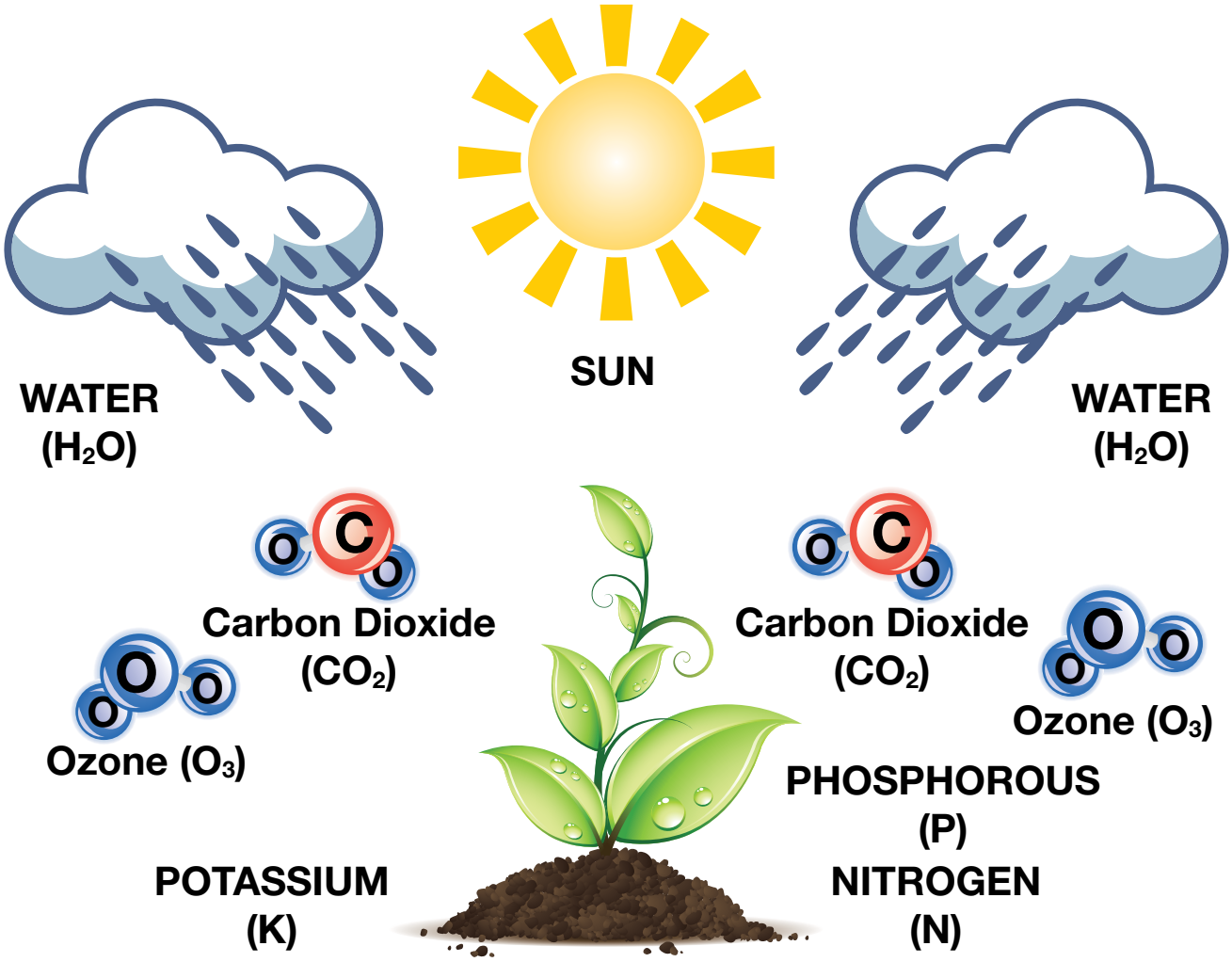
Nutrients. There are three main nutrients that plants get from soil: Nitrogen, phosphorous, and potassium. If the soil becomes depleted, compost or fertilizer should be added to ensure that plants get the food they need.

Sunlight. Plants use sunlight to convert carbon dioxide and water into food during photosynthesis. Plants that do not receive enough sunlight will grow poorly and may die before they are mature.

Space. Plants need to have enough room for their roots, stems, and leaves to spread and grow.

Warmth. Most plants require warmth in order to grow; that's why most vegetables are grown in the summer. Some vegetables—such as spinach and Swiss chard—are considered cool season vegetables and do well in the spring and fall.

See Appendix C for a list of gardening resources.



Eating From the Garden

Word Search Answer Key (Garden Detective News)

PHOTOSYNTHESIS
LEAVES
CHLOROPHYLL
VEGETABLE
ROOT
GARDEN
STEM
SUNLIGHT
FRUIT
SOIL
FLOWER
SEED

W G C L J X V W F Q F H O S F
D S M I N P S Y Y N G S Q V B
S I H K E E K G O N L X F X U
X K L O V L D A F L S B S I Z
X Q G A J E G R Y T L B L J S
F J E K V Q G D L A K L I O S
X L E W Y M M E T S Y M T D V
P H O T O S Y N T H E S I S A
O T P W J D A I P A U U T R K
C L Z K E Y U O T O B N H T N
J P G E B R R H F Q A L D L T
T O S R F O V U D K G I E F E
A M A P L O T C B J R G Q R H
F L Q H V T R L U H E H J B K
G V C K X M Y V V I J T Y Z X

Overhead/Slide 2.1

The Garden Detectives' Code of Conduct

GARDEN DETECTIVE'S CODE OF CONDUCT

- Always wash your hands before and after working in the garden.
- Always walk when in the garden. Do not run.
- Always ask permission before using any tool or harvesting any plant.
- Always wipe your feet before returning to the classroom.

Garden Detective News

Encourage Your Child's Growth

Ask your child to share what he or she learned about growing fruits and vegetables.

USDA United States Department of Agriculture

Garden Detective News

This week, we planted a class garden. We planted _____.

Ask your child to tell you about the garden.

What fruit or vegetable is your child responsible for growing? Serve it at a family dinner this week!

Help your child think like a garden detective! Solve the word search on the following page with your child.

Mystery Solved!

Ways To Help Your Child Eat More Fruits and Vegetables.

1. **Savor the flavor of seasonal vegetables.** Buy vegetables that are in season for maximum flavor at a lower cost. Check your local supermarket specials for the best in-season buys. Or visit your local farmers market.
2. **Plant your own.** Just like your garden detective, start a garden—in the yard or a pot on the deck—for fresh, inexpensive, flavorful additions to meals. Herbs, cucumbers, peppers, or tomatoes are good options for beginners.

Word Search

Eating From the Garden

PHOTOSYNTHESIS
LEAVES
CHLOROPHYLL
VEGETABLE
ROOT
GARDEN
STEM
SUNLIGHT
FRUIT
SOIL
FLOWER
SEED

W G C L J X V W F Q F H O S F

D S M I N P S Y Y N G S Q V B

S I H K E E K G O N L X F X U

X K L O V L D A F L S B S I Z

X Q G A J E G R Y T L B L J S

F J E K V Q G D L A K L I O S

X L E W Y M M E T S Y M T D V

P H O T O S Y N T H E S I S A

O T P W J D A I P A U U T R K

C L Z K E Y U O T O B N H T N

J P G E B R R H F Q A L D L T

T O S R F O V U D K G I E F E

A M A P L O T C B J R G Q R H

F L Q H V T R L U H E H J B K

G V C K X M Y V V I J T Y Z X

Lesson Extension: Weather Station

Standards Addressed

Science
Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

Learning Objectives

Students will be able to:

1. Observe weather conditions.
2. Record observations.
3. Describe relationship of weather to garden conditions.

Time Required

5 minutes daily

Materials

- Indoor/outdoor thermometer
- Rain gauge
- Notebook (e.g., composition notebook), one per class
- Three-hole notebook paper

Preparation

- Establish a spot by the window to place the thermometer and notebook.
- Place rain gauge in the garden.
- Label four columns on the first notebook page: Date, temperature, sunlight, and rain.

Instructional Process

STEP 1 Introduce the weather station.

Tell students

- **Tell students that you are creating a weather station in the classroom to record the conditions that will influence how well the garden grows.**

Ask students:

- **Plants need sunlight, warmth, water, and food (nutrients, air, and space) to grow. Which of these can a weather station measure?** (Warmth, water)

Show students the thermometer, rain gauge, and notebook. Demonstrate how to read the outdoor temperature on the thermometer and read the rain gauge. Show students how to make a daily record in the notebook by recording the first set of observations yourself with them observing:

- Record today's date in the first column.
- Record the outside temperature in the second column.
- Record whether the day is sunny (S), partly cloudy (PC), or overcast (O) in the third column.
- Record the amount of any rain in the rain gauge in the fourth column.

STEP 2 **Assign the daily weather observation task to students.** Assign each student 1 day to be responsible for making and recording weather observations in the notebook. Rotate responsibility among class members so that everyone has an opportunity to participate and all school days throughout the unit are assigned.

STEP 3 **Review the weather observations weekly.** When posting plant growth photos/drawings on the bulletin board each week, review the weather observations recorded in the notebook. Discuss with students whether plants received enough warmth, sunlight, and water to grow well. Have students record their conclusions on notebook paper in their ***Garden Journals.***

Lesson Extension: Conditions for Germination

Standards Addressed

Science
Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

Learning Objectives

Students will be able to:

1. Predict the outcome of an experiment.
2. Record scientific observations.
3. Explain the conditions that plants need to grow.

Time Required

20-30 minutes

Materials

- 4 sealable plastic bags for each small group of students
- 4 paper towels for each group
- 12 seeds, all the same kind for each group (e.g., mung bean, lima bean, alfalfa, or radish)
- 4 labels for each group
- Markers
- Water for wetting paper towels, about ½ cup per group
- Large bowl to hold water, one per class
- *Student Handout 2.1, Predict and Observe*

Preparation

- Obtain required materials.
- Organize students into small groups.
- Duplicate *Student Handout 2.1* on 3-hole-punch paper.

Instructional Process

STEP 1 **Introduce the germination experiment.**
Explain to students that they are going to conduct an experiment to find out what plants need in order to grow. It will be a group experiment. Organize students into small groups of four students and have them choose a name for their group.

STEP 2 **Give each group four bags, labels, and markers.**

Tell the class:

- **Tell students to write their group's name on all the labels. Number the labels 1 through 4. Place one label on each bag.**

STEP 3 **Give each group four paper towels.** Have them fold the paper towels in fourths.

STEP 4 **Wet three of the towels.** Place them in bags 1 through 3. Place the dry towel in bag 4.

STEP 5 **Have students add three seeds to each bag.**

STEP 6 **Discuss where seeds can be placed to receive sunlight and no sunlight.** Also select a cold dark spot where some seeds can be placed.

STEP 7 **Place bag 1 in the sun.** Place bag 2 in the dark. Place bag 3 in the cold dark place. Place bag 4 in the sun.

STEP 8 **Distribute *Student Handout 2.1, Predict and Observe.***

Ask students:

- **Ask students which bag of seeds they expect to grow the best. Next best? Worst? Have students write their predictions on the worksheet and put it in their *Garden Detective Journals*.**

STEP 9 **Check on the seeds in 4-5 days.** Use the chart on ***Student Handout 2.1*** to record the results.

STEP 10 **Review the outcomes of the experiment.**

Ask students:

- **Which bag did the best? What was it about the bag that helped the seeds grow?** (Light, water, warmth)

Reinforce the fact that garden plants need light, food, water, and warmth to grow, just like people do.

Source: Adapted from *Biology of Plants,* © 2006, Missouri Botanical Garden, reprinted courtesy of Missouri Botanical Garden.

Student Handout 2.1

Predict and Observe

Name: _____ Date_____

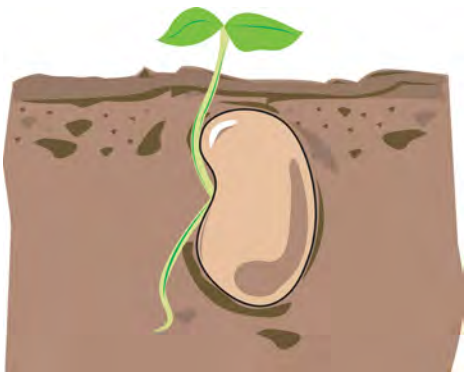
Which bag of seeds do you predict will grow the best? _____

_____

In 4-5 days, write your observation of what happened:

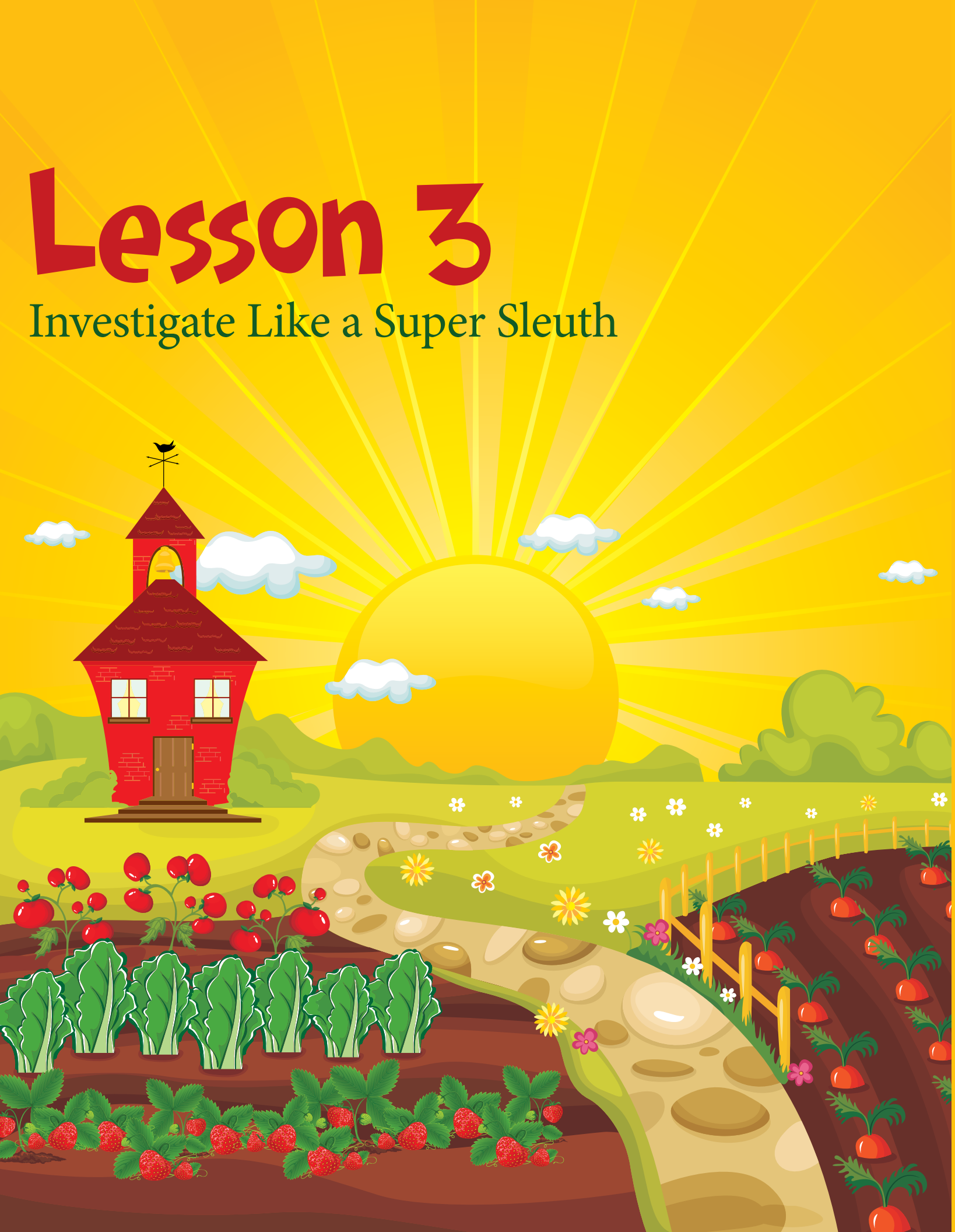
Bag	Conditions (For example: wet towel, sun)	Your Observations
1		
2		
3		
4		

Fruits and vegetables grow in the garden.
Plants in the garden need food, water, and warmth to grow, just like people do.



Lesson 3

Investigate Like a Super Sleuth



Lesson Summary

Overview

The garden detectives use library resources to research one of the fruits or vegetables featured in the curriculum, write a "case report" that summarizes what they learned, and create a poster to share that knowledge with others. Working in small groups, students create Public Service Announcements (PSAs) about their assigned fruit or vegetable, which they present to classmates in Lessons 8-10 and to families and friends at the Sleuths' Mystery Dinner.

Lesson Extensions

The detectives evaluate what makes a good PSA about fruits and vegetables in the lesson extension.

Key Messages

Be a great garden detective! Learn how fruits and vegetables help you eat smart to play hard.

Crack the case wide open! Share how fruits and vegetables help kids eat smart to play hard.

Garden Connection

The garden detectives are assigned to research specific fruits and vegetables that are being grown in the class garden. They take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

School Food Service Connection

After students complete their posters, arrange with the school food service director to hang student posters in the cafeteria for other students to see.

School Connection

The school librarian can help students find research resources to develop their reports. Ask the librarian to prepare a display of books related to gardening, fruits and vegetables, and/or farming.

Home Connection

Send the *Garden Detective News* home to parents/caregivers. Encourage students to solve the fruit and vegetable riddles with their parents/caregivers.

Cookbook Connection

The ***Garden Detective News*** suggests that families prepare a snack or side dish with the fruit or vegetable being studied. Ask students to bring the recipe to class to include in the cookbook.

Media Connection

Invite a local TV station or community cable channel to record and air students' PSAs to fulfill its public interest requirements.

Main Lesson: Investigate Like a Super Sleuth

Standards Addressed

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts

Standard 5, Reading Informational Text: *Use text features and search tools to locate information relevant to a given topic efficiently.*

Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.*

Standard 7, Writing: *Conduct short research projects that build knowledge about a topic.*

Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3/4 topics and texts, building on others' ideas and expressing their own clearly.*

Health

Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 3, Access Information: *Demonstrate the ability to access valid information, products, and services to enhance health.*

Learning Objectives

Students will be able to:

1. Apply library research skills to identify research resources.
2. Write a brief research report.
3. Create citations using approved format.
4. Develop persuasive messages about fruits or vegetables.

Time Required

90 minutes

- 60 minutes for case report
- 30 minutes to plan a PSA

Materials

- ***Student Handout 3.1, Mission: Dig for Clues*** and ***Student Handout 3.2, Public Service Announcement***
- Posterboard/crayons/markers for posters. Posters should be large enough to be visible at a distance since they are to be hung in the school cafeteria.

Preparation

- Duplicate ***Student Handouts 3.1*** and ***3.2***, one for each student, on 3-hole-punch paper.
- Ask the librarian to help students find appropriate research materials for their research assignment.

Instructional Process

STEP 1 **Introduce students to the case report assignment.** Explain to students that they are going to write a short (1-2 page) case report about a fruit or vegetable. (If you have assigned students to tend to a specific fruit or vegetable in the garden, assign that group of students to "their" fruit or vegetable.) A case report is a summary of what a detective learns about a case that he or she is working on.

Each student will write his or her own case report. Each student will also draw a poster about the fruit or vegetable that will be displayed in the school cafeteria (or elsewhere in the school). When the papers and posters are completed, students will work together with the other members of their group to develop a PSA designed to persuade others to try tasting and/or eating that fruit or vegetable.

Distribute ***Student Handout 3.1, Mission: Dig for Clues*** (the graphic organizer on pages 2-3 of the handout is optional). Review with students what information must be included in their case reports:

- A description of the fruit/vegetable
- What part of the plant is eaten
- Why eating the fruit/vegetable is good for you
- Additional interesting facts about the fruit/vegetable, e.g., historical or geographic facts

Remind students that they need to find reliable sources of information for their reports. Write the following guidelines on the board:

- Identify the author or source of the information.
- Decide if the author is an expert based on his qualifications.
- Does the author tell you where you can get more information on this subject?
- Make sure the information is up-to-date (e.g., is there a date that tells you when the information was last updated? Is it relatively recent?).

Tell students when their case reports and posters are due. Allow at least 1 week for students to complete this assignment.

Remind students to be great garden detectives in searching for information to write their case report. They will learn how fruits and vegetables help them eat smart to play hard.

STEP 2 **Visit the library to begin research on the case reports.** Have the librarian show students how to research their topics using materials in the library and/or on the Internet. Allow time for students to begin to collect their research. They should continue this at home.

STEP 3 **Have students create PSAs.** After students have completed their reports and posters, distribute ***Student Handout 3.2, Public Service Announcement***. Review the definition of a PSA on the handout. Have students meet in small groups to plan their PSAs. All students assigned to a specific fruit or vegetable will comprise each small group. Announce when the groups will present their PSAs and where (e.g., in class, on morning announcements, on local media).

As students work in their small groups, circulate around the room to be sure that students are on task.

Tell the students that their poster and PSA will help to crack the case wide open! They will creatively share how fruits and vegetables help kids eat smart to play hard.

Teacher Background Information

Interesting Facts about Fruits and Vegetables

Vocabulary

Case Report: A summary of what the detective has learned about a case that she or he files with the detective agency or client.

Clue: A fact that helps solve a mystery.

Investigate: Conduct research by looking for clues.

Public Service Announcement (PSA): A short message that appears on radio or TV to promote a service or idea that is good for people's health and well-being. A PSA is just like a commercial for a product, except that a TV or radio station plays it for free as a public service.

Sleuth: Another name for a detective.

Share some of the following interesting facts with students to pique their interest in digging deeper into their research about fruits and vegetables.

Leaf Lettuces

- Lettuce belongs to the daisy or sunflower family.
- Lettuce, in terms of production value, is the leading vegetable crop in the United States. More than 90 percent of United States lettuce production is located in California and Arizona. The main varieties include iceberg, romaine, and various leaf varieties.
- The growing popularity of ready-to-eat packaged salad greens, introduced in the late 1980s, has contributed to the dramatic growth in the amount of romaine, leaf lettuce, and spinach available for consumption in the United States.
- Most dark green lettuces are an excellent source of vitamin A, and contain vitamin C and potassium. The vitamin A comes from beta carotene, whose yellow-orange color is hidden by green chlorophyll pigments. Beta carotene is converted to vitamin A in the human body.
- Due to the extremely high water content of lettuce, 94.9 percent, there are no successful methods of long-term home preservation for lettuce. Lettuce does not respond well to freezing, canning, or drying. For optimal nutritional value, lettuce should be eaten while it is fresh and crisp.
- Lettuce is believed to be one of the first vegetables brought to the New World by explorer Christopher Columbus and has been grown in the United States since colonial times.
- In the early 1900s, the ice shipping industry developed in the western States. This made it easier to ship lettuce to many areas of the country, expanding the popularity of lettuce.

Swiss Chard

- Swiss Chard is a member of the beet family. Only the leaves are eaten.
- Chard leaf stalks come in white, yellow, or red leaf stalks.
- Chard is an excellent source of vitamin A and a good source of vitamin C. It also includes calcium, magnesium, potassium, and fiber.
- Chard goes by many names—Swiss chard, leaf beet, seakettle beet, and spinach beet, to name a few. It is a beautiful large-leaf vegetable with wide flat stems resembling celery.
- The word "Swiss" was used to distinguish chard from French charde or chardon by nineteenth century seed catalog publishers and the name stuck. Chard is very popular among Mediterranean cooks but the first varieties have been traced back to Sicily. In the United States, the leaves are preferred while European cooks value the stalks to the point of discarding the leaves or feeding them to animals.

Spinach

- Spinach is an excellent source of vitamin A and a good source of vitamin C. It contains potassium, folate, and calcium. Spinach can be grown as a spring and a fall crop.
- China is the world's leading producer of spinach, followed by the United States. In the United States, California, Arizona, Texas, and New Jersey grow the most spinach.
- There are three basic types of spinach:
  - Flat or smooth leaf—has unwrinkled, spade-shaped leaves (usually used for canned and frozen spinach or in other processed foods)
  - Savoy—has crinkly, dark green curly leaves (usually sold fresh)
  - Semi-Savoy—has slightly curly leaves (usually sold fresh)
- Spinach is a native of Southwest Asia and has been grown in China since at least the 7th century. Spinach use was recorded in Europe as early as the mid-13th century, with colonists carrying spinach seed to the New World.

Carrots

- Carrots are an excellent source of vitamin A and provide a great deal of the vitamin A in the United States diet. Vitamin A is synthesized in humans by the breakdown of carotenes, the orange pigments in carrot roots.
- More beta-carotene is present in carrots that have a dark orange color.
- Carrots are a member of the parsley family, which also includes celery, anise, and dill.
- The top three fresh carrot-producing States in 2010 were (in order): California, Michigan, and Texas.
- Since the late 1980s, baby carrots or mini-carrots have been a popular ready-to-eat snack food available in many supermarkets. Baby carrots were once longer carrots that have been peeled, trimmed, and packaged.
- The carrot originated around Afghanistan and possibly northern Iran and Pakistan.
- Different colors of carrots were grown at different times over the centuries:
  - 900–1000 AD: Purple and yellow carrots were grown from Afghanistan to the eastern Mediterranean
  - 1300s: Purple and yellow carrots were grown in Western Europe and China
  - 1600s: Yellow carrots were grown in Japan
  - 1700s: In addition to purple and yellow, white carrots were reported in Europe with an orange type first reported in the Netherlands and adjoining regions
  - Today: Orange carrots are most common worldwide, although some white types persist in Western and Eastern Europe; some red (not orange) in Japan; some yellow and purple in the Mideast; and some purple, yellow, and red from Turkey to India and China.

Beets

- Beets are also known as beetroot. They are a good source of folate and include potassium, vitamin C, and fiber.
- Beet leaves (tops) can be eaten, too and are an excellent source of vitamins A and C.
- Beets are a vegetable native to Europe and parts of Asia, and cultivated in most cool regions. Its leaves are green or red and edible, though it is generally grown for its thick red or golden root. Some varieties are eaten as a vegetable; others are a source of sugar; and some are used as food for animals.
- Beets are available year-round because they thrive in more than 30 states. June through October is their peak season.
- The types of beet we are familiar with—those that produce large, fleshy, edible roots—were not known 2,000 years ago. The ancients used the root of the wild beet or chard for medicinal purposes.
- The red beet with a turnip-like root was first described as a food plant in Germany in 1558 and was a rarity at that time in northern Europe. The improved beet was called "Roman beet" in the 16th century in northern Europe and France, since it came from Italy.

- Colors of beets may range all the way from extremely dark purplish red to bright vermilion and to white. The roots of some varieties, when cut, show distinct light and dark rings, even white alternating with red or purple, like a bulls-eye target.
- Eating beets can cause urine to become red or pink in color in some people. This condition is called "beeturia." It is not harmful.

Strawberries

- Strawberries are the fifth most preferred fresh fruit in the United States, behind bananas, apples, oranges, and grapes. The United States strawberry industry is mostly located in the southern and coastal areas in California. Florida and Oregon are the second and third largest producing States.
- Strawberries are a member of the rose family.
- Strawberries are usually available fresh year round with a peak from April to July.
- Strawberries are an excellent source of vitamin C. Four strawberries (about ½ cup) will provide over half the recommended daily intake of vitamin C for kids.
- Wild strawberries have been known since the times of the Greeks and Romans.
- The American Indians were already eating strawberries when the colonists arrived. The crushed berries were mixed with cornmeal and baked into strawberry bread. After trying this bread, colonists developed their own version of the recipe and strawberry shortcake was created.
- The strawberries native to the Americas were bigger than European strawberries.
- Strawberries are the only fruit with their seeds on the outside. Every strawberry, no matter the size, has about 200 seeds.

Raspberries/Blackberries

- Raspberries and blackberries are excellent sources of vitamin C and good sources of fiber.
- Blackberries and raspberries are generally referred to as caneberries, which includes all berries that grow on a cane. They are also referred to as "bramble" plants. All caneberries have perennial crown and root systems, and produce biennial shoots that bear fruit every other year.
- Blackberries are native to several continents, including Asia, Europe, and North and South America, and people have been eating them for more than 2,000 years.
- Initial United States commercial blackberry production started in the Pacific Northwest region in 1860, using plants cultivated from European domesticated species.
- Blackberry peak season is June and July, with harvesting beginning in May and ending in September.
- Raspberries continue to rank as the third most popular berry in the United States for fresh use, after strawberries and blueberries. Raspberries come in red, black, purple, and yellow varieties.
- The United States is the world's third-largest producer of raspberries. Although production occurs across much of the country, most of it is concentrated in Washington, California, and Oregon.
- Raspberry season begins in June and lasts through October.

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Other Facts

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Student Handout 3.1

Mission: Dig for Clues

Name: _____ Date _____

As a super sleuth, your job is to dig for clues about how fruits and vegetables help you eat smart and play hard. After you've done your digging, present the results of your investigation in a case report. A case report is a summary of what a detective has learned about a case that she or he files with the detective agency or client.

- Your report should include:
  - A description of the fruit/vegetable
  - What part of the plant is eaten
  - Why eating the fruit/vegetable helps you to be healthy and play hard
  - Additional interesting facts about the fruit/vegetable
    - Historical facts (for example, how the fruit/vegetable changed over time)
    - Geographic facts (for example, where the fruit/vegetable is mostly grown).
  - Bibliography (list books and Web sites you used)
- Introduce your report in a way that grabs the reader's interest.
- End your report in a way that emphasizes the main point of your report.

You should use at least two books or Web sites to find information for your report. List them at the end of your report.

Draw a poster that encourages other students to eat the fruit or vegetable you researched. Include in the poster one or more facts that you learned about it.

Crack the case wide open!
Share how fruits and vegetables help kids eat smart to play hard.

Student Handout 3.1

Mission: Dig for Clues, continued

Name: _____

My Case Report about _____

Paragraph 1

Write a sentence that tells what fruit or vegetable is the subject of your report:

Paragraph 2

Write 2-3 sentences that describe your fruit/vegetable

- Color
- Shape
- Texture/feel
- Smell

Paragraph 3

Write 2-3 sentences that identify what part of the plant it is and the job it does for the plant.

Student Handout 3.1

Mission: Dig for Clues, continued

Name: _____

My Case Report about _____

Paragraph 4

Write 2-3 sentences about how this fruit or vegetable helps you stay healthy and play hard.

Paragraph 5

Write 2-3 sentences that explain something most people don't know about this fruit or vegetable. For example: Where does it grow? Are there different colors/types? Did it play a role in history?

Bibliography

List the books, articles, and Web sites that you used to write your report.

Student Handout 3.2

Public Service Announcement

Name: _____ Date _____

A Public Service Announcement (PSA) is just like a commercial—it presents a persuasive message in a catchy way. A PSA is different from a commercial, however, because it is about a service or idea that is good for you and because PSAs run for free on radio and TV stations.

You will work with other students who are writing about the same fruit or vegetable that you are. Together you will plan a 1-minute PSA (a commercial) to present to the class to persuade other students to try your fruit or vegetable.

Be creative! Think about the ads that you like best and what makes you like them. You could make your PSA a skit, a jingle or short tune, a cartoon, or whatever you think would work best.

Decide together what you want your PSA to be. Divide up the work so that everyone in the group participates in the presentation. For example:

Writer(s): _____

Performer(s): _____

Costume(s): _____

Graphics: _____

Garden Detective News

Grow Healthy Habits With Your Children

Ask your child to share what he or she learned about fruits and vegetables.

USDA United States Department of Agriculture

TEAM Nutrition

Garden Detective News

Every garden detective in our class is researching and writing a report about a fruit or vegetable in our garden. Ask your child which fruit or vegetable he or she is studying. You may want to add this fruit or vegetable to a family meal. Experiment with new recipes using this fruit or vegetable with your child.

When you find a recipe that your family likes, send it to school so we can include it in the class cookbook.

Mystery Solved!

Ways To Help Your Child Eat More Fruits and Vegetables.

1. **Choose fruits and vegetables rich in color.** Brighten your plate with vegetables that are red, orange, and dark-green. They are full of vitamins and minerals. Try spinach, leaf lettuce, carrots, beets, Swiss chard, strawberries, and raspberries/blackberries. They not only taste great but are good for you, too.
2. **Check the freezer aisle.** Frozen fruits and vegetables are quick and easy to use. They can be just as nutritious as fresh when they are packaged without added fats, sugars, or sodium (salt). Try adding frozen peas, green beans, spinach, sugar snap peas, or vegetable blends to some of your favorite dishes or eat them as a side dish.

Family Activity 3

Fruit and Vegetable Riddles

Try solving the following riddles with your child:

What Am I?

1. I'm a vegetable that grows under the ground and has a green top. Eating me helps you have good eyesight. What am I?

   _____

2. I'm a beautiful red fruit that grows in early summer. I taste sweet and you can eat me in a smoothie, in your cereal, or all by myself. What am I?

   _____

3. I'm a leafy dark-green vegetable that likes cool weather. I can be eaten raw or cooked. What am I?

   _____

4. I'm a leafy green vegetable that comes in different colors… including red! You most likely eat me in a salad or on a sandwich next to a slice of tomato. What am I?

   _____

5. I'm round and grow under the ground. My tall green tops taste good in soups and salads, but my red or golden root tastes nice and sweet. What am I?

   _____

6. I am a red or black fruit that can stain your hands when you eat me. I grow on bushes and I taste good on your cereal. What am I?

   _____

7. I'm a leafy vegetable that grows in the garden. I can be green and white or red and green—either way, I taste the same! Most people cook me, but you can eat me raw, too. What am I?

   _____

Answer Key: 1. Carrot. 2. Strawberry. 3. Spinach. 4. Leaf lettuces. 5. Beets. 6. Raspberries/blackberries. 7. Swiss chard.

Try These Kid-Friendly Snack Ideas:

Fruit Wands With Yogurt Dip

- Put pieces of fruit on a toothpick, skewer, or straw.
- Cover with plastic wrap and store in the refrigerator until snack time.
- Serve with low-fat strawberry (Princess Dip) or lime (Swamp Slime) yogurt for dipping.

Happy Snack Packs

- Fill small containers or snack bags with cut-up veggies.
- Add a small container of fat-free ranch dressing for dipping.
- Decorate the outside of the bags with stickers.
- Store in the refrigerator on a shelf where they are easy for your child to see.

Lesson Extension: Learn More About PSAs

Standards Addressed

English/Language Arts

Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3/4 topics and texts, building on others' ideas and expressing their own clearly.*

Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.*

Health

Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 3, Access Information: *Demonstrate the ability to access valid information, products, and services to enhance health.*

Learning Objectives

Students will be able to:

1. Explain what a Public Service Announcement (PSA) is.
2. Analyze characteristics of PSAs that make them effective.

Time Required

20 minutes

Materials

- Examples of PSAs. (You can find links to downloadable PSAs at *http://www.fns.usda.gov/cnd/healthierschoolday/media.htm*.)

Instructional Process

STEP 1 Review what a PSA is (see *Student Handout 3.2*).

STEP 2 Show examples of PSAs to students.

Ask students:

After each PSA, ask students:

- **What was the main message of this PSA?**
- **What tools (e.g., music, story) did the PSA use to get its point across?**
- **Who is the main audience for this PSA?** (e.g., adults, children, teens)
- **How effective do you think this PSA is?**

STEP 3 **Discuss with students what makes an effective PSA.**

Ask students:

- **Which PSAs do you think told the story best? Why?**

Tell students to keep these ideas in mind as they develop their own PSAs about their assigned fruit or vegetable.

Lesson 4

Decipher the Secret Vegetable Code

Lesson Summary

Overview

Garden detectives learn about how the fruits and vegetables they are growing fit into a healthy diet.

Lesson Extensions

A lesson extension engages the detectives in a role-play to develop skills in asking their families to serve more fruits and vegetables.

Key Messages

Make half your plate fruits and vegetables.

Vary your veggies. Eat red, orange, and dark-green vegetables, such as tomatoes, carrots, and spinach, at meals and snacks.

Garden Connection

The garden detectives learn more about the fruits and vegetables they are growing, in addition to many other fruits and vegetables. They take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Home Connection

Send the *Garden Detective News* home to parents/caregivers. Encourage students to survey family members about their fruit and vegetable consumption and to ask their families to serve more fruits and vegetables at meals and as snacks.

Main Lesson: Decipher the Secret Vegetable Code

Standards Addressed

Science
Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts
Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners.*

Health
Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 3, Access Information: *Demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.*

Learning Objectives

Students will be able to:

1. List the five food groups.

2. Identify the Vegetable Subgroups within the Vegetable Group.

Time Required

50 minutes

Materials

- *Student Handout 4.1, MyPlate*
- *Student Handout 4.2, Vegetable Subgroups*
- ***Fruit and Vegetable Flash Cards*** (Appendix D and on CD-ROM)
- ***Detective Veggie Dice*** (Appendix D and on CD-ROM)
- Scissors
- Tape or glue
- Index cards
- Pencils
- Timer

Preparation

- Duplicate one copy of *Student Handouts 4.1* and *4.2* on 3-hole-punch paper for each student.
- Cut out and assemble the ***Detective Veggie Dice*** so that you have a set of three dice for every four students.
- Separate the ***Fruit and Vegetable Flash Cards***. Laminate the ***Flash Cards***, if you have not done so already. NOTE: Only the ***Vegetable Flash Cards*** are required in this lesson.

Instructional Process

STEP 1 **Review the five food groups with students.**

Write the following five food groups on the board:

- Grains
- Dairy
- Protein Foods
- Fruits
- Vegetables

Tell students:

- **To help us get enough of the types of foods we need each day, foods are categorized into five food groups.** Foods in each group contribute similar nutrients to a person's diet. For instance, fruits and vegetables contain many important nutrients, including vitamins A and C, potassium (a mineral), and dietary fiber.

Ask students to give examples of foods in each group.

- **Grains**—Bread, rice, noodles, cereal
- **Dairy**—Milk, cheese, yogurt
- **Protein Foods**—Chicken, turkey, meats, seafood, eggs, beans and peas, nuts, seeds, processed soy products (e.g., tofu)
- **Fruits**—Banana, orange, peach, strawberries, blackberries
- **Vegetables**—Lettuce, Swiss chard, carrots, corn

Some foods in the Vegetable Group actually are considered to be the fruit part of the plant because they contain seeds. However, they belong to the Vegetable Food Group because of how they are used in meals (as vegetables in a salad, on a sandwich, etc.), the nutrients they contain, and their taste. Some examples are tomatoes, cucumber, and squash.

We eat the seeds of some plants. Seeds that we eat are in the Protein Foods Group. Examples of seeds we eat are sunflower seeds and pumpkin seeds.

Distribute ***Student Handout 4.1, MyPlate***. MyPlate is an icon developed by the United States Department of Agriculture that reminds us to choose a healthy plate at mealtimes. The icon emphasizes the Fruits, Vegetables, Grains, Protein, and Dairy Food Groups.

Ask students:

- **Why do you think some sections of the plate are bigger than the others?** (While we need food from all five food groups, we need different amounts from each food group. For example, the MyPlate icon shows that we need a little more vegetables than fruit.)

Instruct students to write examples of some of the foods they eat from each food group in each section of the plate.

Ask students:

- **What does this icon tell us about eating fruits and vegetables—like the ones growing in our garden?** (The icon encourages us to make half of our plate fruits and vegetables—with a little more coming from the Vegetable Group.)

Review the vocabulary words on page 81 with students.

Explain to students that fruits and vegetables contain many nutrients with important health benefits. Ask the students:

Since you have started to research the fruits and vegetables we have in the garden, can anyone tell us a health benefit of eating any of the fruits or vegetables we have planted?

Remind students:

- **Remember when we said that fruits and vegetables have important nutrients, including vitamins A and C, the mineral potassium, and dietary fiber?**
- **Vitamin A keeps eyes and skin healthy and helps to protect against infections.**
- **Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy.**
- **Fiber keeps food moving through the digestive tract.**
- **Potassium plays a role in keeping blood pressure normal.**

The Vegetable Group is broken into five subgroups and people are encouraged to eat vegetables from each subgroup in order to get the nutrients they need to stay healthy. Vary your veggies to get a variety of nutrients in the foods you eat. Eat red, orange, and dark-green vegetables, such as tomatoes, carrots, and spinach, at meals and snacks.

STEP 2 Distribute *Student Handout 4.2, Vegetable Subgroups* and write the names of the Vegetable Subgroups on the board. Review the five Vegetable Subgroups with students by considering examples within each subgroup:

- Dark-Green
  - Examples: bok choy, broccoli, collard greens, dark-green leaf lettuce, kale, mesclun, mustard greens, romaine lettuce, spinach, Swiss chard, turnip greens, watercress, beet greens
- Red and Orange
  - Examples: acorn squash, butternut squash, carrots, Hubbard squash, pumpkin, red peppers, sweet potatoes, tomatoes
- Beans and Peas
  - Examples: black beans, black-eyed peas, garbanzo beans (chickpeas), kidney beans, lentils, navy beans, pinto beans, white beans, soy beans, split peas
- Starchy
  - Examples: corn, green peas, green lima beans, white potatoes, plantains
- Other
  - Examples: artichokes, asparagus, bean sprouts, beets, Brussels sprouts, cabbage, cauliflower, celery, cucumbers, eggplant, green beans, green peppers, iceberg lettuce, mushrooms, okra, onions, parsnips, turnips, wax beans, zucchini

Distribute the ***Vegetable Flash Cards*** so that each student has one.

- Ask the students who have the vegetables to be grown in the school garden to go first.
- Ask each student to raise his or her hand and share the following information:
  - The vegetable on the card,
  - Which subgroup it belongs to, and
  - A nutrition fact from the back of the card.
- Ask the student to take his or her ***Vegetable Flash Card*** to the front of the room and tape it underneath the correct Vegetable Subgroup heading.
- Tell the students that it is important to eat a variety of fruits and vegetables because of the many different nutrients included in these foods.

Point out that green leaf lettuce belongs to the Dark-Green Vegetable Subgroup because of its green color and the nutrients it contains, such as vitamin A. Iceberg lettuce is lighter in color and lower in several nutrients when compared to other vegetables in the Dark-Green Vegetable Subgroup. Iceberg lettuce is part of the "Other" Vegetable Subgroup.

Most people need to eat more vegetables from the Red and Orange, Dark-Green, and Beans and peas Vegetable Subgroups. Beans and peas are special. They also belong to the Protein Foods Group because they are high in protein.

Ask the students:

- **Why aren't all green vegetables in the Dark-Green Vegetable Subgroup?** Some of the "Other" Subgroup vegetables, like zucchini and cucumbers, are different from dark-green vegetables because they are not green inside--they are white inside and only have a green outer skin/peel. Vegetables in the "Other" Subgroup are also lower in certain nutrients than dark-green vegetables. For instance, green beans are lower in vitamins A and C and folate than most dark-green vegetables.
- **Why aren't beet roots in the Red and Orange Subgroup?** Beet roots are different from other vegetables in the Red and Orange Subgroup. First, beet roots that are most commonly available are a purplish color. This purple color is different from the red color you see in red peppers or the orange color in carrots. Beet roots are also lower in some nutrients than red and orange vegetables, such as vitamins A and C. Because of their color and what nutrients they provide, beets are part of the "Other" Vegetable Subgroup.
- **Why aren't green (string) beans and green peas in the Beans and Peas Subgroup?** Green peas are similar in their nutrient content to other starchy vegetables and are grouped with them. Green beans are in the "Other" Vegetable Subgroup. Vegetables in the "Other" Subgroup are still healthful choices. Eating vegetables from all the subgroups helps you get the nutrients you need to play hard and be healthy.

STEP 3 **Play Detective Veggie Dice Game.**

Arrange the tables to seat the students in groups of four, and label each table as Detectives A, Detectives B, Detectives C, and so on. Give each table a set of three Detective Veggie Dice.

Tell students that they are going to play a game called Detective Veggie Dice. The object of the game is to identify the subgroup each vegetable is from.

Read the following directions to the students:

1. There will be four detectives at each table. Players seated across from each other are partners. You will work together earning points for your team's card. One member from each team keeps track of the score as his or her partner is rolling the dice by marking tallies on an index card. Each table will be given a set of three *Detective Veggie Dice,* pencils, and two index cards per team (one card is to keep track of points for each round and one card is to keep track of wins and losses).
2. Before play begins, I will decide which Vegetable Subgroup the first game will focus on: Dark-Green, Red and Orange, Starchy, Beans and Peas, or Other. To begin the game, I will call out "dark-green veggie!" and start a timer. The first detective at each table gets to roll all three dice for 1 minute and his or her partner records the scores on an index card. Each time a dark-green vegetable is rolled, that team gets a point. After 1 minute, I will call out "switch!" The next detective at each table gets to roll the dice for 1 minute. We will do this until all four detectives at each table have a chance to roll the dice for 1 minute.
3. Then we'll play another round using the next Vegetable Subgroup. I will call out "red and orange veggies!" and start the timer again.
4. The object of the game is to acquire points, which are earned each time a detective rolls a vegetable from the designated Vegetable Subgroup. When a point is earned, it is marked on the team's scorecard.

Scoring Basics

- Each correct roll is worth 1 point.

Example: If this round is rolling for "dark-green veggies" and the dice you roll turn up a dark-green veggie, a red and orange veggie, and a starchy veggie, you would receive 1 point.

- If all three dice come up as the designated Vegetable Subgroup, this is called a Veggie Victory and it's worth 10 points. If you get a Veggie Victory, you must call out "Veggie Victory!" and this stops play at all tables for the rest of the round and each table moves on to the next Vegetable Subgroup round. Mark a V on the scoring card to indicate that the team has a Veggie Victory.
- At the end of all Vegetable Subgroup rounds, the team with the most points wins.
- Each team keeps track of its wins and losses on the second index card.

You may wish to play the following variations of the game:

- If all three dice come up as a Vegetable Subgroup other than the designated Vegetable Subgroup (example: you roll three starchy vegetables when the designated round is red and orange vegetables), you will receive 5 points. Play continues at all the tables until time is up or someone rolls a Veggie Victory.
- After each Vegetable Subgroup round, the team with the most points at each table moves to the next table in a clockwise rotation.

Recognition

- It is fun to give non-food prizes or stickers during the Detective Veggie Dice game. Here are some examples of achievements that could be rewarded:
  - Highest score
  - Most wins
  - Most losses
  - Most Veggie Victories

Use the Detective Veggie Dice to review the Vegetable Subgroups.

Note: The Detective Veggie Dice game may be played while smaller groups of students go out to tend the garden.

Teacher Background Information

Nutrients and What They Do

Vocabulary

Dietary Guidelines for Americans: Recommendations from the Federal Government that provide advice for making healthy food choices that promote good health and a healthy weight and help prevent disease for Americans ages 2 and older.

MyPlate: An icon developed by the United States Department of Agriculture that reminds Americans to choose a healthy plate at mealtime. The icon emphasizes the fruits, vegetables, grains, protein foods, and dairy food groups. (See *http://www.choosemyplate.gov.*)

Nutrients: The substances found in food that nourish your body.

Minerals: Nutrients such as calcium, potassium, magnesium, iron, and zinc; some regulate body processes while others become part of body tissues.

Vitamins: Substances found in foods that your body needs to grow and stay healthy. Many fruits and vegetables are high in vitamins A and C, folate, potassium, and fiber.

The *Dietary Guidelines for Americans, 2010* describes a **healthy diet** as one that

- Emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products;
- Includes lean meats, poultry, fish, beans, eggs, and nuts; and
- Is low in saturated fats, *trans* fats, cholesterol, salt (sodium), and added sugars.

The recommendations in the Dietary Guidelines and in MyPlate are for the general public 2 years of age and older. Making healthy food choices and being physically active can help people attain and maintain a healthy weight, reduce their risk of chronic disease, and promote overall health.

Eating more fruits and vegetables is a key part of eating healthfully. More information about fruits and vegetables can be found at *http://www.choosemyplate.gov.*

Food Group	Key Nutrients*	Action in the Body
Vegetables	Vitamin A, Vitamin C, Potassium, Folate, Fiber	**Vitamin A** helps maintain skin and mucous membranes and aids in vision. **Vitamin C** helps the body heal and fight infections. **Folate** is needed for healthy blood cells and is important for cell division, such as in pregnancy and growth. **Fiber** aids the movement of food through the digestive tract.
Fruits	Vitamin A, Vitamin C, Potassium, Folate, Fiber	**Potassium** maintains the heartbeat, regulates body fluids, and is needed for muscle and nerve functioning.

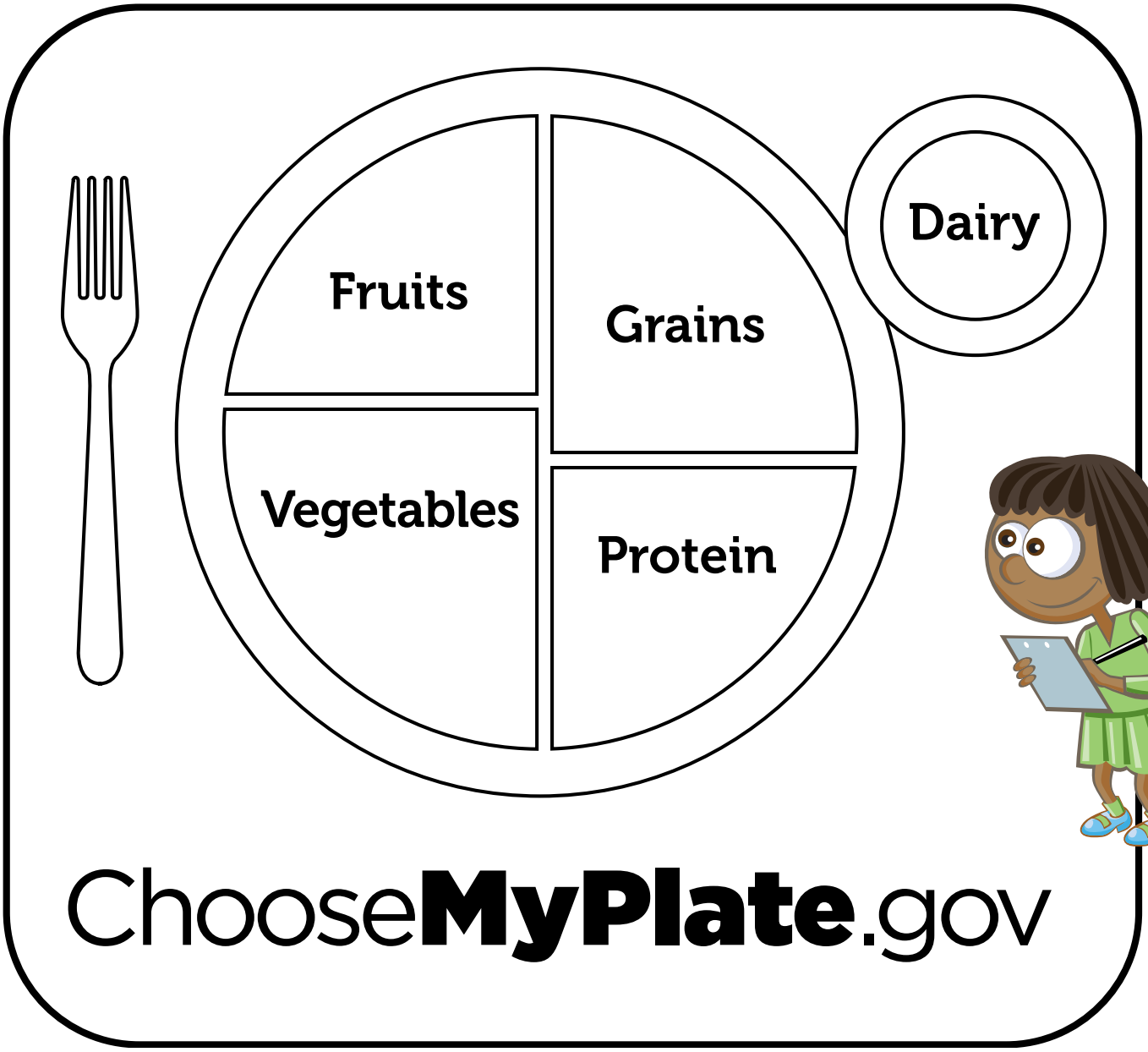
*Each food group contributes many other nutrients in addition to the key nutrients listed here. There are more than 40 different nutrients with many different functions that are required for good health.

Student Handout 4.1

MyPlate

Name: _____ Date _____

Write examples of the foods that you like to eat for each food group in the correct section of the plate.



Make half your plate fruits and vegetables.

Student Handout 4.2

Vegetable Subgroups

There are five Vegetable Subgroups:

- **Dark-Green**
  - Examples: bok choy, broccoli, collard greens, dark-green leaf lettuce, kale, mesclun, mustard greens, romaine lettuce, spinach, Swiss chard, turnip greens, watercress, beet greens
- **Red and Orange**
  - Examples: acorn squash, butternut squash, carrots, Hubbard squash, pumpkin, red peppers, sweet potatoes, tomatoes
- **Beans and Peas**
  - Examples: black beans, black-eyed peas, garbanzo beans (chickpeas), kidney beans, lentils, navy beans, pinto beans, white beans, soybeans, split peas
- **Starchy**
  - Examples: corn, green peas, green lima beans, white potatoes, plantains
- **Other**
  - Examples: artichokes, asparagus, bean sprouts, beets, Brussels sprouts, cabbage, cauliflower, celery, cucumbers, eggplant, green beans, green peppers, iceberg lettuce, mushrooms, okra, onions, parsnips, turnips, wax beans, zucchini

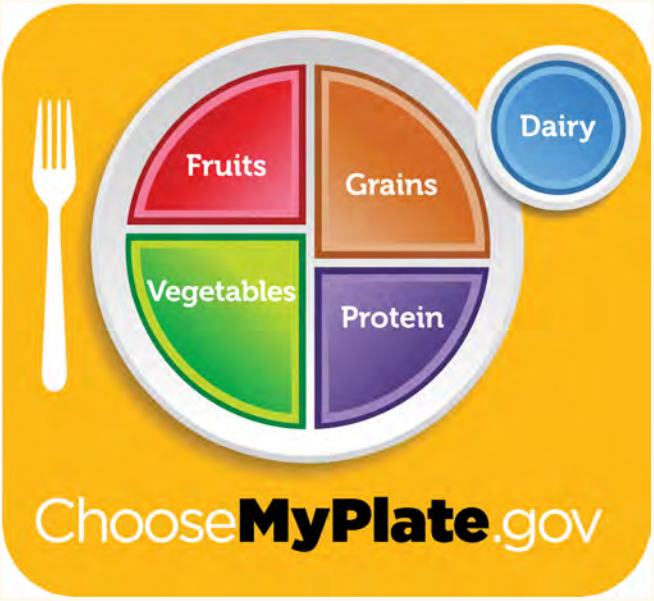
Vary your veggies. Eat red, orange, and dark-green vegetables, such as tomatoes, carrots, and spinach, at meals and snacks.

Garden Detective News

Help Healthy Habits Take Root

Garden Detective News

This week, our class learned about building a healthy plate with foods from each of the food groups. One easy way is to fill half of your plate with fruits and vegetables. They also learned why it is important to vary your veggies and eat dark-green, red, and orange vegetables, and beans and peas. We are discovering lots of new ways to do that through our garden where we are growing dark-green vegetables like spinach, Swiss chard, and leaf lettuce, and orange vegetables like carrots.



Dark-Green Vegetables

- bok choy
- dark-green leaf lettuce
- romaine lettuce
- watercress
- broccoli
- kale
- spinach
- Swiss chard
- collard greens
- mustard greens
- turnip greens
- beet greens

Red and Orange Vegetables

- acorn squash
- carrots
- red peppers
- pumpkin
- Hubbard squash
- sweet potatoes
- butternut squash
- tomatoes

Bean and Peas

- black beans
- kidney beans
- pinto beans
- black-eyed peas
- lentils
- white beans
- garbanzo beans (chickpeas)
- navy beans
- soy beans
- split peas

Help your garden detective complete the family survey with all members of your family. Have fun and be healthy as a family!

Why should kids eat plenty of fruits and vegetables as part of a healthy diet?

Start them early with fruits and veggies. It's easier to get your child in the habit of eating and enjoying fruits and veggies if you start when they are young.

Studies show a positive association between healthier dietary patterns and academic performance.

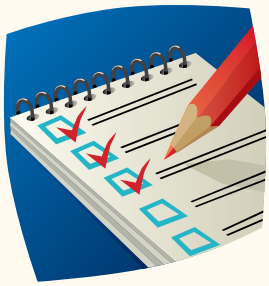
Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy.

Vitamin A keeps eyes and skin healthy and helps to protect against infections.

The fiber in fruits and veggies helps your child feel full longer, and that can help with a healthy body weight. It can also help prevent constipation.

Family Activity 4

Family Survey



It would be a crime not to include the whole family in making healthy food choices!
Let's get everyone involved in making food choices for a healthy diet. Survey your family members to find out the kinds of food choices they are making. Use the questions below. Put a check mark in each person's column for every "yes" answer.

Help Your Family Make Healthy Food Choices

This week did you:	You	Family members			
Eat a fruit or drink 100 percent fruit juice each day?	_____	_____	_____	_____	_____
Eat a vegetable at lunch and dinner each day?	_____	_____	_____	_____	_____
Eat dark-green vegetables?	_____	_____	_____	_____	_____
Eat red and orange vegetables?	_____	_____	_____	_____	_____
Eat beans and peas?	_____	_____	_____	_____	_____
Total check marks	_____	_____	_____	_____	_____

When you are done with the survey, talk with your family about the results.

Do you and your family see any places where you could improve and eat healthier? _____

_____

Set a goal for this week to get more yes answers to these questions. Have fun and be healthy as a family!_____

_____

Lesson Extension: Play a Leading Role

Standards Addressed

English/Language Arts
Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3 and 4 topics and texts, building on others' ideas and expressing their own clearly.*

Health
Standard 4, Interpersonal Communication: *Demonstrate how to ask for assistance to enhance personal health.*

Standard 8, Advocate for Health: *Express opinions and give accurate information about health issues.*

Learning Objectives

Students will be able to:

1. Demonstrate effective verbal persuasion techniques in asking a parent/caregiver to have more fruits and vegetables available at home.

Time Required

30 minutes

Materials

Student Handout 4.3, Playing a Leading Role

Preparation

- Duplicate *Student Handout 4.3* for each student on 3-hole-punch paper.

Instructional Process

STEP 1 **Introduce the role-play activity.** Explain to students that you will be sending a newsletter home to their families about making healthy food choices with plenty of fruits and vegetables, especially red, orange, and dark-green vegetables such as tomatoes, carrots, and spinach, at meals and snacks.

Ask students:

- **Do you eat fruits or vegetables several times a day? If not, why not?**

  Use prompts such as:

- **Do you have fruits and vegetables at home that you like?**
- **How easy is it to find fruits and vegetables at home?**

Explain that all the reasons they have mentioned may make it more difficult to eat more fruits and vegetables.

Point out that you need a variety of fruits and vegetables available at school and home if you want to make half your plate fruits and vegetables. Having plenty of fruits and vegetables available helps you to "vary your veggies" and eat smart to play hard.

STEP 2 **Have students complete the role-play activity.** Distribute ***Student Handout 4.3, Playing a Leading Role***. Review the directions with the students.

Talk briefly about the importance of using respectful words and tone of voice when asking for changes. Ask students to develop ground rules, such as:

- Use a pleasant tone of voice.
- Use positive body language.
- Say "please" and "thank you."
- No put-downs allowed.

Divide the class into groups of four students and assign each group a scene from the handout.

Give students 15 minutes to discuss how they would resolve the situation in their scene.

In pairs, have one student play the parent and the other the student. Have them role-play the student asking his or her parents/caregivers for more fruits and vegetables at home. After 2-3 minutes, allow the pairs to switch roles and try again.

Have each group present its solution to the class. Compare solutions that different groups developed.

Student Handout 4.3

Playing a Leading Role

Read your group's scene. Talk about the scene with your group. What keeps the person in the scene from eating more fruits and vegetables? As a group, decide what you would say and do. Write it down.

_____

_____

_____

_____

_____

_____

_____

Then, divide into pairs. Take turns being the parent and the student. As the student, role-play asking your parent/caregiver for more fruits and vegetables at home. After 2-3 minutes, switch roles and try again. Remember to be respectful to one another.

Scene A

You just got home from school and you really want a fruit or vegetable for a snack. You look in the cupboard, on the counter, and in the refrigerator. There are no fruits or vegetables. What could you say or do so there are healthy snacks for you to eat after school?

Scene B

You are always rushing out the door in the morning and don't have time to sit and eat breakfast. You know you need to eat something to give you energy to learn in class. How could you talk with your parents about having fresh fruit in a bowl on the counter that you could eat on the way to school?

Make half your plate fruits and vegetables.

Lesson 5

Trace the Fruit and Vegetable Trail

Lesson Summary

Overview

The garden detectives read a story about how fruits and vegetables are grown and move from the farm to school or home. They answer comprehension questions about the story and solve math problems related to the farm-to-school theme. These materials may be used in class and/or as homework assignments for students.

Lesson Extensions

An extension to the lesson has students investigating ways their school could work with local farmers, either by starting a farmers market at the school, having a farm-related fundraiser, or looking for ways to use more locally grown foods in the lunch room. In this activity, students are asked to talk to other students, parents, the school food service director, and school administrators.

In another extension, students make a field trip to the farmers market to interview farmers.

Key Messages

Farms, orchards, and gardens grow fruits and vegetables that help you grow and stay healthy.

Know your farmer. Know your food. Fruits and vegetables do not have to travel as far when you buy from local farmers. Farms can also be a great place to learn about where your food comes from.

Garden Connection

The garden detectives relate how food grown in a garden, as well as food grown on a farm or in an orchard, can become food that is eaten at home, in restaurants, or at school. They take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Community Connection

Invite a local farmer to speak to your class about what fruits and vegetables he or she grows and how he or she sells the produce to the public. If time and resources permit, visit a local farm or community garden.

School Food Service Connection

If your school cafeteria is involved in farm-to-school efforts, ask your school food service director to talk with the class about which foods are grown locally.

Home Connection

Send the ***Garden Detective News*** home to parents/caregivers. Encourage students to complete the farm-to-table maze and to investigate local farmers markets with their parents/caregivers.

Main Lesson: Trace the Fruit and Vegetable Trail

Standards Addressed

English/Language Arts

Standard 1, Reading Informational Text, Grade 3: *Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.*

Standard 1, Reading Informational Text, Grade 4: *Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.*

Mathematics

Standard 8, Operations and Algebraic Thinking, Grade 3: *Solve two-step word problems using the four operations.*

Standard 3, Operations and Algebraic Thinking, Grade 4: *Solve multistep word problems posed with whole numbers and having whole-number answers using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.*

Learning Objectives

Students will be able to:

1. Explain where fruits and vegetables come from.
2. Demonstrate reading comprehension skills.
3. Demonstrate arithmetic problem-solving skills.

Time Required

75 minutes

- 35 minutes to read story
- 40 minutes to complete reading and math worksheets

Materials

- ***Student Handout 5.1, Terry and Sam Solve the Mystery of Where Fruits and Vegetables Come From***
- ***Student Handout 5.2, Reading Comprehension Questions***
- ***Student Handout 5.3.1, Farmer Brown Does the Math (less advanced)***
- ***Student Handout 5.3.2, Farmer Brown Does the Math (more advanced)***

Preparation

- Review ***Student Handouts 5.3.1*** and ***5.3.2*** and select the one(s) best for your students.
- Duplicate ***Student Handouts 5.1, 5.2***, and ***5.3*** on 3-hole-punch paper for each student.
- Review the Teacher Background Information, including the handout answer sheets.

Instructional Process

STEP 1 Introduce the story by asking students:

- **Where do you think fruits and vegetables come from?**

Some students may say the grocery store or supermarket.

Ask them:

- **How do fruits and vegetables get to the grocery store/supermarket?**

Listen to students' answers. Make sure that students understand that fruits are grown in orchards and farms and vegetables are grown on farms.

Explain that today students will read a story about 3rd and 4th grade students who take a field trip to a farm.

STEP 2 Have students read the story. Distribute ***Student Handout 5.1, Terry and Sam Solve the Mystery of Where Fruits and Vegetables Come From.*** Explain to the students that it is important "to know your farmer, know your food." Farms can be a great place to learn about where your food comes from.

Have students read the story to themselves silently.

STEP 3 Have students complete the reading comprehension questions. Distribute ***Student Handout 5.2, Reading Comprehension Questions.*** Have students complete the handout. You may wish to collect the completed handouts for grading before proceeding with a class discussion.

Review the questions and answers to the reading comprehension questions with the class.

STEP 4 Have students complete the math problems. Distribute ***Student Handout 5.3, Farmer Brown Does the Math***. Have students complete the handout. You may wish to collect the completed handouts for grading before proceeding with a class discussion.

Review the questions and answers to the mathematics questions with the class.

Teacher Background Information

Helping Students Trace the Fruit and Vegetable Trail

Vocabulary

Community: A group of people living within a common geographic area and/or a group of people who share common interests.

Community supported agriculture (CSA): A method that allows farmers to sell directly to the public by having consumers purchase a share in the season's crops. A basket of farm-fresh fruits and/or vegetables is delivered to a designated location each week by the farmer. The consumer then picks up his or her weekly allotment from that location.

Compost: A mixture of decaying vegetation and manure that is added to soil to provide more nutrients to plants.

Distributor: A business that supplies goods to stores or other businesses that sell to consumers. For example, a produce distributor purchases fruits and vegetables from a farmer and sells them to supermarkets, restaurants, or schools.

Farm: An area of land and buildings that is used for growing crops and raising animals.

Farmers market: A place where farmers sell their products directly to the public.

Orchard: A piece of land planted with fruit trees.

Fruits and vegetables are grown on farms and in orchards. Sometimes, these farms are thousands of miles away. For example, California grows about 80 percent of the fruits and vegetables sold in the United States. Florida and Washington are two other States that are large suppliers of fruits and vegetables. If you live in Ohio, this means that some of the fruits and vegetables you buy in your local supermarket have been shipped by truck over a long distance.

Increasingly, Americans are able to buy fruits and vegetables grown overseas in their local supermarkets. This allows us to enjoy fruits and vegetables that are not in season in our own country. These fruits and vegetables are often in transit from 1 to 2 weeks, however, so they may not be as fresh as produce that is grown closer to home.

Buying locally-grown fruits and vegetables also supports local farmers.

The trail that leads from farm to table can involve many routes. Farmers can sell their produce to wholesale distributors that truck fruits and vegetables from the farm to restaurants, supermarkets, and schools. Other options for farmers to sell directly to consumers include farmers markets and community supported agriculture (CSA).

Farmers markets may be found in many communities. Usually scheduled for once a week at specific locations, farmers markets provide an opportunity for farmers to sell their products directly to consumers.

Community supported agriculture is another way for farmers to sell directly to consumers. In this option, consumers purchase a "share" of the farmer's produce for the season. Every week during the growing season, the farmer delivers a box of fresh produce for consumers to pick up at a designated location. Often, the consumer does not know what produce will be in the box each week, so it is a big surprise! Consumers can have the fun of learning new ways to cook vegetables that they haven't previously considered or trying new types of fruits.

Farm to school is a way to connect schools (K-12) with regional or local farms in order to serve healthy meals using locally produced foods. Farm-to-school activities also provide small and mid-scale farms with new marketing opportunities and school children with the opportunity to learn how food is grown and harvested.

Farm-to-school activities vary from community to community; however, the basic goals are similar:

- To meet the diverse needs of school nutrition programs in an efficient manner;
- To support regional and local farmers and thereby strengthen local food systems; and
- To provide support for health and nutrition education.

Note these Web sites for more information:

http://www.usda.gov/wps/portal/usda/knowyourfarmer?navid=KNOWYOURFARMER

http://www.fns.usda.gov/cnd/F2S/Default.htm

Answer Key for Student Handout 5.2

Reading Comprehension Questions

1. **Where are Terry and Sam going on their field trip?**

   To visit Farmer Brown's farm.

2. **What are three vegetables that Farmer Brown grows on his farm?**

   Carrots, kale, potatoes, spinach, lettuce, beets, Swiss chard.

3. **What are two fruits that Farmer Brown grows in his orchards?**

   Peaches and apples.

4. **What are three things that vegetables need to grow?**

   Sunlight, water, nutrients, compost, worms.

5. **Where are two places that Farmer Brown sells his vegetables?**

   Distributor, local schools, and farmers markets.

6. **How do Farmer Brown's vegetables go from the farm to the supermarket?**

   A distributor takes them from the farm to the supermarket.

7. **Where do fruits and vegetables come from?**

   Farms and orchards. Mystery solved!

Answer Key for Student Handout 5.3.1

Farmer Brown Does the Math

1. **The school cafeteria needs 240 carrots to make enough carrot salad for all 200 kids in the school. Farmer Brown delivered 180 carrots on Wednesday. How many more carrots are needed?**

   Answer: 60 carrots

2. **Farmer Lee sold 25 pints of strawberries at the farmers market. Farmer Garcia sold 38 pints. How many more pints did Farmer Garcia sell?**

   Answer: 13 pints

3. **Eliza has $20 to spend at the farmers market. She sees signs for the following:**

   a. Spinach: $3/bunch
   b. Lettuce: $1/head
   c. Raspberries: $5/pint
   d. Carrots: $2/bunch
   e. Beets: $3/bunch
   f. Peaches: $4/pound
   g. Swiss chard: $2/bunch

   Eliza decides to buy 2 bunches of spinach, 2 pounds of peaches, a head of lettuce, and 1 pint of raspberries. Does she have enough money?

   Answer: Yes. The cost of the fruits and vegetables is $20.00.

4. **Farmer Brown wants to sell his spinach to the supermarket. The distributor says it will have to charge him $51 to ship the spinach to the store. Farmer Brown can sell the spinach to the distributor for $100. How much money will Farmer Brown make?**

   Answer: $49 in profit ($100-51 = $49)

5. **Mrs. Jones wants to make beet chips with her class. The beets cost $3/bunch at the farmers market. She needs 8 bunches of beets. How much will Mrs. Jones have to pay for the beets?**

   Answer: 8 bunches @$3= $24.

Answer Key for Student Handout 5.3.2

Farmer Brown Does the Math

1. **The school cafeteria needs 240 carrots to make enough carrot salad for all 200 kids in the school. Farmer Brown delivered 3 cartons of carrots on Wednesday. Each carton holds 60 carrots. How many more cartons of carrots are needed?**

   Answer: 1 carton (60 carrots)

2. **Farmer Lee sold 25 pints of strawberries at the farmers market. Farmer Garcia sold 38 pints. How many more pints did Farmer Garcia sell?**

   Answer: 13 pints

3. **Eliza has $20 to spend at the farmers market. She sees signs for the following:**

   a. Spinach: $3/bunch
   b. Lettuce: $1/head
   c. Raspberries: $5/pint
   d. Carrots: $2/bunch
   e. Beets: $3/bunch
   f. Peaches: $4/pound
   g. Swiss chard: $2/bunch

   What could Eliza buy for $20?

   Answer: Various options, e.g., one of each item.

4. **Farmer Brown wants to sell his spinach to the supermarket. The distributor says it will have to charge him 34 cents for every mile it trucks the spinach to the store. The closest store is 150 miles away. Farmer Brown can sell the spinach to the distributor for $100. Will Farmer Brown make a profit? How much?**

   Answer: Yes. $49 in profit (.34 x 150 = 51. $100-51 = $49)

5. **Mrs. Jones wants to make beet chips with her class. The beets cost $3/bunch at the farmers market. Each bunch has four beets. There are 30 children in Mrs. Jones' class and she needs 1 beet per child. How many bunches does she need to buy? How much will Mrs. Jones have to pay for the beets?**

   Answer: 30 children/4 beets per bunch = 8 bunches (rounded up from 7.5). 8 bunches @$3= $24.

Student Handout 5.1

Terry and Sam Solve the Mystery of Where Fruits and Vegetables Come From

Terry woke up one fine April morning as the sun rose. He jumped out of bed. His mother didn't even have to tell him that it was time to get up. He pulled on his clothes and ran downstairs to breakfast.

"How come you're up so early this morning?" asked Mom.

"We're going on a field trip today at school. I'm really looking forward to it," said Terry.

"That is exciting! Where are you going to go?" asked Mom.

"We're going to a farm where they grow carrots and potatoes and kale and… lots of other vegetables! We had a farmer come to our class to tell us about his farm. Today we're going to ride a bus into the country and go see it!" exclaimed Terry.

"Well, you'd better eat a good breakfast, then. You'll need lots of energy to explore the farm," said Mom.

Across town, Sam was staring at her closet. She was trying to figure out what to wear on the field trip. Her big sister Jo told her that she'd better wear something that she wouldn't mind getting dirty. There's lots of dirt on a farm. Sam picked out some jeans and a T-shirt.

"Better wear some sturdy shoes, too," said Jo. "You'll be walking a lot in the fields at the farm."

When Terry and Sam got to school, they and their classmates squirmed in their seats while the principal read the morning announcements. When he announced that the 3rd and 4th grade classes were going on a field trip to Farmer Brown's farm, the class members cheered. As soon as the announcements were over, Mrs. Jones lined them up. They marched out to the waiting school bus.

It was a long ride to Farmer Brown's farm. The farm was deep in the country, miles away from the town where Terry and Sam lived. Once they got to the farm, Terry, Sam, and the other kids were happy to see Farmer Brown once again. He welcomed them to his farm.

"On our farm," said Farmer Brown, "we grow lots of different vegetables. We also grow peaches and apples in the orchard. Today, we're ready to start planting carrots, tomatoes, and squash. We've been waiting to plant them until the danger of frost was over. If it gets too cold at night, the frost will kill the baby vegetable plants. We need to wait until the weather is warm enough to help the vegetables grow from seeds into plants."

"On the other hand, we've already planted the vegetables that like cooler weather. Those include spinach, kale, beets, Swiss chard, and lettuce. So you'll be able to see those vegetables growing and you can help us pick

some, too. Let's go take a walk and see what we find."

Mrs. Jones and the students followed Farmer Brown down a dirt path to the fields on his farm.

"We're lucky it's a sunny day for our visit," said Mrs. Jones.

"Yes, vegetables need lots of sunlight to grow," said Farmer Brown. Turning to the children, he asked: "What else do vegetables need to grow?"

All the kids eagerly raised their hands. After all, they had all worked in the school garden and knew a thing or two by now about what vegetables need to grow.

"Water!" shouted Pedro.

"Nutrients from the soil!" called out Diep.

"Worms," suggested LaKeisha. "They keep the soil from getting too hard."

"Compost," said Jacob.

"Well, you're all right," said Farmer Brown. "Plants need sunlight, water, and nutrients from the soil. Compost helps make the soil rich. And worms keep the soil from getting hard."

"Where do you sell your vegetables, Farmer Brown?" asked Sam.

"We sell some of our vegetables to a company called a distributor. They sell the vegetables we grow to grocery stores. We also sell to local schools for the cafeteria. And we sell some of our vegetables at farmers markets," replied Farmer Brown.

"What's a farmers market?" asked Terry.

"A farmers market is a place where local farmers come once a week to sell their products to customers. We take our vegetables to a farmers market in the city square. People come to the market to buy fruits and vegetables that they know are grown locally."

"So farmers markets are a good way to buy fresh fruits and vegetables. And you get to meet the people who grow them!" exclaimed Juanita.

"That's right. And farmers markets help local farmers stay in business, too," said Farmer Brown. "Farming can be hard work. Farmers need lots of ways to sell their vegetables. They like meeting the people who like to eat their vegetables, too!"

By now, the students had come to a big field. It had row after row of spinach plants, their leaves shiny in the sunlight. Farmer Brown gave each student a plastic bag. He invited each student to pick some spinach leaves to take home to their families. But first, he asked everyone to taste the spinach right after they picked it and then washed it under the water faucet in a corner of the field.

"How's it taste?" asked Farmer Brown.

"Hmmm…. yummy," said Juanita.

"It's kind of crunchy and warm," said Tony.

On the bus trip back to school, Sam asked Terry what he liked best about the trip.

"I liked tasting the spinach. I didn't think I was going to like it, but I did! So I'm glad that I can take some home for my family to have, too," said Terry. "What did you like best?"

"I liked meeting Farmer Brown again and seeing all his fields planted with vegetables. I'm going to ask my mom to take me to the farmers market so I can introduce her to Farmer Brown. I bet she'll like knowing where her spinach and carrots come from and the farmer who raised them!"

Student Handout 5.2

Reading Comprehension Questions

Name: _____ Date_____

1. Where are Terry and Sam going on their field trip? _____

   _____

2. What are three vegetables that Farmer Brown grows on his farm? _____

   _____

3. What are two fruits that Farmer Brown grows in his orchards?_____

   _____

4. What are three things that vegetables need to grow? _____

   _____

5. Where are two places that Farmer Brown sells his vegetables?_____

   _____

6. How do Farmer Brown's vegetables go from the farm to the supermarket? _____

   _____

7. Where do fruits and vegetables come from? _____

   _____

Farms, orchards, and gardens grow fruits and vegetables that help you grow and stay healthy.

Student Handout 5.3.1

Farmer Brown Does the Math

Name: _____ Date_____

Farmers have to do more than just grow fruits and vegetables. They have to be business people, too, so they can get the vegetables they grow to people who want to buy them. Help Farmer Brown and his customers solve some math problems.

1. The school cafeteria needs 240 carrots to make enough carrot salad for all 200 kids in the school. Farmer Brown delivered 180 carrots on Wednesday. How many more carrots are needed?

2. Farmer Lee sold 25 pints of strawberries at the farmers market. Farmer Garcia sold 38 pints. How many more pints did Farmer Garcia sell?

3. Eliza has $20 to spend at the farmers market. She sees signs for the following:

   a. Spinach: $3/bunch

   b. Lettuce: $1/head

   c. Raspberries: $5/pint

   d. Carrots: $2/bunch

   e. Beets: $3/bunch

   f. Peaches: $4/pound

   Eliza decides to buy 2 bunches of spinach, 2 pounds of peaches, a head of lettuce, and 1 pint of raspberries. Does she have enough money?

4. Farmer Brown wants to sell his spinach to the supermarket. The distributor says it will have to charge him $51 to ship the spinach to the store. Farmer Brown can sell the spinach to the distributor for $100. How much money will Farmer Brown make?

5. Mrs. Jones wants to make beet chips with her class. The beets cost $3/bunch at the farmers market. She needs 8 bunches of beets. How much will Mrs. Jones have to pay for the beets?

Know your farmer. Know your food. Fruits and vegetables do not have to travel as far when you buy from local farmers. Farms can also be a great place to learn about where your food comes from.

Student Handout 5.3.2

Farmer Brown Does the Math

Name: _____ Date_____

Farmers have to do more than just grow fruits and vegetables. They have to be business people, too, so they can get the vegetables they grow to people who want to buy them. Help Farmer Brown and his customers solve some math problems.

1. The school cafeteria needs 240 carrots to make enough carrot salad for all 200 kids in the school. Farmer Brown delivered 3 cartons of carrots on Wednesday. Each carton holds 60 carrots. How many more cartons of carrots are needed?

2. Farmer Lee sold 25 pints of strawberries at the farmers market. Farmer Garcia sold 38 pints. How many more pints did Farmer Garcia sell?

3. Eliza has $20 to spend at the farmers market. She sees signs for the following:
   a. Spinach: $3/bunch
   b. Lettuce: $1/head
   c. Raspberries: $5/pint
   d. Carrots: $2/bunch
   e. Beets: $3/bunch
   f. Peaches: $4/pound

   What could Eliza buy for $20?

4. Farmer Brown wants to sell his spinach to the supermarket. The distributor says it will have to charge him 34 cents for every mile it trucks the spinach to the store. The closest store is 150 miles away. Farmer Brown can sell the spinach to the distributor for $100. Will Farmer Brown make a profit? How much?

5. Mrs. Jones wants to make beet chips with her class. The beets cost $3/bunch at the farmers market. Each bunch has four beets. There are 30 children in Mrs. Jones' class and she needs 1 beet per child. How many bunches does she need to buy? How much will Mrs. Jones have to pay for the beets?

Know your farmer. Know your food. Fruits and vegetables do not have to travel as far when you buy from local farmers. Farms can also be a great place to learn about where your food comes from.

Garden Detective News

Grow Healthy Habits With Your Children

Find out where fruits and vegetables come from.

USDA United States Department of Agriculture

TEAM Nutrition

5

Garden Detective News

This week, the garden detectives read a story about a class field trip to a farm. They learned how farmers sell their fruits and vegetables to the public. The class talked about how eating produce grown by local farmers has many benefits. For example, your food doesn't have to travel as far to reach you. Freshly-picked fruits and vegetables taste great! Buying local also supports farmers in your community.

Here are some ways to buy local produce:

- Visit the farmers market, if there's one in your community. At a farmers market, farmers sell their produce directly to consumers like you. Look for a farmers market near you at *http://apps.ams.usda.gov/FarmersMarkets/*.
- Stop at a farm stand, if you're driving in the country. Some farmers sell their fruits and vegetables at a stand near their farm.
- Take a trip to a local u-pick farm, where you and your family can pick your own fruits and vegetables.
- Buy a community supported agriculture (CSA) share. Local farmers sell shares in their crops at the beginning of the season, then deliver boxes of fresh produce each week to a designated location for pick-up. Find out more at *http://www.nal.usda.gov/afsic/pubs/csa/csa.shtml*.

Mystery Solved!

Ways To Help Your Child Eat More Fruits and Vegetables.

1. **Go food shopping with your children.** Grocery shopping can teach your child about food and nutrition. Discuss where fruits and vegetables come from. Let your children make healthy choices.
2. **Celebrate the season**. Use fresh fruits and vegetables that are in season—the fruits and vegetables in your detective's garden are in season! Check your local supermarket or farmers market for these fruits and vegetables. They are easy to get, have more flavor, and are usually less expensive.

Family Activity 5

Follow the Path of the Fruits and Vegetables From the Farm to Your Plate

Directions to the Maze:

1. Trace a line from the Farm to the CSA Pickup to Your Plate.
2. Trace a line from the Farm to the Farmers Market to Your Plate.
3. Trace a line from the Farm to the School to Your Plate.
4. Trace a line from the Farm to the Wholesale Distributer to the Grocery Store to Your Plate.
5. Go to the next page to think about the distance from the Farm to Your Plate when buying fruits and vegetables from different sources.

Questions:

1. How many different routes are there from Farm to Plate on the maze? _____

   _____

2. Which route was the longest distance from the Farm to Your Plate? _____

   _____

3. Which routes were the shortest distance from the Farm to Your Plate? _____

   _____

Ask your garden detective what he or she learned in school about where fruits and vegetables come from and the benefits of consuming locally grown fruits and vegetables.

Know your farmer. Know your food. Fruits and vegetables do not have to travel as far when you buy from local farmers. Farms can also be a great place to learn about where your food comes from.

Answer Key: 1. Four 2. Farm to the Wholesale Distributer to the Grocery Store to Your Plate 3. Locally grown fruits and vegetables from the Farm to Farmers Market, CSA Pickup, and School

Lesson Extension: Investigate Sources of Fresh Fruits and Vegetables

Standards Addressed

English/Language Arts

Standard 1, Writing: *Write opinion pieces on topics or texts, supporting a point of view with reasons and information.*

Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3/4 topics and texts, building on others' ideas and expressing their own clearly.*

Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Standard 4, Speaking and Listening: R*eport on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.*

Health

Standard 8, Advocate for Health: *Advocate for personal, family, and community health.*

Learning Objectives

Students will be able to:

1. Advocate for working with local farmers to increase access to fresh fruits and vegetables.

Time Required

60 minutes

Materials

- Paper
- Pens

Preparation

- None.

Instructional Process

STEP 1 **Discuss with students** the reasons why it is important for schools to work with local farmers to increase access to fresh local fruits and vegetables at school. Write their answers on the board, e.g.:

- Locally grown food can help schools provide balanced meals for kids.
- Linking school food offerings to local sources can help kids learn where food comes from.
- Supporting local farmers puts money back into the local community.

Remind students that farms, orchards, and gardens grow fruits and vegetables that help you grow and stay healthy.

STEP 2 **Brainstorm with students** different ways that the school community could work with local farmers. Write their answers on the board, e.g.:

- Starting a farmers market on school grounds where families could shop
- Having a farm-related fundraiser
- Looking for ways to use more locally grown foods in the lunch room

Then have students brainstorm possible barriers that might prevent the school community from working with local farmers.

Have students vote on a list of the top three activities that they consider desirable and feasible.

STEP 3 **Assign teams of students to interview** the school food service director, school administrators, their parents/caregivers, and other students about their level of interest in these activities. Work together to generate a list of interview questions, e.g.:

- Here are three ways our school could work with local farmers to make locally grown fruits and vegetables available to our school community: _____, _____, and _____.
- Which of these activities do you think would work best? Why?
- Which of these activities do you think would be hard to do? Why?
- On a scale of 1-5 where 5 is the highest, which activity would you personally rate the best?

STEP 4 **Have student teams compile the results of their interviews and present them to their classmates.** As a class, discuss which activity has the greatest community support.

STEP 5 **Have students write a letter to the school food service director,** Parent Teacher Association (PTA), or other school parents group, principal, and/or school board recommending the activity that has the widest community support. Students should list as many reasons as they can think of about why this is an important policy to adopt. You may wish to have students write a draft letter that you or a classmate can review and a final version that incorporates any needed corrections.

STEP 6 **Share the letters with the school food service director** or other appropriate policymaker(s) in your school.

Lesson Extension: Visit the Farmers Market

Standards Addressed

English/Language Arts

Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.*

Standard 3, Speaking and Listening, Grade 3: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Learning Objectives

Students will be able to:

1. Describe a farmers market.
2. Conduct an interview.
3. Summarize findings.

Time Required

30 minutes plus field trip

Materials

- Paper
- Pens

Preparation

- Identify farmers markets in your community. Start by checking this Web site: *http://apps.ams.usda.gov/FarmersMarkets/*
- Arrange transportation as needed.
- Invite parents to serve as field trip volunteers.
- Contact farmers market manager to explore existing learning opportunities at the market. Ask the manager:
  - Where is the market? What are its operating hours?
  - How many vendors are usually participating? Where are they from?
  - How long has the market been in operation?
  - How many people typically visit the market?
  - When is the best time for your class to visit the market and interview farmers?
  - Are there descriptive materials about the market that the class should review before its visit? How can you access them?
  - Are there existing educational programs that the market sponsors that your class could participate in?

Instructional Process

STEP 1 **Introduce the farmers market field trip.** Explain to students that they will have a chance to meet real farmers at the farmers market and to learn about how fruits and vegetables are grown and sold. This is a real chance to be a garden detective.

Remind students that farmers markets are great places to learn about where your food comes from, as well as good places to buy locally grown fruits and vegetables.

Ask students:

Why would someone want to shop at a farmers market? (To buy fruits and vegetables that are fresh and in season, to support local farmers, to discover new fruits and vegetables, to talk with farmers; etc.)

Share information about your local farmers market that your class will visit. Use the information you learned from the farmers market manager, such as:

- Where the farmers market is located
- What kind of vendors participate in the market and where they're from
- Interesting facts about the market, e.g., how many people visit the market, how long it has been in existence

STEP 2 **Assign students to work in pairs.** Each pair will be responsible for interviewing a farmer at the market. Working together, students should develop a list of five questions that they want to ask the farmers that they interview about their farm, how they get their fruits or vegetables to market, etc.

Tell students that as they get to know the farmer, they will learn more about the food we eat: "Know Your Farmer. Know Your Food."

STEP 3 **Review interview questions.** Have students volunteer questions that their pair has come up with. Give student pairs an opportunity to add new questions to their list, based on ideas from others.

STEP 4 **Review good interviewing guidelines.** Brainstorm with students about good etiquette to use in interviewing farmers. For example:

- Don't interrupt a farmer who is busy serving customers.
- Ask politely if the farmer is willing to answer a few questions.
- Say thank you after the interview.

STEP 5 **Visit the farmers market.** On field trip day, have students visit different farmers' stands in the farmers market. Student pairs should interview individual farmers with their questions. Decide on procedures in advance: Students could take turns asking questions or one student could ask the questions and the other could take notes.

STEP 6 **Have students write a summary.** After the field trip, have each student write a summary of what he or she learned in the interview as a homework assignment.

Lesson 6

Unravel Clues in the Cafeteria

Lesson 6

Lesson Summary

Overview

In this lesson, students record how many fruits and vegetables they eat at lunch as part of a challenge between classrooms. Students will use all of their detective skills to uncover sources of fruits and vegetables on the school lunch menu and determine how they will meet their goals for adding more fruits and vegetables to their meals. The class that eats the most fruits and vegetables during the week is celebrated as the Fruit and Veggie Detective Challenge Champions.

Lesson Extensions

In a lesson extension, the school food service director visits the classroom to talk about how fruits and vegetables are included on the cafeteria menu. A second lesson extension compares the nutrient values of potatoes and apples in plain and prepared forms.

Key Messages

Eat smart to play hard. Choose fruits and vegetables in the cafeteria.

Make half your lunch tray fruits and vegetables. Include dark-green and red and orange vegetables each week.

Be a great garden detective! Discover what fruits and vegetables are on your school's menu. Share your ideas for other fruit and veggie choices kids might like.

Garden Connection

The garden detectives take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

School Food Service Connection

The school lunch menu is reviewed for availability of fruits and vegetables, including vegetables from each Vegetable Subgroup.

Invite the school food service director to your classroom for a discussion about fruits and vegetables on the school menu (see lesson extension activity).

Home Connection

Send the *Garden Detective News* home to parents/caregivers. Tell students that they'll be going on a scavenger hunt with their families!

lesson

Main Lesson: Unravel Clues in the Cafeteria

Standards Addressed

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

Mathematics

Standard 2, Number & Operations in Base Ten, Grade 3: *Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.*

Standard 4, Number & Operations in Base Ten Grade 4: *Fluently add and subtract multi-digit whole numbers using the standard algorithm.*

Health

Standard 5, Decision Making: *Choose a healthy option when making a decision.*

Standard 6, Goal Setting: *Set a personal goal and track progress toward its achievement.*

Learning Objectives

Students will be able to:

1. Evaluate the fruit and vegetable choices on the school lunch menu.
2. List the offered vegetables by subgroup and the offered fruits.
3. Set a goal of eating more fruits and vegetables as well as a variety of fruits and vegetables at lunchtime.
4. Track their progress in meeting their established fruit and vegetable goals.

Time Required

75 minutes

- 50 minutes pre-tracking instruction
- 25 minutes post-tracking instruction

Materials

- Copies of cafeteria menu for coming week
- Green, yellow, and pink highlighters for each student
- ***Student Handout 6.1, My Lunchtime Fruit and Vegetable Goals***
- ***Student Handout 4.2, Vegetable Subgroups*** (Lesson 4)
- ***Student Handout 6.2, Fruit and Veggie Detective Challenge Tracker***
- ***Student Handout 6.3, Fruit and Veggie Detective Challenge Scorecard***
- ***Overhead/Slide 6.1, Fruit and Veggie Detective Challenge Scorecard***
- Overhead projector or computer with LCD screen for projecting image

Preparation

- Enlist other classrooms to participate in the Fruit and Veggie Detective Challenge. The other classes do not need to be using *The Great Garden Detective Adventure* curriculum to participate.

- Select a "trophy" to present to the winning class to recognize its achievement. This trophy could move from class to class each time the school hosts the competition. (This could be as simple as a "golden pumpkin" award made out of supplies from a local craft store.)
- Select prizes for the winning classrooms(s). If multiple classes are participating, you may wish to designate Gold, Silver, and Bonze level prizes. Prizes should support the overall goal of making healthy food choices and not consist of sweets or other food rewards that are high in solid fats and added sugars. Examples of prizes include:
  - Eat lunch with the principal or local celebrity at specially designated tables in the cafeteria.
  - Let the winning class listen to music in class.
  - Announce the winners over the morning announcements.
  - Celebrate with a special fruit or vegetable snack.
- Obtain the menu from the cafeteria. If the calendar is monthly, mark the week that the class will be examining. Make enough copies for each student.
- Duplicate one copy of ***Student Handouts 6.1, 6.2,*** and ***6.3*** on 3-hole-punch paper for each student.
- Duplicate ***Student Handout 4.2, Vegetable Subgroups*** on 3-hole-punch paper if you have not already done so.
- Make a transparency of ***Overhead/Slide 6.1*** or plan to project it from your computer.

Instructional Process

STEP 1 **Announce to students that their class will be competing with other classrooms in the Fruit and Veggie Detective Challenge** to see which class eats (and/or drinks) the most fruits and vegetables at lunch. Each student will set personal goals and write down what fruits and vegetables he or she eats for 1 week. Explain to students that the class that eats the most fruits and vegetables wins the challenge. Announce what the winning class will receive.

STEP 2 **Introduce the menu assessment activity.** Tell students they are going to investigate the cafeteria menu to see what fruits and vegetables are being offered during the challenge week. Explain to students that eating fruits and vegetables at lunch helps them eat smart and play hard.

Tell students that the class will be looking at the school lunch menu to see how they can do this each day. This way, if they get school lunch, they'll know what fruits and vegetables are going to be part of the meal. If they bring their lunch, this activity might give them some ideas for what fruits and vegetables to include in their lunch from home. Explain that having a goal for how they can eat more fruits and vegetables at lunch makes it easier for them to eat more.

Distribute ***Student Handout 4.2, Vegetable Subgroups*** or ask students to retrieve it from their ***Garden Detective Journals***. Review the five Vegetable Subgroups and which vegetables belong in each subgroup.

Give each student a copy of the following week's cafeteria menu and a green, pink, and yellow highlighter.

Ask the students to underline the vegetables on the menu and circle the fruits. Next have them highlight the vegetables from the Dark-Green Vegetable Subgroup in green, the vegetables from the Red and Orange Vegetable Subgroup in pink, and the vegetables from the Beans and Peas Vegetable Subgroup in yellow.

Ask the students:

- **How many vegetable choices are available on the lunch menu?**
- **How many vegetable choices from the Dark-Green Vegetable Subgroup are available?**
- **How many choices from the Red and Orange Vegetable Subgroup are available?**
- **How many choices from the Beans and Peas Vegetable Subgroup are available?**
- **How many fruit choices are available on the lunch menu this week?**
- **How many 100 percent juice choices are on the lunch menu this week?**
- **Are any of the fruits and vegetables we are growing in the garden on the menu? Which ones?**

Tell students:

- **When you choose lots of different vegetables from all of the Vegetable Subgroups, you eat smart by consuming a variety of important nutrients. This helps you to play hard and do your best in school.**

STEP 3 **Develop goals for fruit and vegetable intake.** Distribute ***Student Handout 6.1, My Lunchtime Fruit and Vegetable Goal***. Have students list the fruits and vegetables they will choose from the lunch menu. If students are bringing bag lunches from home, have them plan what fruits and vegetables they will pack in their lunch bags.

Explain to the students that setting a goal—an idea of something specific they want to achieve--will help them try new fruits and vegetables and make sure half their plate (or school lunch tray) is fruits and vegetables. Remind students to include choices from the Dark-Green and Red and Orange Vegetable Subgroups, along with a variety of other fruits and vegetables.

Tell students to keep the handout in their ***Garden Detective Journals*** as they will need it later in the lesson.

STEP 4 **Introduce the fruit and vegetable tracking activity.** Tell students that as part of the challenge, everyone in the class will be writing down the fruits and vegetables they eat at lunch for 5 days (4 if your school is on a 4-day/week schedule). They will also be working together to track how many fruits and vegetables the whole class eats.

Distribute ***Student Handout 6.2, Fruit and Veggie Detective Challenge Tracker.*** Explain that they will use the Tracker to write down the fruits and vegetables they eat at lunch for the challenge week. Remind students that they should only write down the fruits and vegetables they actually eat.

Allow time immediately after lunch each day for students to record their fruit and vegetable choices on the handout.

Each day after lunch, project ***Overhead/Slide 6.1, Fruit and Veggie Detective Challenge Scorecard*** on the screen. Have students tally the classroom total for how many fruits and vegetables they ate:

- Calculate the total number of daily fruit choices students consumed at lunch.
- Calculate the total number of daily vegetable choices students consumed at lunch.

Fill in the total number of fruits and vegetables, then print or copy the Healthy Eating Scorecard each day and post it prominently in the classroom.

STEP 5 **Analyze individual weekly results of the fruit and vegetable tracking activity.** At the end of the week, each student will analyze how well he or she did in meeting his or her lunchtime fruit and vegetable goals. Distribute ***Student Handout 6.3, Fruit and Veggie Detective Challenge Scorecard*** to each student. Using their completed ***Student Handout 6.2, Fruit and Veggie Detective Challenge Tracker***, have students calculate how many fruit and vegetable choices they have eaten at lunchtime during the week and record their calculations on the handout. Remind students of the importance of eating a variety of vegetables, including those from the Dark-Green, Red and Orange, and Beans and Peas Vegetable Subgroups. This helps them get what they need to play hard and grow.

Next, have students compare the fruits and vegetables eaten to their goals on ***Student Handout 6.1, My Lunchtime Fruit and Vegetable Goals.*** Praise students for achieving their goals.

Ask students:

- **Did anyone try a new fruit or vegetable at lunch this week? If so, which one?**
- **Did we eat a variety of vegetables from each Vegetable Subgroup? How could we increase the variety of fruits and vegetables that we eat at lunchtime?**

Ask students to share their results at home. Encourage them to talk with their families about ways they can eat more fruits and vegetables at meals and snacks.

STEP 6 **Analyze classroom weekly results of the fruit and vegetable tracking activity.** Teachers participating in the challenge will review classroom totals of fruits and vegetables eaten by each class. Choose the winning classroom and award it the Fruit and Veggie Detective Challenge trophy you selected. If multiple classrooms are participating, you may wish to designate the class with the highest total as the Gold Champions, the classroom with the second highest total the Silver Champions, and the class with the third highest total the Bronze Champions. Give the prizes previously decided upon to each winning classroom.

Teacher Background Information

Make Half Your Plate Fruits and Vegetables

Vocabulary

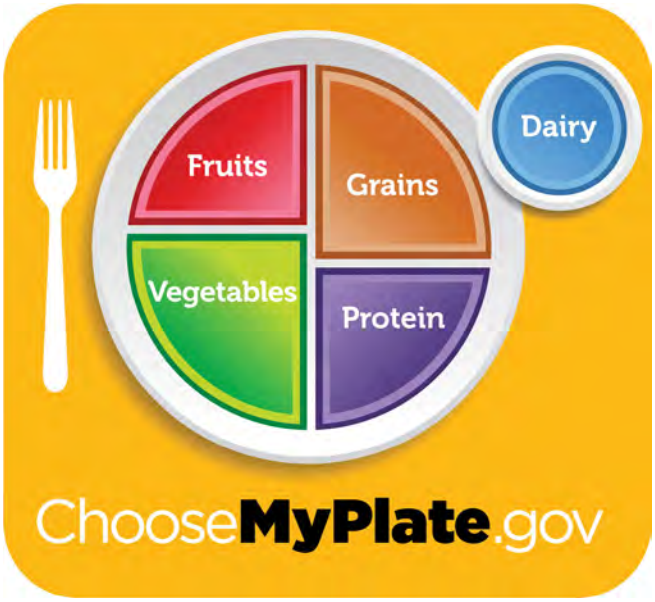
Calories: A measure of the energy used by the body. The term calories also refers to a measure of the energy that food supplies to the body.

Fat: A nutrient that supplies energy, promotes healthy skin and growth, and is a carrier of certain vitamins.

Food Processing: The treatment of foods, such as fruits and vegetables, that changes the food's properties in order to preserve it, improve its quality, or make it functionally more useful. Examples include canning, drying, and freezing.

Nutrients: The substances found in food that nourish your body.

Variety: In terms of food choices, refers to eating different types of fruits and vegetables during the week.



The food icon, MyPlate, encourages the public to make half their plates fruits and vegetables.

This concept is a great way to remind children to eat fruits and vegetables at lunch. What if your school uses a lunch tray and not a round plate? No problem, the same concept applies. You could even have the children draw a picture of their lunch tray with half the tray being fruits and vegetables.

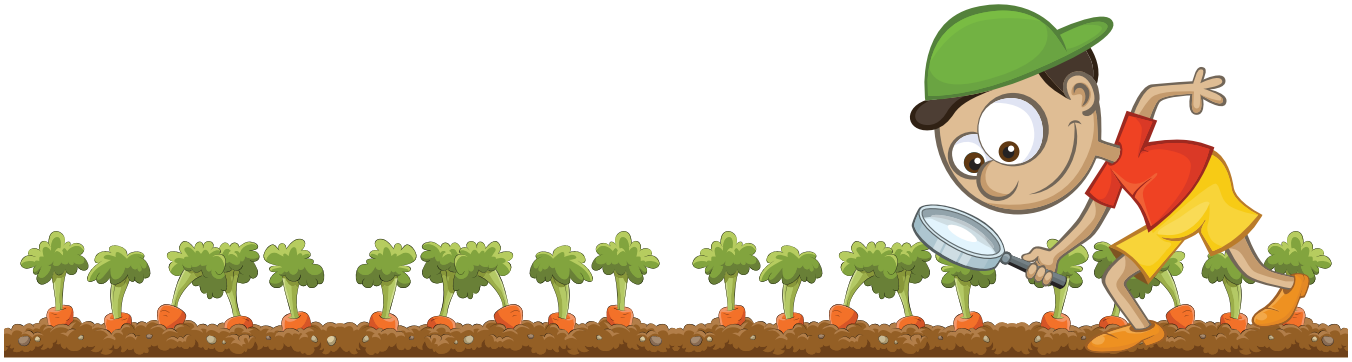
Another message to make clear to the children is to eat a variety of vegetables from all the Vegetable Subgroups, especially the Dark-Green and Red and Orange Vegetable Subgroups, as well as the Beans and Peas Vegetable Subgroup.

Overhead/Slide 6.1

Fruit and Veggie Detective Challenge Scorecard

	Monday	Tuesday	Wednesday	Thursday	Friday	TOTAL Choices
Number of fruit choices (including 100 percent fruit juice) eaten at lunch time—classroom total						
Number of vegetable choices eaten at lunchtime—classroom total						
Grand Total Fruit and Vegetable Choices Eaten						

Make half your lunch fruits and vegetables. Include dark-green, red, and orange vegetables each week.



Student Handout 6.1

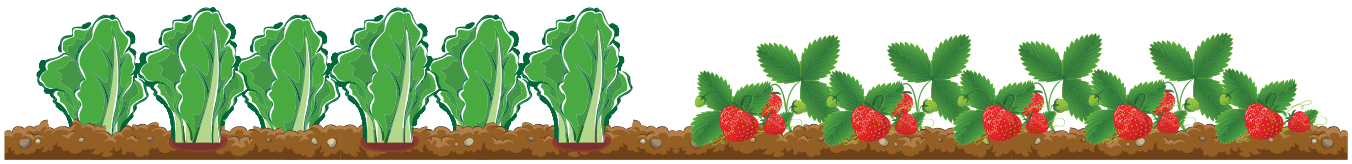
My Lunchtime Fruit and Vegetable Goals

Name: _____ Date_____

I will select and eat these fruits and vegetables at lunch:

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Be a great garden detective! Discover what fruits and vegetables are on your school menu.



Student Handout 6.2

Fruit and Veggie Detective Challenge Tracker

Name: _____ Date_____

Day	Food Group	Names of Vegetables and Fruits Eaten (including 100 percent juice)	Number of Choices Eaten
Example	Vegetables	*Baby Carrots*	*1* Total Vegetables
	Fruits	*Fresh Apple*	*1* Total Fruits
Day 1	Vegetables		_____ Total Vegetables
	Fruits		_____ Total Fruits
Day 2	Vegetables		_____ Total Vegetables
	Fruits		_____ Total Fruits
Day 3	Vegetables		_____ Total Vegetables
	Fruits		_____ Total Fruits
Day 4	Vegetables		_____ Total Vegetables
	Fruits		_____ Total Fruits
Day 5	Vegetables		_____ Total Vegetables
	Fruits		_____ Total Fruits

Eat smart to play hard.
Choose fruits and vegetables in the cafeteria.

Student Handout 6.3

Fruit and Veggie Detective Challenge Scorecard

Name: _____ Date_____

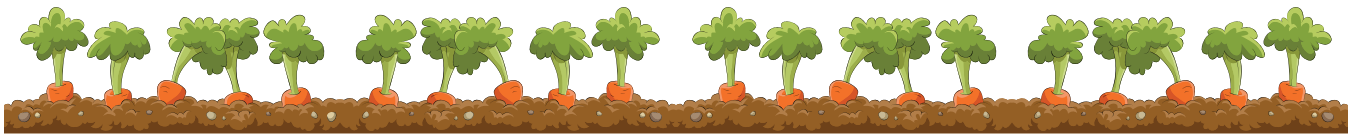
Directions: Using the Lunchtime Fruit and Vegetable Tracker to rate the fruits and vegetables you ate this week, put a star in the box below if you ate a fruit or vegetable at lunchtime. Then put a star in the box if you ate vegetables from the different subgroups. Total each column for the five days. Add up all the totals for a grand total at the bottom of the scorecard. Then find out how you did this week!

	Monday	Tuesday	Wednesday	Thursday	Friday	TOTAL STARS
Did you eat at least one fruit or drink 100 percent juice at lunchtime?						
Did you eat at least one vegetable at lunchtime?						
Of the vegetable choices:						
Did you eat a choice from the Dark-Green Vegetable Subgroup?						
Did you eat a choice from the Red and Orange Vegetable Subgroup?						
Did you eat a choice from the Beans and Peas Vegetable Subgroup?						
GRAND TOTAL SCORE (Add up all the stars)						

How did I do?

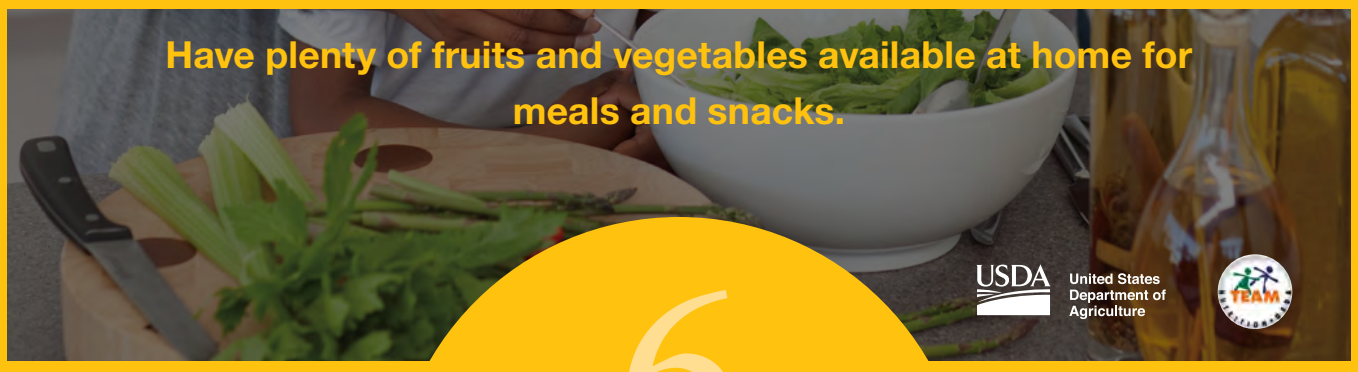
☑ 12 stars or more	Super job of solving the mystery of healthy eating this week!
☑ 9-11 stars	On your way to solving the mystery of eating healthy!
☑ Fewer than 9 stars	You may be following a false lead—you need more clues to solve the mystery of healthy eating!

Make half your lunch tray fruits and vegetables.
Include dark-green, red, and orange vegetables each week.



Garden Detective News

Help Healthy Habits Take Root



Garden Detective News

The garden detectives reviewed the school menu this week to find out what fruits and vegetables are offered on the cafeteria menu. They set goals and decided which fruits and vegetables they were going to choose from the menu. If your child brings a packed lunch, you could plan a brown bag menu that will help him or her meet his or her goal. They also kept track of the fruits and vegetables they chose to eat at lunch for 5 days. Ask your child about the goals he or she set.

Mystery Solved!

Ways To Help Your Child Eat More Fruits and Vegetables.

When they come home hungry, have fruits and veggies ready to eat.

- Keep a bowl of fruit that has been rinsed under running water on the kitchen table.
- Put cut fruits and vegetables that have been rinsed under running water on a shelf in your refrigerator where your child can see them.

Let your kids be "produce pickers." Help them pick fruits and veggies at the store. Kids are more likely to eat fruits and veggies they pick out for themselves. So, as a fun activity, try taking your kids to a farmers market or grocery store and let them each pick out a different colored fruit or vegetable. Different colored produce provides different nutrients. So the more colors they try, the more nutrients they'll get. That's the pot of gold at the end of the rainbow!

Talk with your child about his or her lunch choices. There are many fruit and vegetable options on the school lunch menu.

They learn by watching you. Let your child see you enjoying fruits and vegetables at meals and as snacks.

Family Activity 6

The Great Fruit and Vegetable Scavenger Hunt

As a family, go on a scavenger hunt for fruits and vegetables in your home.

Check your countertops, h, pantry, and freezer for fruits and vegetables. It's no surprise that families that have a variety of fruits and vegetables available at home eat more fruits and vegetables.
Fresh, frozen, dehydrated/dried, and canned are all good choices.

Write down the fruits and vegetables you find in each location below. Use the list of fruits and vegetables on the next page to guide your search.

	Fruit	100 Percent Juice	Dark-Green Veggies	Red and Orange Veggies	Starchy Veggies	Other Veggies	Beans and Peas
Counter							
Fridge							
Pantry							
Freezer							

Does your family have a variety of fruits and vegetables available at home?

_____

What Vegetable Subgroups are you missing?

_____

What are some ways you could make sure your family has a variety of fruits and vegetables available for meals and snacks?

_____

Scavenger Hunt Clues

Here are examples of vegetables in the different vegetable subgroups:

Dark-Green Vegetables

- Examples: bok choy, broccoli, collard greens, dark-green leaf lettuce, kale, mesclun, mustard greens, romaine lettuce, spinach, Swiss chard, turnip greens, watercress, beet greens

Starchy Vegetables

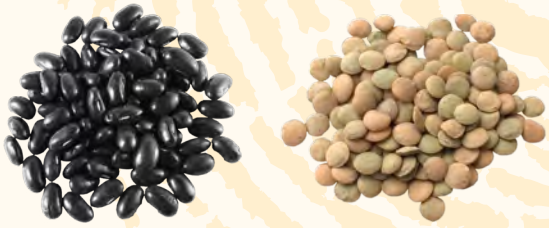
- Examples: corn, green peas, green lima beans, white potatoes, plantains

Red and Orange Vegetables

- Examples: acorn squash, butternut squash, carrots, Hubbard squash, pumpkin, red peppers, sweet potatoes, tomatoes

Other Vegetables

- Examples: artichokes, asparagus, bean sprouts, beets, Brussels sprouts, cabbage, cauliflower, celery, cucumbers, eggplant, green beans, green peppers, iceberg lettuce, mushrooms, okra, onions, parsnips, turnips, wax beans, zucchini



Beans and Peas

- Examples: black beans, black-eyed peas, garbanzo beans (chickpeas), kidney beans, lentils, navy beans, pinto beans, white beans, soy beans, split peas

Lesson Extension: Analyze the Clues

Standards Addressed

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts

Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners, building on others' ideas and expressing their own clearly.*

Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.*

Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Health

Standard 2, Analyze Influences: *Describe how the school and community can support personal health practices and behaviors.*

Standard 4, Interpersonal Communication: *Demonstrate how to ask for assistance to enhance personal health.*

Learning Objectives

Student will be able to:

1. Analyze information from reviewing the cafeteria menu.
2. Prepare questions and talking points about the cafeteria menu analysis.

Time Required

45-60 minutes

Preparation

- Invite the school food service director for a discussion with students about the school lunch menu, specifically the fruits and vegetables offered, and set a date for the discussion. Ask him or her to describe briefly how the menu is decided.

Instructional Process

STEP 1 **Prepare the students for the discussion.**

Explain to students that the school food service director is the nutrition professional who is responsible for developing the school menu. There are standards set by the Government (the U.S. Department of Agriculture [USDA]) that the school food service director must follow. Many other people help, but this professional is usually the person who, in the end, approves the menu.

Tell the students:

- **Tell the students they are great garden detectives!** They discovered what fruits and vegetables are on the cafeteria menu for the week. Now they will be able to share their ideas for other fruit and veggie choices kids might like.

STEP 2 **Prepare questions for the school food service director.** Have the students discuss their data from the menu analysis about how many fruits and vegetables are on the cafeteria menu and prepare questions and talking points for the discussion, such as:

- The total number of vegetables offered on the 5-day menu
  - The total number of vegetables from the Dark-Green Vegetable Subgroup that were offered during the week
  - The total number vegetables from the Red and Orange Vegetable Subgroup that were offered during the week
  - The total number of vegetables from the Beans and Peas Vegetable Subgroup that were offered
- The total number of different fruits that were offered during the week

Brainstorm with the students the kinds of questions they would like to ask the school food service director. Some questions may include:

- How is the menu planned?
- How can students provide input to the menu choices?
- How could the fruits and vegetables grown in the garden be included in school meals menu? (If your garden does not produce enough food to use in the cafeteria, how could the cafeteria include the types of vegetables and fruits in the garden on the cafeteria menu?)
- Does the cafeteria buy locally grown fruits and vegetables from farmers in the area? Why or why not?

STEP3 **Have the school food service director visit the classroom.** Have the school food service director tell the class about his or her job. Have students present their talking points and ask the questions they have developed for their guest speaker.

STEP 4 **Have students write a thank-you letter to the school food service director.**

Lesson Extension: Discover What's in the Food We Eat

Standards Addressed

Science
Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

Mathematics
Standard 3. Operations and Algebraic Thinking, Grade 3: *Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.*

Standard 2, Operations and Algebraic Thinking, Grade 4: *Multiply or divide to solve word problems involving multiplicative comparisons.*

Health
Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 5, Decision Making: *Choose a healthy option when making a decision.*

Learning Objectives

Student will be able to:

1. Choose healthier forms of fruits and vegetables.

Time Required

30 minutes

Materials

- *Student Handout 6.4, Discover What's in the Food You Eat*
- ***Overhead/Slide 6.2, Discover What's in the Food You Eat***
- Overhead projector or computer with LCD projector and screen

Preparation

- Duplicate *Student Handout 6.4* on 3-hole-punch paper for each student.
- Make transparency of ***Overhead/Slide 6.2***, if using overhead projector.

Instructional Process

STEP 1 **Explain to students what happens when fats are added to fruits and vegetables in their fresh or plain form:**

- Fruits and vegetables provide many vitamins and minerals without a lot of calories and fat.
- It is important to get the nutrients the body needs without eating too much fat or sugar.
- Added fats and sugars load foods with extra calories you may not need.

Calories are the energy foods give us to grow and play. We use calories to make our body work and for physical activity like running and jumping. If we eat and/or drink more calories than we use in physical activity and body processes, we store the extra calories as fat in our bodies.

Eating fruits and vegetables helps you get the vitamins and minerals you need without a lot of extra calories. They are healthful choices as long as we do not add lots of sugars and fats, such as butter, to them.

Fat can be added to food by:

- Frying in oil or shortening
- Preparing recipes that include butter, stick margarine, or shortening (example: desserts, snack foods, or any recipe)
- Adding to food after cooking, (example: adding butter or stick margarine to vegetables)
- Adding regular salad dressings and toppings, such as bacon, cheese, etc.

Sometimes fruits and vegetables are processed after they are harvested. This is when the food from the farm is cleaned and transformed so that it lasts longer and is easier to prepare. For instance, apples may be cooked and turned into applesauce. Potatoes may be peeled and cut and turned into fries or chips. Processed forms of fruits and vegetables contain added fats, sugars, and salt.

Ask students:

- **What are some other ways we eat vegetables and fruits that have been processed?** (canned or frozen vegetables, fruit desserts [berry pies, fig cookies], spaghetti sauce)

STEP 2 Distribute ***Student Handout 6.4, Discover What's in the Food You Eat.*** Tell students that today they will be detecting the differences in calories and fat of two different forms of foods containing fruits and vegetables.

These comparisons include a baked potato with French fries and a fresh apple with apple pie. The foods being compared are a plain version of a potato to a fried version of a potato and a fresh apple to apple pie.

Project ***Overhead/Slide 6.2*** on the screen and review the nutrient content of the four foods in the table. Ask the students to answer the questions on ***Student Handout 6.4, Discover What's in the Food You Eat*** individually or answer the questions as a group.

After answering the questions, summarize what the students have learned: Plain versions of fruits and vegetables are usually lower in fat and calories and higher in vitamins and minerals.

Ask students:

- **Does this mean that you cannot eat some of your favorite foods like French fries or apple pie?**

No, it is fine to eat small portions of these food choices sometimes, but be sure to balance this choice with other foods that are lower in calories and have less fats and added sugars. Make sure you are including different types of fruits and vegetables during the week as well. Eat Smart to Play Hard. Choose dark-green, red, and orange vegetables during the week.

Overhead/Slide 6.2

Discover What's in the Food You Eat

Food	Calories	Calories from Fat	Fat
Baked Potato, 1 (138 grams)	128	0	0 grams
French Fries, 1 medium serving (134 grams)	427	206	23 grams
Fresh Apple, 1 (138 grams)	80	0	0 grams
Apple Pie, 1 snack pie (128 grams)	480	200	22 grams

Student Handout 6.4

Discover What's in the Food You Eat

Name: _____ Date_____

Compare the foods in the chart below.

Food	Calories	Calories from Fat	Fat	Vitamin C
Baked Potato, 1 (138 grams)	128	0	0 grams	13 mg
French Fries, 1 medium serving (134 grams)	427	206	23 grams	4 mg
Fresh Apple, 1 (138 grams)	80	0	0 grams	9 mg
Apple Pie, 1 snack pie (128 grams)	480	200	22 grams	0 mg

Let's compare a baked potato and French fries.

1. How many more calories are the French fries than the baked potato?

   _____

   _____

2. How many more grams of fat are in French fries than in the baked potato?

   _____

   _____

3. Why do you think the French fries are so much higher in fat and calories than the baked potato?

   _____

   _____

Let's compare the fresh apple to the apple pie.

1. How many more calories does the apple pie have than a fresh apple?

   _____

   _____

2. How many more grams of fat are in the apple pie than in the fresh apple?

   _____

   _____

3. Why do you think the apple pie has more fat than the fresh apple? _____

   _____

   _____

Draw Your Own Conclusion:

1. Which form of potato do you think is healthier to eat—a baked potato or French fries? _____

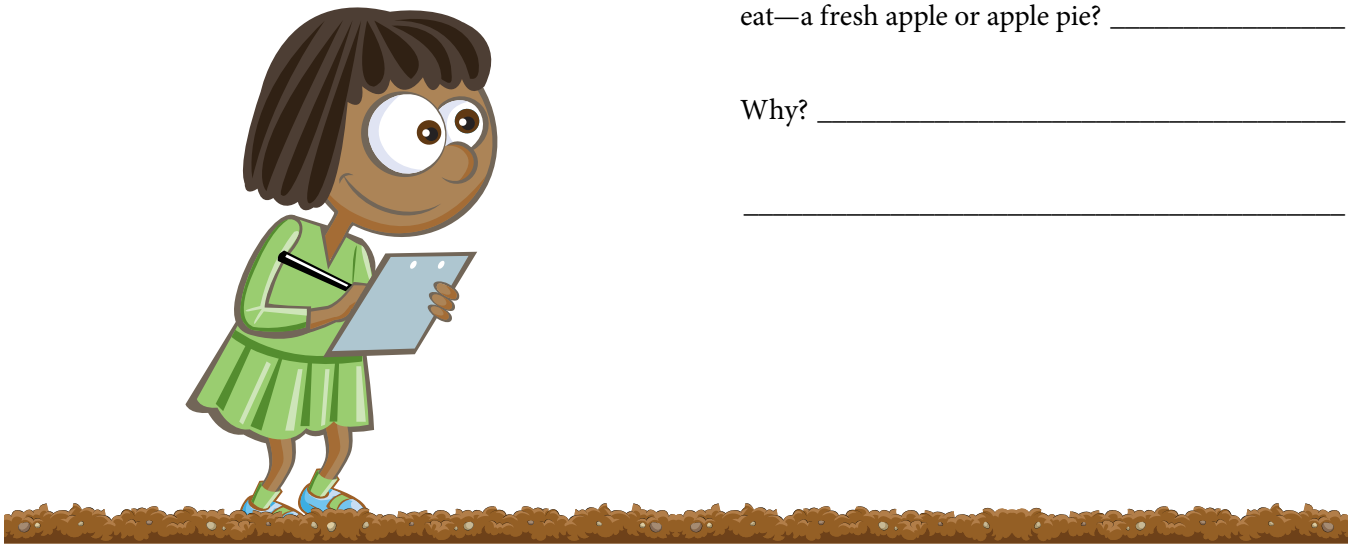
   Why? _____

   _____

2. Which form of apple do you think is healthier to eat—a fresh apple or apple pie? _____

   Why? _____

   _____



Answer Key to Student Handout 6.4

Discover What's in the Food You Eat

Let's compare a baked potato and French fries.

1. ***How many more calories are the French fries than the baked potato?***

   299, as long as one does not add high fat toppings, such as regular sour cream, full fat cheese, or butter. A healthier way to enjoy a baked potato without adding a lot of fat could include using low-fat sour cream or plain yogurt, salsa, or low-fat cheese as a topping.

2. ***How many more grams of fat are in French fries than in the baked potato?***

   23 grams

3. ***Why do you think the French fries are so much higher in fat and calories than the baked potato?***

   French fries are deep fried in shortening or oil and they absorb the frying fat.

Let's compare the fresh apple to the apple pie.

1. ***How many more calories does the apple pie have than a fresh apple?***

   400 calories

2. ***How many more grams of fat are in the apple pie than in the fresh apple?***

   22 grams

3. ***Why do you think the apple pie has more fat than the fresh apple?***

   The pie crust adds fat and calories to the pie. Extra sugar is also added to the pie filling.

Draw Your Own Conclusion:

1. ***Which form of potato do you think is healthier to eat—a baked potato or French fries?***

   Baked potato

   Why? A baked potato is lower in fat and calories.

2. ***Which form of apple do you think is healthier to eat—a fresh apple or apple pie?***

   Fresh apple

   Why? An apple is lower in calories and fat.

Lesson 7

Reveal Family Recipe Favorites

Lesson Summary

Overview

In this lesson, the garden detectives learn about how other families in their class like to prepare fruits and vegetables as they compile a class cookbook of family recipes. They may be surprised at how many unique and creative ways there are to make fruits and vegetables tasty and how the foods we eat reflect the cultures that we come from.

Lesson Extensions

In the lesson extension, a local chef visits the classroom to demonstrate different cooking techniques that can enhance the taste of fruits and vegetables.

Key Message

Be a great garden detective! Discover how your friends and their families like to prepare the fruits and vegetables we are growing in the garden. Share what you learn with your family.

Garden Connection

The garden detectives learn new ways to prepare what is growing in their garden. They take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Encourage students to draw pictures of the garden and their plants or to take pictures of each plant that can be used in their classroom cookbook. A picture of the whole class in the garden would make a good cookbook cover or title page. (Check district photography policy.)

School Food Service Connection

Share the recipes from the Class Cookbook with the school food service director. Discuss if any of the recipes could be incorporated into the school's lunch service. Also discuss which of the recipes could be included in the menu for the Sleuths' Mystery Dinner.

School Connection

Ask teachers and administrators to contribute their favorite fruit and vegetable recipes to the cookbook.

Home Connection

Ask a parent or community guest to come in and share how fruits and vegetables are prepared in their culture.

Ask for parent volunteers to take photos of the students in the garden (check district photography policy) and to help assemble the cookbook. Send the ***Garden Detective News*** requesting favorite family fruit and vegetable recipes home to parents/caregivers at the beginning of the lesson.

Community Connection

Ask a local printer to offer you a discount on printing and binding the cookbook.

Invite a local photographer, college student, or artist into the classroom to help design and assemble the cookbook.

Media Connection

Ask a reporter from your local newspaper to write an article about your cookbook and to feature a few recipes from the cookbook in the newspaper.

Main Lesson: Reveal Family Recipe Favorites

Standards Addressed

English/Language Arts

Standard 1, Language: *Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.*

Standard 6, Writing: *With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.*

Health

Standard 8, Advocate for Health: *Encourage others to make positive health choices.*

Learning Objectives

Students will be able to organize information according to a prescribed template.

Time Required

2 hours

Materials

- Copy of family recipe submitted for class cookbook
- Recipe template (on CD-ROM)
- Computer lab with a computer for each student. If a computer access is not available, the students can copy by hand the submitted recipes onto a prescribed template.
- Digital picture of each student (optional)
- Paper
- Crayons/colored markers

Preparation:

- Duplicate ***Garden Detective News*** for each student and assign the family activity as homework at the beginning of the lesson, unless you have previously collected family recipes.
- If available, reserve a computer lab for classroom use.
- Download a recipe template from the CD-ROM onto the computers the students will be working on.

Instructional Process

STEP 1 **Distribute the *Garden Detective News* to students.** Review the instructions on the handout with students and assign it as homework.

STEP 2 **Have students share their family recipes.** Ask each student to briefly share his or her family recipe that was submitted for the cookbook. In this way, the garden detectives will discover how their classmates and their families like to prepare fruits and vegetables at home. Students can share this information with their own family to create new family favorite recipes.

Tell students that when they present their recipe, they should answer the following questions:

- **What fruits and vegetables are used in the recipe?**
- **Why is it one of your family favorites?**
- **How often does your family eat the food?**
- **Which family member found or created this recipe?**

STEP 3 **Have students type family recipes submitted for the class cookbook.** Give each student a copy of the recipe template. Review the template with the students. Instruct each student to type his or her family's recipe, using the template. If a student's family did not submit a recipe, have the student type up a recipe from the end of this lesson or Lessons 8, 9, or 10 (found in the family newsletter). Tell students to raise their hands once they have typed the recipe, and you will assist them in inserting their digital photo (optional). Instruct all students to then use spell check and save their work using their first initials and their last names. Have each student print one copy of his or her recipe.

If the students are handwriting their recipes, divide the students into pairs and have each student read the other's recipe to check for spelling errors. If any errors are found, have students make corrections.

Collect the copy of each student's recipe that he or she typed or wrote for the cookbook.

STEP 4 **Have students create cookbook cover and organizing pages** (e.g., table of contents, section dividers; see instructions below). Brainstorm the title of the cookbook with students. Have students draw covers for the cookbook and have the class vote on the best drawing to use as the cover.

Divide students into groups. Have one group write an acknowledgments page, one create a table of contents, one create a divider page with pictures for the vegetable section, and one a divider page with pictures for the fruit section.

You may also wish to print out the recipes from Lessons 8, 9, and 10 on the CD-ROM and include them in the class cookbook.

STEP 5 **Assemble class cookbooks.** This step does not need to be completed until right before the Sleuths' Mystery Dinner. Completing it at a later date will allow for the inclusion of student poems from Lessons 8 and 9.

Divide recipes into fruit and vegetable groups. Within each group, organize recipes according to whether they are main dishes, salads, side dishes, snacks, or desserts. Insert other cookbook pages (i.e., cover, title page, acknowledgments, table of contents, fruit and vegetable section pages with photos/pictures of fruits and vegetables), so that one complete copy of the cookbook is assembled.

STEP 6 **Duplicate and bind cookbooks** (teacher or parent volunteer responsibility). Make one copy of the assembled cookbook for each student. Secure the pages with staples or fasteners. Alternatively, take the cookbooks to a local printer for duplicating and binding.

Teacher Background Information

Sources of Fruit and Vegetable Recipes

Vocabulary

Bake: To cook fruits or vegetables by dry heat, usually in the oven.

Blanch: To put fruits or vegetables into boiling water for a very short amount of time, and then put them into cold water to stop the cooking process. Blanching can loosen skins on peaches and tomatoes to make them easier to peel. It can set color and flavor of vegetables before freezing (so they do not turn brown).

Boil: To cook fruits or vegetables in boiling liquids (such as water or broth).

Grill: To cook by placing fruits or vegetables on a grill.

Ingredient: Any of the foods or substances that are combined in a recipe.

Microwave: To cook fruits or vegetables in a covered dish in the microwave oven.

Portion: An amount of food served for one person, i.e., a helping.

Roast: To cook fruits or vegetables in the oven at a high heat in an uncovered pan.

Sauté: To cook fruits or vegetables quickly in a small amount of oil in a skillet or sauté pan over direct heat.

Serving: A standardized amount of a food for one person, such as a cup or an ounce.

Simmer: To cook foods in liquid just below the boiling point (gently bubbling).

Steam: To cook vegetables in a steaming basket or rack over boiling water in a covered pot.

Stir-fry: To place fruits or vegetables in a frying pan with a little liquid or small amount of oil and stir frequently.

Stew: To cook fruits or vegetables with other foods (usually meats) and liquids and simmer for a long time in a covered pot.

Yield: Number of servings that a recipe produces.

A class cookbook is a great way to encourage children to try new fruit and vegetable recipes because each recipe comes with a built-in recommendation from one of their classmates.

You may also include the recipes your class prepares during Lessons 8-10 in the cookbook; the recipes are available on the CD-ROM. This will allow students and families to repeat these recipes at home.

As an additional resource, the CD-ROM includes some select recipes from the Recipes for Healthy Kids competition sponsored by the United States Department of Agriculture (USDA). These recipes were developed by local chefs and students and use vegetables highlighted in this curriculum.

Garden Detective News

Encourage Your Child's Growth

USDA United States Department of Agriculture

Garden Detective News

This week, the garden detectives will create a class cookbook that includes fruit and vegetable recipes that are family favorites. These cookbooks will be given to families at our Sleuths' Mystery Dinner.

This week's family activity is to submit ***your*** family's favorite recipe! Use the form on the next page to record your recipe.

Family Activity 7

Family Favorite Fruit or Vegetable Recipe

What's your family's favorite healthy fruit or vegetable recipe? Talk it over together, choose a recipe, and write it down here to share in a Class Cookbook that we'll create.

Recipes may be for a main dish, salad, side dish, snack, or a healthy dessert.

Your recipe should use fruits and/or vegetables (beans fall within this category) as the main ingredient. We are really interested in hearing how families prepare the fruits and vegetables we are growing in our class garden—leaf lettuces, carrots, beets, spinach, Swiss chard, strawberries, raspberries, and blackberries.

Write your recipe below and **return it to class by** _____ .

Student Name:_____

Recipe Title: _____

It is (mark one): ☑ Main Dish ☑ Salad ☑ Side Dish ☑ Snack ☑ Dessert

Ingredients and amounts: _____

_____

_____

_____

Preparation steps: _____

_____

_____

_____

_____

Yield: _____

Serving size: _____

Describe your recipe in 2-3 sentences: _____

_____

_____

_____

Lesson Extension: Crack the Cookbook Caper

Standards Addressed

English/Language Arts

Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Standard 4, Writing: *Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.*

Health

Standard 3, Access Information: *Demonstrate the ability to access valid information, products, and services to enhance health.*

Learning Objectives

Students will be able to:

1. List at least three methods to cook fruits and vegetables.
2. Explain how different cooking methods affect the taste of fruits and vegetables.

Time Required

75 minutes

Materials

- *Student Handout 7.1, Crack the Cookbook Caper*
- *Student Handout 1.2, Garden Detectives' Tasting Code* (Lesson 1)
- A copy of each family recipe submitted for the class cookbook
- Cooking equipment (selected in consultation with chef and/or school food service), e.g., portable stove, grill, slow cooker, etc.
- Pots and pans (selected in consultation with chef and/or school food service)
- Fruits and vegetables (selected in consultation with chef and/or school food service)
- Oils and condiments (selected in consultation with chef and/or school food service)
- Paper plates
- Forks
- Napkins
- Paper
- Pens/pencils

Preparation

- Duplicate *Student Handout 7.1, Crack the Cookbook Caper* on 3-hole-punch paper for each student.
- Duplicate *Student Handout 1.2, The Garden Detectives' Tasting Code* on 3-hole-punch paper, if you have not previously done so.

- Duplicate one copy of the family recipes.
- Invite a local chef or school food service representative to visit the classroom or cafeteria to demonstrate at least three different ways to cook fruits and vegetables. Decide together what fruits or vegetables will be used in the demonstration and what cooking equipment and supplies are needed.

Instructional Process

STEP 1 **Distribute *Student Handout 7.1, Crack the Cookbook Caper* to students.** Review the vocabulary words with students. Divide students into pairs or small groups. Distribute a few recipes from the class cookbook to each pair/small group. Have students review the recipes and identify the different cooking techniques that are used in these recipes. Have each group report to the class on the cooking methods they found.

STEP 2 **Introduce the chef or school food service representative who will** demonstrate different cooking methods to the students. Have the chef demonstrate how to cook the selected fruits and vegetables in turn without telling the students in advance which method will be used. Ask students to identify the cooking method based on the vocabulary terms that they previously learned. Have students remove *Student Handout 1.2, The Garden Detectives' Tasting Code* from their ***Garden Detective Journals*** and review it together before allowing students to taste the fruits and vegetables cooked in different ways.

STEP 3 **Have students write a thank-you letter to the chef or school food service representative who demonstrated the cooking methods.** In their letters, students should identify three cooking methods that were demonstrated and which recipe they liked best. Review student letters for mastery of learning objectives before delivering them.

Student Handout 7.1

Crack the Cookbook Caper

Is cooking a big mystery to you? Do you know all the ways that cooks and chefs use to make delicious meals with tasty fruits and vegetables?

The first step to solving the mystery of how foods go from the refrigerator to the table is to master the terms that cooks and chefs use. After you learn these terms, you will be able to read a cookbook and know just what to do. Discover the many different ways you can prepare fruits and vegetables. Then you can get cooking!

Bake: To cook fruits or vegetables by dry heat, usually in the oven.

Blanch: To put fruits or vegetables into boiling water for a very short amount of time, and then put them into cold water to stop the cooking process. Blanching can loosen skins on peaches and tomatoes to make them easier to peel. It can set color and flavor of vegetables before freezing (so they do not turn brown).

Boil: To cook fruits or vegetables in boiling liquids (such as water or broth).

Grill: To cook by placing fruits or vegetables on a grill.

Ingredient: Any of the foods or substances that are combined in a recipe.

Microwave: To cook fruits or vegetables in a covered dish in the microwave oven.

Portion: An amount of food served for one person, also known as a helping.

Roast: To cook fruits or vegetables in the oven at a high heat in an uncovered pan.

Sauté: To cook fruits or vegetables quickly in a small amount of oil in a skillet or sauté pan over direct heat.

Serving: A standardized amount of a food for one person, such as a cup or an ounce.

Simmer: To cook foods in liquid just below the boiling point (gently bubbling).

Steam: To cook vegetables in a steaming basket or rack over boiling water in a covered pot.

Stir-fry: To place fruits or vegetables in a frying pan with a little liquid or small amount of oil and stir frequently.

Stew: To cook fruits or vegetables with other foods (usually meats) and liquids and simmer for a long time in a covered pot.

Yield: Number of servings that a recipe produces.

Be a great garden detective! Discover how your friends and their families like to prepare the fruits and vegetables we are growing in the garden. Share what you learn with your family.

Lesson 8

Uncover Tasty Crimes

Lesson Summary

Overview

The garden detectives solve three tasty crimes involving dark-green vegetables. As they investigate these crimes, the detectives share their Public Service Announcements (PSAs) for leaf lettuces, spinach, and Swiss chard (from Lesson 3); review important gardening and nutrition facts about leaf lettuces, spinach, and Swiss chard; and prepare recipes and taste dishes featuring leaf lettuce, spinach, and Swiss chard. You may also want to include beet greens in this lesson (beets are a focus in Lesson 9); beet greens count as a dark-green veggie, too.

Lesson Extensions

In the lesson extension, students create an acrostic poem using the letters in leaf lettuce, spinach, or Swiss chard.

Key Message

Be a great garden detective! Discover what foods taste great with dark-green veggies.

Garden Connection

The garden detectives take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Have the student groups assigned to leaf lettuce, spinach, and Swiss chard show the other students in the class their plants in the garden and have them share information about their plants' growth and care-taking needs using the ***Be a Garden Detective!*** bulletin board.

School Food Service Connection

Collaborate with school food service to include and promote leaf lettuces, Swiss chard, and spinach in the school menu. Ask them to display the posters about these vegetables that students created in Lesson 3.

Ask school food service to help you obtain and prepare the ingredients for the leaf lettuce, spinach, and Swiss chard dishes for this lesson. Request that the school food service demonstrate how to prepare each recipe for the class.

Cookbook Connection

Recipes to prepare the leaf lettuce, spinach, and Swiss chard dishes from this lesson should be included in the class cookbook. Poems created in the lesson extension should also be included.

School Connection

Invite the school principal and others from the school community to visit the classroom to taste the prepared dishes.

Have students share their PSAs with the entire school during morning announcements or post a video of them performing their PSAs on the school's Web site.

Home Connection

Ask for parent volunteers to help with the food preparation activities in this lesson. Send the *Garden Detective News* home to parents/caregivers; it includes the recipes that students prepared in class and suggests that families try a new fruit or vegetable each day for a week. Encourage students to complete this family activity with their parents or caregivers.

Community Connection

Ask a farmer or local grocery store manager to donate the ingredients for the food preparation.

Invite a local chef in to help prepare the leaf lettuce, spinach, and Swiss chard dishes or to prepare a recipe of his or her own for these dark-green vegetables.

Media Connection

Take pictures of the students preparing the dishes and submit to your local newspaper with a press release and recipes.

Main Lesson: Uncover Tasty Crimes

Standards Addressed

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts

Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.*

Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.*

Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.*

Mathematics

Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.*

Health

Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 7, Practice Health-Enhancing Behaviors: *Practice health-enhancing behaviors and avoid or reduce health risks.*

Learning Objectives

Students will be able to:

1. Read and follow procedures in a recipe featuring dark-green vegetables.
2. Use standard units of measurement to prepare a recipe.
3. Describe how to prepare a recipe featuring dark-green vegetables.

Note to Teachers: Swiss chard, spinach, and beet greens are all related and can be used interchangeably in cooked recipes.

Crime #1: The Case of the Scrambled Recipe

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1)
- ***Student Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 8.1, It's a Tasty Crime—Chicken Caesar Salad Wraps***
- ***Student Handout 8.2, The Case of the Scrambled Recipe***
- Apron, smock, or large T-shirt for each child (not the same one used for gardening)
- Disposable plastic food preparation gloves, one pair per child
- Ingredients for Chicken Caesar Salad Wrap
  - 5 boneless, skinless chicken breasts, cooked, and chopped up (4-5 cups of pre-cooked and chopped chicken)
  - 5 tomatoes, chopped
  - 5 tablespoons of fat-free Caesar salad dressing
  - 30 leaf lettuce leaves, separated
- 5 plastic knives for cutting tomatoes
- 5 large bowls
- Measuring spoons (1 tablespoon) for measuring salad dressing, one per student group
- 5 large spoons for mixing
- Paper plates, one per student, plus one extra per group to use as a serving platter
- Napkins or paper towels, one per student

Preparation

- Request assistance (i.e., demonstration of how to prepare recipes) from school food service and/or parents for the food preparation portion of this lesson.
- Obtain ingredients for lettuce wraps.
- With school food service, prepare food ingredients by cleaning, cutting, and cooking as described in the recipe.
- Arrange for refrigerated storage for ingredients prior to preparation time.
- Duplicate one copy of ***Student Handouts 8.1*** and ***8.2*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper, if you have not previously done so.
- Arrange the classroom for five food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Brief volunteers on their roles during the food preparation activity.

Instructional Process

STEP 1 **Review information about leaf lettuces.**

Have the leaf lettuce garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board. Next, have them share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Discuss the following key information about leaf lettuces:

There are four main types of lettuce:

- **Crisphead or iceberg lettuce** is probably the most common and the least nutritious. Crisphead is characterized by a tight, firm head of crisp and light-green leaves. It is NOT a member of the Dark-Green Vegetable Subgroup because it is lower in nutrient content than the other dark-green leafy lettuces.
- **Butterhead lettuce** has smaller, softer heads of loosely folded leaves. The outer leaves may be green or brownish with cream or butter-colored inner leaves. An example of butterhead is Bibb lettuce.
- **Romaine or cos lettuce** forms upright, cylindrical heads of tightly folded leaves. The plants may reach up to 10 inches in height. The outer leaves are medium green with greenish white inner leaves. This lettuce has gained tremendous popularity in the past decade as the key ingredient in Caesar salads.
- **Leaf lettuce** has open growth and does not form a head (the leaves are attached at the stem). Leaf form (frilled, crinkled, deeply loped) and color varies. Color ranges from light green to red and bronze. Examples of leaf lettuce include oak leaf and red leaf. Leaf lettuce is the featured lettuce in the class garden.

Butterhead, romaine, and leaf lettuce all fall into the Dark-Green Vegetable Subgroup because of their dark-green color and the nutrients they contain, such as vitamin A. Vitamin A helps keep our eyes and skin healthy and helps protect against infections.

Iceberg lettuce belongs to the "Other" Vegetable Subgroup due to its lower vitamin A content. So when you are choosing salads, be sure to add in some dark-green lettuces for added nutrition.

All lettuces are low in calories.

STEP 2 **Introduce the food preparation activity.**

Tell students that today they are going to prepare and taste a simple lettuce wrap recipe. As garden detectives, they will discover what food tastes great with dark-green veggies.

Divide students into five small groups of 5-6 students. Have each group go to a food preparation station.

Ask students:

- **Who has eaten a salad wrap before?** (Ask students who have eaten a salad wrap what kind it was and how it tasted.)

Distribute ***Student Handout 8.1, It's a Tasty Crime—Chicken Caesar Salad Wraps.***

Have students read the recipe silently to themselves.

STEP 3 **Have students complete the food preparation activity.** Before beginning food preparation, ask students to retrieve ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Have children put on plastic gloves to ensure food safety and large T-shirts, smocks, or aprons to protect their clothes. Distribute to each group the following items:

- 1 plastic knife for chopping tomatoes
- 1 large bowl
- 1 tablespoon for measuring
- 1 large spoon for mixing
- 2 paper plates, one to hold the chopped tomatoes and the other to hold their prepared wraps
- Ingredients for recipe

Instruct all groups to follow the recipe on ***Student Handout 8.1, It's a Tasty Crime—Chicken Caesar Salad Wraps*** and prepare six servings of Chicken Caesar Salad Wraps. Make sure each member of each student group has a food preparation task to complete (e.g., chopping, measuring, mixing).

STEP 4 **Have students taste the lettuce wraps.** First, review ***Student Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Detective Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute to each group a paper plate and napkin for each student. Have each student taste a lettuce wrap from the serving plate.

Ask the students:

- **What did you think of the Chicken Caesar Salad Wrap?**
- **Were you surprised by the way it tasted?**
- **What are some other dishes you can prepare using leaf lettuces?**

STEP 5 **Solve the Case of the Scrambled Recipe.** Distribute ***Student Handout 8.2, The Case of the Scrambled Recipe.*** Explain to students that the computer has mysteriously scrambled the lettuce wrap recipe when you printed it. The preparation steps are all in the wrong order and there is an important ingredient that's missing. Their job is to find the missing ingredient and put the preparation steps in the correct order.

Crime #2: The Case of the Recipe Thief

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1)
- ***Student Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 8.3, It's a Tasty Crime—Spinach Strawberry Salad***
- Apron, smock, or large T-shirt for each child (not the same one used for gardening)
- Disposable plastic food preparation gloves, one pair per child
- Ingredients for Spinach Strawberry Salad
  - 10 cups washed raw spinach
  - 2 ½ cups sliced strawberries
  - 1 ¼ cups olive oil
  - 1 cup vinegar
  - 1 ¼ teaspoons salt
  - ¾ teaspoon pepper
- 5 plastic knives for cutting strawberries
- 5 large bowls
- 5 sealable jars for mixing salad dressing
- Measuring spoons (1 tablespoon) for measuring salad dressing, one per student group
- Measuring cups, one set per student group
- 5 large spoons for mixing
- Paper plates, one per student
- Napkins or paper towels, one per student
- Plastic forks, one per student

Preparation

- Recruit volunteers (such as a cooperative extension agent, parent, school food service staff, or local chef) to help with the food preparation portion of this lesson.
- Obtain ingredients for Spinach Strawberry Salad.
- Arrange for refrigerated storage of ingredients prior to preparation time.
- Duplicate one copy of ***Student Handout 8.3*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper for each student, if you have not previously done so.
- Arrange the classroom for five food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Brief volunteers on their roles during the food preparation activity.

Instructional Process

STEP 1 **Review information about spinach.** Have the spinach garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board. Next, have them share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Review the following important facts about spinach:

- Spinach belongs to the Dark-Green Vegetable Subgroup and is an excellent source of vitamin A. Vitamin A helps keep our eyes and skin healthy and helps protect against infections.
- It also provides vitamin C, folate, potassium, and fiber. Vitamin C heals cuts and wounds and keeps our gums healthy. Folate helps the body make red blood cells. Potassium helps to maintain heart health, regulates body fluids, and is needed for muscle and nerve functioning.
- Spinach is a cool season plant, so it's grown in the spring and fall in most parts of the country.

STEP 2 **Introduce the food preparation activity.** Tell students that today they are going to prepare and taste a simple spinach salad recipe.

Divide students into five small groups of 5-6 students. Have each group go to a food preparation station.

Ask students:

- **Who has eaten a spinach salad before? What did it taste like?**

Distribute to all students, ***Student Handout 8.3, It's a Tasty Crime—Spinach Strawberry Salad.***

Have students read the recipe silently to themselves.

STEP 3 **Have students begin the food preparation activity.** Before students begin the food preparation, have them retrieve ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Have children put on plastic gloves to ensure food safety and large T-shirts, smocks, or aprons to protect their clothes. Distribute the following items to each group:

- 1 plastic knife
- 1 large bowl
- 1 tablespoon for measuring
- 1 large spoon for mixing
- 1 set of measuring cups
- 1 sealable jar
- Ingredients for recipe

STEP 4 **Inform students that a recipe thief has secretly entered the cafeteria during the night and stolen the bottle of salad dressing!** In order to make the salad, they'll need to mix their own salad dressing.

Write the following ingredient list on the board:

¼ cup olive oil

3 tablespoons vinegar

¼ teaspoon salt

⅛ teaspoon pepper

Have each group measure these ingredients and place them in the jar.

Ask students:

- **What happens when oil and vinegar are mixed together?** (The oil floats on top of the vinegar; they do not blend.)

Now have each group vigorously shake its jar of oil and vinegar. Ask students:

- **What happens when oil and vinegar are mixed together?** (The mixture emulsifies. An emulsion occurs when droplets of one liquid become suspended in the other. The liquids will separate over time.)

STEP 5 **Instruct all groups to follow the recipe** on ***Student Handout 8.3, It's a Tasty Crime—Spinach Strawberry Salad,*** and prepare five servings of Spinach Strawberry Salad. Make sure each member of each student group has a food preparation task to complete (e.g., chopping, measuring, mixing).

STEP 6 **Have students taste the spinach salad.**

First, have students wash their hands according to the guidelines on ***Student Handout 1.1***. Next, review ***Student Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Detective Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute a paper plate, napkin, and fork to each student. Have each group distribute an equal portion of the spinach salad from the bowl to the group members and have them taste it.

Ask the students:

- **What did you think of the Spinach Strawberry Salad?**
- **Were you surprised by the way it tasted?**
- **What are some other dishes you can prepare using spinach?**

Crime #3: The Case of the Incredible Shrinking Ingredient

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1)
- ***Student Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 8.4, It's a Tasty Crime—Dark-Green Pizza***
- Ingredients for Dark-Green Pizza
  - 3 packs pre-split English muffins (six muffins/pack)
  - 6 bunches Swiss chard
  - Minced garlic
  - Olive oil
  - 3 8-oz bags shredded low-fat mozzarella cheese
  - 6 oz grated Parmesan cheese (about 1 ½ cups)
  - 1 can of non-stick olive oil cooking spray
  - ¾ teaspoon each salt and pepper
- 6 large bowls for mixing
- 6 sets of dry measuring cups
- 6 plastic forks
- 6 plastic spoons
- Aluminum foil
- Permanent markers
- Baking trays to fit oven
- Paper plates, one per student
- Napkins or paper towels, one per student
- Oven or toaster oven
- Large frying pan (optional)
- Hot plate (optional)

Preparation

- Request assistance from the school food service or parents for the food preparation portion of this lesson. They will need to sauté the chard and bake at least 30 servings of the Swiss chard pizza.
- Obtain ingredients for Swiss chard pizza, if requested by the school food service.
- Duplicate one copy of ***Student Handout 8.4*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper for each student, if you have not previously done so.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Prepare six food preparation stations with ingredients equally divided and placed at each area.
- Explain the food preparation task to volunteers.

Instructional Process

STEP 1 **Review information about Swiss chard.**

Have the Swiss chard garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board. Next, have them share the posters and PSAs they created in Lesson 3: *Investigate like Super Sleuths* with their classmates.

Review the following important information about Swiss chard:

- Swiss chard is an excellent source of vitamin A and a good source of vitamin C.
- Swiss chard, like spinach and leaf lettuce, is a cool season plant that is grown in the spring and fall in most parts of the country.

STEP 2 **Introduce the food preparation activity.** Tell students that today they are going to make pizza! Ask students to raise their hands if they like pizza.

Tell students that a dastardly recipe thief has made off with the traditional tomato sauce. Instead, they are going to make a dark-green pizza. Ask students to suggest dark-green vegetables from the class garden that could be used to make a tasty dark-green pizza.

Explain to students that both spinach and Swiss chard would be good candidates for pizza. Today, they're going to make pizza with Swiss chard.

Distribute to all students ***Student Handout 8.4, It's a Tasty Crime—Dark-Green Pizza.***

Have students read the recipe silently to themselves.

STEP 3 **Have students prepare the Swiss chard for the pizza.** Before students begin food preparation, ask them to retrieve Student ***Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Divide students into six groups. Send each group to a food preparation station that contains a large mixing bowl and a bunch of Swiss chard. Have the students rinse the Swiss chard in the sink, tear it into bite-size pieces, and place them in the bowl. Next, have the students measure the number of cups of Swiss chard that are in the bowl.

Take the torn up Swiss chard to the cafeteria for sautéing in olive oil and garlic (see recipe in Teacher Background Information, Lesson 1). Cafeteria staff should return six equal portions of wilted Swiss chard. If cafeteria facilities are not available, you can sauté the Swiss chard in a large frying pan on a hot plate.

When the Swiss chard has been prepared and returned to the classroom, distribute a bowl to each student group. Make two columns on the board: Before and After. Have students measure the prepared Swiss chard and compare the pre- and post-cooking amounts. List their findings in the appropriate columns on the board. As a class, calculate the average difference across groups.

Ask students:

- **What happened to the Swiss chard?** (The volume became smaller because the moisture in the leaves evaporates in the heat.)

STEP 4 **Continue the Swiss chard pizza preparation.** Send each group of students back to their food preparation station where ingredients and supplies are located and complete the preparation steps in ***Student Handout 8.4***. Make sure each member of each student group has a food preparation task to complete.

Place the prepared Swiss chard pizzas on baking sheets and bake (in cafeteria oven or toaster oven in the classroom). Keep track of the placement of each student's pizza.

STEP 5 **Have students taste the Swiss chard pizza after baking.** First, have all students wash and dry their hands according to the guidelines on ***Student Handout 1.1***. Next, review ***Student Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute to each student one Swiss chard pizza on a paper plate and a napkin. Have the students taste the pizza.

Ask the students:

- **What did you think of the Swiss chard pizza?**
- **Were you surprised by the way it tasted?**
- **What are some other dishes you can prepare using Swiss chard?**

Teacher Background Information

Get the Facts on Leaf Lettuce, Swiss Chard, and Spinach

Vocabulary

Folate: A vitamin that promotes healthy blood cells that is also important for cell division, such as in pregnancy and growth.

Magnesium: A mineral that is important for muscle and nerve functioning.

Minerals: Nutrients such as calcium, potassium, magnesium, iron, and zinc; some regulate body processes while others become part of body tissues.

Nutrients: Substances, including vitamins and minerals, found in food that nourish your body.

Potassium: A mineral that maintains heart health, regulates body fluids and is needed for muscle and nerve functioning.

Public Service Announcement (PSA): A short message that appears on radio or TV to promote a service or idea that is good for people's health and well-being. A PSA is just like a commercial for a product, except that a TV or radio station plays it for free as a public service.

Vitamin A: A vitamin that promotes growth and healthy skin and hair. It also helps the body resist infections and helps eyes adjust to darkness.

Vitamin C: A vitamin that increases resistance to infections and helps wounds heal. It is also important in helping to keep blood vessels and gums healthy.

Nutrition Information for Green Leaf Lettuce

Leaf Lettuce	
Nutrition Facts	
Serving Size 1 cup shredded (36g)	
Amount Per Serving	**% Daily Value**
Calories 5	
Calories from Fat 0	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 10mg	0%
Total Carbohydrate 1g	1%
Dietary Fiber 1g	2%
Sugars 0g	
Protein 0g	
Vitamin A	53%
Vitamin C	6%
Calcium	1%
Iron	2%
Potassium	2%
Folate	4%

* Percent Daily Values are based on a 2,000-calorie diet.

Nutrition Information for Swiss Chard

Raw Swiss Chard	
Nutrition Facts	
Serving Size 1 cup, chopped (36g)	
Amount Per Serving	**% Daily Value**
Calories 7	
Calories from Fat 0	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 77 mg	3%
Total Carbohydrate 1g	0%
Dietary Fiber 1g	2%
Sugars 0g	
Protein 1g	
Vitamin A	44%
Vitamin C	18%
Calcium	2%
Iron	4%
Potassium	4%
Folate	1%

* Percent Daily Values are based on a 2,000-calorie diet.

Nutrition Information for Spinach

Raw Spinach	
Nutrition Facts	
Serving Size 1 cup, chopped (30g)	
Amounts Per Serving	**% Daily Value**
Calories 5	
Calories from Fat 0	
Total Fat 0g	0%
Sodium 25mg	1%
Total Carbohydrate 1g	0%
Dietary Fiber 1g	3%
Sugars 0g	
Protein 1g	
Vitamin A	60%
Vitamin C	15%
Calcium	2%
Iron	4%
Potassium	5%
Folate	15%

* Percent Daily Values are based on a 2,000-calorie diet.

Source: United States Department of Agriculture, Agricultural Research Service. 2011. USDA National Nutrient Database for Standard Reference, Release 24. Nutrient Data Laboratory Home Page, *http://www.ars.usda.gov/ba/bhnrc/ndl*

Student Handout 8.2 Answer Key:

The Case of the Scrambled Recipe

Name: _____ Date_____

A nasty computer bug has mysteriously scrambled the recipe for Chicken Caesar Salad Wraps. Your job is to find the missing ingredient and to unscramble the steps for preparing the recipe.

Chicken Caesar Salad Wraps

Ingredients

- 1 chicken breast
- 1 tomato
- 6 leaf lettuce leaves

What's missing? **1 tablespoon fat-free Caesar salad dressing**

Preparation

1. Rinse lettuce leaves and tomato under running water and pat dry.
2. Arrange on a platter and serve.
3. Place equal amounts of salad mixture on each lettuce leaf.
4. Wash hands and clean your work area.
5. Combine the chicken, tomatoes, and salad dressing in a bowl and mix well.
6. Roll from one end of the lettuce leaf to the middle. Fold in the sides and continue to roll.

Write the steps to preparing the recipe in the correct order:

1. Wash hands and clean your work area.
2. Rinse lettuce leaves thoroughly and pat dry.
3. Combine the chicken, tomatoes, and salad dressing in a bowl and mix well.
4. Place equal amounts of salad mixture on each lettuce leaf.
5. Roll from one end of the lettuce leaf to the middle. Fold in the sides and continue to roll.
6. Arrange on a platter and serve.

Student Handout 8.1

It's a Tasty Crime—Chicken Caesar Salad Wraps

Name: _____ Date_____

Chicken Caesar Salad Wraps

Ingredients

- 1 chicken breast
- 1 tomato
- 1 tablespoon fat-free Caesar salad dressing
- 6 leaf lettuce leaves

Preparation

1. Wash hands and clean your work area.
2. Rinse tomato and lettuce leaves under running water and dry thoroughly (for example, with a salad spinner or by patting them with a paper towel).*
3. Combine the chicken, tomatoes, and salad dressing in a bowl and mix well.*
4. Place equal amounts of salad mixture on each lettuce leaf.*
5. Roll from one end of the lettuce leaf to the middle. Fold in the sides and continue to roll.*
6. Arrange on a platter and serve.*

Yield

Six servings, 1 wrap each

You can complete all starred* preparation steps.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Be a great garden detective! Discover what foods taste great with dark-green veggies.

Student Handout 8.2

The Case of the Scrambled Recipe

Name: _____ Date_____

A nasty computer bug has mysteriously scrambled the recipe for Chicken Caesar Salad Wraps. Your job is to find the missing ingredient and to unscramble the steps for preparing the recipe.

Chicken Caesar Salad Wraps

Ingredients

- 1 chicken breast
- 1 tomato
- 6 leaf lettuce leaves

What's missing? _____

Preparation

1. Rinse lettuce leaves and tomato under running water and pat dry.
2. Arrange on a platter and serve.
3. Place equal amounts of salad mixture on each lettuce leaf.
4. Wash hands and clean your work area.
5. Combine the chicken, tomatoes, and salad dressing in a bowl and mix well.
6. Roll from one end of the lettuce leaf to the middle. Fold in the sides and continue to roll.

Write the steps to preparing the recipe in the correct order:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Student Handout 8.3

It's a Tasty Crime—Spinach Strawberry Salad

Name: _____ Date_____

Spinach Strawberry Salad

Ingredients

2 cups raw spinach

½ cup sliced strawberries

¼ cup olive oil

3 tablespoons vinegar

¼ teaspoon salt

⅛ teaspoon pepper

Preparation

1. Wash hands and clean your work area.*
2. Rinse spinach and strawberries under running water, dry thoroughly, and tear into bite-sized pieces.*
3. Combine spinach with sliced strawberries.*
4. Mix olive oil, vinegar, salt, and pepper in a jar with a lid. Shake vigorously.*
5. Pour salad dressing over salad and mix thoroughly.*

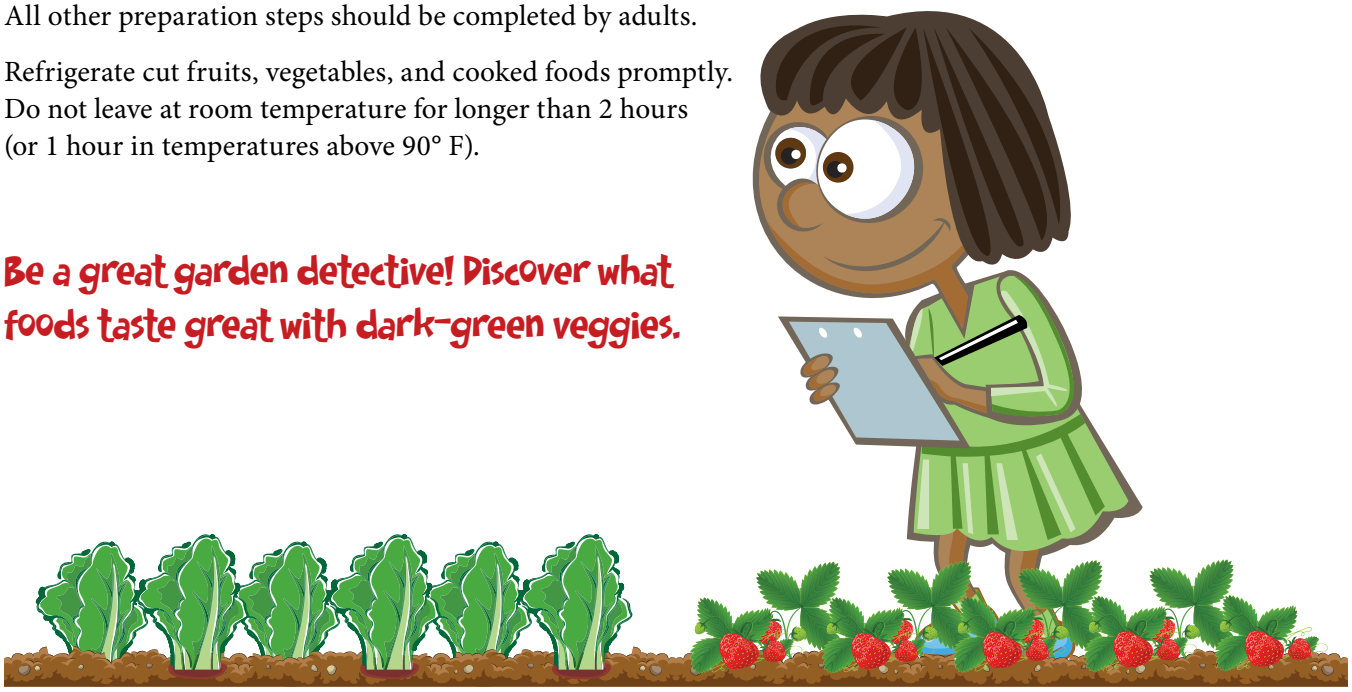
Yield

Five ½-cup servings

You can complete all starred* preparation steps.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly.
Do not leave at room temperature for longer than 2 hours
(or 1 hour in temperatures above 90° F).

Be a great garden detective! Discover what foods taste great with dark-green veggies.



Student Handout 8.4

It's a Tasty Crime—Dark-Green Pizza

Name: _____ Date_____

Dark-Green Pizza

Ingredients

3 pre-split English muffins

Olive oil spray

1 bunch Swiss chard (about 11 oz, stems removed, roughly chopped) sautéed in olive oil and garlic

⅛ teaspoon salt

⅛ teaspoon pepper

1 cup shredded low-fat mozzarella cheese

½ cup grated Parmesan cheese

Preparation

1. Wash hands and clean your work area.
2. Preheat oven to 450° F.
3. Split muffins into two halves with your fingers.
4. Rinse Swiss chard under running water.
5. Spray the muffin halves lightly with olive oil.*
6. Spread the Swiss chard evenly over the muffin halves and season with salt and pepper.*
7. Top with shredded mozzarella and Parmesan cheese.*
8. Bake on a baking sheet for 10-12 minutes.

Yield

Six half-muffin servings

You can complete all starred* preparation steps.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Be a great garden detective!
Discover what foods taste great with dark-green veggies.

Garden Detective News

Grow Healthy Habits With Your Children

8

Garden Detective News

This week, the garden detectives learned how to prepare some of the dark-green vegetables we are learning about in class and growing in the garden. They prepared and tasted recipes featuring dark-green vegetables (really, it's true!). The recipes are included in this newsletter so you can try them at home.

The garden detectives also learned how to follow instructions in a recipe and use standard units of measurement to prepare their dish. It was a tasty way to teach English and math concepts! They also learned why dark-green vegetables are an important part of a healthy diet.

In the green box to the right, there are a few tips for adding dark-green veggies to your family's meals. Recipes the garden detectives prepared and tasted in class are also in this newsletter.

Mystery Solved!

Ways To Help Your Child Eat More Dark-Green Veggies.

How To Add More Leaf Lettuces to Your Family's Meals:

- Serve side salads for lunch or dinner.
- Add green leaf lettuce to your favorite sandwich, pita pockets, or wraps.
- Make a wrap using lettuce (see the Chicken Caesar Salad Wrap recipe we made in class on the following page).

How To Add More Spinach to Your Family's Meals:

- Mix spinach with lettuce in side salads for lunch and dinner (see the Spinach Strawberry Salad recipe we tasted in class on the following page).
- Add chopped spinach to lasagna and soup.
- Stir plain yogurt into chopped or puréed spinach for a low-fat version of creamed spinach.
- Try stir-frying spinach with garlic, onion, and chopped red bell peppers for a colorful tasty side dish.

How To Add More Swiss Chard to Your Family's Meals:

- Toss pasta with olive oil, lemon juice, garlic, and cooked Swiss chard.
- Add zest to omelets and frittatas by adding some cooked Swiss chard.
- Use chard in place of, or in addition to, spinach when preparing recipes.
- Try the Dark-Green Pizza recipe that we tasted in class on the following page.

Garden Detective Recipes

Chicken Caesar Salad Wraps

Preparation Time
10 minutes

Ingredients
6 leaf lettuce leaves, cleaned and separated*
1 tomato
1 boneless, skinless chicken breast, cooked and chopped
1 tablespoon fat-free Caesar salad dressing

Preparation
1. Wash hands and clean your work area.
2. Rinse lettuce leaves thoroughly under running water and dry thoroughly (e.g., with a salad spinner or by patting them with a paper towel).*
3. Rinse and dry tomato,* then chop into bite-sized pieces.
4. Combine the chicken, tomatoes, and salad dressing in a bowl and mix well.*
5. Place equal amounts of salad mixture on each lettuce leaf.*
6. Roll from one end of the lettuce leaf to the middle. Fold in the sides and continue to roll.*
7. Arrange on a platter and serve.*

Yield
Six individual lettuce wraps

Dark-Green Pizza

Preparation Time
20 minutes

Ingredients
1 bunch Swiss chard (stems removed, roughly chopped)
¼ cup olive oil
4 cloves garlic, minced
3 pre-split English muffins
1 can non-stick olive oil cooking spray
⅛ teaspoon salt
⅛ teaspoon pepper
1 8-oz bag shredded low-fat mozzarella cheese
½ cup Parmesan cheese

Preparation
1. Wash hands and clean your work area.
2. Preheat oven to 450° F.
3. Sauté Swiss chard in olive oil and garlic.
4. Split the English muffins in half with your fingers.*
5. Spread the Swiss chard evenly over the six muffin halves.*
6. Season with salt and pepper.*
7. Top with shredded mozzarella and Parmesan cheese.*
8. Bake on a baking sheet for 10-12 minutes.

Yield
Six servings of individual pizzas

Spinach Strawberry Salad

Preparation Time
10 minutes

Ingredients
2 cups raw spinach
½ cup sliced strawberries
¼ cup olive oil
3 tablespoons vinegar
¼ teaspoon salt
⅛ teaspoon pepper

Preparation
1. Wash hands and clean your work area.*
2. Rinse spinach and strawberries under running water, dry thoroughly, and tear into bite-sized pieces.*
3. Combine spinach with sliced strawberries.*
4. Mix olive oil, vinegar, salt, and pepper in a jar with a lid. Shake vigorously.*
5. Pour salad dressing over salad and mix thoroughly.*

Yield
Five ½-cup servings

The starred* preparation steps can be completed by children. All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Family Activity 8

Try Something New With Your Child

Why not try a new fruit and a vegetable every day for 1 week? Choose ones that begin with the first letter of that day of the week. For example:

DAY OF THE WEEK	VEGETABLE	FRUIT
Monday	Mustard Greens	Mango
Tuesday	Turnips	Tangerine
Wednesday	Watercress	Watermelon
Thursday	Tomatillo	Tangelo
Friday	Fava Beans	Fig
Saturday	Swiss Chard	Star Fruit
Sunday	Summer Squash	Strawberries

Record what your family will try:

DAY OF THE WEEK	VEGETABLE	FRUIT
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Lesson Extension: An Acrostic Poem

Standards Addressed

English/Language Arts
Standard 3, Language: *Use knowledge of language and its conventions when writing, speaking, reading, or listening.*

Learning Objectives

Students will be able to write an acrostic poem.

Time Required

20 minutes

Materials

- *Student Handout 8.5, It's a Tasty Crime Poem*

Preparation

- Duplicate one copy of *Student Handout 8.5* on 3-hole-punch paper for each student.

Instructional Process

STEP 1 **Distribute *Student Handout 8.5, It's a Tasty Crime Poem*.** Tell the students that they are going to create an acrostic poem using the letters of the words **lettuce, spinach,** or **Swiss chard**. Explain that an acrostic poem uses the letters in a word to begin each line of the poem. All lines of the poem relate to or describe the main topic word.

Point out the example on the handout and read it aloud.

STEP 2 **Have students complete *Student Handout 8.5, It's a Tasty Crime Poem*.** Tell students that they may choose which vegetable they would like to create an acrostic poem for. Instruct students to complete their poem.

STEP 3 **Have students share acrostic poems.** Ask for volunteers to share their acrostic poems.

Student Handout 8.5

It's a Tasty Crime Poem

Name: _____ Date_____

Directions

Using the letters in the word LETTUCE, SPINACH, or SWISS CHARD, create an acrostic poem. An acrostic poem uses the letters in a word to begin each line of the poem. All lines of the poem relate to or describe the main topic word.

EXAMPLE:

O: Orange in color

R: Round in shape

A: Always sweet to the taste

N: Nutritious

G: Grown on trees

E: Everyone loves to eat

Be a great garden detective!
Discover what foods taste great with dark-green veggies.

Lesson 9

Explore a Flavor Mystery

Lesson Summary

Overview

The garden detectives investigate two mysteries involving carrots and beets. The garden detectives also share their PSAs for carrots and beets (from Lesson 3), review important gardening and nutrition facts about carrots and beets, and prepare and taste dishes featuring carrots and beets.

Lesson Extensions

In the lesson extension, students create a shape poem about carrots or beets.

Key Message

Be a great garden detective! Discover tasty root vegetables.

Garden Connection

The garden detectives take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Have the student groups assigned to carrots and beets show the other students their plants in the garden and have them share information about their plants' growth and caretaking needs.

School Food Service Connection

Collaborate with school food service to obtain and prepare the ingredients for the carrot and beet dishes for this lesson. Serve the prepared carrot and beet dishes in the classroom or in the cafeteria at the end of the lesson.

Cookbook Connection

Include carrot and beet dishes from this lesson in the Class Cookbook (Lesson 7). Poems created in the lesson extension should also be included.

School Connection

Invite the school principal and others from the school community to visit the classroom and taste prepared dishes.

Have students share their PSAs with the entire school during morning announcements or post a video of them performing their PSAs on the school's Web site.

Home Connection

Ask for parent volunteers to help with the food preparation activities in this lesson. Send the ***Garden Detective New***s home to parents/caregivers. Encourage students to help their families prepare a shopping list based on which fruits and vegetables are on sale.

Community Connection

Ask a farmer or local grocery store manager to donate the ingredients for the food preparation.

Invite a local chef in to help prepare carrot and beet recipes.

Media Connection

Take pictures of the students preparing the dishes, and submit them with a press release and recipes to your local newspaper.

Main Lesson: Explore a Flavor Mystery

Standards Addressed

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts

Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.*

Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.*

Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.*

Mathematics

Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.*

Health

Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 7, Practice Health-Enhancing Behaviors: *Practice health-enhancing behaviors and avoid or reduce health risks.*

Learning Objectives

Students will be able to:

1. Read and follow procedures in a recipe using red and orange vegetables.
2. Use standard units of measurement to prepare recipe.
3. Describe how to prepare simple recipes featuring red and orange vegetables.

Mystery #1: The Mystery of the Tender Tastebuds

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1)
- S***tudent Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 9.1, Explore a Flavor Mystery—Carrot Salad***
- ***Student Handout 9.2, The Mystery of the Tender Tastebuds***
- Apron, smock, or large T-shirt for each student (not the same one used for gardening)
- Disposable plastic food preparation gloves, one pair per child
- Ingredients for Carrot Salad
  - 10 cups shredded raw carrots
  - 2 ½ cups seedless raisins
  - 1 ¼ cups low-fat mayonnaise
  - 1 ¼ cups low-fat plain yogurt or ½ cup plus 2 tablespoons (10 tablespoons) low-fat or fat-free milk
  - 2 ½ teaspoons cinnamon
- Measuring cups, one set per student group
- 5 measuring spoons (½ teaspoon) for measuring cinnamon, one spoon per student group
- 5 large bowls
- 5 large spoons for mixing
- Napkins/paper towels, one per student
- Plastic forks, one per student
- Paper plates, one per student

Preparation

- Request assistance from parents for the food preparation portion of this lesson.
- Request assistance (i.e., demonstration of how to prepare recipes) from the school food service and/or parents for the food preparation portion of this lesson.
- Obtain ingredients for the carrot salad.
- Arrange for refrigerated storage for ingredients prior to preparation time.
- Duplicate one copy of ***Student Handouts 9.1*** and ***9.2*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper for each student, if you have not previously done so.
- Arrange the classroom for five food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Brief volunteers on their roles during the food preparation activity.

Instructional Process

STEP 1 **Review information about carrots.** Have the carrot garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board. Next, have them share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Ask students the following questions to review important facts about carrots:

- **What is the edible part of the plant?** (taproot)
- **What Vegetable Subgroup do carrots belong to?** (Red and Orange)
- **What vitamins and minerals can be found in carrots? What do these vitamins and minerals do for you?**

  Carrots contain ***beta-carotene***. Beta-carotene is converted to vitamin A in the human body.

  Vitamin A keeps eyes and skin healthy and helps protect against infections. One-quarter cup of carrots provides over 100 percent of a person's daily need for vitamin A.

  Carrots also include vitamin C and dietary fiber. Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy. Fiber helps keeps your bowel movements regular.

STEP 2 **Introduce the food preparation activity.**

Tell students:

Today they are going to prepare and taste a simple carrot salad recipe.

Divide students into five small groups of 5-6 students. Have each group go to a food preparation station.

Ask students:

- **Who has eaten a carrot salad before?** (If anyone has eaten a carrot salad, ask that student to describe how it tasted. Ask if it was a family favorite and where the recipe might have come from.)

Distribute ***Student Handout 9.1, Explore a Flavor Mystery—Carrot Salad.***

Have the students read the recipe silently to themselves.

STEP 3 **Have students complete the food preparation activity.** Before students begin the food preparation, ask them to retrieve ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Have children put on plastic gloves to ensure food safety and large T-shirts, smocks, or aprons to protect their clothes.

Distribute the following items to each group:

- 1 large bowl
- 1 large spoon for mixing
- 1 set of measuring spoons
- 1 set of measuring cups
- Ingredients for recipe

Instruct all groups to follow the first two steps of the recipe on ***Student Handout 9.1, Explore a Flavor Mystery—Carrot Salad*** (i.e., do not add cinnamon yet) and prepare six servings of the salad.

STEP 4 **Have students taste the carrot salad.** First, have students wash their hands according to the guidelines on ***Student Handout 1.1***. Then review S***tudent Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute a paper plate, napkin, and fork to each student. Have each group distribute an equal portion of the carrot salad from the bowl to its members—using about one-half of the total amount—and have them taste it.

STEP 5 **Now have students finish the recipe by adding ¼ teaspoon of cinnamon to the remaining half of the untasted salad and have them taste it again.** Ask for a show of hands as to who likes the salad better without the cinnamon and who likes it better with cinnamon.

Tell students that cinnamon is a mysterious ingredient that gives the salad a unique flavor. Cinnamon is a spice obtained from the inner bark of special trees and is typically added in sweet foods.

Ask students:

- **What foods have you eaten that have had cinnamon added?** (Possibly applesauce)
- **Who has eaten a vegetable dish spiced with cinnamon?** (Possibly sweet potatoes served at Thanksgiving)

Ask the students:

- **What did you think of the Carrot Salad?**
- **Were you surprised by the way it tasted?**
- **What are some other dishes you can prepare using carrots?**

STEP 6 **Distribute *Student Handout 9.2, The Mystery of the Tender Tastebuds.*** Assign ***Handout 9.2*** as a homework assignment in which students interview their parents/caregivers about which herbs and spices they often use in preparing fruits and vegetables for their families. After students complete the assignment, ask for volunteers to share the herbs and spices that their families frequently use. Explain to students that different cultures prepare foods differently and use different spices. For example, people from Italy may use the herbs basil and oregano frequently, while lemongrass is an herb that people from Thailand use in many dishes.

Mystery #2: The Mystery of the CSA Basket

Time Required

60 minutes plus 60 minutes to roast beets

Materials

- *Student Handout 1.1, Stay Healthy: Wash Your Hands! (*Lesson 1)
- *Student Handout 1.2, The Garden Detectives' Tasting Code* (Lesson 1)
- *Student Handout 9.3, Explore a Flavor Mystery—Roasted Beets*
- Apron, smock, or large T-shirt for each student (not the same one used for gardening)
- Baking sheets to fit oven
- Oven
- Ingredients for Roasted Beets
  - 1 beet for every two students
  - 3 teaspoons olive oil
- Aluminum foil
- Paper plates, one per student
- Napkins or paper towels, one per student
- Plastic knives, one per group

Preparation

- Ask for parent volunteers to assist in the food preparation activity.
- Obtain ingredients for roasted beets. Arrange this with school food service, if possible.
- Prepare beets by cutting off the tops and the roots.
- Duplicate one copy of *Student Handout 9.3* on 3-hole-punch paper for each student.
- Duplicate one copy of *Student Handouts 1.1* and *1.2* on 3-hole-punch paper for each student, if you have not previously done so.
- Prepare six food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.

Instructional Process

STEP 1 **Review information about beets.** Have the beet garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective*** bulletin board. Next have them share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Ask students the following questions to review important facts about beets:

- **What is the edible part of the plant?** (Roots and leaves)
- **What Vegetable Subgroup do beet roots belong to?** (Other)
- **What Vegetable Subgroup do beet greens belong to?** (Dark-Green)
- **What vitamins and minerals can be found in beets? What do these vitamins and minerals do for you?**
  - Beets (roots) are a good source of folate. Folate helps the body make red blood cells.

- Beet leaves (tops) are an excellent source of vitamins A and C. Vitamin A helps keep our eyes and skin healthy and helps protect against infections. Vitamin C heals cuts and wounds and keeps our gums healthy.
- They also contain the minerals potassium and magnesium. Potassium helps to maintain heart health, regulates body fluids, and is needed for muscle and nerve functioning. Magnesium is important for muscle and nerve functioning.

STEP 2 **Tell students that their job today is to solve the mystery of the CSA basket.** Explain to students that Amy's family signed up for a CSA basket this year from Farmer Jones' Evergreen Farm.

Based on their experience in Lesson 5, ask students:

- **What does CSA stand for?** (Community Supported Agriculture)
- **What is CSA?** (A way for farmers to sell directly to the public by having consumers purchase a share in the season's crops.)
- **How does CSA work?** (A basket of farm-fresh fruits and/or vegetables is delivered to a designated location each week by the farmer. The consumer then picks up his or her weekly allotment from that location.)

NOTE: If you did not teach Lesson 5 previously, review the Teacher Background Information in that lesson and introduce these concepts to students.

Explain to students that Amy and her family enjoyed being surprised each week by the different fruits and vegetables that Farmer Jones included in their CSA basket. But this week, they encountered a mystery: What was the dark-red, round vegetable with long dark-green leaves growing out of it? The round part was firm, covered in reddish-brown skin, and had a skinny root growing at the bottom. Amy and her family had never seen this vegetable before!

Ask students:

- **What do you think was the mysterious vegetable in Amy's CSA basket?** (Red beets)

That's one mystery solved! But now Amy and her family had another mystery to consider: What could they do with these beets? Could they eat them raw? Should they cook them? What part of the beet was edible?

Ask students:

- **Garden detectives, what would you advise Amy and her family to do to solve this mystery?** (Both greens and root can be eaten. Greens may be eaten raw or cooked; roots are sometimes eaten raw, such as grated in salads, but are typically cooked.)
- **What are some ways that beets and beet greens can be prepared so they taste good?**

Write the following headings on the board and list students' suggestions. You may need to remind students about different ways that beets were prepared in recipes in the class cookbook (Lesson 7).

Beets	**Beet Greens**
Roasted	Chopped up in salads
Boiled	Added to soups
Pickled in vinegar	Cooked (like spinach)
Sliced in salads	

STEP 3 **Introduce the food preparation activity.**
Tell students that they may remember tasting roasted beets in Lesson 1. Today, they are going to have the chance to make roasted beets and taste them again.

Distribute ***Student Handout 9.3, Explore a Flavor Mystery—Roasted Beets.***

Have students read the recipe silently to themselves.

STEP 4 **Have students complete the food preparation activity.** Before beginning food preparation, ask students to retrieve ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Divide students into six groups and assign each group to a food preparation station. Give each group two beets that an adult has prepared by cutting off the tops and the roots. Have the students rinse and scrub the beets.

NOTE: The water the students use to rinse and scrub the beets will turn purple and could stain clothing; be sure that students are wearing smocks or other protective clothing.

Give each group six squares of foil. Have the students place the beet in the middle of one foil square. Drizzle ½ teaspoon of olive oil over each beet and wrap the foil around the beet. Add two more layers of foil so beet juice doesn't leak. Twist the top closed.

Place the wrapped beets on a baking sheet to roast in the oven.

When the beets are cooked and cool enough to handle, have the students take the beets to the sink, unwrap the foil and, under running water, slip the skins off each beet over a bowl in the sink in case they drop the slippery beet; removing the skins might require some gentle rubbing. Have students (or an adult, depending on your district's policies) use a plastic knife to cut each beet into three pieces.

Have students taste the roasted beets. Before students begin the tasting, have all students wash and dry their hands according to the guidelines on ***Student Handout 1.1***. Then review ***Student Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Detective Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute one-third of a roast beet to each student on a paper plate and a napkin. Have the students taste the roasted beets. (Allow students to share any remaining pieces of beet, if they so desire.)

Ask the students:

- **What did you think of the roasted beets?**
- **Were you surprised by the way they tasted?**
- **What would you tell Amy and her family about roasted beets?**

Tell students to share what they learned about beets with their families.

Teacher Background Information

Get the Facts on Carrots and Beets

Vocabulary

Beta-carotene: A nutrient that helps protect vision, especially night vision. Beta-carotene turns into vitamin A in the human body.

Community Supported Agriculture (CSA): A way for farmers to sell directly to the public by having consumers purchase a share in the season's crops. A basket of farm-fresh fruits and/or vegetables is delivered to a designated location each week by the farmer. The consumer then picks up his or her weekly allotment from that location.

Dietary Fiber: Plant material that cannot be digested. It helps keep food moving through the digestive tract and has other health benefits.

Magnesium: A mineral that is important for muscle and nerve functioning.

Minerals: Nutrients such as calcium, potassium, magnesium, iron, and zinc; some regulate body processes while others become part of body tissues.

Nutrients: Substances, including vitamins and minerals, found in food that nourish your body.

Potassium: A mineral that maintains heart health, regulates body fluids, and is needed for muscle and nerve functioning.

Public Service Announcement (PSA): A short message that appears on radio or TV to promote a service or idea that is good for people's health and well-being. A PSA is just like a commercial for a product, except that a TV or radio station plays it for free as a public service.

Vitamin A: A nutrient that promotes growth and healthy skin and hair. It also helps the body resist infections and helps eyes adjust to darkness.

Nutrition Information on Carrots

Raw Carrots	
Nutrition Facts	
Serving Size ½ cup (64g)	
Amount Per Serving	**% Daily Value**
Calories 25	
Calories from Fat 0	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 45mg	2%
Total Carbohydrate 6g	2%
Dietary Fiber 2g	7%
Sugars 3g	
Protein 1g	
Vitamin A	150%
Vitamin C	6%
Calcium	2%
Iron	2%
Potassium	6%
Folate	3%

* Percent Daily Values are based on a 2,000-calorie diet.

Nutrition Information on Beets

Raw Beets	
Nutrition Facts	
Serving Size ½ cup (68g)	
Amount Per Serving	**% Daily Value**
Calories 29	
Calories from Fat 1	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 53mg	2%
Total Carbohydrate 7g	2%
Dietary Fiber 2g	8%
Sugars 5g	
Protein 1g	
Vitamin A	0%
Vitamin C	6%
Calcium	1%
Iron	3%
Potassium	6%
Folate	19%

* Percent Daily Values are based on a 2,000-calorie diet.

Source: United States Department of Agriculture, Agricultural Research Service. 2011. USDA National Nutrient Database for Standard Reference, Release 24. Nutrient Data Laboratory Home Page, *http://www.ars.usda.gov/ba/bhnrc/ndl*

Student Handout 9.1

Explore a Flavor Mystery—Carrot Salad

Name: _____ Date_____

Ingredients

2 cups shredded carrots

½ cup seedless raisins

¼ cup low-fat mayonnaise

¼ cup low-fat plain yogurt or 2 tablespoons low-fat or fat-free milk

½ teaspoon cinnamon

Preparation

1. Wash hands and clean your work area.
2. Combine shredded carrots with raisins.*
3. Mix together mayonnaise and yogurt (or milk). Pour over salad. Mix.*
4. Add cinnamon and mix thoroughly.* Do NOT do Step 4 until your teacher tells you to do so.

Yield

Six ½-cup servings

You can complete all starred* preparation steps.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Be a great garden detective! Discover tasty root vegetables.

Student Handout 9.2

The Mystery of the Tender Tastebuds

Name: _____ Date_____

Cooks often use herbs and spices to make fruit and vegetable dishes more interesting. **Herbs** are plants that add flavor to food. For example, the herb **oregano** adds a familiar flavor to pizza sauce.

Spices come from plants and are used to season or flavor food. Cinnamon and black pepper are commonly used spices.

Both herbs and spices have strong aromas or smells.

You probably already eat a lot of herbs and spices, but you may not know you're eating them—certain foods like pizza just taste a certain way to you.

So now it's up to you to find out what herbs and spices you've been eating all along.

Investigate

Talk to the person who does most of the cooking in your family. Find out what herbs and spices she or he cooks with most often and in what fruit or vegetable dishes.

Write down your findings:

Herb or spice	Fruit or vegetable dish
Pepper	All vegetables

Student Handout 9.3

Explore a Flavor Mystery—Roasted Beets

Name: _____ Date_____

Ingredients

2 beets

½ teaspoon olive oil

Preparation

1. Wash hands and clean your work area.
2. Trim the beet tops and roots.
3. Scrub the beets with a vegetable brush under cool running water.*
4. Place each beet on a square of foil and drizzle with about ½ teaspoon of olive oil. Bring the corners of the foil up around the beets and twist to seal. Add two more layers of foil. Repeat with the remaining beets.*
5. Place foil-wrapped beets on a pan and roast in an oven 350° F over for 60 minutes or until a knife can slide easily through the largest beet.
6. When the beets are cool enough to handle, unwrap the foil, and, under running water, slip the skins off each beet. Cut each beet into three pieces with a plastic knife and serve.*

Yield

Six servings, ⅓ beet each

You can complete all starred* preparation steps.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Be a great garden detective!
Discover tasty root vegetables.

Garden Detective News

Encourage Your Child's Growth

Ask your child to share what he or she learned about preparing carrots and beets.

USDA United States Department of Agriculture

Garden Detective News

This week, the garden detectives learned about carrots and beets. They prepared and tasted some delicious healthy recipes using these nutritious vegetables.

Did you know that these vegetables contain vitamins and minerals that can help keep you healthy and protect you from disease?

In the green box to the right, there are a few tips to add these vegetables to your family's meals. Recipes the garden detectives prepared and tasted in class are also in this newsletter.

Mystery Solved!

Ways To Help Your Child Eat More Carrots and Beets.

How To Add More Carrots to Your Family's Meals:

- Add chopped or shredded carrots to salads.
- Dice carrots into smaller pieces and add them to soups and stews.
- Steam or roast carrots for an easy side dish.
- Eat them raw as a quick-and-easy snack.
- Try carrot salad. See the recipe on the following page.

How To Add More Beets to Your Family's Meals:

- Dice beets into smaller pieces and add them to soups and stews.
- Steam or roast beets for an easy side dish.
- Microwave 2 to 3 small beets in a small amount of water for 8 to 15 minutes or until soft.
- Try roasted beets. Follow the recipe on the following page.

Garden Detective Recipes

Carrot Salad

Preparation Time

5 minutes

Ingredients

2 cups shredded raw carrots

½ cup seedless raisins

¼ cup mayonnaise

¼ cup low-fat plain yogurt or 2 tablespoons low-fat milk

½ teaspoon cinnamon

Preparation

1. Wash hands and clean your work area.
2. Combine shredded carrots with raisins.*
3. Mix together mayonnaise, and yogurt or milk.*
4. Add cinnamon and mix.*
5. Pour over salad and toss well.*

Yield

Five ½-cup servings

The starred* preparation steps can be completed by children. All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Roasted Beets

Preparation Time

5 minutes

Cooking Time

60 minutes

Ingredients

6 beets

1 tablespoon olive oil

Preparation

1. Wash hands and clean your work area.
2. Scrub the beets with a vegetable brush under cool running water.*
3. Scrub the beets under running water.*
4. Place each beet on a square of foil and drizzle with about ½ teaspoon of olive oil. Bring the corners of the foil up around the beets and twist to seal. Add two more layers of foil so beet juice doesn't leak. Repeat with the remaining beets.*
5. Place foil-wrapped beets on a pan and roast in an oven 350° F oven for 60 minutes or until a knife can slide easily through the largest beet.
6. When the beets are cool enough to handle, unwrap the foil, and, under running water, slip the skins off each beet.

Yield

Six servings, 1 beet each

The starred* preparation steps can be completed by children. All other preparation steps should be completed by adults.

Family Activity 9

Plan Ahead To Add More Fruits and Veggies To Your Meals

Planning ahead before you go grocery shopping helps you buy the foods your family enjoys and keeps the family budget under control. Team up with your child this week to look through the weekly grocery store flyers in the newspaper to find the specials and best buys in fruits and vegetables. You can also find the weekly flyer online by searching for your favorite grocery store.

Make a list of fruits and vegetables that your family likes that are on sale this week:

Fruits/Price	Vegetables/Price

Decide together what to buy.

Go grocery shopping with your child this week. Have your garden detective search for and find the fruits and vegetables that you have chosen. Add them to your grocery cart.

Keep prepared fruits and veggies in a handy place for easy snacking once you get home. For example, put a bowl of whole fruits, such as apples and oranges, on the counter so family members can help themselves. Keep cut-up veggies in the fridge for a quick and convenient snack.

Lesson Extension: A Shape Poem

Standards Addressed

English/Language Arts
Standard 3, Language: *Use knowledge of language and its conventions when writing, speaking, reading, or listening.*

Learning Objectives

Students will be able to write a shape poem.

Time Required

20 minutes

Materials

- *Student Handout 9.4, A Shape Poem*
- Orange and red-violet crayons, one for each student

Preparation

- Duplicate one copy of *Student Handout 9.4, A Shape Poem* on 3-hole-punch paper for each student.

Instructional Process

STEP 1 **Distribute Student Handout 9.4, A Shape Poem.** Tell the students that they are going to use the shape of a carrot or beet to create a shape poem. Explain to students that a shape poem describes an object and is written in the shape of the object it describes.

Point out the apple example on the handout and read it aloud.

STEP 2 **Have students complete Student Handout 9.4, A Shape Poem.** Tell students that they may choose which vegetable they would like to create a shape poem for. Instruct students to write their poem and fit it into the shape of the vegetable they chose.

STEP 2 **Have students share shape poems.** Ask for volunteers to share their shape poems with the class.

Student Handout 9.4

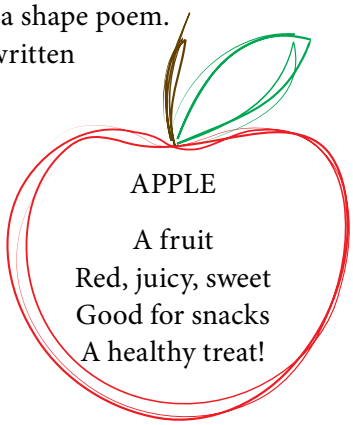
A Shape Poem

Name: _____ Date_____

Directions

Using the shape of a carrot or beet, create a shape poem. A shape poem describes an object and is written in the shape of the object it describes.

EXAMPLE:



Use the space below to draw the outline of a carrot or beet. Inside your drawing, write your shape poem. When you are finished, color in your vegetable with an orange or red-violet crayon.

Be a great garden detective! Discover tasty root vegetables.

Lesson 10

Discover Berry Sweet Evidence

Lesson Summary

Overview

The garden detectives build evidence files about strawberries and raspberries/blackberries in this lesson based on what they learn about these fruits. The garden detectives share their PSAs for strawberries and raspberries/blackberries (from Lesson 3), review important gardening and nutrition facts about strawberries and raspberries/blackberries, and prepare recipes and taste dishes featuring strawberries and raspberries/blackberries.

Key Messages

Be a great garden detective! Discover how berries taste great in meals and snacks.

Eat smart to play hard. Power up with berries and yogurt.

Garden Connection

The garden detectives take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

Have the student groups assigned to strawberries and raspberries/blackberries show the class their plants in the garden and share information about their plants' growth and care-taking needs.

School Food Service Connection

Collaborate with school food service to obtain and prepare the ingredients for the strawberry and raspberry/blackberry dishes for this lesson. Serve the prepared dishes in the classroom or in the cafeteria at the end of the lesson.

Cookbook Connection

You can include the recipes for the strawberry and raspberry/blackberry dishes in this lesson in the Class Cookbook.

School Connection

Invite the school principal and others from the school community to taste prepared dishes.

Have students share their PSAs with the entire school during morning announcements or post a video of them performing their PSAs on the school's Web site.

Home Connection

Ask for parent volunteers to help with the food preparation activities in this lesson. Send the ***Garden Detective News*** home to parents/caregivers. Encourage students to solve the Strawberry Scramble with their families.

Community Connection

Ask a farmer or local grocery store manager to donate the ingredients for the food preparation.

Ask a farmer to donate a small berry plant so the students can see what these plants look like after they've been growing for a bit and visit the classroom to share tips for nurturing berry plants.

Invite a local chef in to help prepare the strawberry and raspberry/blackberry dishes or a recipe of his or her own for these berries.

Media Connection

Take pictures or videos of the students preparing the dishes (check district photography policy) and submit with a press release and recipes to your local newspaper or TV station.

Main Lesson: Discover Berry Sweet Evidence

Standards Addressed

English/Language Arts

Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.*

Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.*

Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.*

Science

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

Mathematics:

Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.*

Health

Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.*

Standard 7, Practice Health-Enhancing Behaviors: *Practice health-enhancing behaviors and avoid or reduce health risks.*

Learning Objectives

Students will be able to:

1. Read and follow procedures in a recipe featuring strawberries or raspberries/blackberries.
2. Use standard units of measurement to prepare recipe.
3. Describe how to prepare simple recipes featuring strawberries or raspberries/blackberries.

Evidence File #1: The Case of the Frozen Fruit

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1)
- ***Student Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 10.1, Evidence File: The Case of the Frozen Fruit***
- ***Student Handout 10.2, Discover Berry Sweet Evidence—Strawberry Smoothie***
- Apron, smock, or large T-shirt for each student (not the same one used for gardening)
- Disposable plastic food preparation gloves, one pair per child
- Ingredients for Strawberry Smoothie
  - 4 (8-oz) containers of low-fat vanilla yogurt
  - 4 (12-oz) packages of frozen unsweetened strawberries, partially thawed
  - 2 ½ cups orange juice (100 percent juice)
- 1 blender
- 5 large bowls, one per student group
- 5 large spoons for stirring and serving, one per student group
- 5 sets of liquid measuring cups, one per student group

Preparation

- Request assistance from parents for the food preparation portion of this lesson.
- Request assistance (e.g., demonstration of how to prepare recipes) from the school food service for the food preparation portion of this lesson.
- Obtain ingredients for Strawberry Smoothies.
- Arrange for refrigerated storage of ingredients prior to preparation time.
- Duplicate one copy of ***Student Handouts 10.1*** and ***10.2*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper for each student, if you have not previously done so.
- Arrange the classroom for five food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Brief volunteers on their roles during the food preparation activity.

Instructional Process

STEP 1 Distribute ***Handout 10.1, Evidence File: The Case of the Frozen Fruit.*** Tell students that their job as detectives is to compile the facts they learn about strawberries—fresh and frozen—and draw conclusions based on what they learned and observed. They should record what they learned on the first part of the handout after the following presentations and class discussion.

Have the strawberry garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board. Then have them share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Ask students the following questions to review important facts about strawberries:

- **What is the edible part of the plant?** (Fruit)
- **Are strawberries annuals or perennials?** (A perennial, but often treated as an annual)
- **What does it mean to be a perennial?** (The plant lives for more than one growing season.)
- **What vitamin can be found in strawberries? What does this vitamin do for you?** (Strawberries are loaded with vitamin C, which helps heal cuts and wounds. One cup of strawberries has more vitamin C than one cup of orange juice.)

Have students complete the first part of ***Handout 10.1***.

STEP 2 **Introduce the food preparation activity.**

Tell students that today they are going to prepare and taste a simple smoothie recipe. Explain to the garden detectives that they can power up with berries and yogurt to eat smart to play hard.

Divide students into five small groups of 5-6 students. Have each group go to a food preparation station.

Ask students:

- **Who has made a smoothie before?** (If any students have made a smoothie, ask them what kind of smoothie they made and how it tasted.)

Distribute Student ***Handout 10.2, Discover Berry Sweet Evidence—Strawberry Smoothie***.

Have students read the recipe silently to themselves.

STEP 3 **Ask students what kind of strawberries are used in this recipe (frozen unsweetened berries).** Explain to students that freezing fruits and vegetables is one way to preserve the bounty of the garden. Preserving foods means to prepare them so that you can safely keep them to eat in the future.

Ask students:

- **What happens when fresh fruits and vegetables are not eaten promptly?** (They lose their texture and flavor; eventually they rot.)

Besides freezing fruits and vegetables, what other ways are there to preserve foods? (Canning, drying)

Tell students:

Today, we can buy fruits and vegetables in the supermarket in the wintertime that are grown in other parts of the world where it is summertime. We can also buy frozen and canned fruits and vegetables year-round. But in the past, people in the United States didn't have supermarkets; they had to grow fruits and vegetables in their gardens in the summer and preserve them so that they would have these foods to eat in the winter.

STEP 4 **Have students complete food preparation activity.** Before students begin the food preparation, ask them to retrieve ***Student Handout 1.1, Stay Healthy: Wash Your Hands!*** (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Next, have all students wash and dry their hands according to the guidelines on the handout.

Have children put on plastic gloves to ensure food safety and large T-shirts, smocks, or aprons to protect their clothes. Distribute the following items to each group:

- 1 large bowl
- 1 large spoon for mixing
- 1 set of liquid measuring cups
- Ingredients for recipe

Instruct all groups to follow the recipe on ***Student Handout 10.1, Discover Berry Sweet Evidence—Strawberry Smoothie*** and prepare six servings of the Strawberry Smoothie in their bowls.

Demonstrate how to use the blender for the students. Then have each group place their ingredients into the blender and blend. Once the smoothie is blended, pour ¼ cup of smoothie into each paper cup so that each student in the class can have a taste of the smoothie.

STEP 5 **Have students taste the Strawberry Smoothie.** First, have students wash their hands according to the guidelines on ***Student Handout 1.1***. Then review ***Student Handout 1.2, The Garden Detectives' Tasting Code*** from students' ***Garden Detective Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Distribute a cup containing the Strawberry Smoothie to each student. Have the students taste the strawberry smoothie.

Ask the students:

- **How would you describe the taste of the strawberry smoothie?**
- **Were you surprised by the way it tasted?**
- **What are some other dishes you can make using strawberries?**

Have students complete the second part of ***Handout 10.1*** describing their experience tasting the Strawberry Smoothie and drawing a conclusion about the use of frozen strawberries.

Evidence File #2: The Case of the Missing Color

Time Required

60 minutes

Materials

- ***Student Handout 1.1, Stay Healthy: Wash Your Hands***! (Lesson 1)
- ***Student Handout 1.2, The Garden Detectives' Tasting Code*** (Lesson 1)
- ***Student Handout 10.3, Evidence File: The Case of the Missing Color***
- ***Student Handout 10.4, Discover Berry Sweet Evidence—Fruit Salad***
- Apron, smock, or large T-shirt for each student (not the same one used for gardening)
- Disposable plastic food preparation gloves, one pair per child
- Ingredients for Fruit Salad With a Splash of Lime
  - 5 apples (equal to 5 cups), cubed
  - 5 pints raspberries
  - 5 pints blackberries
  - 5 cups seedless grapes
  - 3 limes, cut in quarters
- 2 tablespoons of lemon juice, if you chop apples in advance and store
- 5 large bowls, one per student group
- 5 large spoons for mixing and serving, one per group
- Paper cups, one per student
- Paper bowls or plates, one per student
- Plastic forks or spoons, one per student

Preparation

- Request assistance (i.e., demonstration of how to prepare recipes) from the school food service and/or parents for the food preparation portion of this lesson.
- Obtain ingredients for fruit salad.
- Rinse fruit under running water.
- Chop apples and limes in advance. Sprinkle lemon juice over the apples to preserve their color.
- Arrange for refrigerated storage of ingredients prior to preparation time.
- Duplicate one copy of ***Student Handouts 10.3*** and ***10.4*** on 3-hole-punch paper for each student.
- Duplicate one copy of ***Student Handouts 1.1*** and ***1.2*** on 3-hole-punch paper for each student, if you have not previously done so.
- Arrange the classroom for five food preparation stations.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.
- Brief volunteers on their roles during the food preparation activity.

Instructional Process

STEP 1 Distribute ***Handout 10.3, Evidence File: The Case of the Missing Color.*** Tell students that their job as detectives is to compile the facts they learn about raspberries/blackberries and draw conclusions based on what they learned and observed. They should record what they learned on the first part of the handout after the following presentations and class discussion.

Have the raspberry/blackberry garden detectives report on their plants' progress in the garden by reviewing the growth pattern on the ***Be a Garden Detective!*** bulletin board, then ask them to share the posters and PSAs they created in Lesson 3: *Investigate Like a Super Sleuth* with their classmates.

Ask students the following questions to review important facts about raspberries/blackberries:

- **What is the edible part of the plant?** (fruit)
- **What is the type of bush that raspberries/blackberries grow on?** (bramble)

What vitamins and minerals can be found in raspberries/blackberries? What do these vitamins and minerals do for you?

- Raspberries and blackberries are an excellent source of vitamin C and a good source of fiber.
- Raspberries and blackberries are bramble plants, i.e., they grow on prickly bushes.

Students should now record what they've learned about raspberries/blackberries on the first part of *Handout 10.3*.

STEP 2 **Introduce the food preparation activity.** Tell students that today they are going to prepare and taste an easy-to-make fruit salad.

Ask students:

- **Who has ever made a fruit salad before?** (If students have made a fruit salad before, ask them what kind of fruit they used and how the salad tasted.)

Distribute *Student Handout 10.4, Discover Berry Sweet Evidence—Fruit Salad* to all students.

Have students read the recipe silently to themselves.

STEP 3 **Have students complete the food preparation activity.** Before students begin the food preparation, ask them to retrieve *Student Handout 1.1, Stay Healthy: Wash Your Hands!* (Lesson 1) from their ***Garden Detective Journals*** and review its key points. Then have all students wash and dry their hands according to the guidelines on the handout.

Divide students into five small groups of 5-6 students. Have each group go to a food preparation station.

Have children put on plastic gloves to ensure food safety and large T-shirts, aprons, or smocks to protect their clothes. Distribute the following items to each group:

- 1 large bowl
- 1 large spoon for mixing
- Ingredients for recipe

Instruct all groups to follow the recipe on *Student Handout 10.4, Discover Berry Sweet Evidence—Fruit Salad* and prepare six servings of fruit salad in their bowls.

STEP 4 **Have students taste the fruit salad.** Review *Student Handout 1.2, The Garden Detectives' Tasting Code* from students' ***Garden Detective Journals*** (or project ***Overhead/Slide 1.2*** from Lesson 1) by reading the tasting guidelines aloud.

Tell students that this class of garden detectives are about to discover that berries taste great in meals and snacks.

Distribute a paper plate/bowl, napkin, and fork/spoon to each student. Have each group distribute an equal portion of the fruit salad from the bowl to each of its members and have them taste it.

Ask the students:

- **What did you think of the Fruit Salad?**
- **Were you surprised by the way it tasted?**
- **Did you like the way it looked? What colors from the rainbow were missing from the salad?** (orange from oranges, possibly green from grapes depending on the grapes you chose, blue from blueberries) **Do you think a fruit salad that included these fruits would taste good?**
- **What are some other dishes you can make using raspberries/blackberries?**

Have students complete the second half of ***Handout 10.3***.

Teacher Background Information

Get the Facts on Berries

Vocabulary

Annual: A plant that grows, flowers, and dies in 1 year or growing season.

Bramble: A prickly shrub or bush.

Blender: An electric appliance with whirling blades for chopping, mixing, or liquefying foods.

Dietary Fiber: Plant material that cannot be digested.

Folate: A nutrient that promotes healthy blood cells that is also important for cell division, such as in pregnancy and growth.

Freezing: A process of preserving foods by placing them below freezing temperature (i.e., below 32° F).

Iron: A mineral that carries oxygen in red blood cells and muscle cells.

Magnesium: A mineral that is important for muscle and nerve functioning.

Perennial: A plant that lives for more than 1 year.

Potassium: A mineral that maintains the heartbeat, regulates body fluids, and is needed for muscle and nerve functioning.

Preservation: The act of safely preparing and storing foods for future use, e.g., freezing, canning, and drying.

Salad: A mixture of foods, usually involving a combination of fresh vegetables and/or fruits that is served with a dressing.

Smoothie: A blended, chilled beverage made from fresh fruit and milk, yogurt, or ice cream.

Vitamin C: A vitamin that helps wounds heal. It is also important in helping to keep blood vessels and gums healthy.

Nutrition Information on Raspberries

Raspberries	
Nutrition Facts	
Serving size ½ cup (62g)	
Amounts Per Serving	**% Daily Value**
Calories 32	
Calories from Fat 5	
Total Fat 0g	1%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 7g	2%
Dietary Fiber 4g	16%
Sugars 3g	
Protein 1g	
Vitamin A	0%
Vitamin C	27%
Calcium	2%
Iron	2%
Potassium	3%
Folate	3%

* Percent Daily Values are based on a 2,000-calorie diet.

Nutrition Information on Blackberries

Blackberries	
Nutrition Facts	
Serving size ½ cup (72g)	
Amounts Per Serving	**% Daily Value**
Calories 31	
Calories from Fat 3	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 0mg	0%
Total Carbohydrate 7g	2%
Dietary Fiber 4g	15%
Sugars 4g	
Protein 1g	
Vitamin A	3%
Vitamin C	25%
Calcium	2%
Iron	3%
Potassium	3%
Folate	5%

* Percent Daily Values are based on a 2,000-calorie diet.

Nutrition Information on Strawberries

Strawberries	
Nutrition Facts	
Serving Size ½ cup, sliced (83g)	
Amount Per Serving	**% Daily Value**
Calories 25	
Calories from Fat 0	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 0 mg	0%
Total Carbohydrate 6g	2%
Dietary Fiber 2g	7%
Sugars 4g	
Protein 1g	
Vitamin A	0%
Vitamin C	80%
Calcium	2%
Iron	2%
Potassium	4%
Folate	5%

* Percent Daily Values are based on a 2,000-calorie diet.

Source: United States Department of Agriculture, Agricultural Research Service. 2011. USDA National Nutrient Database for Standard Reference, Release 24. Nutrient Data Laboratory Home Page, http://www.ars.usda.gov/ba/bhnrc/ndl

Student Handout 10.1

Evidence File: The Case of the Frozen Fruit

Name: _____ Date_____

Part 1.

You were planning to make a strawberry smoothie, but the strawberries have been mysteriously frozen! Will this ruin your refreshing drink?

Write down three facts that you've learned about strawberries:

1 _____

_____

2. _____

_____

3. _____

_____

Part 2.

Looks like you're stuck making your smoothie with frozen strawberries. After you've tasted your smoothie, write three adjectives that describe how it looks, feels, and/or tastes.

_____ _____ _____

Now write a sentence that tells someone else about strawberry smoothies. Use the three adjectives that you wrote down.

_____

_____

_____

Conclusion

Can you make a tasty fruit smoothie with frozen strawberries? ☐ YES ☐ NO

Eat smart to play hard. Power up with berries and yogurt.

Student Handout 10.2

Discover Berry Sweet Evidence—Strawberry Smoothie

Name: _____ Date_____

Ingredients

6 oz low-fat vanilla yogurt

9 oz frozen strawberries

½ cup orange juice

Preparation

1. Wash hands and clean your work area.
2. Combine the ingredients in a blender.*
3. Blend for 15 to 30 seconds or until smooth.

Yield

Six ½-cup servings

The starred* preparation steps can be completed by children.
All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly.
Do not leave at room temperature for longer than 2 hours
(or 1 hour in temperatures above 90° F).

Be a great garden detective!
Discover how berries taste great in meals and snacks.

Student Handout 10.3

Evidence File: The Case of the Missing Color

Name: _____ Date_____

Part 1.

Yum … fruit salad! You're going to start by using raspberries or blackberries.

Write down three facts that you've learned about raspberries and blackberries:

1 _____

_____

2. _____

_____

3. _____

_____

Part 2.

Would you like to make your salad more colorful? Write down five fruits of different colors that you could use in a fruit salad, along with raspberries and blackberries:

Fruit	Color
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Conclusion

What colors were missing from the fruit salad that you made today?

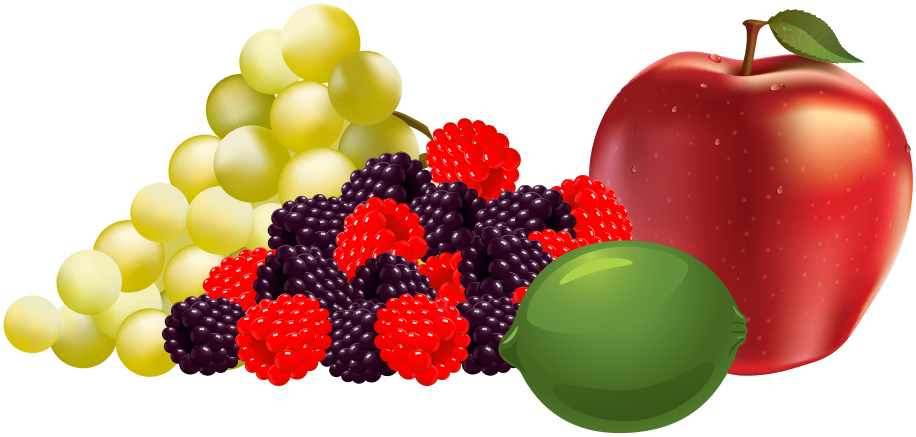
_____ _____ _____

Student Handout 10.4

Discover Berry Sweet Evidence—Fruit Salad

Name: _____ Date_____

Ingredients



2 apples, diced

1 pint raspberries

1 pint blackberries

2 cups seedless grapes

½ lime

Preparation

1. Wash hands and clean your work area.
2. Rinse fruit under running water.
3. Combine the apples, raspberries, blackberries, and seedless grapes into a bowl.*
4. Squeeze lime over the fruit in the bowl.*
5. Stir and serve.*

Yield

Six ¾-cup servings

The starred* preparation steps can be completed by children. All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Be a great garden detective! Discover how berries taste great in meals and snacks.

Garden Detective News

Help Healthy Habits Take Root

Garden Detective News

This week, the garden detectives learned about strawberries, raspberries, and blackberries. They prepared and tasted some delicious healthy recipes using these nutritious berries.

Did you know that berries contain important vitamins, minerals, and fiber that your family needs to grow and be healthy?

In the green box at the right are a few tips to add these berries to your family's diet. The delicious recipes the garden detectives prepared and tasted this week are on the next page. Ask your child about these recipes.

Mystery Solved!

How To Add More Strawberries, Raspberries, and Blackberries to Your Plate:

- Add berries to your cereal, low-fat yogurt, or waffles and pancakes for breakfast.
- Make a parfait for breakfast or dessert with berries, granola, and low-fat yogurt.
- Blend berries, yogurt, bananas, and ice to make a tasty smoothie.
- Toss some berries into your salad for lunch.
- Try the Fruit Salad With a Splash of Lime recipe in this newsletter.

Garden Detective Recipes

Strawberry Smoothie

Preparation Time

5 minutes

Ingredients

2 (8-oz) containers of fat-free or low-fat vanilla yogurt

20 oz frozen unsweetened strawberries, partially thawed

1 ¼ cups 100 percent orange juice

Preparation

1. Wash hands and clean your work area.
2. Combine the ingredients in a blender.*
3. Blend for 15 to 30 seconds or until smooth.

Yield

Five 1-cup servings

The starred* preparation step can be completed by children. All other preparation steps should be completed by adults.

Refrigerate cut fruits, vegetables, and cooked foods promptly. Do not leave at room temperature for longer than 2 hours (or 1 hour in temperatures above 90° F).

Fruit Salad With a Splash of Lime

Preparation Time

15 minutes

Ingredients

2 apples (1 apple is equal to 1 cup), diced

1 pint raspberries

1 pint blackberries

2 cups seedless grapes, halved

½ lime

Preparation

1. Wash hands and clean your work area.
2. Rinse fruit under running water.
3. Combine the apples, raspberries, blackberries, and grapes into a bowl.*
4. Squeeze lime over the fruit.*
5. Stir and serve.*

Yield

Six 1-cup servings

The starred* preparation steps can be completed by children. All other preparation steps should be completed by adults.

Family Activity 10

Strawberry Scramble

Complete the Strawberry Scramble with your child. Have your child explain what each word in the scramble means.

Directions

Rearrange the letters in each word to form a word that has something to do with strawberries. Write each word on the line next to the scrambled word. You can use the word list at the bottom for help.

1. C nimativ _____
2. esmthooi _____
3. nnialserep _____
4. fzorne _____
5. tsmo pularpo _____
6. deess _____
7. tiurf _____
8. srevpere _____

Seeds
Vitamin C
Preserve
Most Popular
Perennial
Fruit
Frozen
Smoothie

1. Vitamin C; 2.Smoothie; 3. Perennials; 4. Frozen; 5. Most Popular; 6. Seeds; 7. Fruit; 8. Preserve

Lesson 11

Celebrate the Sleuths' Mystery Dinner

Lesson Summary

Overview

The garden detectives celebrate their hard work in the garden! Students harvest the ripe fruits and vegetables and help prepare a gala dinner from the garden for their families and schoolmates.

Depending upon the growing conditions of the local area and the growth cycle of the different fruits and vegetables, the plants may mature at different times. This lesson may be introduced at an earlier time, if the plants are maturing early. This lesson will need to be flexible depending on the maturation of the garden.

Key Message

You are a great garden detective! Share what you've learned with others.

Garden Connection

The garden detectives take a photograph (or create a drawing to scale) of their assigned fruit or vegetable in the garden each week and post it on the bulletin board. As they do so, they report to the rest of the class on how their plants are growing.

The children harvest their garden and use the fruits and vegetables at the Mystery Dinner. Parents and the rest of the school see pictures of the gardens and progress over the course of the unit, and have the option of touring the garden space. A tour could be led and designed by the students. For example, students may wish to light the garden area with jack-o-lanterns in the fall or create a scavenger hunt.

School Food Service Connection

Ask school food service to showcase at the Mystery Dinner how it has featured the fruits and vegetables grown in the garden in the cafeteria. Have students work with school food service to plan and prepare the menu. Find ideas in the *Recipes for Healthy Kids Cookbook* on the CD-ROM.

Home Connection

Parents will be invited to attend the Mystery Dinner and receive a copy of the class cookbook. Collaborate with your school's parent organization (PTA/PTO) to plan the event. It may be willing to help fund supplies and provide volunteers.

Community Connection

Consider inviting a mystery guest from the community to join in recognizing the students. This guest could be a chef, school board member, sports star, farmer, or community leader.

Media Connection

Invite local media to report on the Sleuths' Mystery Dinner and gardening efforts.

Main Lesson: Celebrate the Sleuths' Mystery Dinner

Standards Addressed

Science

Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.*

English/Language Arts

Standard 1, Writing: *Write opinion pieces on topics or texts, supporting a point of view with reasons and information.*

Vocabulary

Harvest: To pick the fruits and vegetables when they are ripe and ready to eat.

Ripe: Developed to the point of maturity where a plant is ready for harvest.

Sleuth: Another name for a detective.

Learning Objectives

Students will be able to:

1. Describe when fruits and vegetables are ready to harvest.
2. Prepare simple recipes using garden produce.
3. Describe gardening activities to family members.

Time Required

2 hours

- 60 minutes for harvest and journal reflection
- 60 minutes for Mystery Dinner

Materials

- Pictures of mature plants that are ready to be harvested (in Appendix D and on CD-ROM)
- Clean containers to hold harvested fruits and vegetables
- Depending on size of garden, additional fruits and vegetables may be needed to prepare a sufficient harvest feast for family members
- Variety of low-fat salad dressings and low-fat yogurt for dipping fruits
- Disposable plastic food preparation gloves, one pair per student
- Paper plates, napkins, and plastic cutlery in sufficient quantity, based on anticipated number of guests
- ***Garden Detective Certificates*** (in Appendix D and on CD-ROM)

Preparation

- Select date for Sleuths' Mystery Dinner in conjunction with cafeteria, if dinner will be held in the cafeteria. Discuss the date with the school principal and put the date on the school calendar (see Getting Started Guide).
- Share ***Recipes for Healthy Kids Cookbook*** from CD-ROM with school food service. Select a menu for the Sleuths' Mystery Dinner.
- Work with your PTA/PTO or parent group, school food service, or other sources to obtain funds for purchasing ingredients and supplies, including paper products.
- Announce Sleuths' Mystery Dinner to families by having students prepare an appropriately themed invitation.
- Post an invitation to the dinner in the cafeteria.

- Invite the principal to attend the Mystery Dinner and to hand out the ***Garden Detective Certificate*** to each student. You may also invite a mystery guest from the community, such as a school board member, chef, or local celebrity.
- Invite parent volunteers or Master Gardeners to assist students during harvesting.
- Print and laminate pictures of mature plants to guide harvesting.
- Print one copy of the ***Garden Detective Certificate*** for each student and personalize each one with the student's name, teacher's signature, and principal's signature.
- With school food service, prepare harvested fruits and vegetables by cleaning them and cutting them into bite-size pieces.
- Wash the surface of the desk or tables with hot, soapy water. Sanitize with a solution of 1 tablespoon of unscented liquid chlorine bleach per gallon of water.

Instructional Process

STEP 1 **Start the harvest lesson in the garden.**

Explain to students that it has now been approximately 10 weeks since they planted their garden. It is time to harvest what they've grown, i.e., to pick the ripe fruits and vegetables.

Begin by passing around photographs of the garden plants at maturity so students can see what they look like. Then demonstrate to students how to harvest each plant, using the following guidelines (see Grow Sheets in Appendix C as well):

Beets

- Beets are ready to harvest when the root is 1 ½ inches in diameter.
- If a beet is not ready to harvest, pick some of the young greens. They can be used in salads. Be sure to leave 2 to 3 leaves so the plant will continue to grow.

Carrots

- Carrots are ready to harvest when the orange top starts to become visible or when the root is about ½ inch in diameter.

Swiss Chard

- Do not pull out the plant by the root.
- Pick individual leaves to keep the plant in place and producing.
- Leave several leaves for the plant to keep growing.

Lettuce

- Do not pull out the plant by the root.
- Pick individual leaves to keep the plant in place and producing.
- Leave several leaves for the plant to keep growing.

Spinach

- Harvest spinach by cutting the entire plant off at soil level when the outer leaves are 6- to 8-inches long.

It is unlikely that strawberries and raspberries/blackberries will bear fruit in the first year they are planted because these plants require 2 or more years to become fruit-bearing.

Strawberries

- Harvest strawberries when the berry is red and fragrant.
- Grasp the stem just above the berry between the forefinger and the thumbnail and pull with a slight twisting motion.

Raspberries/blackberries

- Raspberries are ripe when they have achieved their desired color (red, gold, etc.).
- Blackberries are ready to harvest when they are black and soft.
- Gently grasp the berry with your fingers and thumb, and tug gently.

STEP 2 **Harvest the ripe fruits and vegetables.** Using parent or other volunteers to help, harvest the fruits and vegetables that are ripe. First, have students wash hands thoroughly and put on their garden T-shirts or smocks. Give each garden detective group the photograph of their fruit or vegetable at maturity so that they can recognize which plants are ready to harvest. Encourage the students and volunteers to handle the ripe fruits and vegetables with care. Place harvested produce in clean containers.

STEP 3 **Prepare a simple salad with harvested fruits and vegetables.** Work with your school food service or PTA/PTO to obtain additional fruits and vegetables, if needed, to serve a salad featuring the fruits and vegetables from the garden. Have students wash hands, put on plastic gloves to ensure food safety, and then have them rinse fruits and vegetables under running water, tear or cut them into bite-size pieces, and assemble them in large salad bowls. Store the bowls in the cafeteria refrigerator.

You may also wish to ask the school food service to prepare a main course for the dinner or ask families to contribute a main dish for a class potluck with a vegetable salad and fruit dessert from the garden.

STEP 4 **Have students write about their harvest experience in their *Garden Detective Journals.*** Using 3-hole-punch notebook paper, have the students write a reflection entry in their ***Garden Detective Journals*** about what they learned from their gardening experience, from planting to harvesting.

STEP 5 **Prepare for the Sleuths' Mystery Dinner.** Clean all serving surfaces prior to the dinner. Have students and/or cafeteria staff set up the salads, salad dressings and dips, plates, napkins, and cutlery, on one serving table so that family members can help themselves. Allow room for the main course, as well.

STEP 6 **At the Sleuths' Mystery Dinner, welcome families and special guests to the harvest celebration.** Explain that the class members have been garden detectives in training during this unit, learning to solve the mysteries of where fruits and vegetables come from and how they help us to achieve and maintain good health. Describe the fruits and vegetables that the class has been growing, and the activities that they have completed over the past several weeks (i.e., maintaining the garden, monitoring plant growth and weather conditions, researching fruits and vegetables and making fruit and vegetable PSAs, tasting fruits and vegetables, preparing simple recipes, tracking their fruit and vegetable intake at lunch, and preparing for today's celebration). Instruct students to share the contents of their ***Garden Detective Journals*** with their parents/caregivers.

Tell the students they are great garden detectives! They learned about gardening, where food comes from, and the importance of healthy eating habits with plenty of fruits and vegetables. And best of all… they shared their knowledge with their friends, their families, and with their community. They are truly great garden detectives and ambassadors for good health.

STEP 7 **Have each small group present its fruit/vegetable PSAs** (from Lesson 3).

STEP 8 **Distribute class cookbooks.** Instruct each student to give family members or guests his or her cookbook. Review the cookbook contents with today's guests.

STEP 9 **Ask the principal to distribute the Garden Detective Certificate** to each student and to say a few words about the importance of the garden to the school and its learning activities.

STEP 10 **Celebrate the harvest.** Thank the guests for attending the Sleuths' Mystery Dinner, and the students for all their hard work. Invite all guests and students to enjoy the dinner.

Appendix A. Social Cognitive Theory Elements

Social Cognitive Theory Constructs Aligned With Activities

SCT Behavioral Construct	Curriculum Component/Activity
Environment	Call to Action meeting with school principals, school food service director, PTA/PTO president, librarian, and present a letter to the classroom parents with background information about the Garden Curriculum and specific suggestions for what they can do to support the program and the children's health; e.g., • **Cafeteria:** Help with procurement and preparation of fruits and vegetables for recipes and taste testing; point of sale signage; hang student posters; suggest potential menu revisions to include specific vegetables and fruit; include key messages on menu. • **Principal:** Make morning announcements; participation in taste testing and Sleuths' Mystery Dinner. • **PTA President:** Encourage healthy fundraisers; recruit parent volunteers; have an informational meeting on the school's gardening activities; provide funds for gardening activities. • **Classroom Parents:** Serve more fruits and vegetables at home, complete family activities included in family newsletter with their child, and volunteer in the classroom and the garden. • **Librarian:** Create book display on fruits and vegetables and gardening, and help students use library resources for their reports. Guidance for teachers on how to be a catalyst for change in the school environment, and/or how to enlist students in making changes in the school environment Students plant, care for, and harvest a school garden. Students create posters of featured fruits and vegetable to hang in the school and create PSAs. ***Garden Detective News:*** Family Newsletter to be sent home—share information with the family about the curriculum; information about purchasing, storing, and preparing fruits and vegetables for the family; and family activities to be completed as a family. ***Garden Detective News*** family activities designed to increase availability and accessibility of fruits and vegetables at home.

SCT Behavioral Construct	Curriculum Component/Activity
Behavioral Capability	Skills training in gardening • Prepare the soil for planting, provide adequate light. • Care for plants (water, weed). • Determine ripeness. • Measure, record, and graph plant growth. • Weather Station activity • Conditions for Germination activity Classroom teaching: • Nutrient content of fruits and vegetables and the importance for growth and development • Vegetable Subgroups; importance of variety • Where do fruits and vegetables come from?—Trace the Fruit and Vegetable Trail activity and Farmer Brown Does the Math activity Visit the Farmers Market activity Detective Veggie Dice game activity—reinforce Vegetable Subgroup knowledge by playing a simple game. Fruit and Vegetable Flash Card activities—learn nutrition facts, edible part of the plant, Vegetable Subgroups, and interesting facts about the fruits and vegetables featured on the cards. Student Research Project (Investigate like a Super Sleuth—Dig for Clues) and Public Service Announcement (PSA) Healthful food preparation activity of simple recipes in classroom—The Case of the Scrambled Recipe, The Case of the Recipe Thief, The Case of the Incredible Shrinking Ingredient, The Mystery of the Tender Tastebuds, The Mystery of the CSA Basket, The Case of the Frozen Fruit, The Case of the Missing Color • Measuring ingredients for food preparation • Following steps of recipe Fruit and vegetable taste-testing Children develop a fruit and vegetable cookbook: collect and taste test healthy vegetable and fruit recipes with parents at home.

SCT Behavioral Construct	Curriculum Component/Activity
Self-Control	Goal setting activity—My Lunchtime Fruit and Vegetable Goals • Teacher and students set individual fruit and vegetable consumption goals. Self-monitoring activity—Lunchtime Fruit and Vegetable Tracker, Lunchtime Healthy Eating Scorecard, Classroom Healthy Eating Scorecard • Teacher and students tally their own fruit and vegetable intake and compare to their goal. • Students calculate class consumption average for week and assess variety.
Observational Learning	Fruit and vegetable taste-testing activity and lunch consumption • Observe teachers and fellow students tasting and enjoying fruits and vegetables. • Prepare recipes. Home and parental component activities—*Garden Detective News* Family Newsletter • Encourage and observe family consumption of fruits and vegetables. • Encourage recipe preparation by parents and children. Food Demonstration activity of featured fruit or vegetable by local chef—Crack the Cookbook Caper activity • Provide opportunity for students to taste and practice skills. Master Gardener or local farmer gardening activity • Provide opportunity for students to practice skills.

SCT Behavioral Construct	Curriculum Component/Activity
Self-Efficacy	Practicing skills in gardening • Preparing the soil for planting, provide adequate light • Caring for plants (water, weed) • Determining ripeness • Measuring, recording, and graphing plant growth Tasting and food preparation activities of featured fruit or vegetable Student role-play activities—Play a Leading Role • Students role-play ways to increase fruit and vegetable intake when presented with common barriers. • Students role-play situations to enhance their confidence to ask for fruits and vegetables. School Food Service Director Discussion—Analyze the Clues activity • Students share their menu analysis activity with the school food service director. • Students discuss how the school and community can support personal health behaviors. • Students demonstrate how to ask for assistance to enhance health.
Reinforcements	Principal may recognize class in morning announcements for their gardening activities. School food service personnel provide positive comments ("Nice Job!") to students for their posters and efforts in growing vegetables for inclusion in school menus. Students recognize themselves as catalysts for change by sharing with their family what they learned in school about healthy eating. Celebration of the Sleuths' Mystery Dinner—The students, teacher, principal, PTA/PTO, parents, and school food service will work together to showcase the garden fruits and vegetables and what the students have created and learned. Each student receives a *Great Garden Detective Certificate* from the principal.

SCT Behavioral Construct	Curriculum Component/Activity
Outcome Expectancies	Knowledge and attitudes about fruits and vegetables positively changed via gardening activities and learning about where fruits and vegetables come from Motivational messages used to help change attitudes about fruits and vegetables and encourage consumption. Taste-testing and food preparation activities in classroom and school food service increase preferences for fruits and vegetables. Children have fun growing, preparing, and tasting fruits and vegetables with their peers. Student can find fruits and vegetables for meals and snacks at home, i.e., increased availability and accessibility.
Reciprocal Determinism	The dynamic interaction of the curriculum on multiple levels of behavioral influences increases the possibility of positive behavioral change in students. The curriculum components which simultaneously intervene on multiple levels to increase fruit and vegetable consumption include: • Classroom instruction—students learn about the health importance of fruits and vegetables and where fruits and vegetables come from. • Gardening components—students learn to grow their own fruits and vegetables. • School food service environmental changes—the menu features harvested fruits and vegetables and exposes students to more fruits and vegetables. • Parental/family component—family activities increase availability and accessibility of fruits and vegetables at home. The increased exposure to fruits and vegetables increases preferences for fruits and vegetables as well as consumption of fruits and vegetables.

Appendix B. Curriculum Standards by Lesson

Academic Standards Addressed in Lessons

Lesson	Standards
Lesson 1: **Use Your Five Senses**—Main Lesson	**Science** Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.* **English/Language Arts** Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.*
Lesson Extension: How Plants Grow	**Science** Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organism sand environments.*
Lesson 2: **Dig for Dirt**—Main Lesson	**Science** Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.* **English/Language Arts** Standard 7, Reading Informational Text, Grade 3: *Use information gained from illustrations and the words in the text to demonstrate understanding of the text.* Standard 7, Reading Informational Text, Grade 4: *Interpret information presented visually, orally, or quantitatively and explain how the information contributes to an understanding of the text in which it appears.*
Lesson Extensions: Weather Station & Conditions for Germination	**Science** Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.*

Lesson	Standards
Lesson 3: **Investigate Like a Super Sleuth**—Main Lesson	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/ Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 5, Reading Informational Text: *Use text features and search tools to locate information relevant to a given topic efficiently.* Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.* Standard 7, Writing: *Conduct short research projects that build knowledge about a topic.* Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3 or 4 topics and texts, building on others' ideas and expressing their own clearly.* **Health** Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.* Standard 3, Access Information: *Demonstrate the ability to access valid information, products, and services to enhance health.*
Lesson Extension—Learn More about PSAs	**English/Language Arts** Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3 or 4 topics and texts, building on others' ideas and expressing their own clearly.* Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.* **Health** Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.* Standard 3, Access Information: *Demonstrate the ability to access valid information, products, and services to enhance health.*

Lesson	Standards
Lesson 4: **Decipher the Secret Vegetable Code**—Main Lesson	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/ Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 1, Speaking and Listening: E*ngage effectively in a range of collaborative discussions with diverse partners.* **Health** Standard 1, Concepts: C*omprehend concepts related to health promotion and disease prevention to enhance health.* Standard 3, Access Information: *Demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.*
Lesson Extension: *Play a Leading Role*	**English/Language Arts:** Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3 and 4 topics and texts, building on others' ideas and expressing their own clearly.* **Health** Standard 4, Interpersonal Communication: *Demonstrate how to ask for assistance to enhance personal health.* Standard 8, Advocate for Health: *Express opinions and give accurate information about health issues.*

Lesson	Standards
Lesson 5: **Trace the Fruit and Vegetable Trail—**Main Lesson	**English/Language Arts** Standard 1, Reading Informational Text, Grade 3: *Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for answers.* Standard 1, Reading Informational Text, Grade 4: *Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.* **Mathematics** Standard 8, Operations and Algebraic Thinking, Grade 3: *Solve two-step word problems using the four operations.* Standard 3, Operations and Algebraic Thinking, Grade 4: *Solve multistep word problems posed with whole numbers and having whole-number answers using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.*
Lesson Extension: Investigate Sources of Fresh Fruits and Vegetables	**English/Language Arts** Standard 1, Writing: *Write opinion pieces on topics or texts, supporting a point of view with reasons and information.* Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners on grade 3/4 topics and texts, building on others' ideas and expressing their own clearly.* Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.* Speaking 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.* **Health** Standard 8, Advocate for Health: *Advocate for personal, family, and community health.*
Lesson Extension: Visit the Farmers Market	**English/Language Arts** Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.* Standard 3, Speaking and Listening, Grade 3: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.*

Lesson	Standards
Lesson 6: **Unravel Clues in the Cafeteria**—Main Lesson	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.* **Mathematics** Standard 2, Number & Operations in Base Ten, Grade 3: *Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.* Standard 4, Number & Operations in Base Ten, Grade 4: *Fluently add and subtract multi-digit whole numbers using the standard algorithm.* **Health:** Standard 5, Decision Making: *Choose a healthy option when making a decision.* Standard 6, Goal Setting: *Set a personal goal and track progress toward its achievement.*
Lesson Extension *Analyze the Clues*	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 2, Writing: *Write informative/explanatory texts to examine a topic and convey ideas and information clearly.* Standard 1, Speaking and Listening: *Engage effectively in a range of collaborative discussions with diverse partners, building on others' ideas and expressing their own clearly.* Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.* **Health** Standard 2, Analyze Influences: *Describe how the school and community can support personal health practices and behaviors.* Standard 4, Interpersonal Communication: *Demonstrate how to ask for assistance to enhance personal health.*

Lesson	Standards
Lesson Extension: Discover What's in the Foods You Eat	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/ Nutrition): *Develop an understanding of how various foods contribute to health.* **Mathematics** Standard 3. Operations and Algebraic Thinking, Grade 3: *Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.* Standard 2, Operations and Algebraic Thinking, Grade 4: *Multiply or divide to solve word problems involving multiplicative comparisons.* **Health** Standard 1, Concepts: *Comprehend concepts related to health promotion and disease prevention to enhance health.* Standard 5, Decision Making: *Choose a healthy option when making a decision.*
Lesson 7: **Reveal Family Recipe Favorites**—Main Lesson	**English/Language Arts** Standard 1, Language: *Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.* Standard 6, Writing: *With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.* **Health** Standard 8, Advocate for Health: E*ncourage others to make positive health choices.*
Lesson Extension: Crack the Cookbook Caper	**English/Language Arts** Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.* Standard 4, Writing: *Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.* **Health** Standard 3, Access Information: *Demonstrate the ability to access valid information, products.*

Lesson	Standards
Lesson 8: **Uncover Tasty Crimes**— Main Lesson	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/ Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.* Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.* Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.* **Mathematics** Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.* **Health** Standard 1, Concepts: C*omprehend concepts related to health promotion and disease prevention to enhance health.* Standard 7, Practice Health-Enhancing Behaviors: *Practice health-enhancing behaviors and avoid or reduce health risks.*
Lesson Extension: An Acrostic Poem	**English/Language Arts** Standard 3, Language Conventions: *Use knowledge of language and its conventions when writing, speaking, reading, or listening.*

Lesson	Standards
Lesson 9: **Explore a Flavor Mystery—** Main Lesson	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/ Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.* Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.* Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.* Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.* **Mathematics** Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.* **Health** Standard 1, Concepts: C*omprehend concepts related to health promotion and disease prevention to enhance health.* Standard 7, Practice Health-Enhancing Behaviors: *Practice health-enhancing behaviors and avoid or reduce health risks.*
Lesson Extension: *A Shape Poem*	**English/Language Arts** Standard 3, Language Conventions: *Use knowledge of language and its conventions when writing, speaking, reading, or listening.*

Lesson	Standards
Lesson 10: **Discover Berry Sweet Evidence**	**Science** Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 3, Reading Informational Text: *Describe the relationship between a series of steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.* Standard 2, Speaking and Listening: *Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.* Standard 3, Speaking and Listening: *Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.* Standard 4, Speaking and Listening: *Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.* **Mathematics** Standard 2, Measurement and Data: *Measure and estimate liquid volumes and masses of objects using standard units.* **Health** Standard 1, Concepts: C*omprehend concepts related to health promotion and disease prevention to enhance health.* Standard 7, Practice Health-Enhancing Behaviors: P*ractice health-enhancing behaviors and avoid or reduce health risks.*
Lesson 11: **Celebrate the Sleuths' Mystery Dinner**	**Science** Standard C, Life Science: *Develop an understanding of the characteristics of organisms, life cycle of organisms, and organisms and environments.* Standard F, Science in Personal and Social Perspectives (Personal Health/Nutrition): *Develop an understanding of how various foods contribute to health.* **English/Language Arts** Standard 1, Writing: *Write opinion pieces on topics or texts, supporting a point of view with reasons and information.*

Appendix C. Gardening Resources

Types of Gardens

There are three types of gardens that are most adaptable to school gardening needs: in-ground gardens, raised beds, and container gardens. Which one you select is influenced by how much space is available, the quality of the soil on the school property, and your preference.

Here are the basics on each garden type:

An in-ground garden is a plot of land on the school grounds. Depending on its size, its advantage is that it allows you to grow a large quantity of different vegetables and many people can work in the garden simultaneously. The larger the garden plot, the more labor will be required to build and maintain the garden.

The soil available in your in-ground garden is important. First, you will want to test the soil. Soils can be acidic, alkaline, or neutral as measured by the pH level. Vegetables prefer soils with a pH reading of 6.0 to 7.0, which means slightly acidic to neutral. When you find out what the pH level of your soil is, you can determine what kind of amendments, such as fertilizer, that you may need. You also want to test for contaminants, such as lead, to make sure that the food you grow in the garden is safe to eat. You can ask your local Cooperative Extension agent (*http://www.csrees.usda.gov/Extension*) who can provide you with sampling materials for a lab in your State.

Secondly, soil preparation plays an important role in whether the fruits and vegetables you plant in an in-ground garden will thrive. There are three types of soil: sand, clay, and loam. Sandy soil is loose and helps the roots of plants breathe because it lets the air pass through easily. Clay soil absorbs water faster and keeps it inside longer, so a soil composition that has more clay particles in it would be ideal for places that are too hot and the soil dries up quickly. Loam is a mixture of about 40 percent sand, 40 percent silt (quartz particles), and 20 percent clay. You can amend your soil to make it easier for your garden to grow. Again, your Cooperative Extension agent or Master Gardener can help guide you.

A raised bed garden is one built on top of your plot of land. Raised bed gardens can be contained, e.g., with wood boards to keep the bed intact, or they can be more free form, with soil and amendments merely piled several inches high. Raised bed gardens offer several advantages:

- They allow you to compensate for poor soil in the ground by using new soil.
- They warm more quickly in spring, allowing you to work the soil and plant earlier.
- They drain better.
- They may be easier to work because you don't need to bend as low to the ground.

Container gardening is the practice of growing plants in containers instead of planting them in the ground. Containers may include terracotta or plastic pots of different sizes, as well as half-barrels and other large containers. The advantages to growing plants in containers include:

- There is less risk of soil-borne disease because you provide the soil.
- Containers eliminate most weed problems.
- Movable pots allow more control over moisture, sunlight, and temperature.
- Container gardens can fit into most classrooms.

The disadvantage, of course, is that you can grow only a small quantity of fruits and vegetables in a container garden.

If you opt for a container garden, make sure there is a hole in the bottom of the pots to allow water to drain out.

Grow Sheets

Leaf Lettuce

Lettuce is an easy-to-grow cool-season crop for school gardens that can withstand light frost.

When to plant (spring garden): Lettuce can be planted in most parts of the United States up to 8 weeks before the last expected frost. It can be planted every 10 - 14 days for a continuous harvest. Baby lettuce is ready to harvest 3–4 weeks after planting, depending on weather conditions. Increasing day length and high summer temperatures usually causes seed stalk formation (bolting) and bitter flavor.

When to plant (fall garden): Start planting seeds when students return to school and continue until 6 weeks prior to the first expected fall frost. Lettuce seed germinates slowly when soil temperature is above 80° F. Plant in partial shade to speed germination. Floating row covers, i.e., protective coverings of lightweight materials (e.g., on hoops) that shield plants from the elements, will help to shade late summer/early fall lettuce from direct sunlight and high temperatures.

How to plant: Sow 10 to 20 seeds per foot in rows 8 to 12 inches apart. Leaf lettuce also grows very successfully in a wide bed arrangement when seedlings are thinned to 4 to 8 inches on all sides. Sow seeds evenly, cover lightly with fine soil (¼ inch), and firm gently. Mist or lightly water the soil after planting and keep the soil evenly moist but not too wet until seeds germinate.

Thinning seedlings: When plants are a few inches tall, pull out extra plants so that each remaining plant is 4 to 8 inches from its neighbor. The more space between plants, the larger the plant can grow.

Care of plants:

- **Fertilizing:** Medium-heavy feeder. Mix organic matter and fertilizer into the soil prior to planting. If plants are growing poorly, fertilize lightly every 2 weeks after planting with compost tea or a liquid fertilizer.
- **Watering:** Use frequent, light watering to encourage rapid growth, but do not over-water, as this may contribute to root and leaf diseases. Overhead watering should always be done in the morning to give plants time to dry off.
- **Weeding:** Cultivate carefully, as lettuce is shallow-rooted. Cover the soil around lettuce plants with a 1 to 2-inch-thick organic mulch (e.g., sections of newspaper covered with straw or grass clippings) to maintain soil moisture and suppress weeds.
- **Special Directions:** Floating row covers are very useful in promoting rapid growth in the early spring and minimizing slug and other pest feeding. Lettuce production can be also extended later in the fall with floating row covers (garden fabric stretched over hoops) or cold frames; in the Northern States, heavy snowfall could collapse hoop houses or tear fabric. Some lettuce cultivars may overwinter if healthy 3-week-old transplants are set out around October 15. These small plants will establish a root system and be able to withstand cold weather with protection. When spring arrives they will begin active growth and produce early harvests. Some recommended cultivars for overwintering include Black Seeded Simpson, Waldmann's Dark Green, Salad Bowl, Winter Density, Brune D'Hiver, Winter Marvel, and Arctic King.

Harvesting: Leaf lettuce can be cut as soon as plants are 5 to 6 inches tall—usually 21–30 days from seeding depending on weather conditions. Use sharp scissors to cut older, outer leaves which contain high levels of calcium first. You may wish to harvest every other one of the largest plants to accomplish thinning. You can also let the plants grow to full size (45–50 days from planting) and cut the entire plant at ground level.

Cut and Come Again Harvesting: For continuous harvests of quick-and-easy salad greens, sow a raised bed thickly (about 1 inch apart) with a mixture of your favorite salad greens (with maturity dates close to one another). Shear the plants with sharp scissors when they are 6 to 10 inches tall. Take off 2 to 4 inches or cut them to the crown. They will quickly re-grow if watered and fertilized and be ready to cut a second time 2–3 weeks later. Sow a second bed. Turn under the plants when they become overly mature and bitter.

Spinach

Spinach is a hardy annual plant that grows to a height of 8- to 12-inches. There are two types of regular spinach—smooth leaf and savoy leaf. The savoy types have more texture, but soil and sand tend to catch in the crinkles of the leaves.

When to plant (spring garden): Plant seed as soon as the soil can be loosened, raked, and leveled.

When to plant (fall garden): Plant seed as soon as students return to school.

How to plant: Space seeds 3 inches apart in rows, or broadcast seed evenly in wide rows or beds. Cover with soil, barely covering the seeds, and then tamp down to ensure good soil-to-seed contact. Make several small plantings several days apart.

Note: spinach seed is slow to germinate. You can speed the process by soaking seeds in water for 24 hours prior to planting.

Thinning seedlings: Remove or cut every other plant 2–3 weeks after seedlings emerge so that plants are spaced 6 inches apart. Thinnings may be used in salads or sautéed.

Care of plants:

- **Fertilizing:** Spinach is a heavy feeder. Incorporate lots of compost and apply a garden fertilizer (according to label directions) prior to planting.
- **Watering:** Keep plants uniformly supplied with moisture for best performance. Water deeply and regularly during dry periods.
- **Weeding:** Remove all young weed seedlings by hand and mulch along each side of the row to keep weed seeds from germinating.
- **Special Directions:** Use floating row covers to exclude pests such as spinach leaf miners and to speed the growth of the plants. Spinach bolts (sends up a flower stalk) as the days lengthen and temperatures rise. Make a final harvest when the plants send up their flower stalks. Because spinach tolerates frost, it is a good crop for the fall garden and with protection can be harvested into December. In mild areas, spinach sown in late fall will overwinter and make new growth in the spring.

Harvesting: Spinach matures in 28–45 days from planting. Cut full-size leaves and new leaves will regrow from the base.

Carrots

There are a number of types of carrots that will grow well in spring and fall gardens. Some fast-growing varieties produce carrots that are only 2–3 inches long.

When to plant (spring garden): Plant seed as soon as the soil can be loosened, raked, and leveled. Direct seed into loose, well-drained soil that is free from rocks, clods, or debris. Raised beds work well for carrots. Carrot seeds take 1–3 weeks to germinate, so try marking the rows by sprinkling a few radish seeds in with them. (Harvest radishes before they compete with carrots.) Best shape and quality are achieved when carrots are grown between 55–75° F.

When to plant (fall garden): Plant 10–12 weeks before the first frost. This usually requires planting before school starts in the fall.

How to plant: Plant seeds about ½ inch apart in rows that are 12 inches apart or broadcast seed over a bed. Cover seed with ¼ to ½ inch of soil, tamp down with hands to ensure good soil to seed contact, and keep evenly moist.

Thinning seedlings: Thin excess seedlings so that plants are 1–4 inches (depending on the variety and seed packet instructions) apart when plants are about 2 inches tall. Cut seedlings rather than pulling them out to avoid root disturbance.

Care of plants:

- **Fertilizing:** Medium feeder. Fertilize lightly before planting with a garden fertilizer.
- **Watering:** In dry weather, water lightly each day until plants are established. Ease up on watering near time of harvest, as excessive moisture may cause roots to crack.
- **Weeding:** Apply compost or mulch around plants to control weeds. Alternatively, you can hand-pull weeds or use a hand cultivator or hoe to slice weeds at the soil line. Use only shallow cultivation to avoid root disturbance.

Harvesting: For fresh use, harvest carrots before they exceed 1 inch in diameter, or about 65–75 days after planting. Fall-planted carrots can be harvested throughout the winter months if covered with an organic mulch of straw or shredded leaves.

Beets

The beet (Beta vulgaris) is an enchanting vegetable for young gardeners that does double duty: children love the excitement of pulling up the storage roots and the leaves are very good to eat fresh or steamed (and are a good source of calcium and vitamin A). The history of beet cultivation stretches back about 4,000 years. The plant was probably domesticated somewhere along the Mediterranean. Beets are easy to grow and come in a variety of interesting shapes and beautiful colors.

When to plant (spring garden): Plant seed as soon as garden soil can be loosened, raked, and leveled. Your beet plants will grow best in full sun.

When to plant (fall garden): Plant seed in late August–early September, as soon as students return to school.

How to plant: Space seeds 1–2 inches apart in rows, or broadcast seed evenly in wide rows or beds. Cover seeds with about ½-inch of fine soil and then tamp down to ensure good soil to seed contact. Expect germination in 10 to 15 days.

Thinning seedlings: Beet seed is actually a fruit or seed ball with several embryos. Unless you buy seed designated as monogerm seed—one embryo per fruit—you will need to thin the planting when plants are 2 inches in height. Thinnings can be used in salads. Final spacing should be 3 inches in all directions.

Care of plants:

- **Fertilizing:** Beet is a heavy feeder. Incorporate lots of compost and apply a garden fertilizer (according to label directions) prior to planting.
- **Watering:** Keep plants uniformly supplied with moisture for best performance. Water deeply and regularly during dry periods.
- **Weeding:** Remove all young weed seedlings by hand. You can also lay down an organic mulch along each side of the row to keep weed seeds from germinating. When using hand cultivators or hoes to cut or dig out weeds, be careful not to damage enlarging beet roots. Frequent shallow cultivation or weed pulling is important because beets compete poorly with weeds, especially when small.
- **Special directions:** Soaking seed in warm water for 24 hours before planting will aid germination which, in turn, may help prevent soil rot problems in cool, spring soil. Use floating row covers to exclude pests, such as leaf miners, and to speed the growth of the plants.

Harvesting: Begin harvesting 50 to 60 days from the date you plant seed. Pull beet roots when they are 1 to 3 inches in diameter.

Swiss Chard

Swiss chard (Beta vulgaris var. cicla) is a leafy vegetable in the same species as beet. The word Swiss was used to distinguish chard from French spinach varieties by 19th century seed catalog publishers. The first varieties of this popular leafy vegetable have been traced to Sicily. While tender young Swiss chard leaves are eaten raw in salads, older chard leaves and stems are typically cooked or sautéed.

Some cultivars, such as "Lucullus" and "Fordhook Giant," have cream-colored midribs. Some, such as "Ruby Chard" and "Rhubarb Chard," have red mid-ribs. There are some beautiful cultivars, such as "Rainbow Chard," with multi-colored mid-ribs. All parts of the chard plant contain oxalic acid.

Swiss chard leaves grow vigorously throughout the season, and the plants can reach a height of 3 feet.

When to plant (spring garden): Plant seeds in loose, fertile soil in an area that receives full sun. Plant in early spring, 2-3 weeks before the last spring frost date.

When to plant (fall garden): Plant seed as soon as students return to school.

How to plant: Space seeds 2 inches apart in rows, or broadcast seed evenly in wide rows or beds. Cover with about ½ inch of soil and then tamp down to ensure good soil-to-seed-contact.

Thinning seedlings: Similar to beet seed, Swiss chard seed is really a fruit containing several embryos which will need to be thinned. Thin plants to 4 inches apart when they are about 2 inches high. You can replant the thinned seedlings, but you will need to water them twice daily until they establish new root systems. Continue to thin out plants if plants are growing vigorously before the end of the school year. Large plants need 12- to 18-inch spacing.

Care of plants:

- **Fertilizing:** Swiss chard is a heavy feeder. Incorporate lots of compost and apply a garden fertilizer (according to label directions) prior to planting.
- **Watering:** Keep plants uniformly supplied with moisture for best performance. Water deeply and regularly during dry periods.
- **Weeding:** Remove all young weed seedlings by hand and lay down mulch along each side of the row to keep weed seeds from germinating.
- **Special directions:** Soaking seeds in warm water for 24 hours before sowing will aid germination and may help prevent soil rot problems in cool, spring soil. Use floating row covers to exclude pests, such as leaf miners, and to speed the growth of the plants.

Harvesting: Swiss chard can be harvested while the leaves are young and tender or after maturity when they are larger and have slightly tougher stems. Young leaves (smaller than 4 inches) may be eaten fresh in salads. Mature leaves may be chopped and sautéed. The "ribs" may be eaten like celery. It can be harvested until frost. At any point in the growing season, snip leaves 2 inches above crowns to rejuvenate plants. New, succulent leaves soon will be ready to harvest.

Raspberry/Blackberry

These plants are referred to as "brambles." They are perennials—they live from year to year—and most are thorny. Brambles are fairly easy to grow in full-sun locations and can be grown organically. Most brambles produce biennial canes. In year 1, new shoots (primocanes) from the crown (base) grow through the spring and summer. The shoots live through the winter in a dormant state. In year 2, the shoots (now floricanes) produce flowers and fruit and then die.

Fall-bearing raspberry is a type of bramble plant that is probably best suited to a school garden and has a slightly different growth habit. The primocanes produce flowers and fruit from late July until the first frost. The plants can then be cut down to within 6 inches of the ground, making them very manageable through the fall and winter. "Caroline," "Josephine," "Jaclyn," and "Anne" are some recommended cultivars.

Raspberry plants (other than the fall-bearing type) will bear fruit in June and blackberry in July depending on location in the United States. There are a number of erect, thornless blackberry cultivars that take up considerably less space than trailing thornless blackberry cultivars. These include "Navaho," "Apache," and "Arapaho."

Each bramble plant requires a minimum of 10 square feet of growing space. They are difficult to grow in containers because of their growth habit, the need to keep containers watered consistently, and the potential for root injury from very cold winter weather.

When to plant: Early spring. Purchase dormant crowns and plant in a full-sun location in garden soil to which lots of compost has been added.

Care of plants:

- **Fertilizing:** Add a 1-inch layer of compost around plants each year. Sprinkle a garden fertilizer (always follow label instructions) around plants each spring during bloom.
- **Watering:** Regular watering during dry periods is critical. Water around the base of plants, not over the top of plants. Brambles have shallow root systems and will drown in poorly drained soils that remain sopping wet after rainfall.
- **Weeding:** Place organic mulch (e.g., newspapers covered with straw or shredded leaves) around plants and hand-pull weeds when necessary.
- **Special directions:** Drive an 8-foot metal or wooden fence post 2 feet into the ground at either end of the row. Connect the posts with a wire stretched taut between them at a height of 3 feet. Tie the canes to the wire. You will also need to run strong twine down either side of the plants and around the posts to keep the fruit-laden canes upright. Raspberry, in particular, will produce many new shoots that need to be thinned in spring to a 6- to 8-inch spacing. Check out the online resources from regional Extension Services for specific pruning and training information.

Harvesting: When fruits are fully ripe. Bramble fruit do not sweeten after being picked.

Strawberry

Strawberry plants are perennial, i.e., they live from year to year. New shoots emerge from the base (crown) each spring that produce leaves, flowers, and soft, delicious fruits with seeds on the outside! Most varieties are "June-bearing," producing their entire crop over a short period of time. Day-neutral varieties are also available and have some advantages for school gardens:

They bear fruit the first year after planting; plants don't spread out very much; they can be grown in containers; and they produce flowers and fruits throughout the growing season, but mostly in late spring/early summer and late summer/early fall.

When to plant (spring garden): June-bearing or day-neutral varieties: Plant in early spring as soon as soil can be loosened, raked, and leveled. Incorporate compost into the planting area. Order plants ahead of time from a fruit nursery or purchase plants locally.

When to plant (fall garden): Day-neutral varieties: Plant in September, after students have returned to school. Plants will produce flowers and fruit the following spring. Cover plants with mulch or a floating row cover to protect them over the winter.

How to plant: Plant June-bearing varieties 12 inches apart in rows 2 feet apart. Plant day-neutral varieties 6- to 8-inches apart in rows 3 feet apart. If plants arrive too early, wrap the roots in moist shredded newspaper or stand the plants up in a container with water at the bottom. Don't let the roots dry out prior to planting.

Care of plants:

- **Fertilizing:**
  - *June-bearing varieties:* Sprinkle a garden fertilizer (always follow label instructions) around plants each spring during bloom and again in late summer/early fall before next year's buds begin to form.
  - *Day-neutral varieties:* Sprinkle a garden fertilizer (always follow label instructions) around plants once a month while plants are actively growing.
  - *For both types of strawberry plants:* Try to add a 1-inch layer of compost around plants each year and be sure to sweep fertilizer off the foliage.
- **Watering:** Regular watering during dry periods is critical. Water around the base of plants, not over the tops of plants.
- **Weeding:** Plants have a shallow root system and are easily damaged by cultivation close to plants. Place organic mulch (e.g., newspapers covered with straw) around plants and hand-pull weeds when necessary.
- **Special directions:** For June-bearing varieties, pull off all blossoms the first growing season after planting. For day-neutral varieties, remove all "runners" the first season. Runners are the creeping stems with leaves (stolons) that grow out from the mother plant and become daughter plants when they root to the soil.

Harvesting: When fruits are fully ripe. Strawberries do not sweeten after being picked.

Gardening Resources

You can learn more about how to establish and maintain a school garden, as well as how to use it as a classroom resource, from USDA's School Gardens Web site at *http://healthymeals.nal.usda.gov/resource-library/school-and-preschool-gardens*

Appendix D. Curriculum Tools

This appendix contains copies of the curriculum tools used in the lessons. These tools are also available on the CD-ROM. All items except for the journal cover and certificate are also provided separately for use in the classroom. *The Garden Detective News* for parents appear at the end of each lesson and are not found in this appendix. Copies of the newsletters for schools to send home to parents are also available for order through the Team Nutrition Web site at *http://teamnutrition.usda.gov.*

Be a Garden Detective! Bulletin Board

Garden Detective Journal Cover

Detective Veggie Dice

Fruit and Vegetable Flash Cards

Photographs of Mature Plants

Great Garden Detective Certificate

Be a Garden Detective! Bulletin Board

Bulletin Board Instructions

1. Remove bulletin board cutouts from the enclosed envelope. If the cutouts are not available, print the bulletin board cutouts from the CD-ROM onto card stock paper.
2. Assemble the bulletin board cutouts on an existing corkboard or tape on the wall so that they mirror the picture below. Include only the fruits and vegetables that your class is growing.
3. Draw a grid in the white space to create spaces for 3-inch by 5-inch photos or drawings of the plants (see instructions in *Lesson 2, Dig for Dirt*).
4. During Lesson 2, glue the corresponding fruit/vegetable seed next to the name of the fruit/vegetable on the bulletin board background paper and a copy of the seed packet (instruction side) for that fruit/vegetable in the Week 1 column.
5. In Weeks 2 through 10, add a photo or a drawing of the vegetables and fruit each week to show the progress of the plant's growth over time (see instructions in *Lesson 2, Dig for Dirt*).

Be A

Week 1 Week 2

Garde

Week 3 Week 4

n Pete

Week 5 Week 6

ctive!

Week 7 Week 8

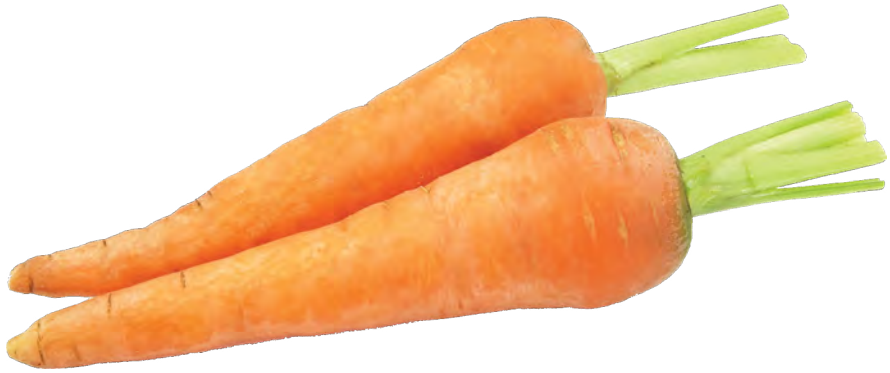
Week 9 Week 10

Lettuce

Swiss Chard

Spinach

Carrots



Beets

Strawberries

Blackberries/ Raspberries

United States Department of Agriculture

Food and Nutrition Service

Detective Veggie Dice

Detective Veggie Dice 1

Directions

1. Cut out the dice along the white line.
2. Fold along each dotted line.
3. Fold each flap and glue to make a three-dimensional die.

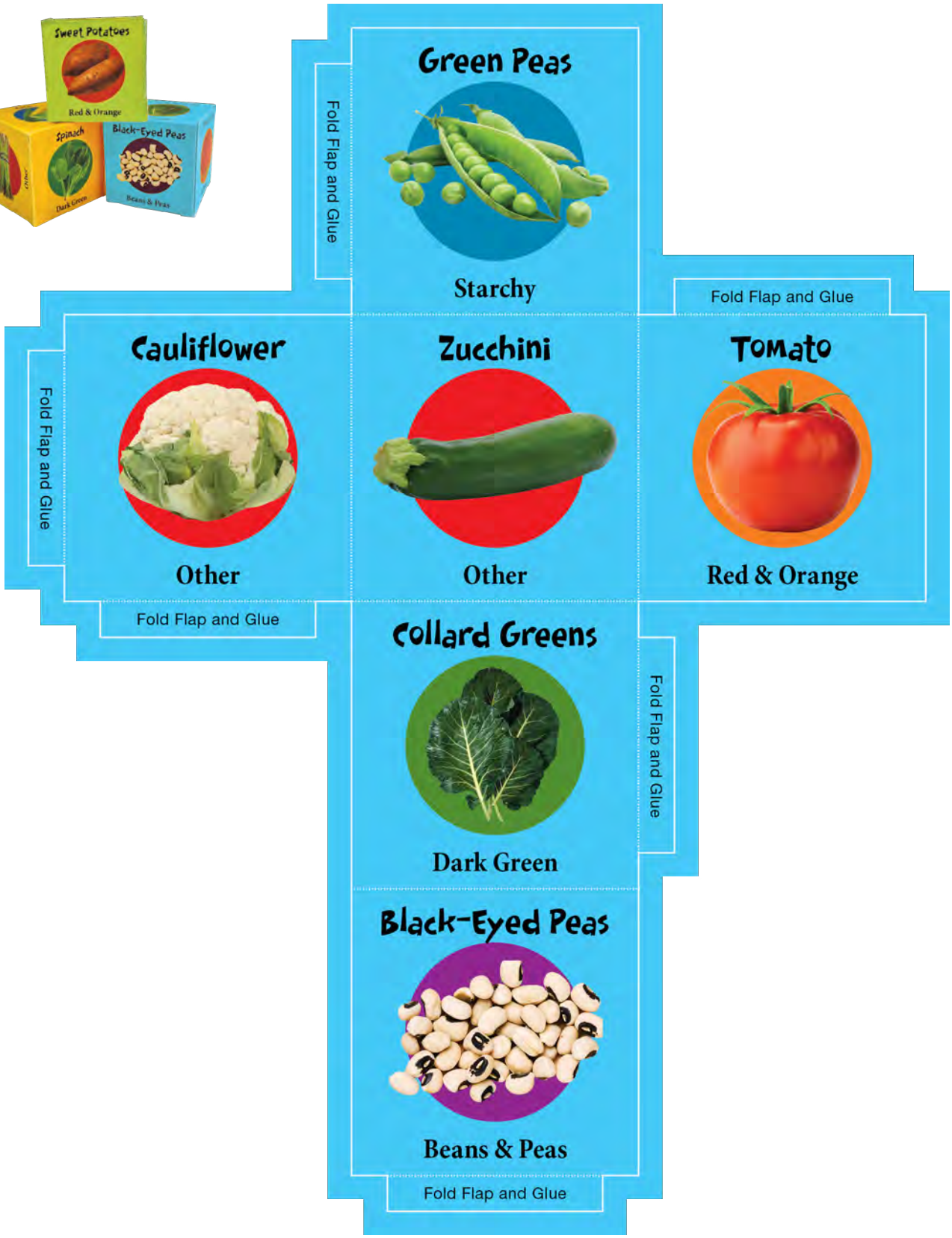
Finished Product Shape

Detective Veggie Dice 2

Directions

1. Cut out the dice along the white line.
2. Fold along each dotted line.
3. Fold each flap and glue to make a three-dimensional die.

Finished Product Shape



Detective Veggie Dice 3

Directions

1. Cut out the dice along the white line.
2. Fold along each dotted line.
3. Fold each flap and glue to make a three-dimensional die.

Finished Product Shape

Fold Flap and Glue

Beet

Other

Fold Flap and Glue

Asparagus

Other

Fold Flap and Glue

Corn

Starchy

Carrot

Red & Orange

Fold Flap and Glue

Spinach

Dark Green

Fold Flap and Glue

Lentils

Beans & Peas

Fold Flap and Glue

Fruit and Vegetable Flash Cards

WANTED

Sweet Potato

WANTED

Spinach

WANTED

Leaf Lettuce

WANTED

Sweet Corn

Spinach

Aliases: None

Description: A dark-green leafy vegetable that can grow up to about 12 inches tall. Its leaves can be smooth, crinkly and curly, or slightly crinkly.

Wanted for: Its delicious leaves that are packed with vitamin A and also contain vitamin C, folate, and the mineral potassium. Fueling up on spinach helps kids eat smart to play hard.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: Spring and fall gardens where temperatures are cool. In some areas of the country, spinach can survive the winter and starts growing as the soil thaws. It is popular in salads, including salads served in the school cafeteria.

Notes: Recipes with "Florentine" in their name contain spinach, such as "Eggs Florentine."

Sweet Potato

Aliases: Sometimes mistaken for a yam (a starchy root that grows in Africa and Asia).

Description: This potato can have a light tan, orange, or purple skin. It can be a pale buff to deep orange color inside.

Wanted for: Its sweet root, which provides the mineral potassium, vitamins A and C, and fiber. Sweet potatoes are a delicious way to help make half your plate fruits and vegetables.

Known Associates: Member of the Red and Orange Vegetable Subgroup.

Last Known Location: Underground—dig it up in August through October. Also hangs out in supermarkets year round.

Notes: One large sweet potato equals 1 cup of veggies.

Sweet Corn

Aliases: Maize

Description: Usually yellow or white kernels attached to a cob.

Wanted for: Its seeds (the corn kernels). Corn helps kids eat smart to play hard.

Known Associates: Member of the Starchy Vegetable Subgroup.

Last Known Location: According to the 2007 Census of Agriculture (2009), sweet corn is harvested on over 28,000 farms and in all 50 States.

Notes: There is one strand of silk for each kernel of corn.

Leaf Lettuce

Aliases: Looseleaf, Oak Leaf, Red Leaf, and Green Leaf

Description: This lettuce does not form a head (like iceberg lettuce). Instead, its leaves attach at the stem. It can be yellow, green, red, reddish-bronze, or purplish.

Wanted for: Its crisp leaves, which give crunch to salads and sandwiches. The leaves provide vitamin A to help keep your eyes and skin healthy.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: In fall and summer gardens, leaf lettuce can go from seed to baby lettuce in just 3 to 4 weeks. Also found in salads everywhere.

Notes: High temperatures can make the leaves turn bitter in the garden.

WANTED

Swiss Chard

WANTED

Blackberry

WANTED

Broccoli

WANTED

Collard Greens

Blackberry

Aliases: Bramble Fruit

Description: A sometimes thorny bramble plant that produces a black or dark purple berry.

Wanted for: Its sweet and juicy fruit, which are loaded with vitamin C and also a good way to add fiber to your meal. Eating blackberries helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: On a bramble plant and ready to be picked between May and September. Oregon is the top grower of blackberries in the United States.

Notes: Blackberries are different from black raspberries! Blackberries have a solid center, while raspberries are hollow when picked.

Swiss Chard

Aliases: Leaf Beet, Seakettle Beet, and Spinach Beet

Description: Green leafy vegetable with white, yellow, or red stalks.

Wanted for: Its tasty leaves and stems that provide vitamins A and C and the mineral potassium. Eating Swiss chard helps kids eat smart to play hard.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: Frequently seen in fall and spring gardens, when the temperature is cool. Also found raw in salads or cooked in soups, on pizza, or served as a vegetable side dish.

Notes: The Bright Lights variety produces a rainbow of stem colors in your garden.

Collard Greens

Aliases: None

Description: A vegetable with smooth green leaves that grow at the top of a short, thick stalk.

Wanted for: Its leaves, which have vitamins A and C, folate, and fiber. Cooked greens are a Southern tradition—and superstitiously thought to bring good luck for the upcoming year when eaten on New Year's Day.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: Growing in gardens in warm weather.

Notes: Collard greens were made South Carolina's State Vegetable in 2011 after a third-grader at Rocky Creek Elementary School wrote to her State senator.

Broccoli

Aliases: The name "broccoli" comes from the Latin word brachium, which means "branch" or "arm."

Description: Its tree-like stalks are topped with umbrella-shaped clusters of purplish green florets.

Wanted for: Its flowers, which are packed with vitamin C and a good way to add fiber to your meal or snack.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: Growing in nearly every State, including Alaska and Hawaii. California is your best bet for "catching" it though; that State grows the most.

Notes: Raw broccoli and low-fat ranch dip is a great snack!

WANTED

Kale

WANTED

Romaine Lettuce

WANTED

Acorn Squash

WANTED

Carrot

Romaine Lettuce

Aliases: Cos Lettuce (in Europe)

Description: This lettuce has a loaf-like shape with darker outer leaves.

Wanted for: Its crisp leaves, which provide your body with vitamin A and folate.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: In Caesar salads everywhere.

Notes: The Romans called it “Roman lettuce,” due to their belief in its health and healing properties.

Kale

Aliases: Borecole

Description: Dinosaur kale has long blue-green leaves with a bumpy texture (like the hide of a dinosaur). Curly kale had ruffled leaves and a dark green color. There are also types of kale with flat leaves.

Wanted for: Its beautiful leaves, packed with vitamins A and C.

Known Associates: Member of the Dark-Green Vegetable Subgroup.

Last Known Location: On plates, as a cooked vegetable side dish and in soups.

Notes: A light frost (freezing temperature) makes kale’s leaves sweeter. Kale can be baked with a little oil to make deliciously crunchy kale chips. Yum!

Carrot

Aliases: None

Description: A root vegetable that is most often seen orange but can be white, red, or purple.

Wanted for: Its crunchy root, packed with vitamin A. Carrots help kids eat smart to play hard.

Known Associates: Member of the Red and Orange Vegetable Subgroup.

Last Known Location: Underground.

Notes: One medium carrot is ½ cup of vegetables. Six baby carrots equals ½ cup of vegetables.

Acorn Squash

Aliases: Winter Squash (one of many types)

Description: An acorn-shaped vegetable. While it can be other colors, the most common is green. Inside, it is a golden yellow.

Wanted for: Its “fruit” part of the plant, which we eat as a vegetable. Acorn squash is a good way to add vitamin C, fiber, and potassium to meals so you can eat smart to play hard.

Known Associates: Member of the Red and Orange Vegetable Subgroup.

Last Known Location: Growing on a vine in fall or winter. Some varieties grow on a bush.

Notes: Squash was given to the settlers by the Native Americans.

WANTED

Tomato

WANTED

Pumpkin

WANTED

Butternut Squash

WANTED

Green Peas

Pumpkin

Aliases: Winter squash (one of several). Its seeds are known as Pepitas.

Description: A round and orange (usually) vegetable attached to a vine by its stem.

Wanted for: Its fruit, which is eaten as a vegetable, and for its seeds. Pumpkin is packed with vitamin A.

Known Associates: Its fruit is a member of the Red and Orange Vegetable Subgroup. Its seeds are a member of the Protein Foods Group.

Last Known Location: Pureed and sold canned in grocery stores. Often eaten in soups and as an ingredient in breads and muffins.

Notes: The pumpkin was one of the foods of the first Thanksgiving.

Tomato

Aliases: Nightshade vegetable (one of several)

Description: Ripe tomatoes are often red, but there are yellow, orange, and purple varieties of tomatoes as well.

Wanted for: Its "fruit" that is eaten as a vegetable. Tomatoes provide vitamins A and C and some potassium. Tomatoes help kids eat smart to play hard.

Known Associates: Member of the Red and Orange Vegetable Subgroup.

Last Known Location: Growing in warm season gardens and on salad bars and on pizza and pasta in the form of tomato sauce in your school cafeteria.

Green Peas

Aliases: Pod Peas, English Peas, Shelling Peas

Description: Grass-colored green pods holding small round peas.

Wanted for: Its seeds (the peas!), which provide vitamins A and C, fiber, and some potassium. Green peas are a delicious way to help make half your plate fruits and vegetables.

Known Associates: Member of the Starchy Vegetable Subgroup.

Last Known Location: One of the first vegetables growing in gardens in early spring.

Notes: Thomas Jefferson's favorite vegetable.

Butternut Squash

Aliases: Winter squash (one of several)

Description: A large cylinder-shaped squash that is wider and rounder at the bottom. On the outside, its skin is camel-colored. Inside, the flesh is orange.

Wanted for: Its "fruit" part of the plant, which we eat as a vegetable. Provides vitamins A and C, fiber, and some potassium. Butternut squash is a great way to add color to your plate.

Known Associates: Member of the Red and Orange Vegetable Subgroup.

Last Known Location: Seed is planted in the spring and squash is harvested in the fall.

WANTED

Potato

WANTED

Asparagus

WANTED

Cabbage

WANTED

Beets

Asparagus

Aliases: None

Description: The most common variety in the United States has green stalks with purplish tips.

Wanted for: Its stem, for vitamins A and C and folate.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in California, Michigan, and Washington between January and June.

Notes: Europeans prefer white asparagus, which is grown underground to prevent it from turning green.

Potato

Aliases: Spud

Description: Types include the Russet (baking potato), Red-skin New, Long White Fingerling, and Blue/Purple-skinned Yellow Flesh.

Wanted for: Its root, which provides vitamin C and potassium.

Known Associates: Member of the Starchy Vegetable Subgroup.

Last Known Location: Underground, especially in Idaho, Washington, Wisconsin, Colorado, and Oregon.

Notes: Kids eat more potatoes than any other veggie. This is mostly in the form of French Fries. To eat smart to play hard, make sure to eat a variety of vegetables during the week.

Beets

Aliases: Beetroot

Description: The root can be red or golden.

Wanted for: Its root and leaves. Beets are a good source of folate for your growing body.

Known Associates: Member of the Other Vegetables Subgroup.

Last Known Location: Roasted or pickled on salad bars. Can often be found on hamburgers in Australia.

Notes: Eating beets can cause urine to become red or pink in color. This condition is called “beeturia.” It is not harmful.

Cabbage

Aliases: None

Description: Red and Green cabbages form tight compact heads of leaves.

Wanted for: Its leaves, which provide vitamin C. Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Being processed into coleslaw.

Notes: In the United States, cabbage is most in demand in March because of preparation of traditional corned beef and cabbage meals for St. Patrick’s Day.

WANTED

Cauliflower

WANTED

Celery

WANTED

Vidalia Onion

WANTED

Artichoke

Celery

Aliases: None

Description: Light green stalks growing parallel and topped with leaves.

Wanted for: Its crunchy stems, which are eaten raw or sliced and cooked. Its root can also be eaten as a vegetable. The leaves and seeds can also be used as a flavoring/garnish.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in California and Michigan.

Cauliflower

Aliases: Cabbage Flower

Description: A compact head of white flower buds surrounded by green leaves.

Wanted for: Its flowers, which are packed with vitamin C.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in California—88 percent of all fresh cauliflower grown in the United States comes this State.

Notes: The green leaves that surround the head keep the flower buds from sunlight. The lack of sunlight prevents chlorophyll from developing. The result is the white color.

Artichoke

Aliases: Green Globe, Desert Globe, Big Heart, and Imperial Star

Description: A green bud that has many triangle-shaped scales.

Wanted for: Its flower bud, which is filled with vitamin C and fiber.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in California.

Notes: Taste best when prepared and eaten soon after harvest.

Vidalia Onion

Aliases: Sweet Onion

Description: A light-yellow onion.

Wanted for: Its sweet root, which provides vitamin C.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in Vidalia, Georgia, between April and June.

Notes: Georgia's official State vegetable since 1990.

WANTED

Parsnips

WANTED

Green
Bell Peppers

WANTED

Okra

WANTED

Brussels
Sprouts

Green Bell Peppers

Description: A large, green bell-shaped pepper.

Wanted for: Its crunchy fruit, which is eaten as a vegetable and is packed with vitamin C. Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in California and Florida; those States grow the most bell peppers.

Notes: Red bell peppers are actually green bell peppers that were allowed to ripen on the plant.

Parsnips

Aliases: None

Description: Looks like an off-white or light-yellow carrot.

Wanted For: Its root, which contains vitamin C and fiber.

Known Associates: Member of the Other Vegetable Subgroup.

Last Known Location: Growing in the winter in near freezing temperatures, which makes it sweeter.

Notes: Parsnips are eaten cooked. They are usually roasted, cooked and mashed, or eaten in soups and stews.

Brussels Sprouts

Aliases: None

Description: Look like tiny heads of cabbage.

Wanted for: Its leaves, which are high in vitamin C. Vitamin C helps heal cuts and wounds and keeps teeth and gums healthy.

Known Associates: Member of the Other Vegetables Subgroup.

Last Known Location: Growing in California.

Notes: Brussels Sprouts were named after the capital of Belgium where it is thought that they were first cultivated.

Okra

Aliases: Bindi, Bhindi, Lady's Finger, and Gumbo

Description: A fuzzy, green-colored, and ribbed pod that is approximately 2-7 inches in length. It has tiny seeds inside and a slimy or sticky texture.

Wanted For: Its fruit, which is eaten as a vegetable and is a great source of vitamin C. Vitamin C helps your body heal cuts and wound and to have healthy teeth and gums.

Known Associates: Member of the Other Vegetables Subgroup.

Last Known Location: In soups and stews, where okra's sticky insides help thicken the broth.

WANTED

Cucumber

WANTED

Apple

WANTED

Strawberry

WANTED

Raspberry

Apple

Aliases: Golden Delicious, Red Delicious, Fuji, Granny Smith, and many others.

Description: Round and found in all shades of red, green, and yellow. May range in size from a little bigger than a cherry to as large as a grapefruit.

Wanted for: Its sweet and crunchy fruit, which provides fiber and some vitamin C and the mineral potassium. Eating apples helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Hanging on a branch of an apple tree. Served whole or sliced in many school cafeterias. These are a kid favorite.

Notes: Americans eat about 120 apples each in a year.

Cucumber

Aliases: Cukes

Description: Long dark-green vegetable (actually the fruit of the plant) that grows on a vine.

Wanted for: Its cool fruit, which is eaten as a vegetable.

Known Associates: Member of the Other Vegetables Subgroup.

Last Known Location: On vegetable trays and salad bars everywhere.

Notes: The inner temperature of a cucumber can be up to 20 degrees cooler than the outside air. Hence the phrase, "Cool as a cucumber."

Raspberry

Aliases: Bramble Fruit

Description: Raspberries come in four colors: red, purple, black, and gold (yellow).

Wanted for: Its sweet and juicy fruit, which provide vitamin C and fiber. Eating raspberries helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Washington State grows the most red raspberries.

Notes: The small hairs of raspberries are called stiles.

Strawberry

Aliases: Berries

Description: Bright red, heart-shaped fruit with seeds on the outside and a green cap.

Wanted for: Its tender, sweet fruit, which are packed with vitamin C. Eating strawberries helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Growing on a plant in a garden, strawberry pot, or on a farm between April and July. California grows 83 percent of the strawberries in the United States.

Notes: Every strawberry, no matter the size, has about 200 seeds.

WANTED

Orange

WANTED

Peach

WANTED

Cantaloupe

WANTED

Pear

Peach

Aliases: Tree Fruit and Stone Fruit

Description: Round and about the size of a baseball. Skin color is yellow or cream, sometimes blushed with red. The flesh inside is usually yellow, but may also be white. There is a large pit in the center that is not eaten.

Wanted for: Its sweet fruit, which provides vitamin C and some vitamin A, fiber, and potassium. Eating peaches helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Hanging out on the branches of a peach tree in California and the Southern States.

Notes: Georgia is known as the “Peach State.”

Orange

Aliases: Navel, Valencia, Mandarin, and Chinese Apple

Description: Round and yellow-orange in color. Inside, there are juice segments with seeds.

Wanted for: Its juicy fruit, which are loaded with vitamin C. Also provides fiber and folate. Eating oranges helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Hanging out in orchards on the branches of an orange tree.

Notes: Orange trees started in Southeast Asia. Travelers brought sweet orange seed and seedlings with them to the New World. By 1820, there were orange groves in Florida.

Pear

Aliases: Anjou, Bartlett, Bosc, Comice, Forelly, and Seckel, among others

Description: Seen in a variety of shapes, sizes and colors. Skin colors include green, golden yellow, and red.

Wanted for: Its sweet and juicy fruit, which provides fiber and vitamin C. Eating pears helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Hanging out on the branch of a pear tree in a sunny garden or orchard. Washington,Oregon and California produce 97 percent of the pears in the United States.

Notes: About 40 percent of pears in the United States are eaten as canned pears. Canned pears packed in 100 percent juice or water have less sugar than those canned in heavy syrup.

Cantaloupe

Aliases: Muskmelon

Description: Round with a light-brown rind (thick skin) and orange flesh with seeds in the center.

Wanted for: Its very sweet fruit, which is loaded with vitamin A and vitamin C. Eating cantaloupe helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Growing on vines in gardens and on farms.

Notes: Melon seeds were transported to North America by Christopher Columbus and eventually Spanish explorers grew them in California.

WANTED

Grapes

WANTED

Watermelon

WANTED

Navy Beans

WANTED

Lentils

Watermelon

Aliases: Allsweet, Ice-Box, Seedless, and Yellow Flesh

Description: Green and round or oblong, weighing between 5 and 30 pounds. Inside, most have red flesh but there are orange- and yellow-fleshed varieties. Some have seeds and some are seedless.

Wanted for: Its sweet and juicy fruit, which is loaded with vitamins C and A. Eating watermelon helps kids eat smart to play hard.

Known Associates: Member of the Fruit Group.

Last Known Location: Lying around on the ground attached to a vine in large gardens where it is warm for most of the year. Georgia, Florida, Texas, California, and Arizona are the top producers of watermelon.

Notes: Watermelon originated in Africa over 5,000 years ago. Americans eat about 17 pounds of watermelon a year.

Grapes

Aliases: Thompson, Flame, Ruby, Perlette and Tokay

Description: Small, round, seen in many colors: black, blue, blue-black, golden, red, green, and purple.

Wanted for: Its sweet and juicy fruit. Power up with grapes at snacks.

Known Associates: Member of the Fruit Group.

Last Known Location: In orchards, growing in clusters on vines. Many grapes are grown in Nebraska, but most grapes eaten in the United Sates are grown in California.

Notes: Grapes are about 80 percent water, making them a delicious low-calorie snack or dessert. Raisins are dried grapes and contain only about 15 percent water.

Lentils

Aliases: None

Description: Can appear in a variety of colors, such as yellow, red-orange, green, brown, and black. The lentil is very small and hard to spot sometimes; it is about as wide as a pencil eraser, but flatter than a pancake!

Wanted for: Its seeds, which contain fiber, protein, and folate. Lentils help kids to eat smart to play hard.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: In an Indian recipe known as Dal.

Navy Beans

Aliases: Pea Beans and Haricot Beans

Description: A small white bean, sold dried or canned.

Wanted for: Its seed, which is full of fiber, folate, and protein. Power up with beans at lunch or dinner.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: North Dakota grew the most in the United States in 2009. Often a key ingredient in baked beans—check your school cafeteria.

Notes: Navy beans are a key ingredient in Senate Bean Soup, which is sold in the U.S. Senate restaurant every day.

WANTED

Black-eyed Peas

WANTED

Black Beans

WANTED

Pinto Beans

WANTED

Garbanzo Beans

Black Beans

Aliases: Turtle Beans

Description: When dried, they are small and shiny. When fresh, they can be found growing on bushes, hiding out inside pods (like a pea pod).

Wanted for: Its seeds, which contain fiber, protein, and folate. Power up with black beans in soups and quesadillas.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: Used in the national dish of Brazil, called "feijoada," which is a stew made with beans, beef, and pork. They are also very popular in Cuba, served in Black Bean Soup.

Black-eyed Peas

Aliases: Cow Peas

Description: Black-eyed peas grow in a pod, just like green peas. The black "eye" (or spot) is where the tan pea attaches to the pod.

Wanted for: Its seed, which is packed with fiber, protein, and folate. Black-eyed peas are a tasty vegetable to try.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: Black-eyed peas like warm weather to grow, so they avoid chilly areas that can frost at night.

Notes: Some believe that if you eat black-eyed peas on New Year's Day, you will have good luck all year. Whether or not that's true, it is certainly a healthy way to try your luck!

Garbanzo Beans

Aliases: Chick Peas, Falcon Faces (in ancient Egypt)

Description: Garbanzos are rounder than most other beans. They are a very light tan color. They grow in a pod, on plants that can grow 1-2 feet high. Each pod usually contains two or three garbanzos inside.

Wanted for: Its seeds, which contain fiber, protein, and folate. Eating garbanzo beans helps kids eat smart to play hard.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: Mashed up with garlic, olive oil, lemon juice, and spices to make hummus. Hummus is used as a dip for vegetables and bread, or can also be spread on a sandwich.

Pinto Beans

Aliases: Mottled Beans

Description: Named after the "pinto" horse, it is a light reddish tan in color, with darker speckles all over.

Wanted for: Its seeds, which contain fiber, protein, and folate. Pinto beans are a delicious way to help make half your plate fruits and vegetables.

Known Associates: Member of the Beans & Peas Subgroup and the Protein Group.

Last Known Location: Mashed up as refried beans or as an ingredient in burritos.

Photographs of Mature Plants

Swiss Chard

Blackberries

Carrots

Beets

Leaf Lettuce

Strawberries

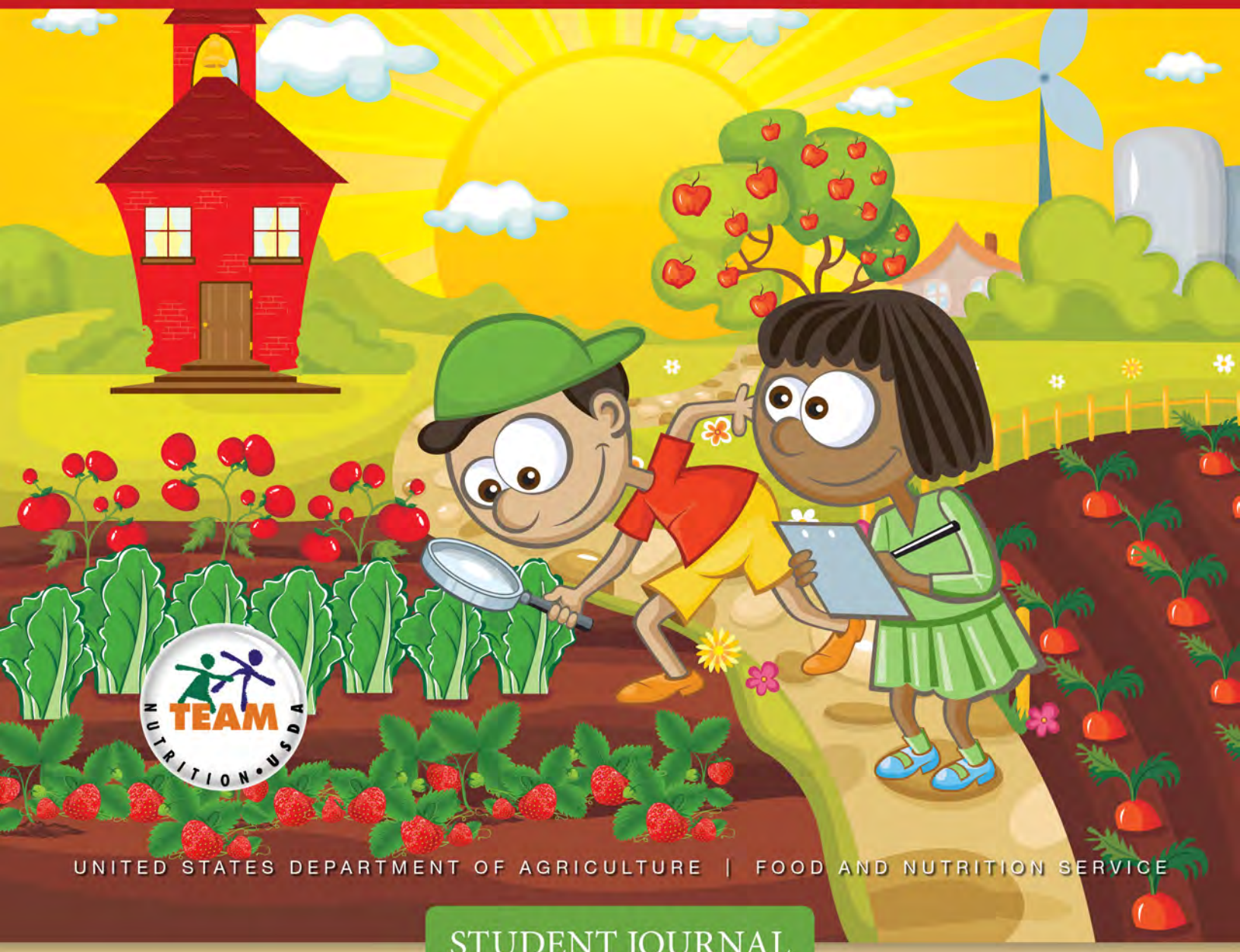
Raspberries

Spinach

Garden Detective Journal Cover

The Great Garden Detective Adventure

A Standards-based Gardening Nutrition Curriculum for Grades 3 and 4



UNITED STATES DEPARTMENT OF AGRICULTURE | FOOD AND NUTRITION SERVICE

STUDENT JOURNAL

NAME

Recipe Title:

Student Name

◯ Main Dish ◯ Salad ◯ Side Dish ◯ Snack ◯ Dessert

Ingredients and amounts

Amount Ingredient

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Yield _____

Portion size _____

Describe your recipe in 2-3 sentences

Preparation Steps

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

http://www.fns.usda.gov/tn/great-garden-detective

Discover what fruits and vegetables are sweetest, crunchiest, and juiciest through a series of investigations and fun experiences connecting the school garden to the classroom, school cafeteria, and home. This eleven-lesson curriculum for 3rd and 4th grades includes bulletin board materials, veggie dice, fruit and vegetable flash cards, and ten issues of Garden Detective News for parents/caregivers.

Print Availability: Elementary schools participating in the National School Lunch Program or other Child Nutrition program may request a free print copy of the curriculum using the Resource Order Form. The curriculum comes with 35 of each of the 10 parent newsletters. Additional newsletters may also be requested.

File Upload:

- Cover, Acknowledgments, and Table of Contents (1.91 MB)
- Getting Started with The Great Garden Detective Adventure (1.78 MB)
- Lesson 1: Use Your Five Senses Lesson (5.2 MB)
- Lesson 2: Dig for Dirt (5.02 MB)
- Lesson 3: Investigate Like a Super Sleuth (3.97 MB)
- Lesson 4: Decipher the Secret Vegetable Code (3.33 MB)
- Lesson 5: Trace the Fruit and Vegetable Trail (3.86 MB)
- Lesson 6: Unravel Clues in the Cafeteria (8.62 MB)
- Lesson 7: Reveal Family Recipe Favorites (4.46 MB)
- Lesson 8: Uncover Tasty (6.5 MB)
- Lesson 9: Explore a Flavor Mystery (5.89 MB)
- Lesson 10: Discover Berry Sweet Evidence (8.12 MB)
- Lesson 11: Celebrate the Sleuths' Mystery Dinner (2.48 MB)
- Garden Detective Recipe Template (303.67 KB)
- Appendix A. Social Cognitive Theory Elements (122.79 KB)
- Appendix B. Curriculum Standards by Lesson (136.77 KB)
- Appendix C. Gardening Resources (164.84 KB)
- Appendix D. Curriculum Tools (78.39 KB)
- Be a Garden Detective! Bulletin Board Instructions (136.74 KB)
- Be a Garden Detective! Bulletin Board Pieces (1.2 MB)
- Garden Detective Journal Cover (221.9 KB)
- Detective Veggie Dice (335.99 KB)
- Fruit and Vegetable Flash Cards (2.8 MB)
- Photographs of Mature Plants (1.77 MB)
- Great Garden Detective Certificate (138.04 KB)
- Garden Detective News: Issue 1 (589.76 KB)
- Garden Detective News: Issue 2 (889.37 KB)
- Garden Detective News: Issue 3 (596.91 KB)
- Garden Detective News: Issue 4 (649.88 KB)
- Garden Detective News: Issue 5 (488.44 KB)
- Garden Detective News: Issue 6 (2.61 MB)
- Garden Detective News: Issue 7 (1.61 MB)
- Garden Detective News: Issue 8 (977.29 KB)
- Garden Detective News: Issue 9 (1.05 MB)
- Garden Detective News: Issue 10 (1.39 MB)

For parent newsletters like the sample provided, go to the website at the top of page and look for these.

Garden Detective News

Grow Healthy Habits With Your Children

In both the class garden and at your table, your child can learn about fruits and vegetables. This month, give them chances to try Swiss chard, carrots, and spinach.

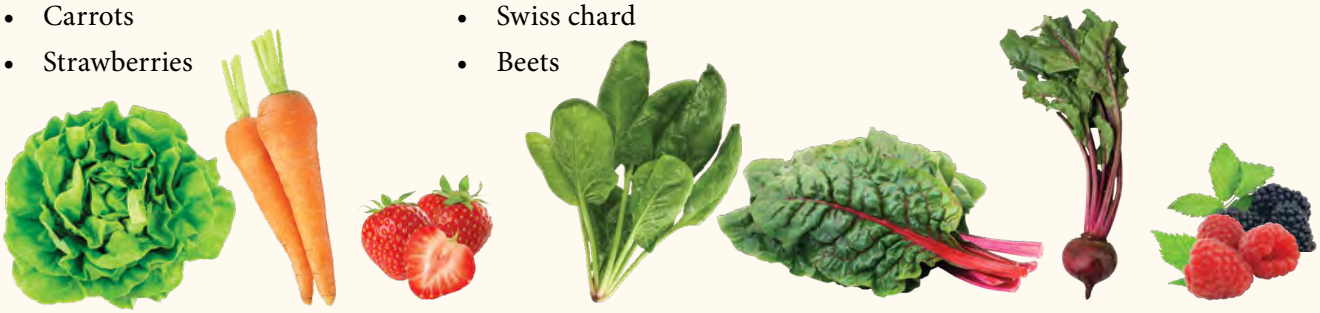
USDA United States Department of Agriculture

Dear Parents:

Our class is about to embark on a *Great Garden Detective Adventure!* Over the next couple of months, we will be exploring fruits and vegetables through gardening, classroom, and school cafeteria activities. By the end of the unit, your child will have used math, science, and English/language arts skills to learn more about where fruits and vegetables come from and why they are good for us.

This week, we tasted some fruits and vegetables that we may grow in our garden. Ask your child to tell you how these fruits and vegetables taste:

- Leaf lettuces
- Carrots
- Strawberries
- Spinach
- Swiss chard
- Beets
- Raspberries or blackberries



Here are some ways you can help make our garden adventure a success:

- Send two large T-shirts or smocks to school by _____ to cover your child's clothes while working in the garden and while cooking.
- Volunteer to help us plant and maintain the garden (return the attached form).
- Volunteer to help in the classroom with our cooking activities (return the form).
- Volunteer to help us put a class cookbook together (return the form).
- Contribute a favorite family recipe featuring fruits or vegetables to our class cookbook (more details to follow).
- Come to school on _____ when we celebrate our garden harvest with a Sleuths' Mystery Dinner (more details to follow).
- Read the *Garden Detective News* when it comes home with your child, and help him or her complete the activities.
- Try serving some of the fruits and vegetables we are learning about at home. Frequent issues of the *Garden Detective News* will share ideas.

We look forward to sharing our adventures with you in the weeks to come!

Sincerely,

WANTED

Parent Volunteer Form

Yes, I'd like to help with The Great Garden Detective Adventure. I can:

_____ **Help plant the garden on** _____

_____ **Help out in the garden occasionally in the next 10 weeks (e.g., watering, pulling weeds). My best time is:** _____ **(day/times)**

_____ **Help out in class for cooking activities**

_____ **Help with the class cookbook**

The best time to reach me is _____

By _____**(telephone) or** _____**(email)**

Signed: _____

Print name: _____

Student: _____

Thank you! Please return this form to _____

by_____.

Family Activity 1

Cook Together This Week

Try making a recipe with fruits or vegetables with your child this week. Then help your child answer the following questions:

Name of recipe: _____

Where did this recipe come from? _____

_____

_____

What fruits and/or vegetables were in the recipe? _____

_____

_____

What part of the plant did these fruits and/or vegetables come from?

Fruit/vegetable	Part of Plant?
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Write 1-2 sentences about how the recipe was prepared and what you thought about it. For example: *I chopped up green peppers and carrots and added them to the tomato sauce. We put it on the spaghetti and it was delicious.*

_____

_____

_____


School Name
The Great Garden Detective Award
presented to
For excellence in gardening and eating more fruits and vegetables
by
Principal
Teacher