Healthy Gardens, Healthy Youth
Educational Toolkit Framework

The Educational Toolkit was developed to provide 19-20 lessons over an 18-month period for interventions schools in Healthy Gardens, Healthy Youth, the People’s Garden School Garden Pilot Project Research Grant (USDA CN-CGP-11-0047). The lessons began in the early spring 2012, and extended through the next school year, ending in Spring 2013.

A team of extension specialists in nutrition, horticulture and youth development reviewed 17 (see references) curricula, numerous garden implementation resources and other materials to select appropriate resources for this project. Criteria used to select curricula for consideration included 1) experiential learning 2) age-appropriate nutrition, food, and gardening content and skills 3) research-based content and standards alignment, 4) Science, Technology, Engineering and Math (STEM) area focus, 5) support for the school garden.

Lessons were selected from ten curricula (detailed below) to meet the necessary topic areas for the two years. Permission from the original authors was sought for reproduction in the Educational Toolkit. Additional activities directly related to the garden were developed to enhance the lesson. Since each state has slightly different educational standards, a compendium of content standards and benchmarks compiled by Mid-continent Research for Education and Learning, a private nonprofit corporation was used as standards. During this grant period, the Common Core Standards were introduced and the USDA introduced MyPlate to replace MyPyramid. Some lessons may contain references to MyPyramid.

The Toolkit provided 10-11 lessons to be taught in 2012 between February and the end of the school year in weekly sessions, and nine lessons to be taught through the month from September 2012 – May/June 2013. Because classes in the Arkansas and Washington could begin gardening earlier in the year than Iowa and New York, it was suggested that they start in 2012 with the garden planning and planting lessons, and then cover the first few lessons later in the spring.

The Toolkit included information and safety guidelines to create, maintain and harvest gardens; store, use and sample garden produce; take the garden through the summer; build community capacity; and sustain and grow the program. In addition it provided tasting and snack suggestions and information on the use of produce in the school cafeterias.

All Toolkit resources were available on a password-protected website. Lessons were introduced through webinars posted to the secure website and videos on our YouTube channel https://www.youtube.com/user/ExtSchoolGarden. Other supplementary materials, such as donated books, were delivered to the schools by the local Extension Educator.
Lesson Sequence

Spring 2012, February – May/June (depended on school end dates)

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<td>My Lunch Came from Soil</td>
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<td>2</td>
<td>Rock to Ice Cream: Keep Soil Alive</td>
<td>Get the Scoop on Soil &amp; Composting</td>
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<td>3</td>
<td>Our Food Garden Plan</td>
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<td>8</td>
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<td>11</td>
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<td>Eating from the Garden</td>
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Fall 2012 – Spring 2013

For Grade 2 students who went into Grade 3

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<td>Harvest</td>
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<td>October</td>
<td>Post-Harvest, Garden Clean-up</td>
<td>Post-Harvest, Garden Clean-up</td>
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<td>November</td>
<td>Apples and Squash</td>
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<td>December</td>
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<td>January</td>
<td>My Food Garden Plan</td>
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<td>Winter Vegetables and Mulch</td>
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<td>March</td>
<td>Planting Our Garden</td>
<td>Planting Our Garden</td>
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<td>April</td>
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<td>Food for Plants and People</td>
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<td>May/June</td>
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For Grade 4/5 students who went into Grade 5/6
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<tr>
<td>Lesson 1: How does food relate to plants? Source: “Plant Parts Become Me” from <em>Growing In The Garden</em>, Iowa State University Extension and Outreach</td>
<td>Identify the basic and edible parts of plants and their functions. Make connections between plants and food choices.</td>
<td>Songs, actions, and fruit and vegetable identification and tasting</td>
<td>Classroom activity: students start out as seeds curled up in the soil waiting for water so that they can sprout roots, stems, leaves, and flowers.</td>
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<tr>
<td>Lesson 2: How does healthy soil relate to food? Source: “Rocks to Ice Cream” and “Keeping Soil Alive” from <em>Growing In The Garden</em>, Iowa State University Extension and Outreach</td>
<td>Discover and describe how most of our food starts with soil and how soil can remain healthy. Explain why the decomposition cycle and healthy soil are important for plants, animals and people.</td>
<td>Songs, soil composition activity, worm farm observation, making ice cream in a ziplock bag and predicting outcomes Ice cream tasting</td>
<td>Classroom activity: students standing in a circle and moving based on their part in the cycle; skit or puppet show.</td>
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<tr>
<td>Lesson 3: How do we make a garden plan? “Our Food Garden Plan” from <em>Growing In The Garden: Local Foods And Healthy Living</em>, Iowa State University Extension and Outreach</td>
<td>Identify and select locally grown fruits and vegetables to plant, grow, harvest and eat. Use a variety of mathematics and science concepts and skills to create local garden plans and calendars.</td>
<td>Develop a garden plan; Square Foot Gardening. Rank fruits/veggies to plant. Determine a calendar for planting. Fruit/veggie tasting</td>
<td>Classroom activity: students develop their garden on the floor, moving around to “plant” different items in the masking-taped floor area.</td>
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<tr>
<td>Lesson 4: How do we make a garden calendar? “Seasons Through the Year” from <em>Food, Land &amp; People: Resources For Learning</em>, Food Land &amp; People</td>
<td>Identify the seasons in cycle order and describe at least three things that occur in each season in gardens or fields, in their own community, and in an urban area.</td>
<td>Classify seasonal activities, make a seasonal mural, create books, discuss seasonal activities and growing, seasonal fruit/veggie tasting.</td>
<td>Classroom activity: students stand to divide into lines by seasons.</td>
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</tbody>
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Book: *Diary of a Worm* by Doreen Cronin

Book: *The Vegetables We Eat* by Gail Gibbons

Book: *The Reasons for Seasons* by Gail Gibbons
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| **Lesson 5:** Where do seeds come from?  
“Sunflower House” and “Germination” from *Growing In The Garden*, Iowa State University Extension and Outreach | Describe the seed to seed cycle. Understand how one seed can produce many seeds. Understand how different things affect seed germination. | Sunflower life cycle, seed germination experiment and record, diagram seed, seed tasting | Classroom activity: students move to collect activity parts; do stomp, chant and clap activity. |
| **Lesson 6:** How do we plant a garden?  
Source: “Planting” and “Nutrition Super Heroes” from *Seed To Salad*, Cornell University Garden-Based Learning and Ithaca Children’s Garden | Identify and use special tools and techniques to mark and plant a garden. Identify garden crops and match them to their nutritional contributions for good health. | Planting, Garden Rules, Garden Tool Safety, taste a healthy snack | Plant the garden; participate in the Garden Tool Safety game or an obstacle course game based on nutrients. |
| **Lesson 7:** What do plants need to grow?  
Source: “Seeds and Sprouts” from *Got Veggies?*, Wisconsin Department of Health Services – Nutrition, Physical Activity and Obesity Program with support from University of Wisconsin Extension | Identify what plants and people need to live and grow (sun, soil, water, and air). Identify and make a healthy food from a garden. | Role play, observation/recording plant growth, journaling, snack preparation | Students use simple props and role play how plants need sun, soil, water, and air in order to grow.  
Students water the garden. |
| **Lesson 8:** How do we help the plants to grow in the garden?  
Source: “Salad Garden” from *Growing In The Garden*, Iowa State University Extension | Understand and apply strategies to water and maintain a garden. Describe garden crops. Determine and organize garden maintenance tasks. | Watering the garden Know Your Crops game, vegetable tasting | Students water and weed in the garden. |
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<tr>
<td>and Outreach</td>
<td>Learn about, prepare and eat a garden crop.</td>
<td>Read a book, write a story, do counting exercise. Participate in a melodrama, vegetable tasting.</td>
<td>Students become plant and animal actors as they perform a garden melodrama.</td>
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<td>What do insects and</td>
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<td>Students do Garden Patrol Charades and go into the garden.</td>
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<td>other animals do</td>
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<td>from *GROWING IN THE</td>
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<td>How do we manage</td>
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<td>pests in the garden?</td>
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<td>“Garden Patrol” from</td>
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<tr>
<td>Lesson 11:</td>
<td>Apply harvesting, cleaning, and salad mixing strategies for salad crops. Plan and implement a Salad Party.</td>
<td>Harvest in the garden, plan a party.</td>
<td>Students work in the garden.</td>
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<tr>
<td>When and how do we</td>
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<td>harvest our salad</td>
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<td>garden? How do we</td>
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<td>clean and prepare</td>
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<td>salads? How do we plan</td>
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<td>and have a Salad Party?</td>
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<td>“Harvesting” and “Salad Party” from <em>Seed To Salad</em>, Cornell University Garden-Based Learning and Ithaca Children’s Garden</td>
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Connecting Healthy Gardens with Healthy Youth

Lesson One: How does food relate to plants?

“Plant Parts Become Me” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

Students start out as seeds curled up in the soil waiting for water so that they can sprout roots, stems, leaves, and flowers. Through songs, actions, and fruit and vegetable identification and tasting, students will be able to tell everyone what parts of plants they are eating. To add to the fun and the reading component, please find a copy of *Tops and Bottoms* by Janet Stevens. The sleepy ol’ bear learns parts of plants from the industrious hare...the hard way.

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<th>Content objectives:</th>
<th>Identify the basic and edible parts of plants and their functions. Make connections between plants and food choices.</th>
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**Core and STEM concepts and skills:**

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<tr>
<td>Social Studies</td>
<td>Individual development and identity; Production, distribution and consumption; Individuals, groups and institutions; People, places and the environment</td>
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**Healthy snack:** Plant parts

**Additional and supporting resources:**

*Singing in Our Garden* (CD), “Plant Parts” by the Banana Slug String Band from bananaslugstringband.com
LESSON PLANS FOR 2011-12 SCHOOL YEAR, Grade 2

BEFORE THE LESSON

1. **Grade 2, Lesson 1:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.

2. Secure a copy of *Singing in Our Garden* (CD), “Plant Parts” by the Banana Slug String Band from [www.bananaslugstringband.com](http://www.bananaslugstringband.com)

3. **Plant Parts Taste Testing**
   Select at least four fruits or vegetables for each student to sample that represent roots, stems, leaves, and flowers. Wash and cut the samples and store them in separate bags in a cooler or refrigerator until this lesson. Keep one example of each of the vegetables intact so that students can see what it looks like.
   Examples include:
   - Roots – carrots, radishes
   - Stems – celery, chives
   - Leaves – lettuce, spinach;
   - Flowers or from flowers – broccoli, cauliflower, chive flowers

   Consider serving a simple dipping dressing, such as a choice of dressings like Ranch or Thousand Island.

THE LESSON

1. **Plant Parts Become Me** has optional activities that can be completed on different days.

AFTER THE LESSON

No additional activities recommended after this lesson.
# Plant Parts

## Become Me!

### CONTENT OBJECTIVES
Identify the basic and edible parts of plants and their functions,  
Make connections between plants and personal food choices

### LIFE SKILL OBJECTIVES
Critical thinking; Communicating by singing, group work, and responding to questions and instructions; Learning to learn;  
Cooperation; Healthy lifestyle choices

### INDICATORS
Correctly assemble plant parts; Work with groups and individually to match pictures of fruits, vegetables and seeds to the part of the plant they come from; Increase fruit and vegetable consumption by tasting new ones

### SUBJECT STANDARDS
**Science:** Life (characteristics of organisms), Science in personal and social perspectives (personal health, types of resources)  
**Language Arts:** Vocabulary, Reading, Factual understanding, Main idea, Interpreting, Inferring, Sequencing, Summarizing, Character development  
**Math:** Number and operations, Algebra, Data analysis and probability  
**Social Studies:** Individual development and identity; Production, distribution and consumption; Individuals, groups and institutions; People, places and the environment

### LEARNER TYPES
Linguistic-words, Logical-mathematical, Spatial-visual, Music, Bodily-kinesthetic, Interpersonal, Intrapersonal, Natural

### MATERIALS
*Singing in Our Garden* CD by the Banana Slug String Band *(optional, see Introduction section, go to [www.bananaslugstringband.com](http://www.bananaslugstringband.com) for ordering information)*  
*Tops and Bottoms* by Janet Stevens  
Vegetable cards *(copy and cut one card per student, found at the end of this lesson)*  
Samples of fruits and vegetables that represent different plant parts *(examples include: roots – carrots, radishes; stem – celery; leaves – lettuce, spinach; flowers or from flowers – broccoli or cauliflower, snow peas, peppers, popcorn; see TEACHER’S NOTE at the beginning of the Apply section)*

*MATERIALS continued on next page*
**MATERIALS continued**

- Squeeze bottle of Ranch™ dressing
- Small paper plates *(one per student)*
- Napkins *(one per student)*
- Edible Parts of Plants activity sheet *(one per student or one to do together, found at the end of this lesson)*

### INTRODUCTION

**ENGAGE**

**SET THE STAGE**

5 MINUTES

**LIFE SCIENCE:** Characteristics of organisms

**TEACHER’S NOTES:** *This lesson is fun to do inside or outside.*

Let’s pretend that it is spring and we are seeds that have been planted in the ground. Curl up on the floor (or on the seats of your chairs) like seeds planted in the ground. The soil is all around you.

**What do you need to start growing?**

Water. I am going to float around the room like a cloud raining upon the ground or a watering hose or watering can sprinkling water over the soil and trickling down to you, the seeds. Your seed coats are starting to soften so your plants can start to grow.

**What part of your body can you use to become roots?**

Stretch out your feet and legs like they are roots growing out of the seed and pushing down into the soil. Roots hold plants to the ground just like your feet and legs that hold you to the ground when you are standing.

**What part of your body is the stem pushing its way up and out of the soil?**

Your body is the stem. Wiggle your bottom, shoulders and elbows. Pop up you head and start growing straight up above the soil.

**Now what does your plant need to keep growing?**

Sun, water and air. I am pretending to be the sun. *(Use your arms to make a circle above your head.)*

**We have roots and stems, what grows next?**

Leaves and branches start to grow.

**What parts of your body could be the leaves and branches?**

Your arms could be branches and your hands and fingers could be leaves. Stretch your arms out like branches and wiggle your hands and fingers as if they were leaves fluttering in the breeze. Reach toward the sky to catch the sun’s rays. The plant’s food is made in the leaves and the ingredients include energy from the sun, water, and air.

**What part of the plant grows next?**

The flower. Stand up straight with your head held high and smile because your head is a beautiful flower on top of a sturdy stem. Move your flower back and forth like it is enjoying the sunshine and the breeze. Flowers make it possible for plants to produce fruits, vegetables and seeds. All you need are some bees, butterflies, other critters or the breeze to pollinate your flowers.
Shout out the four basic parts of plants.
Roots, stems, leaves, and flowers

You may want to play the “Roots, Stems, Leaves” song from Singing in Our Garden by the Banana Slug String Band.

What happens to many plants after they have produced roots, stems, leaves, flowers, fruits, and seeds?
They either die or go dormant and rest awhile. So you can pretend to do either and sit back down on your roots or bottoms. We are going to call sitting on your roots, “plant basics”.

If you were a fruit tree or plant, what kind of fruit would you want to produce?
Apples, pears, cherries, plums, peaches, lemons, limes, oranges, grapefruit, bananas, kiwi, strawberries, raspberries, blackberries, grapes, watermelon, musk melon, etc.

If you were a vegetable plant, what kind of vegetables would you want to produce?
Cucumbers, tomatoes, peppers, broccoli, carrots, cauliflower, corn, peas, beans, okra, radishes, bedets, onions, potatoes, sweet potatoes, eggplant, brussel sprouts, lettuce, etc.

Have the students gather where you read.

Raise your branches and leaves if you know the “Head, Shoulders, Knees and Toes” song.

Since you are pretending to be plants, we are going to change the body parts to plant parts and sing the song as “Flowers, Leaves, Stems and Roots.” Stand up and let’s figure out the song together.

If your body was a plant...
What part of your body would be the flower?
Your head with a bright, beautiful smile
What part of your body would be the leaves?
Your arms and arms reaching out for the sun
What part of your body would be the stem?
Your body taking food and water to all the branches, leaves and flowers
What part of your body would be the roots?
Your feet holding the plant securely in the ground

Let’s practice hand motions to replace head, shoulders, knees and toes with flowers, leaves, stems and roots. Open your hands like petals on a flower on both sides of your head and say “flower.” Hold out your arms and hands and say “leaves.” Touch your waist and say “stem.” Reach toward your feet and say “roots.” Now, let’s sing the “Head and Shoulders” song using the parts of the plant. *(When you come to the part that is usually “eyes and ears and nose and mouth” just keep singing “flowers, leaves and stems and roots.” Sing it once slowly and a second time a little faster.)*

Distribute the Roots, Stems, Leaves and Flowers activity sheet.
Practice your plant basics by sitting on your roots. We are going to read a story titled *Tops & Bottoms* written and illustrated by Janet Stevens.

*Show the way the book opens and has a top and a bottom. Go to the inside title page and look at the illustration of garden plants. Have the students identify the crops and do a thumbs up if they would eat the tops of the plant (flowers), thumbs down for the bottom of the plant (roots), and thumbs to the side if they would eat the middle of the plant (leaves and stems).*

*Show the illustrations and read the book. Stop and make predictions what Hare will grow the second time when Bear wanted the bottoms. Do the same when Bear wanted both the tops and the bottoms and Hare settled for the middles.*

**What three steps did Hare and his family do every time they gardened?**

They planted, watered and weeded.

**Was Hare making a fair deal with Bear? Why or why not?**

Hare and his family worked very hard on the garden while Bear slept. However, the garden was on Bear’s land. Hare was tricking Bear by choosing crops that would benefit his family but not Bear. Being tricked three times made Bear stop sleeping and start using his own land to exercise and grow healthy food through gardening.

Many landowners make arrangements with farmers to grow crops on their land. The farmers either pay rent or share the harvested crops with the landowners. That arrangement seems more fair than the one Hare made.

**Was everybody happy at the end of the book? Why?**

Eventually, they all got the food they wanted from the garden. They probably were healthier from all the outdoor exercising and eating healthy foods.

*Use the illustrations on the inside front or inside back cover to check for understanding. Point to each picture and have the students identify it and then do thumbs up for edible tops, thumbs down for edible roots, and thumbs pointed to the sides for edible middles.*

*Talk about what tops, middles and bottoms they might like to grow from the book and where a similar garden could be located near where they live and go to school.*
Distribute one vegetable card to each student, found at the end of this lesson. If you have time, they can use colored pencils or crayons to color their vegetable according to what color they think it is when it is ripe or ready to eat. Have them hold up their cards so others can see them. Ask them to tell what vegetable is on their card. If they don’t know, have the other students help them out. After everyone is finished, have them put down their cards. Proceed with the following strategy to group them as plant parts.

What part of the plant is the bottom part?
Roots

Where do roots grow?
Under the soil

What root crops did Hare plant?
Carrots, beets, and radishes

If you think you have a vegetable that is a root we eat, hold up your card.
Have the students sitting nearby look at the picture and confirm that the crop is a root or tell the student why they don’t think it is a root crop.

Did anyone hold up an onion as a root crop?
Onions grow just below the surface of the ground like many root crops but think about the layers on the onion. The layers of the onion are actually leaves that have swollen to form a bulb. So onions would be in the group with edible leaves.

Did anyone hold up a potato?
Potatoes are actually underground stems. Potatoes are covered with buds or eyes that can sprout into shoots or new potato plants. We can cut up a potato and start growing a new one from the buds. Sweet potatoes don’t have buds or eyes so they are still a root crop. So a potato would be in the group with edible stems.

Have all the students with root crops stand at one end of a larger open space, or a pretend garden space.

What part of the plant holds all the other parts together?
Stem

What vegetable did Hare plant that grows stems in the middle part of the plant that we eat?
Celery

If you think you have a vegetable that is a stem we eat, hold up your card.
Celery, asparagus and potatoes (remember potatoes are underground stems with buds or eyes) are the primary examples of the stem vegetables we eat. The stalk of the celery is actually called a “petiole” or the leaf stem that attaches to the real stem, which is the solid core that attaches all the celery stalks to the roots. However, we will still refer to celery as a stem. You can also eat the celery leaves.

Have the students with the stem crops stand in a separate group near the root crops.

What part of the plant grows next?
Leaves

What vegetable did Hare plant that grows leaves on the top part of the plant that we eat?
Lettuce
If you think you have a vegetable that has leaves that we eat, hold up your card. Have the students sitting nearby look at the pictures and confirm that the crop is a leaf or tell the student why they don’t think it is a leaf. Students may not view parsley as a vegetable and they may need to be reminded that the layers on the onions are actually leaves.

Have the students with the edible leaf crops stand on either side of the stem crops.

There are four basic part of a plant. What is the fourth part?
Flowers

Did Hare grow any flowers?
The book didn’t say that he did. But many of the vegetable plants he grew had flowers before the plants could grow fruit with seeds in them. Many of those fruits we call vegetables because they aren’t usually a dessert item or a sweet treat.

What vegetables are left that look like we eat flowers or that have the word “flower” in their names?
Hold up the picture if you think you have these.
Broccoli, cauliflower, sunflower

What vegetables are left that have seeds in them?
Hold up the picture if you think you have these.
Cucumber, pumpkin, pepper, tomato, corn, and pea pods

What part of the plant had to be present before these vegetables could grow?
Flowers. The flowers had to be pollinated by bees, butterflies, other critters or the breeze before the plants could produce these vegetables that contain seeds.

Everyone with cards that look like flowers or that came from flowers stand together in the flower group on the opposite side of the roots. Our vegetable garden should now be organized in roots, stems, leaves and flowers.

Use the Vegetable Card Key and visit the groups one by one to be sure that everyone is in the right group.

VEGETABLE CARD KEY

| Roots       | carrot, sweet potato, radish, beets |
| Stems       | potato (underground stem with buds), asparagus, celery |
| Leaves      | onion (layers are leaves), lettuce, cabbage, spinach, parsley |
| Flowers     | sunflower (eat the seeds in the middle of the flower), cauliflower, broccoli |
| Come from flowers | beets, pumpkin, tomato, pepper, pea pod, corn (the tassel is the flower) |

Have everyone count together the number of vegetables in each group.

Which group is the largest?
Flowers

Which group is the smallest?
Stems

Have everyone put their cards down on the floor in the middle of their group. Ask them what their favorite vegetable is and have them move to that part of the plant. For example, if they
like corn best, they would move to where the flower pictures are laying on the floor. If their favorite vegetable is carrots, they would move to the root crop pictures. If they like pizza, spaghetti sauce, salsa, or ketchup that contains tomatoes and they didn’t have any other favorite vegetable, they would go to the flower pictures that include tomatoes. The same thing could apply to pickles made from cucumbers. Tell them not to discuss their favorites with anyone, just move there. (Otherwise, they tend to choose the same as someone else.)

Discuss the most and least popular plant part groups. Then have each of them tell which vegetable they liked best that attracted them to each of the groups they are in. If they ended up in the wrong plant part group, you may have to move them and see if that changed the most popular plant part.

**TEACHER’S NOTES:** Select at least four fruits or vegetables for each student to sample that represent roots, stems, leaves, and flowers. Keep one example of each of the vegetables intact so that students can see what it looks like. Wash and cut the samples and store them in separate bags in a cooler or refrigerator until this lesson. Be prepared for dipping with a squeeze bottle of Ranch™ dressing.

Also select other roots, stems, leaves and flowers crops and display them on a platter along with the intact examples of the samples the students will eat. After you show and talk about the extra examples, you may choose to wash and cut them to sample, as well.

Before starting this Apply section, wash your hands and the surface of the serving table and have the students wash their hands. While they are doing that, put out enough small paper plates for each student and place one of each of the plant parts on each plate. Adult or student helpers make the work go faster. Have the helpers deliver the plates to the students. **Remind all the students not to eat anything until after you discover more about each sample.**

Use the tray of edible plant parts to proceed with the following activity.

**What is special about this tray of food?**
Possible answers include:
- It includes only fruits and vegetables.
- It has plant parts that we can eat.
- It is probably healthy because it includes lots of fruits and vegetables.
- It is very colorful.
- It has lots of shapes and sizes.
- It makes me hungry.
- It includes things that grow in gardens.
- I don’t know what all of the things are.

If you said that these fruits and vegetables are healthy, you were right.

**What is in fruits and vegetables that is so healthy?**
Fruits and vegetables contain vitamins and minerals.
Raise your hand if you have heard any of these sayings: “Carrots are good for your eyes.” “An apple a day keeps the doctor away.” “Eat oranges to prevent a cold.”
Fruits and vegetables contain nutrients called vitamins and minerals that can help our eyes, skin and hair to sparkle and our bodies to fight off colds, flu, and other illnesses. They also contain fiber to help clean out our bodies.

If you noticed that the fruits and vegetables were colorful and come in many shapes and sizes, you discovered a healthy tip. We are suppose to “vary our veggies” meaning that we should eat a variety of colors and kinds of fruits and vegetables. That means we are getting several different kinds of good vitamins and minerals.

Raise your hand if you eat a variety of fruits and vegetables throughout the week. How about throughout one day?

What are some of your favorite colors of fruits and vegetables?

Let’s see if you can identify each plant by its color, shape, and size. (Go through each sample on the tray color by color and have students tell the color and the name of the fruit or vegetable. For example, start with the green fruits and vegetables and have them identify each of them such as lettuce, peas, broccoli and so on.)

Before we identify the plant parts on the big tray of fruits and vegetables, guess what plant parts you have on your plate. Find the root sample and put it on the part of the plate where you would find roots. Then decide what other plant parts you have and arrange them where you would find them on a plant. After you are done, you will have designed a new, totally edible plant. Think about what you would name your new plant. (Give them a minute or so to arrange their plant.)

Go through the fruits and vegetables on the tray, one at a time, and have the students determine whether they are roots, stems, leaves, flowers or they come from a flower. Remind them of the following:

• Potatoes are really underground stems because of the buds or eyes, but sweet potatoes don’t have buds or eyes so they are roots.
• Celery is really a leaf stem and the real stem is the thick part connecting all the stalks of celery to the roots.
• An onion has many layers of leaves so it is really a leaf rather than a root, even if it grows underground.
• On some plants like asparagus and broccoli, we eat both the flowers and the stem.
• Vegetables that have seeds come from plants that have flowers first before they produce fruits and seeds. Fruits grow on plants, but we call some of them vegetables because they aren’t as sweet and we don’t usually eat them as desserts.

The students can taste one bite of their root, stem, leaf, and flower sample as it is discussed. After all the fruits and vegetables have been discussed, the students can finish eating their fruit or vegetable. Go around with the squeeze bottle of dressing for dipping, if they request it.

Distribute the Edible Parts of Plants activity sheet or make a large image of it on the wall or screen, found at the end of this lesson. Have the students label the sunflower verbally or on the blank lines. Have students take turns to come up and point to the edible plants on the left and make a line with their finger or a pointer to the part of the plant it comes from. For example, point to the radish and draw a line to the root of the sunflower. Remember that fruits and seeds come from a flower.
**OPTIONAL ACTIVITY IDEA**

**MY TOTALLY TASTY PLANT**

Have the students fold a blank sheet of paper into thirds, hamburger style. Looking at the bottom third of the paper, draw a line to represent soil near the fold or the top of that section. Have them draw a root that they can eat below the soil line on the bottom third of the paper. After they are done, have them start to draw the stems up over the fold to the middle part of the paper. Then have them open up the middle section so they just see that section and not the top or bottom. Have them pass the paper to someone else. The next student should not look at the bottom or root part of the picture. It will be a surprise.

In the middle section, have the students draw edible stems or leaves. When they are done, have them draw a stem line up into the top third of the paper, turn the paper so the next students will only see the top third, and pass it on. Remind the next students to not look at the middle or bottom part of the picture.

In the top section, have the students draw edible flowers or a fruit or vegetable that comes from a flower (and has seeds inside or out). When they are done, have them toss their papers like pollen or seeds in the air that float to the ground where they may be planted in the soil. Have the students pretend to be watering cans and water the seeds, the sun to give them energy to grow, and blow on them to give them air.

Then have the students, or gardeners, harvest or pick up the papers, open them up and find the new totally tasty plant. Students can share what is on their plant and then you can collect them to display on a wall garden.
carrot  potato  onion  sweet potato
radish  asparagus  pea pod  corn

tomato  pepper  sunflower  leaf lettuce
cabbage  celery  spinach  pumpkin
cucumber  broccoli  cauliflower  parsley
## Edible Parts of Plants

<table>
<thead>
<tr>
<th>Plant Parts</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>radish</td>
<td></td>
</tr>
<tr>
<td>carrot</td>
<td></td>
</tr>
<tr>
<td>sunflower seeds</td>
<td></td>
</tr>
<tr>
<td>celery</td>
<td></td>
</tr>
<tr>
<td>tomato</td>
<td></td>
</tr>
<tr>
<td>corn kernels</td>
<td></td>
</tr>
<tr>
<td>lettuce</td>
<td></td>
</tr>
<tr>
<td>cucumber</td>
<td></td>
</tr>
</tbody>
</table>

**KEY:**
- **f.** flowers
- **l.** leaves
- **r.** roots
- **s.** stems

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Lesson two: How does healthy soil relate to food?

“Rocks to Ice Cream” and “Keeping Soil Alive” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach.

Where does most food come from? Students are engaged in a timeline that starts with rocks that break down into soil and ends with ice cream. Then they can make ice cream in zip lock bags. The students discover how to keep soil healthy so it can grow food by building vermi-compost columns. Collect clear plastic liter pop bottles and look for red wiggler worms in teacher supply catalogues or from bait shops. The Master Gardeners at your local extension office may help you to find them.

Content objectives: Discover and describe how most of our food starts with soil and how soil can remain healthy; Explain why the decomposition cycle and healthy soil are important for plants, animals and people.

Life skill objectives: Critical thinking, Learning to learn, Responsibility, Citizenship, Healthy living

Core and STEM concepts and skills:
Science  Life science, Earth and space, Physical, Science in personal and social perspectives
Math  Number and operations, Algebra, Geometry, Measurement, Data analysis and probability, Problem solving, Connections, Communication, Representation
Language Arts  Sequencing, Main idea, Reading, Factual understanding, Inferring, Interpreting, Main idea, Character development, Summarizing, Vocabulary, Asking questions, Listening
Social studies  People, places and environments; Production, distribution and consumption

Healthy snack: Ice cream in a bag

Additional and Supporting Resources: Singing in Our Garden (CD), “Dirt Made My Lunch” and “Decomposition” by the Banana Slug String Band from bananaslugstringband.com
BEFORE THE LESSON

1. **Grade 2, Lesson 2:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.


3. Check materials list for complete description of items needed. This lesson includes an optional activity of making a Worm Observation Farm.

4. Assemble necessary ingredients and materials for either "Yummy Ice Cream" made in a plastic bag. Consider topping it with seasonal fresh fruit.

THE LESSON

1. **Rocks to Ice Cream** and **Keeping Soil Alive** are meant to be taught over two or more days. There are optional activities to extend the lesson as time allows.

AFTER THE LESSON

Optional activities are included in the lesson plan for making and observing a worm farm.

Also optional is reading and discussing *Diary of a Worm* by Doreen Cronin in the ‘What is Helping the Soil to be Healthy?’ section. You can find this book at the library or purchase it online. If you cannot find the book, this section offers discussion questions.
RECIPE

Yummy Ice Cream

This recipe is made in one quart-sized zip-closure freezer bag and serves five to eight people using 5 ounce paper cups.

ICE CREAM INGREDIENTS
2 cups of milk (This can be flavored milk purchased in individual bottles. One percent and skim milk do not freeze as quickly.)
Equivalent of 2 eggs of pasteurized egg product (such as Egg Beaters™ or Better N Eggs™)
1/2 cup sugar (less or none for flavored, pre-sweetened milk)
1/4 teaspoon vanilla

ICE CREAM SUPPLIES
1 quart-sized zip-closure freezer bag (Do not double bag or ice cream won’t freeze.)
5-ounce paper cups, one per person
Plastic spoons, one per person
Dry and liquid measuring cups
Measuring spoon
Scissors

ICE CREAM FREEZER SUPPLIES
2 one gallon-sized zip-closure freezer bags
Approx. 2 1/2 pounds crushed ice (7 lb. bag works for three of these recipes)
Approx. 1 pound or 4 handfuls of rock salt (Four lb. box works for four to five of these recipes. Do not use table salt)
Bath towel, kitchen towel, or mittens to hold on to the cold freezer bag
Paper towels for clean-up

INSTRUCTIONS

After the students wash their hands, have one student securely hold open the quart-sized bag while other students take turns adding the ice cream ingredients. After all the ingredients are added, have two students carefully get the air out of the bag and seal the bag shut. Holding the bag at the top and keeping it upright, gently squeeze the bottom of the bag to mix the ingredients.

Have a different student hold open one of the gallon-sized zip-closure freezer bags while another student adds a couple handfuls or heaping cups full of ice and two handfuls or a little less than a cup of rock salt. Put the bag of ice cream ingredients into the freezer bag. Add another couple of handfuls or heaping cups of ice and two handfuls or a little less than a cup of rock salt. Close the ice cream freezer bag securely. Put the freezer bag into another gallon-sized zip-closure bag and close it. This is the ice cream freezer. Wrap it in a towel so that it is not so cold to handle.

Have the students take turns hand-churning the ice cream by turning the bag over and over in their hands or on a tabletop. The ice cream should harden within 10 minutes. You may want to check it occasionally. After it hardens to the consistency of firm, soft-serve ice cream, pull the bag out of the ice cream freezer, wipe it off, clip off one of the lower corners of the bag, and squeeze the ice cream into the paper cups. (Note that the ice cream ingredients were not touched by anyone’s hands.)

Enjoy!
Rocks to Ice Cream and Keeping Soil Alive

CONTENT OBJECTIVES
Discover and describe how much of our food starts with soil
Identify and describe how soil can remain healthy because of decomposition

LIFE SKILL OBJECTIVES
Critical thinking, Learning to learn, Communication, Citizenship, Leadership

INDICATORS
Verbally trace how ice cream ingredients start with the soil
Construct, maintain, record observations and explain the purpose of the decomposition cycle

EVALUATIONS

SUBJECT STANDARDS
Science: Life (organisms and environments, life cycles and characteristics of organisms), Earth (changes in the earth and sky, properties of earth materials), Physical (properties of objects of materials), Science in personal and social perspectives (types of resources)

Math: Number and operations, Algebra, Geometry, Measurement, Data analysis and probability, Connections, Communication, Representation

Language Arts: Reading, Factual understanding, Sequencing, Inferring, Interpreting, Main idea, Character development, Summarizing, Vocabulary, Asking questions, Speaking, Listening

Social Studies: People, places and environments; Production, distribution and consumption

Art and Music

LEARNER TYPES
Linguistic-words, Logical-mathematical, Spatial-visual, Bodily-kinesthetic, Intrapersonal, Interpersonal, Music, Natural

MATERIALS
Day One:
3- to 4-inch diameter rock
Empty ice cream container
19 white sheets of paper or heavy card stock (see the Do section)
Colored markers
Magazines or other sources of pictures (see the Do section)
Yummy Ice Cream recipe (copy one per student, found at the end of this lesson)
Ingredients and Supplies for Yummy Ice Cream (see recipe found at the end of this lesson)

MATERIALS continued on next page
What is the connection between rocks and ice cream?

Have the students make guesses such as rocky road ice cream, using rock salt to make ice cream, etc.

Of course, rocks are not one of the ingredients that go into ice cream, but they are an important part of how we get that great treat. Let’s find out how ice cream begins with rocks.

(Student work time varies depending on who makes the signs.)

TEACHER’S NOTES: The students will be holding up signs or small posters to show the rocks to ice cream sequence found in this section. You may choose to make the signs yourself or have the students make the signs. Use blank sheets of paper or heavy card stock and markers to write the bolded words found in the numbered sequence in this section. Then draw or find a picture in a magazine or on the Internet to illustrate the word. If there are less than 19 students, you may make the extra signs or assign two signs to some of the students that may have easier words to illustrate, such as “water,” “eggs”, or “sugar”. If you have more than 19 students, more than one student could illustrate certain words, such as “water,” “weather,” “plants,” and “decomposition,” because it took many years for rocks to break down into soil.
ROCKS TO ICE CREAM SEQUENCE

Have the students form a shoulder-to-shoulder line around the room or in a large circle. Distribute the signs or small posters in order according to the following sequence. Or, if they made their own signs, you may want them to guess where they stand and then correct themselves as you read the sequence. Have them hold their signs toward their bodies so nobody can see them yet. Give a rock to the first person in the line and an empty ice cream carton to the last person in the line.

I am going to read the sequence about how ice cream comes from rocks. When you hear me emphasize your word, please hold up your sign so that everyone can see it. Continue to hold up your sign throughout the reading of the sequence. Every step is needed to make ice cream.

1. The soil we have today started many thousands of years ago as ROCKS. Over the years, the rocks were broken down into smaller pieces by several forces of nature.
2. It rained and WATER flowed over the rocks, breaking them apart.
3. Changes in the WEATHER, such as freezing and thawing temperatures, further broke the rocks down into smaller pieces.
4. PLANTS started growing in and around the rocks.
5. Through the process of DECOMPOSITION, or the breakdown of plants and animals over thousands of years, the good rich soil was developed.
6. Eventually, a FARMER owned the land and started his or her farm on it.
7. The farmer planted a PASTURE.
8. The farmer owned a herd of dairy COWS that ate the plants in the pasture.
9. Every day, the farmer got MILK from the cows.
10. The milk was collected in a large tank truck and a TRUCK DRIVER took it to the dairy.
11. The milk was unloaded in the dairy where DAIRY WORKERS mixed the milk with other ingredients.
12. One of the ingredients was EGGS from chickens that ate grain growing from the soil.
13. Another ingredient was SUGAR from sugar beets or sugar cane grown in the soil. Other tasty ingredients may have been added.
14. They mixed and churned the ingredients and voilà, they had tasty ICE CREAM that they put in containers and into the freezer.
15. When an order came in, a TRUCK DRIVER took the ice cream from the dairy to a grocery distribution center warehouse.
16. The WAREHOUSE WORKERS put the ice cream in a large freezer.
17. A grocer ordered several ice cream products from the distribution center so a TRUCK DRIVER delivered them to the grocery store.
18. The GROCER put the ice cream in the freezer cases at the grocery store.
19. Finally you, the CUSTOMER, buys and enjoys the tasty ice cream!

(The student with the empty ice cream container holds it up to show the class.)
**TEACHER’S NOTES:** Prepare to make the “Yummy Ice Cream” recipe found at the end of this lesson. Make copies for the students to follow and to take home. Please read the entire recipe and instructions and prepare ingredients and supplies according to the number of students in your classroom.

How many steps did it take to get ice cream from rocks to you?

19

Have each student read off what is on his/her paper as the rest of the class counts.

How many years do you think it took?

Millions

What would happen if we didn’t have enough soil to grow plants?

We wouldn’t have good things such as ice cream to eat.

You may want to hang the signs or posters on the wall in order forming a timeline. Have the students take another look at the sequence and discuss the approximate number of years, months or days that each step took place.

Distribute copies of the “Yummy Ice Cream” recipe found at the end of this lesson. Have the students look at the recipe for the following discussion. The students will enjoy taking this recipe home and making it with their family and friends.

What is the name of this recipe?

Yummy Ice Cream

Raise your hand if you have made or eaten homemade ice cream.

What two containers did you need to make homemade ice cream?

You probably had one container for the ice cream ingredients and a bigger container for the ice cream freezer.

What are we going to use for the ice cream and freezer containers in this Yummy Ice Cream recipe?

We will be using quart-sized bags for the ice cream ingredients and gallon-sized bags for the freezer. *(Hold up the bags.)*

The words “quart” and “gallon” in this recipe and for the bags are units of measure for something that is liquid.

According to the recipe, how many cups of milk will go into the quart-sized bag?

Two cups

How many cups would fill a quart-sized bag to the top?

A 1-quart bag will hold about 4 cups of liquid, but it would be hard to handle because it would be too full.

How many cups would fill a gallon-sized bag?

A 1-gallon bag will hold about 16 cups, or 4 quarts, of liquid ingredients.

According to the recipe, what are we putting in the gallon-size bag and how much?

The gallon-sized bag will be our churn. It will hold approximately 2½ pounds of crushed ice and 1 pound or several handfuls of rock salt.

The ice cream bag with more than 2 cups of liquid ingredients will be put inside the gallon sized bag. It will be surrounded with lots of ice and rock salt.

Why do we need rock salt to freeze or make ice cream hard?

The rock salt makes the ice water colder so the ice cream freezes faster. Table salt, the salt that you eat won’t work.
If you are going to double the recipe, you may want to use the next two sets of questions.

**How many people does this recipe serve?**
It will serve five to eight people in 5-ounce (bathroom-sized) cups.

**Will that be enough ice cream for our class?**
(Discuss how many recipes it will take to make enough ice cream for the class.)

**What are the ingredients in the ice cream and how do each of them come from the soil?**
- Milk is produced by cows; cows eat pasture plants and grain; grain grows in the soil.
- Eggs are produced by chickens; chickens eat grain; grain grows in the soil.
- Sugar is manufactured from sugar beets or sugar cane; both grow in the soil.
- Vanilla is extracted from pods that grow on the vanilla plant; the vanilla plant grows on trees in tropical areas; the trees grow in the soil.

Have the students wash their hands and gather in small groups of five to eight where they are going to make the ice cream. While they wash their hands, gather your ingredients and supplies from the cooler or refrigerator. Don’t forget to wash your own hands! Help them make the ice cream and the freezers according to the Yummy Ice Cream recipe. Have the students note what time they started freezing their ice cream mixture. While they are churning or turning the bags, you may want to proceed with the following math activity.

**MAKING PREDICTIONS**
As the students begin to turn their ice cream freezers, have them predict how many minutes it will take for the ice cream to harden. Record their predictions on the board by writing the amount of time and draw ice cream cones instead of chicken scratches to represent the number of students that made the same prediction. You may want to turn the prediction data into a line or bar graph. Talk about variables or things that they did or could do to make the process go faster or slower. Too little rock salt or using table salt instead of rock salt will slow down the freezing process. The rock salt helps take the heat out of the ice cream mixture more rapidly so the ice cream can freeze. Using not enough ice can slow down the process. Using milk with some fat content freezes smoother and faster than using skim milk. Keeping the bag moving will freeze it faster. If you double bag the ice cream mixture, it won’t freeze because the extra bag helps insulate the ice cream mixture from the ice/rock salt mixture.

**OPTIONAL ACTIVITIES**

**“DIRT MADE MY LUNCH” by the Banana Slug String Band**
Play “Dirt Made My Lunch” by the Banana Slug String Band. If you do not have the CD, you may want to have the students read the lyrics and then proceed with the activity. Discuss the foods described in the song and how each of them came from dirt or soil.

**DIRT MADE MY LUNCH SKIT or PUPPET SHOW**
Divide the class into smaller groups of six to eight students. Have them create short skits or puppet shows to act out the lyrics and the song. They can make their own puppets, costumes or props. You may want to provide construction paper, lunch bags for puppets, or craft supplies, anything to help them with their skit. Encourage them to find creative ways to describe how food starts from the soil. Have them act out their skits or puppet shows along with the song or as someone reads the lyrics. You may want to evaluate them based on evidence that they clearly understand.
**TEACHER’S NOTES:** This section of the lesson should be done on a separate day or later the same day. Please collect soil from outside, enough for one cup of soil for every four students. Gather the supplies for the Worm Observation Farms, one farm for every four students. If the ground is frozen, Master Gardeners or owners of a local garden store may be able to find some garden soil for you to use.

Put a cup of the soil you collected from outside on one plastic plate for every four students. If possible, give each small group a magnifying glass. If you have a microscope, put some soil on a slide and set up a station so that students can take turns looking at the soil through the microscope at low magnification.

Divide the class into groups of four to look at the soil samples. Ask them to talk about what they see in the soil and be ready to tell the rest of the class. Remind them to look at the Rocks to Ice Cream timeline and see if they can find evidence of how rocks became soil. Talk about what living and nonliving things they can find in the soil. They should be able to find different soil particles that look like tiny rocks, sand, silt or clay; decaying leaves and sticks; worms, tiny insects, slugs, grubs; and so on.

Have the students share their findings with the rest of the class. You may want to list what they found on a board or large sheet of paper. Collect the soil and put it back in the bag or bucket.

You can’t see them, but soil experts tell us that there are billions of tiny organisms such as bacteria and fungi in a single teaspoon of soil. You were looking at many teaspoons of soil! We are going to make Worm Observation Farms to see how all the items found in soil work together to make soil and keep it healthy so that plants can grow.

**WORM OBSERVATION FARM**

1. Cut off the top of a 2-liter pop bottle.
2. Put a 1 inch layer of small rocks in the bottom of the bottle.
3. Add 1- to 2-inch layers in the order listed; as you add each layer, spray each layer gently with water to moisten.
   - Newspaper torn into long, thin strips
   - Garden soil
   - Shredded newspaper strips
   - Vegetable scraps *(Fruit scraps may attract tiny fruit flies.)*
   - Repeat the above steps until the bottle is three-fourths full.
4. Add ten to fifteen red wiggler worms.*
5. Put plastic wrap over the top of the bottle, secure it with a rubber band, and poke ventilation holes into it.
6. Wrap black construction paper around the bottle and secure it with a rubber band to keep it dark for the worms.
7. Keep in a cool to moderately warm location, out of the sun.
8. Add vegetable scraps every 3 to 7 days. Bury them in the bedding or place them on top and add more moist newspaper strips.
9. Keep the contents moist, but not soggy.

*Because they eat near the surface, red worms, also known as red wigglers, red hybrids, fish worms, manure worms, and English red worms, are better choices for this activity than night crawlers or other earthworms. Redworms are available through some garden catalogs and you may find them at bait shops.

Adapted from Maine Agriculture in the Classroom. *How to Make a Worm Observation Column.* Freeport, Maine. Healthy Foods From Healthy Soil. 1998.
OBSERVATION RECORD FORM
Distribute plain sheets of white paper. Have each student write Worm Observation Farm across the top of wide side of the page. Underneath the title, have them write their names. Fold the paper vertically into three columns. At the top of the first column, write “Week 1” and today’s date. At the top of the second column, write “Week 4.” At the top of the third column, write “Week 8.” Have the students draw a picture of their worm farm in Column One and label the layers. Collect the observation record forms for later distribution in Weeks 4 and 8.

OPTIONAL ACTIVITIES
These activities can be incorporated into lessons when you check the worm observation farms for several weeks.

WHAT IS DECOMPOSITION?
Play “Decomposition” or “Dirt Made My Lunch” by the Banana Slug String Band. You may want to copy or project the words on a transparency for everyone to follow along. In “Decomposition,” there are three group sections that you could teach to your students. Divide the class into three groups and follow the instructions in the lyrics. Play the song again with the students participating.

What is the circle described in the song?
The circle of decay or decomposition is where plants and animals decay to make good soil for growing more plants and feeding animals. When those plants die and the animals leave droppings, the process starts all over again.

Why are the words “munch, munch, munch” in the song about decomposition?
Worms, snails, slugs and bugs “munch” or eat dead plants, leaves and twigs, and animal droppings to get them to decompose. That’s why these munching organisms are called decomposers.

What is “munching” or decomposing the plant materials in our Worm Observation Farms?
Worms are munching on the leaves, newspapers, and so on.

What does the word “decomposition” mean?
Breakdown or decay; plants and animals breakdown and decay to provide nutrients to the soil. We are watching the decomposition process or cycle in our Worm Observation Farms.

What plant parts and animal resources “get down” into the soil?
Leaves, flowers and stems die and fall or “get down” into the soil. Droppings from animals “get down” into the soil. Plants and animals provide organic matter that keeps soil healthy.

How did our plant materials such as lettuce leaves and newspapers “get down” into the soil?
We put them in the bottles. When people make compost, they put the plants into the pile to decompose.

What happens in the “breakdown” of plants and animals?
Decomposers such as worms, snails, slugs and other organisms break them down by eating them. Water and air also help to breakdown the plants and animals into smaller soil particles.
The decomposition cycle is also called the “Nutrient Cycle.” We eat nutrients like vitamins, minerals, carbohydrates, protein, and so on to keep us healthy.

**What is the decomposition or nutrient cycle keeping healthy?**

The soil

**Why is it important to keep the soil healthy?**

It grows the plants that animals, including people, eat and make into all kinds of things such as houses, this paper, your clothes, and so on.

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**REMINDER:** Remember to take out the Observation Forms and draw and date a second picture or description of what the Worm Observation Farms are doing.

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**WHAT IS HELPING THE SOIL TO BE HEALTHY?**

Form a circle in your reading area to read and discuss *Diary of a Worm* by Doreen Cronin.

A Greek philosopher who lived more than 2,000 years ago said, “Earthworms are the intestines of the earth.” What did he mean by that?

We eat food grown on the earth, and it passes through our intestines. Earthworms eat the earth. The earth passes through the earthworms’ long intestine-like tube until it is deposited in their droppings or poop. These are called “castings” and they provide nutrients to the soil to make it healthy.

To find out more about worms, we are going to read *Diary of a Worm* by Doreen Cronin. It is written like a diary with daily entries of fun things the worm has done or learned. Let’s make a list of worm facts on the board as you read them.

Send the book around the circle so students can take turns reading the diary entries. As the book is passed, ask the class to give you a worm fact that you can record on the board. Number the facts as you write them. You may want to discuss some of the facts. Examples include: worms eat and decompose newspapers – as you are learning in your worm farms; worms come out on the sidewalk when it rains because the soil is filled with water and no oxygen.

Let’s explore some more facts about worms.

Nightcrawlers make burrows or tunnels that can go 8 feet or more below the surface of the soil. (*With a tape measure, measure 8 feet up to see how far down a nightcrawler can go.*)

Each worm has about a thousand tiny bristles on its body that help it move.

**How many bristles would ten/one hundred/one thousand worms have all together?**

(*Write on the board:* 10 worms x 1,000 bristles = 10,000/ten thousand bristles

100 worms x 1,000 = 100,000/one hundred thousand bristles

1,000 worms x 1,000 bristles = 1,000,000/one million bristles)

Earthworms can move a stone fifty times their own weight. That is like you moving a 1-ton pickup truck! (*You may want to see if they know what a full-size pickup truck looks like by checking your parking lot or identifying families in your class that have a pickup truck and can describe it.*)
One acre of soil (the size of a football field) may hold between 50,000 and one million earthworms. Write those numbers on the board and ask the students to give you some numbers between 50,000 and one million to show how many earthworms might be in an acre of soil. Explain that farm fields are several acres such as forty, eighty, one hundred and more.

How many more facts can we add to our worm fact list on the board?
Four

How many facts did you learn about worms?
(Have the students count aloud the number of tallies or chicken scratches on the board. Write the total number of facts the class learned about worms.)

Do all these facts tell you anything about the importance of worms?
Yes.
What do they tell us?
That worms are important to the soil, plants and animals…including us.

What are we making in our worm farm?
The red wiggler worms are helping to decompose the paper, vegetable scrap and soil layers to make compost. Compost is an essential part of healthy soil

What did we use to make the compost that will make our soil healthy?
Newspaper strips, soil, vegetable scraps and worms

What were the decomposers that we added?
Red wiggler worms

How did they turn the layers of the worm farm into rich compost?
They ate it, and their castings became compost.

REMINDER: Remember to take out the Observation Forms and draw and date a third picture or description of what the Worm Observation Farms are doing.

Nightcrawlers make burrows or tunnels that can go 8 feet or more below the surface of the soil.
Each worm has about a thousand tiny bristles on its body that help it move.
Earthworms can move a stone fifty times their own weight. That is like you moving a one-ton pickup truck!
One acre of soil (the size of a football field) may hold between 50,000 and one million earthworms.
REFERENCE
Adapted from Food, Land, and People training, Williamsburg, VA, May, 1997.

RESOURCES
Banana Slug String Band, bananaslugstringband.com
Iowa Agricultural Awareness Coalition, www.agaware.org Links to Iowa commodity organizations
YUMMY ICE CREAM

This recipe is made in one quart-sized zip-closure freezer bag and serves five to eight people using 5 ounce paper cups.

ICE CREAM INGREDIENTS
2 cups of milk (This can be flavored milk purchased in individual bottles. One percent and skim milk do not freeze as quickly.)
Equivalent of 2 eggs of pasteurized egg product (such as Egg Beaters™ or Better ‘N Eggs™)
1/3 cup sugar (less or none for flavored, pre-sweetened milk)
1/2 teaspoon vanilla

ICE CREAM SUPPLIES
1 quart-sized zip-closure freezer bag (Do not double bag or ice cream won’t freeze.)
5-ounce paper cups, one per person
Plastic spoons, one per person
Dry and liquid measuring cups
Measuring spoon
Scissors

ICE CREAM FREEZER SUPPLIES
2 one gallon-sized zip-closure freezer bags
Approx. 2/1/2 pounds crushed ice (7 lb. bag works for three of these recipes)
Approx. 1 pound or 4 handfuls of rock salt (Four lb. box works for four to five of these recipes. Do not use table salt)
Bath towel, kitchen towel, or mittens to hold on to the cold freezer bag
Paper towels for clean-up

INSTRUCTIONS

After the students wash their hands, have one student securely hold open the quart-sized bag while other students take turns adding the ice cream ingredients. After all the ingredients are added, have two students carefully get the air out of the bag and seal the bag shut. Holding the bag at the top and keeping it upright, gently squeeze the bottom of the bag to mix the ingredients.

Have a different student hold open one of the gallon-sized zip-closure freezer bags while another student adds a couple handfuls or heaping cups full of ice and two handfuls or a little less than a cup of rock salt. Put the bag of ice cream ingredients into the freezer bag. Add another couple of handfuls or heaping cups of ice and two handfuls or a little less than a cup of rock salt. Close the ice cream freezer bag securely. Put the freezer bag into another gallon-sized zip-closure bag and close it. This is the ice cream freezer. Wrap it in a towel so that it is not so cold to handle.

Have the students take turns hand-churning the ice cream by turning the bag over and over in their hands or on a tabletop. The ice cream should harden within 10 minutes. You may want to check it occasionally. After it hardens to the consistency of firm, soft-serve ice cream, pull the bag out of the ice cream freezer, wipe it off, clip off one of the lower corners of the bag, and squeeze the ice cream into the paper cups. (Note that the ice cream ingredients were not touched by anyone’s hands.)

ENJOY!
DIRT MADE MY LUNCH

By the Banana Slug String Band © 2002

CHORUS
Dirt made my lunch,
Dirt made my lunch,
Thank you Dirt, thanks a bunch,
For my salad, my sandwich
My milk and my munch 'cause
Dirt, you made my lunch.

Dirt is a word that we often use,
When we're talkin' about the earth
beneath our shoes.
It's a place where plants
can sink their toes;
In a little while a garden grows.

Chorus ...

A farmer's plow will
tickle the ground,
You know the earth has laughed
when wheat is found.
The grain is taken and
flour is ground,
For making a sandwich
to munch on down.

Chorus ...

A stubby green beard grows
upon the land,
Out of the soil the grass will stand.
But under hoof it must bow,
For making milk by way of a cow.

Chorus ...
Is there waste? Well, I don’t know.
‘Cause one thing dies
to let another grow.
This circle we see most every day.
The name that we call it…decay.

**CHORUS**
Well come on all you people,
gather ’round,
Break down and listen to…
decomposition.

**Group 1** (comes in and goes out saying):
Munch,
Munch,
Munch…

**Group 2** (comes in and goes out saying):
Decomposition,
Decomposition,
Decomposition…

**Group 3** (comes in and goes out saying):
Get Down,
Break Down,
Get Down,
Break Down

There are many kinds of bugs,
Worms and snails and banana slugs,
They are useful for me and you,
They help to make the soil renew.
**CHORUS**…

Decomposition is a useful game,
A tree drops its leaves
but they don’t stay the same.
A bug chews them and spits them back out,
Making the soil for a new tree to sprout.
**CHORUS**…
**Lesson three:** How do we make a garden plan?

“Our Food Garden Plan” from GROWING IN THE GARDEN: LOCAL FOODS AND HEALTHY LIVING, Iowa State University Extension and Outreach

Students draw their favorite foods from plants on paper plates that they “plant” in a garden taped out on the floor. When they discover the challenge of making all the plants fit, they go through a series of tasting, math, and science activities until they come up with the crops they will actually plant in their cool season and fall harvest gardens.

<table>
<thead>
<tr>
<th>Content objectives:</th>
<th>Identify and select locally grown fruits and vegetables to plant, grow, harvest and eat; Use a variety of mathematic and science concepts and skills to create local garden plans and calendars.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life skill objectives:</td>
<td>Critical thinking, Problem solving, Decision making, Healthy living, Communication (listening, asking and responding to questions), Citizenship (sharing an idea to improve something), Leadership (working together in a team)</td>
</tr>
</tbody>
</table>

**Core and STEM concepts and skills:**

**Math**
- Operations and algebraic thinking
- Number and operations
- Measurement and data
- Geometry
- Mathematical practices

**Science**
- Science as inquiry
- Earth and space
- Life science

**Language Arts**
- Reading
- Speaking
- Listening
- Viewing

**Social Studies**
- Economics
- Geography

**Healthy snack:** Vegetables students can choose from to plant in their garden

**Additional and supporting resources:**

“How do you plan a garden?” General Information for planning unit in GROWING IN THE GARDEN: LOCAL FOODS AND HEALTHY LIVING, *The Vegetables We Eat* by Gail Gibbons (check in library or purchase online)
LESSON PLANS FOR 2011-12 SCHOOL YEAR  Grade 2

BEFORE THE LESSON

1. **Grade 2, Lesson 3:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.

2. Check materials list for complete description of items needed.

3. Review “Gardening Tips for Working with Kids.”

4. Have a planning meeting. A few weeks before doing the planning lesson, have a meeting with the all the adults that want to be involved in the second grade gardens. Make copies of the “Gardening Tips for Working with Kids” to distribute at the meeting

   ▪ The students will taste fruits or vegetables that they could plant as cool season and warm season crops. Are there any suggestions on fruits or vegetables that the adults would like to plant with the students? Come up with three or four options for each of the cool and warm season crops so the students have an opportunity to make choices on what they would like to plant. Are there any recommendations regarding purchasing and preparing the samples for this lesson and others?

   ▪ The students will be planning their garden first on a floor garden plan and then on a garden grid. They have charts to know how much space certain crops take. It would be helpful if a Master Gardener or a garden expert could help with the planning lesson so that the students can eventually come up with the garden plan that they will actually use. The students also need help to start a garden calendar that they can follow in your region. Make a plan for a garden expert to work with the teacher and the students during the planning lesson. Share a copy of the lesson and The Lesson section below so that everyone can be ready.

   ▪ We highly suggest trying the square foot gardening method to get the most out of small garden spaces as possible, to make it easier to plant the garden, and to eventually make it harder for weeds to grow. Refer to the lesson to learn more about this method and assign people the task of making square foot garden templates 1 and 2 from the patterns at the end.
5. Assemble necessary fruits and vegetables for “Where We Live Fruits and Vegetables Sampler.”

6. This is a good time for each student to start his or her own Garden Journal. Each time you do a lesson or go out in the garden there is an opportunity to add something new to the Garden Journal. A 1’’ vinyl binders or sturdy plastic folders with 3-ring binders works well; students can take their journals to the garden and add pages, activity sheets, charts, recipes, etc. The binders with a window on the front are nice because students can design their front cover on a heavy piece of paper and slip it into the sleeve. The students can also design their own inside cover page. Provide permanent markers so they can at least creatively write the title, using their first and last name such as “Charlie Smith’s Garden Journal,” on the front of the binder or folder. We have found that it works best to collect the journals after each use.

THE LESSON
1. Our Food Garden Plan is meant to be taught over two or more days.

AFTER THE LESSON
Add a copy of the class’s Our Food Garden Plan to the Garden Journal. On the back of the page, have the students copy the list of crops that the class chose to grow. If one of their crops did not survive the vote, have them list that crop. If the class discovered that all the crops would not fit in their garden space, have them note that as well. Make a copy of the Garden Calendar so that the students can add information about their garden. Hopefully, they can write “Plant cool season crops” on one of the days.

RECIPE
“Where We Live Fruits and Vegetables Sampler” Select at least three to five fresh fruits and/or vegetables that students can taste and that could be grown in their gardens. Refer to the lesson to include both cool season and warm season crops.
USDA FNS People’s Garden School Garden Pilot Project: Healthy Gardens, Healthy Youth

Tips for Working with Kids and the Garden

The following tips are from HGHY Master Gardeners and site leaders and are based on their experiences gardening with kids. These are tips for both school and the summer programs. A sample in-garden lesson outline can be found at the end of this document.

Be Prepared

- Send home information about the garden program including the details about who is leading the program, what the kids will be doing, where the gardens are located, when the kids will be gardening, what is happening with the garden produce, and expectations of the young gardeners. All gardeners should be wearing close-toed shoes and have sun protection. They will not be allowed to work in the garden or with food if they are sick or have been sick within the last 24 hours.

- Every time you go to the garden, take supplies such as a first aid kit, wet wipes, water jug with cups (or have kids bring their own water) and water for washing the produce.

- Use lesson plans and educational resources to prepare for each session. Play a game, sing a song, act out a play, read a book, or make a garden-based craft each session. Remember to have fun! See the Sample Garden Session outline at the end of these tips.

Working With the Kids

- Make sure the young gardeners know the 3 R’s garden rules: Respect, Responsibility, Readiness.

- Be fully prepared before heading to the garden so there will be little down time for the kids. The tools and any supplies should be easy to access and ready to go. Break large groups into manageable sizes. Have more than one activity and rotate them. Keep every child busy and on task or their attention will shift and they will drift. Have enough adult supervision to make this happen.

- Always demonstrate before letting the kids work on their own. The more adult helpers you have to float around and guide the kids, the better. Do not do things for the kids, show them how and have them show you how back.

- Check their work. Don’t take their word for it when they say they have completed a task. You might find that things were missed.

- Take frequent shade and water breaks. Break times are good times to introduce healthy snacks, books, garden journals, or other hands-on activities.

- Every child will appreciate some one-on-one time with instructors while working in the garden. Let them tell their stories and show you the weeds they found and pulled, etc.
Planning the Garden

- Use the hands-on, deeply aligned classroom lessons to help the students plan their gardens. The kids will have fun learning and taking ownership of the garden. They will get excited about choosing what to plant and how much they need to plant by doing these lessons. A Master Gardener or an experienced gardener is a valuable resource to help kids discover what crops can be grown in the climate and in the amount of space they will have to garden. Start a Garden Journal or Garden Records right away.

- Young students are not able to prepare the site for gardening. Master Gardeners and others can provide leadership for that. FFA students, parents, Ameri-Corps, Food Corps, garden clubs, retired teachers, neighbors and others have been instrumental in preparing the gardens and helping the youth in the planning stages.

- For the young children, have the sections of the garden already measured out and marked according to the garden plan. For the older youth, help them measure and mark the garden sections.

- Kids like to use garden tools, but they LOVE to use child-sized tools such as kid-sized rakes, hoes, shovels, watering cans, and gloves. The type of garden tools they need depend on the type of garden they will be working with and how it is planted – square foot vs. rows. They can share tools. Older students have been using adult-sized tools and even tools that have been loaned by Master Gardener groups.

- Master Gardeners and FFA members are using their green houses to start seeds and grow transplants for the school gardens.

Help the students start a compost bin and get the whole school involved.

Planting

- Go over tool safety rules for hoes, trowels, and rakes. A tool safety game is part of the gardening curriculum.

- Go over ways the plants in your garden are going to be planted: seeds, sets, transplants, seed pieces.

- Plant fast growing (cool season) crops like radishes and spinach for early satisfaction. Try to stagger your crops for constant harvest opportunities. Make sure the students will have something to harvest when they return to school in the fall.

Maintaining

Watering

- Watering is extremely important, especially in raised bed gardens. If you are meeting just once a week, you may have to make plans for additional watering. Families, youth groups, organizations, neighbors can sign up for times. Someone will need to be responsible to make sure the watering plans are carried out.

- Using a watering wand is a good way to water the garden. Show how to water at the base of the plant. Teach the kids to count how long it takes to water a plant.
Weeding
- Help the kids distinguish the difference between weeds and garden plants. Show them how to pull weeds so that the garden plants are not disturbed. Tell them where you want them to put the weeds. Have challenges such as finding the biggest weed, most unusual weed, most weeds, etc. Talk about why some parts of the gardens have more weeds than other parts, etc.

Insects and pests
- Insects intrigue and scare children. They enjoy doing the lessons about pests and going on hunting missions to find and eradicate them. Getting to show everyone the squash bug they found – and sometimes their eggs – is a joy in and of itself!
- Use the lessons from Grades 2 and 4 to identify “good guys” and “bad guys” in the garden and to figure out what to do about them. Then help the kids take the next steps to protect their garden from unwanted pests.

Harvesting, Preparing and Eating the Produce!
- Kids get excited when they see fruits/vegetables growing on the plants. Make sure that they show everyone by pointing and not picking! Describe what to look for to determine when the fruits/vegetables are ready to harvest.
- Show kids HOW to harvest produce gently. For example, gently hold a bean plant before pulling off the bean, cut the lettuce with scissors, etc.
- Kids love to harvest and taste the bounty. Try to include this in every lesson.
- Include in the lesson, ideas for how the food can be eaten. Simple recipes such as cucumber-flavored water, radish or veggie sandwiches, veggies with dip, cucumbers and onions in vinegar, etc. are the best. Get a large bottle of Ranch dressing because the kids will try anything they can dip! There are several ideas in the lessons.
- Show the whole vegetable before cutting it open. Have them find the seeds.
- Plastic plates and knives can be used for cutting and preparing produce.
- Help the kids put their gardens to bed.
Our Food Garden Plan

CONTENT OBJECTIVES
Identify and select locally grown fruits and vegetables to plant, grow, harvest and eat. Use a variety of mathematic and science concepts and skills to create local garden plans and calendars.

LIFE SKILL OBJECTIVES
Critical thinking, Problem solving, Decision making, Healthy living, Communicating (listening, asking and responding to questions), Citizenship (teamwork), Leadership (sharing an idea to improve something)

INDICATORS
Students will develop a productive garden plan that will demonstrate how much healthy food can be grown in a limited amount of space.

EVALUATIONS

SUBJECT STANDARDS
21st Century Skills: Employability skills, Health literacy
Science: Science as inquiry, Earth and space, Life science
Mathematics: Operations and algebraic thinking, Numbers and operations, Measurement and data, Geometry, Mathematical practices
Social Studies: Economics, Geography
Literacy: Reading, Speaking, Listening, Viewing

CORE CONCEPTS AND SKILLS
Linguistic-words, Logical-mathematical, Spatial-visual, Bodily-kinesthetic, Interpersonal, Intrapersonal, Natural

LEARNER TYPES

MATERIALS
See TEACHER’S NOTES following this list to find help with these materials and to deliver this lesson. Working with local partners grows community capacity and sustainability.

White paper (two sheets per student)
Crayons or colored pencils
2 to 4 long tape measures
Masking tape
White or black interactive board, or large sheet of paper and markers or chalk (see chart in Introduction section)
Where We Live Fruits and Vegetables Sampler (see the TEACHER’S NOTES following this Materials list)
Small paper plates (one per student)
Napkins (one per student)
Food handling gloves (optional, wash hands thoroughly)
Garden Grid (There are two pages of garden grids. Choose the page that fits your garden space. Make a copy to show the class. The grids are found at the end of this lesson)
3 sheets of plain paper (write Small, Medium, and Large on them)
Fruit and vegetable squares (copy and cut, one square per person, found at the end of this lesson)

Materials continued on the next page.
Raise your hand if you have ever planted a garden.

**What did you grow in your garden and why?**

Have a few students share their experiences.

Hand out white paper and ask the students to use their crayons or colored pencils to draw a picture of one fruit or vegetable they might like to grow and eat. Tell them that they will have five minutes to draw and color their fruit or vegetable. Remind them to choose their own fruit or vegetable and not copy others.

While they are drawing, use tape measures and masking tape to create the outside edges of a floor garden in your classroom. The garden should be almost large enough for the students to “plant” their drawings. A 4’ x 8’ garden is an example of a raised bed garden. Draw and color your own fruit or vegetable.

Have the students bring their drawings and sit around the floor garden space.

The masking tape marks the outside of what we are going to call “Our Floor Garden.” One by one, please stand up and tell us what fruit or vegetable you drew and why you chose it. Then you can plant your picture somewhere in “Our Floor Garden” space. I will start.
Don’t be concerned if the fruit really comes from an orchard or vineyard. Plant everything in the
garden for now. Once the drawings are in the garden, proceed with the following discussion ques-
tions and give the students an opportunity to change where their fruits and vegetables are growing.

Take a good look at our fruit and vegetable garden.

**Have you ever seen a real garden that looks like ours?**

**What makes ours different?**

Possible answers include:

- The floor garden is a non-living thing made up of the floor, masking tape and paper; real gardens grow living things.
- One garden doesn’t usually have this many kinds of plants and numbers of plants.
- There are too many plants in this garden. The plants are piled on top of each other.
- Some of these plants don’t grow here.
- Some fruits grow on trees. Trees usually grow in orchards or in the yard, not in gardens.
- The same fruit or vegetable is scattered around the garden and they usually grow
together in a row, section or square, or a patch.

Let’s make “Our Floor Garden” look more like a real garden.

1. **Sort the pictures into groups of similar plants.**
2. **Identify the fruits that grow on trees and plant them in an orchard somewhere else in the room.**
3. **Replant the rest of the pictures in similar groups.**
4. **Discuss the amount of space and the variety of plants in your floor garden.**

Gardeners like to record things about their gardens so they know what to plant, how much, when to plant and so on. Let’s record things about “Our Floor Garden” using a chart.

*On the board or a large sheet of paper, make a chart with four columns similar to the il-
lustration on this page. You may need two charts depending on the number of fruits and vegetables you will be working with.*

Ask the students to name and count each of the fruits and vegetables in “Our Floor Garden.”
Record the information in the “Fruits or Vegetables” and “Quantity” columns. Add the number of different kinds of fruits and vegetables and the quantities and record the total at the bottom of each column. The quantity total should equal the number of students plus you.

In the **Ranking** column, have the students rank the fruits and vegetables from most popular, number 1, to least popular. You may want to create a bar chart with this information.

You might want to take a little survey and have the students raise their hands if they have tried eating each of the fruits and vegetables. Challenge them to try something new from the list.

*We just started to plan a garden. I would love to actually grow this garden, wouldn’t you?*

**What are some questions we’d have to ask ourselves before we could plant our classroom fruit and vegetable garden?**

Examples of questions:

- Can the fruit or vegetable grow where we live?
- How much space does each plant take and how much food does each plant produce?
Now you can go harvest your fruit and vegetable pictures out of the garden and take them back to your seats. We will reuse the pictures. We are going to take what we learned and plan “Our Food Garden.”

**Do**

- Is there enough space to grow all the plants?
- When can we plant it and when can we harvest it?

**Teacher’s Notes:** See the “Where We Live” Fruits and Vegetables Sampler described in the Teacher’s Notes at the end of the Materials list. Wash and precut samples and store them in bags. Save a whole one to show the students and to demonstrate how to prepare or cut it. Invite a few students to help distribute the samples. You may want them to wear gloves or use tongs to put the samples on one paper plate per student. Students are more likely to try new fruits and vegetables if you add some ranch dressing or a dip on their plates. Additional local fruits and vegetables could be discussed by showing pictures from food packages, cans, models, internet sources, magazines, or food advertisements. Explain that most of the frozen and canned fruits and vegetables they eat are not grown locally. Often times fresh fruits and vegetables come from hundreds or thousands of miles away.

Have the student helpers wash their hands first and then have the rest of the students wash their hands. Clean the serving table and your hands. Then set up the table with the fruits and vegetables, cutting boards, knives, gloves, paper towels, paper plates, and napkins. Have the student helpers put the paper plates out on the table so that they can place one sample of each fruit or vegetable on each plate. When the other students are done washing their hands, have them pick up their sample plates and take them back to their seats. **Instruct them not to eat anything on their plates until they are told.**

We make a lot of our food choices based on how things taste. Fruits and vegetables are healthy food choices. They are called “GLOW” foods because the vitamins and minerals in them can make shiny hair, sparkling eyes, glowing skin, and healthy or glowing bodies.

We are going to taste fruits and vegetables that can grow near where we live and that we might be able to grow in our garden. I grew/bought these at ______________________. I kept most of these in the refrigerator to keep them fresh until we needed them. Then I washed and cut them into sample sizes. Please don’t eat them until we can talk about each one. Let’s see if you can identify them and then we’ll taste them one by one.

**Show one whole fruit or vegetable at a time. Have the students tell what it is. Then have them describe the outside, slice it open and have them describe the inside. Have the students find and try that fruit or vegetable from their plate. Have them describe the taste, texture, and smell. Then use the same procedure to move on to the next fruit or vegetable. If you want to introduce more locally-grown fruits and vegetables, show pictures of them.**

**Have the students find the fruits and vegetables they just ate or learned about in the first column of the “Our Floor Garden” chart. Circle the fruits or vegetables as the students identify them and add new ones to the bottom of the list.**

Think about each of the vegetables you just ate and which ones would be your first and second choices to plant in our garden. We will take a hand vote and make a tally mark for
each vote beside the vegetables on our chart. You will get two votes – one for your first choice and one for your second choice. When we are done, we will count the number of tally marks and determine what we will be growing in our garden. (Ask if there are any questions. You may want to ask students to help count and to make the tally marks. Remind them that they can vote twice. Proceed with the vote.)

As a class, count up the number of tallies for each fruit or vegetable and record the number next to the tally marks. Compare the quantity, ranking, and tally columns and discuss the most popular fruits and vegetables on the chart. Put a star next to the top four to six choices. Make sure that there are two or three cool season crops such as lettuce, spinach, radishes, and green onions. You may be able to plant and harvest those before you plant the warm season crops.

We are getting closer to deciding what we will plant in our garden. What do we need to know about these plants before we include them in our garden?

Examples of questions:
- How many fruits or vegetables does one plant grow?
- How many plants do we need to grow and is there enough space in our garden?
- When will we get to eat the fruits and vegetables that we plant?

There are many decisions to make when you are planning a garden. In order to find the answers to our questions, we will need to gather more information.

TEACHER’S NOTES: Start this section on another day or after students have had a brain break. This section relates to decisions regarding space in the garden. If you haven’t had a lot of gardening experience, you may want to find expert help from the list of partners in the TEACHER’S NOTES following the Materials list. Here are some things you will need to prepare ahead of time.

1. Choose the Garden Grid page that best fits your garden space and make at least two copies. One should be the grid that you work on with the students, the other will be the final garden plan. Once the final plan is completed, make back-up copies. If you are using the 10’ x 15’ grid, make an outline the size or your actual garden space before you share it with the students.

2. Make a list of the crops that you will probably end up planting from the students choices and be sure to include spring and fall harvest crops. We suggest starting a new garden with just vegetable crops, unless you want to try melons. Fruits either grow on trees or take a few years to produce a good crop. You can add those fruits another year.

3. Copy the vegetables and fruits picture squares at the end of this lesson. Cut apart each square so everyone receives on picture. If the vegetables or fruits you are planting are not pictured, use the blank square to draw and label your own picture. Write “Small”, “Medium”, “Large” on separate pieces of paper to use as headers for three columns. Project or make a copy of the Planting Guide chart found at the end of the lesson so that everyone can refer to it. You may want to use poster board to make a sample of Square Foot Garden Templates 1 and 2 found at the end of this lesson.

4. If possible, go outside where you can look at your garden spaces. Otherwise, mark out your garden spaces on the floor. You may want to show pictures of the type of garden you will be planting from the Internet.

5. Continue to use “Our Floor Garden to Our Food Garden” chart.
ACTION STEPS to explore the relationship between the space in the garden and the food plants you want to grow

1. **Work together to find out how much space you will have to grow food in your actual garden.**
   
   Display the “Garden Grid” where everyone can see it.

   I have started a plan on this Garden Grid that will become “Our Food Garden Plan”. We will use it to plan the garden(s) that we will grow. This will help us to grow the kinds and amounts of fruits and vegetables that we want to eat.

   **What is/are the basic shape(s) of our garden spaces?**
   
   You may have different shapes depending on the use of containers. Most raised bed and tilled food gardens are rectangle, but they don’t have to be.

   We will be planting gardens in (container/raised bed/or tilled) gardens. (Explain the differences by showing them the actual garden spaces or showing pictures of each kind of garden space.)

   Go outside or somewhere that you can view and measure the garden(s) you will be planting. If that is not possible, use your floor to work with the students and tape out the sizes and shapes of your containers, raised beds or tilled gardens.

   Have the students count off by four vegetables that you are planning to plant in your garden, for example, radishes, lettuce, sweet potatoes and pumpkins. Then have all the radish students stand on one side of the garden space, the lettuce students stand on another side and so on.

   Show them the tape measure and talk about how it works. Give a tape measure to a student at one corner of the garden. Have them hold the end of the tape to the corner of the garden and pass it down his or her side of the garden until it reaches the other end. Show the last person how to lock the tape measure. Have everyone on the same side lay the tape measure along the edge of the garden to make sure it is flat. Have them read the tape measure and record the measurement on the outside edges of the garden on “Our Food Garden Plan.” If you have four tape measures, it would be good to leave them around the edges of the garden to show everyone how that looks. You may want to introduce the concepts of perimeter and area.

   Now that we know how much garden space we have to work with, let’s see how many plants we can grow in “Our Food Garden.”

2. **Work together to find out how big the plants will grow.**
   
   Write “Small,” “Medium,” and “Large” on three pieces of paper and place them like column headers on top of a large table or on the floor.

   Distribute the vegetable and fruit pictures, at least one per student.

   Display the “Plant Sizes” chart where everyone can see it.

   Invite the students to bring their squares with vegetable or fruit pictures to come and sit or stand around the small, medium, and large column headers. Have someone read
the title of the “Plant Sizes” chart and another student read the column headers. Talk about the measurements that determine whether a plant is small, medium, or large. Show what 3 inches, 6 inches, and 12 inches looks like on a ruler. Explain that some plants grow even bigger than that.

**Why do we need to know how big our vegetable and fruit plants are going to grow?**

It helps us to find out what plants and how many of them can fit into our container, raised bed, or traditional tilled (in the ground) gardens. It also tells us how far apart to plant our seeds or young plants.

You each have a small square with a picture on it. **Do you think the vegetable or fruit on your square comes from a small, medium or large plant?**

Let’s find out.

We have “Small,” “Medium,” and “Large” column headers on the table/floor just like you see on the “Plant Sizes” chart. One person at a time, please tell us what vegetable or fruit you have and if you have ever seen it or eaten it before. Then guess if your vegetable or fruit comes from a small, medium, or large plant and put your picture square in the right column. We will use the chart to see if you guessed correctly. (Everyone can help each other through this activity. Many students may not have heard of their vegetable or fruit.)

Let’s use “Our Floor Garden to Our Food Garden” chart and compare our pictures to the circled fruits and vegetables on the chart. Remove the vegetable and fruit squares that we didn’t eat or learn about. Those vegetables and fruits may not grow well here and we will most likely not be planting them in our garden.

Look at the remaining vegetables and fruits in our columns. We could grow these plants here, but we want to take a closer look at just the plants we want to plant in our garden. Look at the fruits and vegetables on the chart that have stars in front of them. Remove all the other vegetable and fruit pictures until all that is left in the “Small,” “Medium,” and “Large” columns are the plants that we want to grow in our garden.

Focus on the characteristics of the plants that remain in the columns. Medium sized plants start to look like small shrubs with branches. Large sized plants may grow tall or like vines or tall plants that spread out. Discuss how many fruits or vegetables come from each of the plants and how many plants you would need to grow to produce a sample for everyone to eat. For example, you may want to grow one radish per person, one lettuce plant for two or three people, one cherry tomato plant, two hills of sweet potatoes and so on. Record the number of plants you think you need in the margin next to the fruit or vegetable on the “Our Floor Garden to Our Food Garden” chart. Have the students return to their seats.

3.  **Work together to see if the plants fit into our garden.**

Let’s see how our plant choices from “Our Food Garden” chart will fit in the gardens we are going to plant. Take out your rulers, markers or crayons, scissors, and the fruit or vegetable pictures you drew. (Have your own supplies, plus newspapers.)
What large plants do we want to plant in our garden and how many did we think we needed?
(You should have at least one of these plants because they will provide your students with something to harvest in the fall when they return to school.)

Distribute individual pages of the newspaper and have students work together to measure and cut 12 inch to 15 inch squares that will represent the large plants in the garden. Have them write the name of the vegetable or fruit and draw a picture of it, on top of the square.

Have the students take the large squares and place them on your actual container, raised bed, or tilled garden spaces or on the floor gardens taped on the floor. You may need to hold the papers down with a rock or stake them down with a small stick.

Repeat this process with the medium and small plants by making 6 to 10 inch squares and 3 or 4 inch squares. Use the paper from their fruit and vegetable pictures especially for the small plants.

Give the students five minutes to work together to fit all the crops into the actual container, raised bed, or tilled garden spaces or the taped spaces on the floor. If you are outside, use coins, erasers, or rocks to hold the papers in place.

Discuss how the garden turned out.

There is one more thing we need to explore about plants in the garden that may help us grow everything we want to grow. Let’s see if a planting guide will help us grow more things in our garden.

4. Explore the possibilities of using a planting guide to grow more crops in your garden space.
Display the “Planting Guide” chart where everyone can see it. Have a calendar handy to count the days from planting to eating.

This is a “Planting Guide” chart. It shows how many days it takes from the time you plant a seed or young plant to the day you can harvest and eat it. It is arranged in small, medium and large crops so we can easily use it to think about how we might be able to rearrange the plants in our garden or grow them at different times.

Go through the chart and highlight or circle your garden choices and the days until the vegetable or fruit is most likely to be ready to eat.

Most of the small vegetables can be planted inside in late winter or outside in a raised bed when the ground is workable. Refer to the chart and a calendar to show students when you may be able to plant the small crops and then count the number of days until harvest. Mark the beginning and end dates on the calendar.

Is it possible that we could plant the small plants or crops and be able to eat them before school is out in the summer?
Yes
If we harvested the small plants, what could we make with them?
Possible answers include: Veggies and dip, salads, wraps, sandwiches, egg rolls

Some of the medium and large plants, such as tomatoes, broccoli, eggplant and peppers can be started from seed in containers in the classroom and they can be planted outside once the chance of frost has passed. Use a calendar and show the students when you may be able to plant the medium and large crops. Then have them use the chart and calendar to count the number of days it will take for the fruit or vegetable to grow and be ready to eat.

Is it possible that we could plant the medium and large plants before the end of the school year and come back at the beginning of the next school year to harvest and eat them?
Yes

What can we do with this information to help us plant and harvest all the fruits and vegetables we want to plant?
We could plant the small plants and harvest them. That would leave a space in the garden to plant the medium and large plants. If we started some of the medium and large plants in our classrooms, we could give them a head start and move them outside when there is space.

5. **Plan the garden to make everything work.**
An efficient use of garden space that incorporates ease of planting in container and raised bed gardens is Mel Bartholemew’s Square Foot Gardening method. You can combine the square foot method and try row gardening in a tilled garden (traditional, in the ground). The students will be using square foot templates to plant the garden. Therefore, when the students rearrange their plant squares, have them try to work in square plots instead of rows.

One more thing we can do to get the most food from our garden is to use a planting method called square foot gardening. This time when we arrange our small and medium plants in the garden, we can group them in squares of plots instead of rows.

Let’s go back to the garden and put the puzzle together using our plant squares as the puzzle pieces.

Use the raised bed and tilled garden plans found at the end of this lesson and the container garden illustrations on this page as examples for the students. Have the students compare the illustrations with their garden plans made by squares in the garden. Remind the students that they can use double cropping or use the space to grow spring harvest crops and then replant the garden with late summer and fall harvest crops.

Other adults or high school volunteers and mentors can work with the students to rearrange the plant squares into a spring harvest garden and then a late summer and fall harvest garden. You may need to add or subtract plant squares.

**Special note:** You may want to tape the squares together and display your garden plan like a mural or quilt on the wall.
IMPORTANT: Draw the spring harvest and late summer or fall harvest garden plans on the “Our Food Garden Plan” worksheets. Write the name of the plants and the number of plants in each of the sections. Record any other notes on the Plan.

We now have “Our Food Garden Plan” to help us move closer to planting.

What can we do to have more fruits and vegetables for our school?

Possible answers include:

- Work with local food producers, gardeners and farmers to share what they grow.
- Work with the community and neighborhood garden site to grow more food.
- Partner with high school students and teachers in horticulture, FFA, or 4-H.
- Expand your gardens to nearby empty lots, public spaces, senior centers, health and wellness centers, after-school program sites, etc.
- Explore the possibilities of adding different types of containers to grow food such as kid’s swimming pools to grow melons or pumpkins, or using wagons or wheelbarrows or decorated oil drums on wheels.

You may choose to actually expand your garden or access to healthy foods in one or more of the ways mentioned above. If so, have the students use what they have learned to plan another garden. If you are new to gardening, starting small is a good idea.

**MY HOME FOOD GARDEN PLAN**

Distribute plain sheets of paper or blank copies of one of the Garden Grids found at the end of the lessons. The students will need their pencils and rulers.

At the top of your paper write “My Home Food Garden Plan” and put your name below the title. This is an opportunity for you to draw a food garden plan that you can share and do at home. If you don’t have a yard, you can plant some plants in different containers or in a windowsill garden. Or, you can have a space in a community or neighborhood garden. Think of the type of garden spaces you can create at home and the plants that you might be able to help your family grow. Use “Our Food Garden Plan” and the charts as a guide. Start small to keep things manageable, you won’t have all your classmates to help you. If you already have a garden, draw a section of it where you might be able to make your own plans.

Ask some of the students to share their plans with the rest of the class. Have them stand where everyone can see their plan and speak loudly so everyone can hear.

Collect their garden plans and see what they learned. Give them suggestions so that they can actually use the plan or part of the plan at their homes.

Make copies of the family letter found at the end of this lesson on the back of the students’ “Home Food Garden Plans.” Have the students write the date at the top and sign their own names after “Thanks!” Send the students home with their letters and their garden plans. Have them describe their garden plans to their families. A few days later, give them an opportunity to share their families’ reactions to their plans.
Garden Grid

OUR FOOD GARDEN PLAN

Name

= 1 square foot

Grade 2 Lesson 3

Printed with Permission, February 2012
Garden Grid

**OUR FOOD GARDEN PLAN**

---

**4' x 8' RAISED GARDEN**

- Grid layout with labeled axes

**15” x 30” EARTHOBOX™ CONTAINER GARDENS**

- Diagrams of container gardens with dimensions

---

**Name**

---

---
### PLANT SIZES

**How big will plants grow?**

<table>
<thead>
<tr>
<th>SMALL 3 to 5 inches</th>
<th>MEDIUM 6 to 24 inches</th>
<th>LARGE 24 inches or more tall or long</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VEGETABLES</strong></td>
<td><strong>VEGETABLES</strong></td>
<td><strong>VEGETABLES</strong></td>
</tr>
<tr>
<td>Beets</td>
<td>Asparagus</td>
<td>Brussel sprouts</td>
</tr>
<tr>
<td>Carrots</td>
<td>Beans</td>
<td>Cucumbers</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>Broccoli</td>
<td>Okra</td>
</tr>
<tr>
<td>Onions</td>
<td>Cabbage</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Radishes</td>
<td>Cauliflower</td>
<td>Pumpkins</td>
</tr>
<tr>
<td>Garlic</td>
<td>Collards</td>
<td>Summer squash</td>
</tr>
<tr>
<td>Kale</td>
<td>Eggplant</td>
<td>Sweet corn</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Peas</td>
<td>Sweet potatoes</td>
</tr>
<tr>
<td>Mustard greens</td>
<td>Peppers</td>
<td>Tomatoes</td>
</tr>
<tr>
<td>Spinach</td>
<td></td>
<td>Tomatillos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Winter squash</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Zucchini</td>
</tr>
<tr>
<td><strong>FRUIT</strong></td>
<td><strong>FRUIT</strong></td>
<td><strong>FRUIT</strong></td>
</tr>
<tr>
<td>Strawberries</td>
<td>Blueberries</td>
<td>Grapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muskmelon (cantaloupe)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watermelon</td>
</tr>
</tbody>
</table>
1. Make a copy of this page.
2. Cut around the 4 inch squares and cut out the circles.
3. Place one template on one corner of a poster board.
   Draw around the outside of the square and around the circles.
4. Use the same template four times to make a square foot gardening guide.
5. Cut around the square foot and cut out the circles.
6. Write the names of the crops in the center of the guide.
7. It is best to laminate these guides to keep them in good shape from year to year.
# PLANTING GUIDE

<table>
<thead>
<tr>
<th>VEGETABLES OR FRUIT</th>
<th>DAYS UNTIL HARVEST*</th>
<th>PLANTING DATE</th>
<th>HARVESTING DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMALL PLANTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>60 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrots</td>
<td>60 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onions</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radishes</td>
<td>30 - 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kale</td>
<td>60 - 70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lettuce</td>
<td>30 - 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustard greens</td>
<td>40 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinach</td>
<td>35 - 40</td>
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<td></td>
</tr>
<tr>
<td><strong>MEDIUM PLANTS</strong></td>
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<td></td>
</tr>
<tr>
<td>Asparagus</td>
<td>3 yrs after first planting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>50 - 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td>60 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>60 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cauliflower</td>
<td>60 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collards</td>
<td>50 - 55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggplant</td>
<td>75 - 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Okra</td>
<td>70 - 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>50 - 75</td>
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<td></td>
</tr>
<tr>
<td>Peppers</td>
<td>70 - 75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strawberries</td>
<td>1 yr after first planting</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LARGE PLANTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brussel sprouts</td>
<td>90</td>
<td></td>
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</tr>
<tr>
<td>Cucumbers</td>
<td>50 - 70</td>
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<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>70 - 110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumpkins</td>
<td>90 - 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer squash</td>
<td>60 - 75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet corn</td>
<td>65 - 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>100 - 110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>70 - 80</td>
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<tr>
<td>Tomatillos</td>
<td>70 - 80</td>
<td></td>
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<tr>
<td>Winter squash</td>
<td>90 - 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zucchini</td>
<td>60 – 75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muskmelon (cantaloupe)</td>
<td>70 – 85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* varies with variety
# Garden Calendar

<table>
<thead>
<tr>
<th>JANUARY</th>
<th>FEBRUARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUN</td>
<td>MON</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>MARCH</th>
<th>APRIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUN</td>
<td>MON</td>
</tr>
<tr>
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<table>
<thead>
<tr>
<th>MAY</th>
<th>JUNE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUN</td>
<td>MON</td>
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</tbody>
</table>
# Garden Calendar

<table>
<thead>
<tr>
<th></th>
<th>SUN</th>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
<th>SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>JULY</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>AUGUST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td></td>
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</tr>
<tr>
<td>OCTOBER</td>
<td></td>
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</tr>
<tr>
<td>NOVEMBER</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DECEMBER</td>
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</tr>
</tbody>
</table>
## RAISED BED GARDEN PLAN

**SQUARE-FOOT METHOD FOR 4’ x 8’ RAISED BED**

<table>
<thead>
<tr>
<th><strong>SPRING</strong></th>
<th><strong>FALL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant as soon as soil can be worked.</td>
<td>Plant near the end of May.</td>
</tr>
<tr>
<td><strong>Leaf Lettuce</strong></td>
<td><strong>Butternut Squash</strong></td>
</tr>
<tr>
<td><strong>Onions</strong></td>
<td><strong>Potatoes</strong></td>
</tr>
<tr>
<td><strong>Beets</strong></td>
<td><strong>Grape or Cherry Tomatoes</strong></td>
</tr>
<tr>
<td><strong>Radishes</strong></td>
<td><strong>Peppers</strong></td>
</tr>
<tr>
<td><strong>Broccoli</strong></td>
<td><strong>Sweet Potatoes</strong></td>
</tr>
<tr>
<td><strong>Spinach</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Snap Peas</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TILLED GARDEN PLAN

SQUARE-FOOT METHOD FOR 10' x 15' GARDEN

cucumber  cucumber  tomato

pepper  pepper  pepper

beans

WALKWAY

broccoli  broccoli  cabbage

cucumber

cabbage

broccoli  broccoli  cabbage

onions

trellis

lettuce  flowers  peas

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IOWA STATE UNIVERSITY
Extension and Outreach
Healthy People. Environments. Economies.

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Dear Family,

Our class is planting a garden. We are excited to grow food to eat at school. Did you know that I tried some new fruits and vegetables today?

We made up plans for home food gardens. Do you think my garden plan would work in our yard or in some containers? Please help me make changes.

My teacher would like me to bring my plan back to school so I can share it with the class.

Thanks!
Planning a Healthy Garden

Lesson four: How do we make a garden calendar? “Seasons Through the Year” from FOOD, LAND & PEOPLE: RESOURCES FOR LEARNING, Food Land & People

Using a calendar and birth dates, students organize themselves into a calendar year and then into seasons. They share what the weather is like; what plants, animals, and people are doing; what foods are popular and why; and what celebrations occur besides their birthday.

Content objectives: Identify the seasons in cycle order and describe at least three things that occur in each season in gardens or fields, in their own community, and in an urban area.

Life skill objectives: Communication, Cooperation, Citizenship, Critical thinking, Healthy living

Core and STEM concepts and skills:
Science Earth and space, Life science
Math Numbers and operations
Language Arts Reading for literature and informational text, Writing, Speaking, Listening, Vocabulary
Social Studies Behavioral sciences, Geography, History

Healthy snack: A fruit or vegetable that is “in season”

Additional and supporting resources: The Reasons for Seasons by Gail Gibbons and Farming by Gail Gibbons (check library or purchase online)
Lesson 4: Seasons of the Year

*Seasons of the Year* is a lesson developed by Project Food, Land and People. This lesson, appropriate for Grade Level K-6, explores and builds awareness of seasonal change and how it affects growing.

Lesson objectives includes

- Identify the seasons in cycle order;
- Identify the season in which his or her birth date occurs and describe a season characteristic of the day;
- Describe at least three things that occur in each season in gardens or fields in their own community and in an urban area.

Although *Healthy Garden, Healthy Youth* received permission to use the lesson during the research study, we do not have permission to post the lesson at this time. To purchase this lesson, go to [http://www.foodlandpeople.org/ordering/gardenwise/](http://www.foodlandpeople.org/ordering/gardenwise/). Look for *Seasons of the Year*. You can purchase this single lesson as a digital download.
Lesson five: Where do seeds come from?

“Sunflower House” and “Germination” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

Where do seeds come from? What does one seed grow? How does a seed grow? Students make sunflower seed to seed models with some simple supplies and use them to explore the seed to seed cycles of other food plants. They also conduct two science experiments to see how a seed starts to grow. Students will taste seeds that are healthy vegetables. A lengthy list of children’s books about seeds comes with this lesson.

Content objectives: Describe the seed to seed cycle;
Understand how one seed can produce many seeds;
Understand how different things affect seed germination.

Life skill objectives: Learning to learn, Critical thinking, Problem solving, Decision making, Healthy living

Core and STEM concepts and skills:
Science Life science, Earth and space, Science as inquiry
Math Operations and algebraic thinking, Measurement and data,
Connections
Language Arts Reading, Vocabulary, Sequencing, Inferring, Interpreting, Viewing,
Speaking, Listening

Healthy snack: Seed snacks

Additional and supporting resources:
A Seed is Sleepy by Diana Hutts, Sunflower House by Eve Bunting, From Seed to Plant by Gail Gibbons, Pumpkin Circle by George Levenson, From Seed to Sunflower by Dr. Gerald Legg (check if available from library or purchase online)
LES S SI ON PLANS FOR 2011-12 SCHOOL YEAR    Grade 2

BEFORE THE LESSON

1. **Grade 2, Lesson 5:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.

2. Check materials list for complete description of items needed.

3. Check your library for the books associated with this lesson: *A Seed is Sleepy* by Diana Hutts, *Sunflower House* by Eve Bunting, *From Seed to Plant* by Gail Gibbons, *Pumpkin Circle* by George Levenson, *From Seed to Sunflower* by Dr. Gerald Legg (or purchase online).

4. Assemble necessary ingredients and materials for the Seed Snack.

THE LESSON

1. **Sunflower** and **Germination** are meant to be taught over several days.
   Students will check the growth of seeds they plant.

AFTER THE LESSON

Optional activities are included in the lesson plan include reading *A Seed is a Promise* by Claire Merrill. Consider doing “Banking on Seeds” the lesson from Project Food Land and People, available for purchase and digital download from [http://www.foodlandpeople.org/ordering/gardenwise/](http://www.foodlandpeople.org/ordering/gardenwise/)

Have students keep their bean seed growth chart in their garden journal.

RECIPE

**Seed Snack**  A variety of seed choices can be used as a snack: sunflower seeds, corn kernels or seeds, soy nuts, pumpkin seeds or dried peas. Or select fruits or vegetables with visible seeds: cucumber, snow peas, citrus with seeds, kiwi, strawberries (seeds on the outside).
Outdoor classrooms such as school gardens open up a fun new world full of discovering and learning. Outdoor classroom experiences are apply/expand activities that students can do and enjoy for the rest of their lives. School gardening helps students to:

- Learn life skills such as critical thinking, decision making, problem solving, healthy lifestyle choices, communication, cooperation, responsibility, respect, service learning, learning to learn, patience, and others;
- Gain knowledge and experience and increase interest in science, health, math, social studies, language arts, and the arts;
- Apply their learner types and challenge them to try new ones such as bodily-kinesthetic, spatial-visual, logical-mathematical, linguistic-words, intrapersonal, interpersonal, music, and natural (Howard Gardener's multiple intelligences);
- Increase vegetable and fruit consumption and physical activity;
- Grow healthy, fresh food for themselves, their families, others, or as a business;
- Identify hobbies or potential career interests;
- Set goals, plan, implement and evaluate activities;
- Identify local resources and partners to accomplish goals;
- Work as partners with caring adults to learn new skills and accomplish goals.

Corresponding lessons from Growing in the Garden:
- General Unit, Lesson 1: Project Discovery
- General Unit, Lesson 3: My Special Garden
- General Unit, Lesson 4: A Dream Garden
- Natural Resources Unit, Lesson 1: Sun, Soil, Water and Air
- Natural Resources Unit, Lesson 2: Just Right – Water and Light
- Plants Unit, Lesson 1: Start with Seeds
- Plants Unit, Lesson 2: Plant Parts Become Me
- Plants Unit, Lesson 6: Germination
- People Unit, Lesson 2: Claude Monet: Connecting Nature and Art
MATERIALS - Small yellow paper plates (one per student)
- Sunflower Life Cycle (one copy per student, found in this activity)
- Scissors (enough for everyone to share)
- Glue (enough for everyone to share)
- Tape (enough for everyone to share)
- Paint stir sticks (one per student)
- Sunflower seeds (You may want to use a small bag of bird food. You will need at least 6 seeds per student.)
- Brown crayon or marker (enough for everyone to share)
- Green dessert napkins (Cut along the fold line so two students can use a napkin. You may want to substitute green construction paper and cut out the leaves.)
- Sunflower head pictures or an actual sample (optional)

You may want to set the materials listed above in a supply station for everyone to walk by and pick up.

Hold up a yellow paper plate.
What shape is this?
Circle
What other things are circles?
Wheels, hoops, plates, pancakes, etc.

Wheels are circles that go around and around.

What is it called when a wheel or circle makes one complete rotation?
It is a cycle. You probably have a bicycle. “Bi” means two. “Cycle” means it goes around and around in complete circles. Bicycles have two circular wheels that go around and around to move you across the ground.

When something goes through a full cycle, where does it end?
Technically, a cycle never ends unless something stops it. In the case of a seed, a butterfly, or a food cycle, a cycle ends where it started and then it has the ability to start over again. We are going to make a sunflower seed to seed life cycle to show how one sunflower seed starts a cycle by producing a plant and ends by producing more seeds that can grow into more plants.

Have the students pick up their sunflower life cycle supplies or distribute one paper plate, a sunflower life cycle pattern, a paint stir stick, half a green napkin, and at least six seeds to each person. Have them use their own scissors, glue, tape, and markers or crayons.
SUNFLOWER SEED TO SEED CYCLE

1. Cut around the circular edge of the Sunflower Seed to Seed Cycle and glue it to the inside of the yellow paper plate.
   What is the picture at Step 1 of the Seed to Seed Cycle?
   It is a seed.
   What do you do with the seed to start the cycle?
   Plant it in the ground and water it.

2. Glue one sunflower seed to the bottom of the paint stir stick as if you were planting the seed in the ground and the stick was the stem that grew from the seed.
   When the seed is watered, what is the next step in the Seed to Seed Cycle?
   Hint: Take a look at Step 2 on the picture.
   The seed germinates or sprouts. The roots start first and then the leaves and stem grow up out of the ground.

3. Use a brown marker or crayon to draw roots growing out of the seed on the paint stick. The paint stick becomes the stem that grows out of the ground.
   While the small sprout or sunflower plant continues to be fed by the sun, soil, water and air, take a look at Step 3 and tell us what it does next.
   The stem and leaves continue to grow. You may begin to see a bud for the flower.
4. Take the green napkin and pinch it together in the middle to form two green leaves. Put tape across the pinched part of your leaves and tape them to the back of your stem or stir stick. **Take a look at Step 4 of the cycle and describe what happens after a sunflower grows a little taller?**
One flower starts to grow on the sunflower plant.

5. Make petals around the yellow paper plate, or sunflower blossom, by cutting slits from the outer edge of the plate to the Seed to Seed Cycle picture. You may want to bend some of the petals to make it look more like a real flower. Then put a strip of tape across the back of the paint stick to hold the flower in place. You may choose to glue the flower onto the stick. Look at your bright, colorful sunflowers. This is usually the favorite step or stage of growing a sunflower.
   **What happens when the sunflower begins to fade?**
   When flowers fade on plants, fruits form. The dried-up flower head is the fruit of a sunflower. It is represented in Step 5 of the Seed to Seed Cycle.
   **After the sunflower head dries, what is forming in the middle of the flower or fruit?**
   Sunflower seeds
   **Why is Step 6 written next to Step 1 of the Seed to Seed Cycle?**
   The sunflower plant has produced more seeds like the ones in the picture to start the Seed to Seed Cycle over again.

6. Glue several sunflower seeds in the middle of the Seed to Seed Cycle picture. You will see several rows of sunflower seeds in the center of a real sunflower. You may want to show a picture or have a real sunflower head for the students to examine.

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We have gone through one complete Seed to Seed Cycle of a sunflower.

**How many steps are there in the sunflower Seed to Seed Cycle?**
Six

The sunflower Seed to Seed Cycle also can be called a sunflower life cycle.

**How can the Seed to Seed Cycle be the same as a life cycle?**
When a sunflower seed is planted and watered, it starts a sunflower sprout or small plant. The sprout needs sun, soil, water and air to grow and become a healthy larger plant. Then a flower grows on the plant. The flower produces the fruit that contains many seeds. The plant dies, but the seeds from the plant can produce new sunflower plants with more seeds.

Let's say the steps together: seed, sprout, grow, flower, fruit, seed.

*Try this in the stomp, chant and clap activity below. Go through it once slowly, then speed up.*

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STOMP foot, CHANT “seed,” and CLAP at the same time
STOMP foot, CHANT “sprout,” and CLAP at the same time
STOMP foot, CHANT “grow,” and CLAP at the same time
STOMP foot, CHANT “flower,” and CLAP and the same time
STOMP foot, CHANT “fruit,” and CLAP at the same time
STOMP foot, CHANT “seed,” and CLAP at the same time
Germination

Lesson 5

CONTENT OBJECTIVES
Identify simple parts of a seed, Describe how seeds grow, List reasons seed germination is important to the students and others

LIFE SKILL OBJECTIVES
Learning to learn through observing, experimenting, and recording; Responsibility; Critical thinking; Problem solving; Decision making; Communicating with yourself and others

INDICATORS
Accurate completion of the Germination Record activity sheet, Promise statement about what they would do to germinate a seed or grow a plant, Oral and written responses to questions, Completion of paper chain characteristics of seeds, Use of germination tests to decide what seeds to grow

EVALUATIONS

SUBJECT STANDARDS
Science: Life (characteristics of organisms, life cycles of organisms, organisms and environments) Social Studies: Individual development and identity Language Arts: Vocabulary, Reading, Factual understanding, Main idea, Interpreting, Inferring, Sequencing, Summarizing, Writing Math: Number and operations, Measurement, Data analysis and probability, Connections, Communication

LEARNER TYPES
Linguistic-words, Logical-mathematical, Spatial-visual, Bodily-kinesthetic, Interpersonal, Intrapersonal, Natural

MATERIALS
A Seed is a Promise by Claire Merrill (optional or use the summary in the Optional Activity Ideas found at the end of this lesson, see the Introduction section) Dry lima beans (from grocery store, two per student; see the Do/Reflect Part 1 section) Container or zip-closure bag (to soak the lima beans, see the Do/Reflect Part 1 section) A Seed is Sleepy by Dianna Hutts Ashton Strips of colored paper (at least six per student to write one word and to form into a paper chain, see the Do/Reflect Part 1 and Apply sections) Germination Record activity sheet (copy one per student and one transparency, found at the end of the lesson)

MATERIALS LIST continued on next page
MATERIALS continued
Overhead projector
Egg cartons (one per group of three students)
Potting soil (enough to fill egg cartons)
Scoop (something to scoop soil into the egg cartons)
Plastic spoons (one per group of three students)
Disposable plastic plates (one per group of three students plus three more)
Garden bean seeds (from garden store, approximately ninety; see the Do/Reflect Part 2 section)
Three different varieties of green bean seeds (from garden store, see the Apply section)
Pencils or pens
Rulers
Tape or staples and stapler (to complete paper chain)
Absorbent paper towels
3 clear plastic gallon-sized bags

INTRODUCTION

ENGAGE

SET THE STAGE
5 TO 10 MINUTES

Social Studies:
Individual development
and identity

Life Science:
Characteristics of organisms,
Life cycles of organisms,
Organisms and environments

Language Arts:
Reading, Vocabulary,
Factual understanding,
Main idea, Interpreting,
Inferring, Sequencing,
Summarizing

TEACHER’S NOTES: You may want to start this section by reading A Seed is a Promise by Claire Merrill. If you are unable to find the book, there is a short summary in the Optional Activity Ideas found at the end of this lesson.

Raise your hand if you ever promised someone something.

What are some of the promises you made?
What did you have to do or not do after you made the promise?
Could you keep your promise?
Why not?

What is a definition of a promise?
According to Webster’s New World Student’s Dictionary, Revised Edition, 2006, a promise is “an agreement to do or not to do something.”

How is a seed a promise?
If seeds are given the right conditions of sun, water, soil and air, they promise to try to grow into the plant that they came from. Seeds assure us that the species of that plant will continue on.

What kind of promises can seeds make to farmers or gardeners?
Their promises are that they will grow and produce crops if other factors or forces don’t interfere. Farmers and gardeners can use the crops to feed their families.

Can it take a long time for a promise to be fulfilled?
Yes, it might take an oak tree a few months to germinate and nearly 20 years before it is large enough to provide much shade or produce acorns.
GERMINATION BASICS

**TEACHER’S NOTES:** Soak enough dry lima beans at least an hour in warm water so that each student can examine two bean seeds.

Besides being a promise, seeds are many other things. Together, we are going to read *A Seed is Sleepy* by Dianna Hutts Aston. I am passing a strip of paper to each of you and after you have read a section in the book, write the descriptive word about seeds on your strip of paper. I’ll show you what I mean by writing the word “promise” on my strip of paper.

Pass the book around the room and have each student read one section or description such as “A seed is sleepy.” Write the descriptive words on the board as they read them. Have the student write the word that he/she read on his/her strip of paper.

After reading the story, use the questions and answers below and have each student read the word on his/her strip of paper and discuss what the word means. Then have the students put their strips on the corner of their desks to return to later.

Let’s see if we remember why a seed is all of these things:

Why is a seed (a) ... Promise?
(Every plant is a chance to grow into a plant like the one it came from.)

... Sleepy?
(Seeds don’t germinate until conditions are just right.)

... Secretive?
(Seeds don’t reveal themselves too early. It may take several years before some seeds germinate.)

... Fruitful?
(Most plants are flowering plants that produce fruits that contain seeds.)

... Naked?
(Some seeds hide in scales on cones rather than in fruit.)

... Many sizes?
(Some seeds are very tiny, almost microscopic; others are very large.)

... Adventurous?
(Some seeds have mechanisms that help them move with a breeze or float in water.)

... Inventive?
(Some seeds have mechanisms that help them stick to things or survive after they have been eaten. This helps them move from one area to another.)

... Generous?
(Seeds have a “coat” that protects the embryo, and seed leaves have the food to feed the baby plant before it emerges.)

... Ancient?
(Seeds can live a long time and still germinate.)
Why is a seed ...  Thirsty?  
*Seeds need water to grow.*  

... Hungry?  
*At first seeds use their own nutrients or food to grow. When a plant starts growing its own leaves above the ground, it needs nutrients from the soil.*  

... Clever?  
*Plants make their own food through photosynthesis.*

Distribute copies of the “Germination Record” activity sheet located at the end of the lesson and give each student two soaked bean seeds. Use the transparency copy or draw an outline of a bean seed on the board and proceed with the following discussion.

Take a close look at your bean seed. The clear “skin” on the outside of the seed is called the **seed coat**. It is stuck tight to the seed when it is dry and serves as a protective covering for the baby plant. When the seed coat softens in moist soil or water, it allows water into the seed, enabling the seed to begin growing. The seed coat may be thin like on this bean seed or very thick like a coconut. Draw the seed coat on the bean seed picture. Draw a line to the seed coat and label it. *(Do the same on your transparency or drawing.)*

You may want to refer to the diagram on this page or the cross section of the bean seed in *A Seed is Sleepy* by Dianna Hutts Aston.

Feel the seed between your thumb and pointer finger.  
**Can you feel a place on the seed that divides it into two parts?**  
Use your fingernail and gently break the seed into two parts.  
**What do you see?**

The two large pieces are called the cotyledons *(pronounced cot-y-LEE-dunz)*. They are sometimes called the “seed leaves” because they were part of the seed. In some plants, they are the first leaves to emerge from the soil. Some plants such as corn have seeds with only one cotyledon. Other plants such as beans have two. The cotyledons are the stored food for the young plant until it starts making its own food. Draw a line to the cotyledon on your drawing and label it. *(Do the same on your transparency or drawing.)*

**What color are the cotyledons when they are in the seed?**  
They are white. When the cotyledons or seed leaves grow above the soil surface and are exposed to the sunlight, they change colors.  
**What color do the seed leaves become when they are above the ground and in the sun?**  
Green  
**Why?**  
The chlorophyll in the cotyledons starts working, causing them to turn green. We will learn more about that in a lesson about photosynthesis.
On the inside curve of the bean seed you will see a tiny plant called the **embryo**. The embryo has a root, stem and leaves. Draw the embryo on your seed picture and label the root, stem and leaves. *(Do the same on your transparency or drawing.)*

When water is present, the seed coat will soften and water will soak into the cotyledons. The embryo soaking up some of the water and starts to grow. The root is the first part of the embryo to grow. It stretches out and pushes its way through the softened seed coat. The stem and leaves of the embryo then push out of the seed coat and grow up. The cotyledons on some plants such as beans grow above the soil. They stay in the soil on other plants such as corn.

Think about the story we read and your bean seeds to answer these questions.

**Why is a seed a promise?**
Every seed is a chance to grow into a plant like the one it came from.

**What things are needed to make this promise happen?**
Water, soil, air, light

**What are some reasons that seeds might not be able to fulfill their promise to grow into plants?**
The seeds may not have developed properly or have been injured by drying out, rotting, poor soil conditions, insect damage, animals ate them, etc.

**Why are ancient seeds able to sprout after thousands of years?**
They had been stored in a cold, dry, dark place. To preserve the species of certain plants, unique and rare seeds are stored in special rooms such as at a government facility near Iowa State University and at Seed Savers in Decorah, Iowa.

Seeds are like tiny time capsules. The seed is a time capsule that opens as soon as the conditions are right. For some seeds, this can be as soon as there is moisture present. Many seeds of perennial plants, such as trees and shrubs, need a few months of cold temperatures before they will sprout and grow. This prevents these seeds from spouting in the fall and the new, young plants from being killed by freezing temperatures.

Seeds of some plants need to pass through the body of a bird or animal before they will germinate. The acid in the stomach of the animals softens the seed coat that protects the embryo. Once the seed passes through the animal, it is able to take up moisture and sprout.

Some seeds live a very long time, waiting for the right conditions before they start to grow. Seeds might be considered the “resting stage” of a plant. Seeds of lotus, a water plant, have germinated more than 200 years after falling from their mother plant. Seeds of beans and squash have been found in ancient ruins that were more than 500 years old. They were like time capsules that were opened hundreds of years later!

**If a seed coat is very hard and solid, what can you do to that seed to make it grow faster?**
Soak it in water for a while. Use a file, such as a nail file, and file a small spot through the seed coat so that water can enter.
GERMINATION EXPERIMENT

Divide the class into groups of three. Give each group an egg carton and twelve bean seeds. Have the students scoop potting soil into the cells of the egg carton and plant one bean seed 1/4 inch deep in each cell. With a pencil have them number the cells on the lid from one to six. Have them water the soil well and set the egg cartons in a location that receives bright light.

Two days after planting, have the students predict what the seeds will look like. Then have the students use plastic spoons to carefully dig up the seeds in the two cells labeled “1,” put the bean seeds on a plastic plate, and look at them. The students should document the growth of their bean seeds on the “Bean Seed Growth Chart” found on their “Germination Record” sheets.

Four days after planting, have the students dig up the seeds in the two cells in row two, look at them, and record their findings on the “Bean Seed Growth Chart.”

Six days after planting, have the students dig up the seeds in the two cells in row three, look at them, and record their findings. They should measure any root growth that has occurred.

The students should continue digging, measuring and recording their findings until all the seeds have sprouted.

On the board, use the germination record from one group to plot out the growth rate of the bean plant, with number of days on the bottom (“Y” axis) and the length in centimeters or fraction of inches on the vertical (“X” axis). Plot out the root growth before plotting out the shoot growth. It should show a slow start and then more rapid growth with the root emerging first. In other words, the line curving up on the graph shows that once the seeds started to grow, they grew quickly.

Did the seeds change in size after only 2 days?
Yes.

How and why did they change?
They got larger because they absorbed water.

What was the first part of the young plant to break out of the seed coat?
Root

How many days did it take before you saw the seedlings above the ground?

What grew faster and longer on the young seedlings, the root or the stem?
Root

Why do you think the roots were the first thing to grow when the seeds germinated?
Roots absorb water and nutrients for the other parts of the plant.

Were the cotyledons above or below the soil after the young plant came out of the soil?
Above
What color were the cotyledons after they emerged from the soil?
Green

I am going to ask you a few questions and if you think the answer is “live,” raise your hand. If you think the answer is “die,” keep your hand in your lap.

If a seed is given enough water to sprout and then it dried out, would it live or die?
Die, because it started growing and can’t go back to “resting”

If a seed is soaked in a glass of water for a week or two, would it live and grow or die?
It didn’t get any oxygen so it will probably rot and die.

If a seed is kept at a uniform temperature and in a dry location for a hundred years, would it still be alive and able to grow if given the right conditions?
Depending on the species, yes, it would be alive.

Have the students give you their Germination Record sheets so that you can evaluate accuracy and completion. Read them prior to doing the Apply section so that if you need to review, you can do so.

**PROMISE STATEMENTS**

Seeds need the right conditions to fulfill their promise to grow.

What do you need to do to keep your promises?
Let’s refer to the steps or actions you need to follow to keep your promises as your “action plans.” Give some examples of promises you’ve made and your action plans to keep those promises.

What happens when a seed is unable to keep its promise?
The plant does not grow. Farmers and gardeners won’t buy that variety of seeds because they want seeds they can depend on.

What happens when you are unable to keep your promise?
What you promised does not happen. The people you promised something to may think you are not responsible to keep your promises and lack of trust may break down your relationship.

What happens when a seed is able to keep its promise?
A plant grows and produces food, clothing, shelter, beauty, and thousands of products. Everyone is happy.

What happens when you are able to keep your promise?
Whatever you promised happens. People will think you are responsible and trust that you will do what you say. Everyone is happy.

Have the students write a promise about what they would do to germinate a seed or grow a plant. Have them start with their name. Examples include: “Jessica promises to follow the seed packet directions for planting flowers.” “John promises to plant the tomato plant in a place where there is plenty of light, and he promises to keep it watered.” Underneath your promise, write an action plan or what you have to do to keep your promise. Then conclude with what you expect to happen after you have fulfilled your promise.
PAPER CHAIN CHARACTERISTICS OF SEEDS

Distribute at least four or five more strips of paper to each student.

Do you remember what a seed needs to fulfill its promise to grow?
Think about what you plant a seed in and what you do to get it to grow. There are four natural resources that both plants and animals, including you, need in order to grow. Write one or two of the natural resources on your strips of paper. (Sun, soil, water, air)

The author of the book A Seed is Sleepy used many descriptive words to teach us about seeds. You wrote one of the words on a strip of paper.

What else do you know about seeds?
Write one thing you know about seeds on each strip of paper. Consider what we read in the book and think about the seeds you see, the ones you eat, the many uses of seeds, what seeds grow into, what seeds need to grow, how they grow, and so on. Put your initial in the corner of each strip of paper you write on.

When they are done with writing what they know about seeds, attach all their answers together into a paper chain. Put it up in the room. See how big you can make it grow by proceeding with the following discussion.

Think about what you wrote and how long our chain is and answer the question, “How important is seed germination to you?”
(Go around the room and ask the students to answer the question based on what they wrote on their pieces of paper. Possible answers include: seeds grow the plants I eat; the trees we use for shelter or paper; the plants we use for clothing; the plants that produce food for animals; seeds are used for ethanol, soy diesel, corn syrup, salad oil, and thousands of other products; seeds are essential to growing more of the same kind of plant; growing and selling seeds are ways of making an income for a family; seeds make pretty flowers; seeds make nutritious foods; and so on.)

How important are seeds to our state and country?
Seeds have a huge effect on food and energy production for the United States and the rest of the world. We feed seeds to livestock such as pigs, cattle, dairy cows, sheep, laying hens, turkeys, horses, and goats here and around the world. Seeds are ingredients in thousands of products we use. Seeds produce biofuels such as ethanol and soy diesel to run our vehicles. Internationally recognized seed companies, such as Pioneer in Johnston, Iowa; they develop seeds that can be grown in a variety of soils and climates. Seeds bring millions of dollars into our economy. (You may want to add more links or papers to your chain or line.)

GARDEN DECISIONS

Let’s pretend that we want to decide what kind of green bean seeds would grow best in this year’s garden.

What is the first thing we could do to help us make a decision on what green bean seeds to buy?
Read the packet to determine characteristics of the green bean plant that grows from the seeds. (Pass sample packets of green beans around and ask the students to read any descriptions and length of time from planting to harvest.)
We could also conduct a germination rate to see how many seeds keep their promise to grow in each of the three varieties of green bean seeds.

Put ten seeds of one variety of green beans on a damp, absorbent paper towel on a plastic plate. Put another damp paper towel over the seeds. Put the plate of seeds in a clear plastic bag and seal it. Tape the name of the variety and the number of seeds on the top of the bag. Repeat for the other two varieties of green beans. Set the bags in a location that receives indirect light. Have the students predict how many seeds will germinate. Write their guess on the tape label on each variety.

After 5 days, check the seeds. Depending on the variety, it may take a week or 10 days for the seeds to germinate. Count the number of seeds that sprouted. Compare the number that germinated with the students’ predictions. Calculate the fraction or percent germination.

Were there differences in the germination percentages between varieties?

Based on the germination test and what you read on the packets of seeds, which seeds would you choose to plant in your garden and why? 
Have the class discuss it in small groups and share their consensus with the rest of the class.

Why is the rate of germination important to farmers?
If there isn’t a good germination rate in the field, the farmers’ yields go down. Farmers have actually used this test to decide what kind of seeds to grow in their fields.

Would the way the seeds are stored affect the germination rate? Explain your answer.
Yes. For example, the lupine seeds from *A Seed is a Promise* by Claire Merrill were stored in a cold, dry, dark hole in the ground where there was a constant cool temperature and no moisture to start the germination process. As long as the seeds are kept in a constantly cool, dry, dark environment, they will not germinate. Those seeds may germinate once they are placed in the right conditions of air, water and light. If seeds are stored in moist or wet places, they will not germinate; instead, they will mold and decompose.

Would having more seeds give us a better indication of the germination rate?
Yes. Farmers and scientists conduct germination tests using many seeds so that the results of the tests can be as accurate as possible.
OPTIONAL ACTIVITY IDEAS

MORE READING AND DISCUSSION

A SEED IS A PROMISE by Claire Merrill

Have the students read aloud A Seed is a Promise by Claire Merrill. If you are unable to locate A Seed is a Promise by Claire Merrill, here is a brief review, focusing on the parts that are pertinent to this lesson. You may choose to have a student(s) read the review.

A Seed is a Promise reminds us that we already know a lot about seeds. Seeds come from plants, and in every seed there is a promise that a new plant will grow, the same kind of plant that the seed came from. Seeds form in flowers of plants and travel away from the plant in a variety of ways. All seeds start with a chance to grow, but there are lots of reasons that they might not. You can find a tiny baby plant starting inside of seeds such as lima beans. As long as the tiny plant stays alive, there’s a chance that the seed can keep its promise. The author gives an example of ancient seeds found in northern Canada. A miner was digging and found some old animal burrows with bones and tiny seeds. Scientists discovered that the bones were from small burrowing lemmings that probably stored the seeds for food. The cold ground preserved the bones and seeds for thousands and thousands of years. Scientists used special wet papers to get the seeds to sprout and grow. The seeds had kept their promise.

The seeds that the miner found were thought to be between 10,000 and 15,000 years old. They grew into plants called Arctic lupine, which have tall spikes of flowers. You can buy and plant a variety of the lupine plant to grow at your home.

What did the miner find in the frozen earth in northern Canada?

Seeds and bones that were thousands of years old

Why were the seeds buried next to the lemmings’ bones?
The lemmings may have stored the seeds for food in their burrow.

What did the scientists do with the seeds?
They tested them to see if they would germinate.

What happened to the seeds they tested?
They sprouted after being underground for thousands of years.

Describe ways that seeds are like promises.

“BANKING ON SEEDS”

You may want to do the “Banking on Seeds” lesson from Project Food, Land and People: Resources for Learning. See the Resources section for more information.

REFERENCE AND RESOURCES

REFERENCE


RESOURCES


GERMINATION RECORD

BEAN SEED DIAGRAM

BEAN SEED GROWTH CHART

<table>
<thead>
<tr>
<th>DAYS AFTER PLANTING</th>
<th>OBSERVATION (measure root and shoot growth)</th>
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## Lesson six: How do we plant a garden?

“Planting” and “Nutrition Super Heroes” from SEED TO SALAD, Cornell University Garden-Based Learning and Ithaca Children’s Garden

How do you successfully plant a garden with twenty second graders? This lesson will help students mark and plant their gardens. They will be garden heroes for starting healthy gardens and they will be nutrition super heroes for running through obstacle courses, identifying nutrients and tasting fruits and vegetables that can grow healthy bodies.

### Content objectives:
Identify and use special tools and techniques to mark and plant a garden; Identify garden crops and match them to their nutritional contributions for good health.

### Life skill objectives:
Learning to learn, Critical thinking, Problem solving, Decision making, Communication, Citizenship, Leadership, Healthy living

### Core and STEM concepts and skills:

<table>
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<tr>
<td>Language Arts</td>
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<td>Interpreting, Viewing, Speaking, Listening</td>
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### Healthy snack:
Vegetable sampling from the garden or from those used in the Super Hero game

### Additional and supporting resources:

- Square foot gardening template (provided in lesson and garden resource toolkit) GROWING IN THE GARDEN: LOCAL FOODS AND HEALTHY LIVING, Lesson 5A, “Planting Our Food Garden”;
- Iowa State University Extension and Outreach
BEFORE THE LESSON

1. Grade 2, Lesson 6:
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.


3. Schedule additional help to plant in the garden: parents, Master Gardeners, etc.

4. Assemble necessary ingredients and materials for the selected vegetable sampling.

THE LESSON

1. Planting the Garden and Nutrition Super Heroes can be taught over two or more days.

AFTER THE LESSON

Have students draw pictures of the garden or describe their experience planting the garden in their garden journal.

RECIPE

Select veggies from the garden or from those used in the Nutrition Super Heroes activity: beets, carrots, green beans, corn, peppers, cucumber, lettuce, tomato, radish, peas, zucchini.
USDA FNS People’s Garden School Garden Pilot Project: Healthy Gardens, Healthy Youth

Tips for Working with Kids and the Garden

The following tips are from HGHY Master Gardeners and site leaders and are based on their experiences gardening with kids. These are tips for both school and the summer programs. A sample in-garden lesson outline can be found at the end of this document.

Be Prepared

- Send home information about the garden program including the details about who is leading the program, what the kids will be doing, where the gardens are located, when the kids will be gardening, what is happening with the garden produce, and expectations of the young gardeners. All gardeners should be wearing close-toed shoes and have sun protection. They will not be allowed to work in the garden or with food if they are sick or have been sick within the last 24 hours.

- Every time you go to the garden, take supplies such as a first aid kit, wet wipes, water jug with cups (or have kids bring their own water) and water for washing the produce.

- Use lesson plans and educational resources to prepare for each session. Play a game, sing a song, act out a play, read a book, or make a garden-based craft each session. Remember to have fun! See the Sample Garden Session outline at the end of these tips.

Working With the Kids

- Make sure the young gardeners know the 3 R’s garden rules: Respect, Responsibility, Readiness.

- Be fully prepared before heading to the garden so there will be little down time for the kids. The tools and any supplies should be easy to access and ready to go. Break large groups into manageable sizes. Have more than one activity and rotate them. Keep every child busy and on task or their attention will shift and they will drift. Have enough adult supervision to make this happen.

- Always demonstrate before letting the kids work on their own. The more adult helpers you have to float around and guide the kids, the better. Do not do things for the kids, show them how and have them show you how back.

- Check their work. Don’t take their word for it when they say they have completed a task. You might find that things were missed.

- Take frequent shade and water breaks. Break times are good times to introduce healthy snacks, books, garden journals, or other hands-on activities.

- Every child will appreciate some one-on-one time with instructors while working in the garden. Let them tell their stories and show you the weeds they found and pulled, etc.
Planning the Garden

- Use the hands-on, deeply aligned classroom lessons to help the students plan their gardens. The kids will have fun learning and taking ownership of the garden. They will get excited about choosing what to plant and how much they need to plant by doing these lessons. A Master Gardener or an experienced gardener is a valuable resource to help kids discover what crops can be grown in the climate and in the amount of space they will have to garden. Start a Garden Journal or Garden Records right away.

- Young students are not able to prepare the site for gardening. Master Gardeners and others can provide leadership for that. FFA students, parents, Ameri-Corps, Food Corps, garden clubs, retired teachers, neighbors and others have been instrumental in preparing the gardens and helping the youth in the planning stages.

- For the young children, have the sections of the garden already measured out and marked according to the garden plan. For the older youth, help them measure and mark the garden sections.

- Kids like to use garden tools, but they LOVE to use child-sized tools such as kid-sized rakes, hoes, shovels, watering cans, and gloves. The type of garden tools they need depend on the type of garden they will be working with and how it is planted – square foot vs. rows. They can share tools. Older students have been using adult-sized tools and even tools that have been loaned by Master Gardener groups.

- Master Gardeners and FFA members are using their green houses to start seeds and grow transplants for the school gardens.

Help the students start a compost bin and get the whole school involved.

Planting

- Go over tool safety rules for hoes, trowels, and rakes. A tool safety game is part of the gardening curriculum.

- Go over ways the plants in your garden are going to be planted: seeds, sets, transplants, seed pieces.

- Plant fast growing (cool season) crops like radishes and spinach for early satisfaction. Try to stagger your crops for constant harvest opportunities. Make sure the students will have something to harvest when they return to school in the fall.

Maintaining

Watering

- Watering is extremely important, especially in raised bed gardens. If you are meeting just once a week, you may have to make plans for additional watering. Families, youth groups, organizations, neighbors can sign up for times. Someone will need to be responsible to make sure the watering plans are carried out.

- Using a watering wand is a good way to water the garden. Show how to water at the base of the plant. Teach the kids to count how long it takes to water a plant.
Weeding
- Help the kids distinguish the difference between weeds and garden plants. Show them how to pull weeds so that the garden plants are not disturbed. Tell them where you want them to put the weeds. Have challenges such as finding the biggest weed, most unusual weed, most weeds, etc. Talk about why some parts of the gardens have more weeds than other parts, etc.

Insects and pests
- Insects intrigue and scare children. They enjoy doing the lessons about pests and going on hunting missions to find and eradicate them. Getting to show everyone the squash bug they found – and sometimes their eggs – is a joy in and of itself!
- Use the lessons from Grades 2 and 4 to identify “good guys” and “bad guys” in the garden and to figure out what to do about them. Then help the kids take the next steps to protect their garden from unwanted pests.

Harvesting, Preparing and Eating the Produce!
- Kids get excited when they see fruits/vegetables growing on the plants. Make sure that they show everyone by pointing and not picking! Describe what to look for to determine when the fruits/vegetables are ready to harvest.
- Show kids HOW to harvest produce gently. For example, gently hold a bean plant before pulling off the bean, cut the lettuce with scissors, etc.
- Kids love to harvest and taste the bounty. Try to include this in every lesson.
- Include in the lesson, ideas for how the food can be eaten. Simple recipes such as cucumber-flavored water, radish or veggie sandwiches, veggies with dip, cucumbers and onions in vinegar, etc. are the best. Get a large bottle of Ranch dressing because the kids will try anything they can dip! There are several ideas in the lessons.
- Show the whole vegetable before cutting it open. Have them find the seeds.
- Plastic plates and knives can be used for cutting and preparing produce.
- Help the kids put their gardens to bed.
Seed to Salad: Nutrition Super Heroes

Overview
Nutrition Super Heroes is a game that gets young people on their feet and moving to learn about nutrition in the garden. Each participant assumes a Nutrient Super Hero “secret identity” such as calcium or vitamin C and must complete the obstacle course if a vegetable their nutrient (secret identity) is found in is called.

Materials
- 12-15 wooden stakes (outside) or a roll of masking tape (inside)
- hula hoops, 5 gallon buckets, dish pans, garden gloves, jump ropes, etc: anything you can find to create reasonable obstacles
- vegetable cards & nutrient tags
- hat or basket for vegetable cards
- super hero capes (optional)

Preparation
Create Nutrient Tags and Veggie Cards
Use the templates provided or develop your own. You’ll need a nutrient tag for each participant (if you have a big group, feel free to have 2 of each nutrient). Choose vegetable cards that reflect the vegetables you grow in your garden or vegetables that participants have mentioned as their favorites.

Set Up the Obstacle Course
If you’re working outside, use wooden stakes to create an outline of the human body in a level open area. Lay a garden glove at the end of each arm. Alternatively, you can use athletic field pant. Chalk the outline if the only open space is paved. If you’re working inside, use masking tape on the floor of a hallway or gym.

Add any obstacles you can think of such as buckets, hula hoops, create squiggly lines with jump ropes. Use obstacles to create major parts of the body: muscles in arms and legs can be buckets. The heart and stomach can be hula hoops. Use jump ropes to create arteries or intestines. Smaller dishpans can be other major organs.

Rules of the game
The group leader will choose a vegetable out of a hat, read the name of the veggie and the nutrients (i.e. secret identities/super powers) that vegetable has. If your secret nutrient identity is among those listed for that vegetable you enter the obstacle course through the head, making sure to hit all the obstacles (i.e. all the parts of the body) before exiting through a foot.

Super heroes must keep their identities secret. Ask youth to keep track of how many times they run through the body. Also encourage them to pay attention to when the body is most full of super heroes. In a discussion at the end of the game you can ask questions that reveal what nutrients are the most readily available in foods and which are harder to get. By noticing when the body is very full versus very empty you can judge how nutrient rich a vegetable is.
Playing the game

1. Hand out secret identity nutrient tags, and capes if desired, to each participant.

2. Explain the rules of the game and demonstrate running through the course to reach each obstacle.

3. Pull veggie cards out of a hat or basket one at a time.

4. Read the name of the veggie and the list of nutrients.

5. Wait until all super heroes are back at the head before reading the next vegetable card.

After the game

6. After all the veggie cards are read, have the group gather. It’s time to reveal secret identities. Have each participant read the description of their nutrient “fights infections; heals bones/wounds,” and see if other participants can guess what nutrient they were.

7. Ask who ran through the course a lot, who only once or twice. What does that mean about your nutrient? Are you easy to find in foods?

8. What about how full the body was? What veggies had the most super heroes in the body? Which the least? What does that mean about how nutritious certain veggies are compared to others?

9. You can follow the activity with sampling veggies from the garden or from those used in the game.

Adapting the game

When working with younger youth (pre-K, K, 1st and even 2nd grade) consider making the super hero identities the vegetables rather than the nutrients. Each youth assumes the role of “Captain Carrot” or “Powerful Peas.” When the leader draws out of the hat, they call the nutrient (Calcium), defines it (helps build strong bones) and then lists all the veggies (super heroes) that contain these nutrients.
<table>
<thead>
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**Printed with Permission, February 2012**
Powerful Peas

Clever Corn

Radical Radish

Brave Beans
Protein
Builds and repairs tissue

Carbohydrate
Fuels body functions

Vitamin A
Fights infection and helps eyesight

Vitamin C
Fights infections
Heals bones/wounds
Vitamin E
Heals and maintains skin

B Vitamins
Helps body use food energy

Iron
Carries oxygen

Potassium
Helps nerves and muscles
Phosphorus
Builds strong bones

Calcium
Builds strong bones

Vitamin A
Fights infection and helps eyesight

Vitamin C
Fights infections
Heals bones/wounds
Seed to Salad: Planting Tips

Many salad garden vegetable seeds are tiny. They can be hard to handle and plant, and they easily blow out of a cupped hand with even a slight breeze. To deal with this, reuse empty plastic spice containers. If you put the word out early to parents and volunteers, you can often accumulate a good amount.

**Step by step**
- Label each spice container with the name of the seed and the number code you assigned it during the design phase.
- For seeds that will be used a lot, such as lettuces, consider having two or three shakers available.
- If you’re working with younger children, have an extra adult or older youth volunteer on the sidelines to help fill up shakers. This way you can add just enough seed to each shaker for a single plot, avoiding spills or dumping too much seed in one place.

**Other tricks of the trade**
- If you have the space, consider having a “test plot” to demonstrate planting techniques before youth head off to plant their own plots.
- You can use a design everyone worked on together or make one up on the spot.
- Start by identifying the edges of the plot, and orienting the plan on the ground nearby.
- Along the way, give a demonstration and then have youth take turns outlining and planting different areas of the “test plot.”

**Three ways to outline your design in the soil prior to planting:**
- Use a twig, stick, or small branch to “draw” the design in the soil.
- Draw the design by sprinkling white play sand.
- Use carefully placed pebbles, gravel, or small stones to create the outlines of your shapes.
**Demonstrate**
- Show the angle to hold the shaker so that seeds come out easily.
- Demonstrate different kinds of shaking and have a conversation about what appears to be too light, too hard, and just right.
- Show how to take handfuls of spare soil and sprinkle it over newly planted seeds.
- Some seeds need to be planted rather than sprinkled on top of the soil. Show how to lay seed, such as nasturtiums, spaced on top of the soil, then push them gently into the soil.

**Watering tips**
- Watering a newly planted salad garden can be tricky. Lots of tiny seeds are sitting on or just below the soil surface. A gush of water will send them cascading far from where they were planted. You may want to do a demo on a spare patch of bare soil.
- Avoid using watering cans until seedlings begin to emerge.
- Use an adjustable water wand on the gentlest setting.
- Demonstrate holding the wand high enough and slowly moving it back and forth to avoid “mudslides” and “puddles.”

**Experiment**
- Plant a few seeds in each area of two trial areas, water one gently and the other too vigorously. How does it effect growth?
These lesson instructions were developed by Growing in the Garden, Iowa State University Extension and Outreach to enhance the Seed to Salad: Planting Tips from Ithica Children’s Gardens and Cornell University Department of Horticulture, New York.

These instructions and the Seed to Salad Planting Tips lesson have been prepared to meet the needs of younger gardeners. Extension Master Gardeners, students’ families that have experience with gardening, high school horticulture students, and other garden experts from the community would be great help before, during, and after planting your garden. Here are the steps to make this lesson successful for everyone involved.

1. Watch the “Garden Basics Webinar” and refer to the “Implementation and Beyond” gardening resource in the Educational Toolkit, Extension or School Educators pages on the www.peoplesgarden.wsu website. Your state leader has additional information pertaining to the Healthy Gardens, Healthy Youth gardens in your area.

2. As soon as it is possible to plant cool season crops where you live, build the gardens and prepare them for planting. If you are using container gardens inside, the students can help prepare the container on the same day that they plant. For this age group, use the students’ garden plans from the Planning Our Food Garden lesson and go ahead and mark out the raised beds and tilled gardens to indicate the boundaries for the square foot sections or rows and what should be planted in those spaces. The plans should include cool season crops first and then plans for warm season crops.

3. Use the students’ garden plans from the Planning Our Food Garden lesson for their cool season and then warm season plant choices and acquire the appropriate types and numbers of seeds, sets, transplants, or seed pieces. The plants should yield enough produce for the class to have a salad party by the end of the school year and to have some crops to harvest and eat when they return to their classrooms in August or early September. This may involve multiple plantings.

4. Make sure that all the tools have been gathered and are ready for the students to use.

5. Watch the Grade 2, Unit 3 Curriculum Webinar from the Educational Toolkit on the www.peoplesgarden.wsu website. The webinar, including the video, will help you understand what the students might be doing as they plant their gardens.
6. **Prepare the square foot gardening templates** using both of the ¼ square foot patterns found on the attached Square Foot Gardening Template. These can be used with container, raised bed, and tilled garden spaces. You can choose one or both of the following suggestions.

**Poster board:** Use poster board and make at least two of each pattern for small and medium-sized plants. Be sure to use permanent markers and write the names of the plants on the templates. You may choose to laminate them. These templates can be used for several seasons of gardening – remember that when you feel challenged to cut out all the holes!

When you use these in the garden, place the template in one corner and have the students work together to plant the appropriate seeds in each hole. After planting in all the holes, move the template to the adjoining empty space and plant in each hole. Continue the process to plant each designated area for square foot gardening.

Another option is introduced in the Seed to Salad Planting Tips. You can mark each hole with a little sand, flip the template over, sprinkle the holes with sand and continue to cover the space designated for that crop. Use temporary or student garden markers to designate the type of crop that should be planted in each area.

**Newspaper:** Newspaper is biodegradable and can be left in the garden as decomposing mulch. If you choose this method, use the attached patterns and make as many squares as you need for the types and numbers of plants in your garden. Instead of cutting out the holes, use a marker and draw where the holes should be. Be sure to use permanent markers to write the names of the crops on each newspaper template. When you place the newspapers in the garden space, use small sticks or the garden markers as stakes to hold the corners and sprinkle some soil over the top so the newspapers do not blow away.

When it comes time to plant, the students can poke a hole in each of the marked circles or dots and plant the seeds.

8. **Prepare the seed shakers or pinch cups for the seeds.**

**Seed shakers:** Look at the size of the seeds and find old spice or cheese shaker containers that can be used to shake seeds into the garden. Wash the containers, dry them completely, fill them with seeds, and label the container. Make sure to save the seed packet so that you can use the instructions on the packages.

**Pinch cups:** Label plastic bathroom-sized cups according to the crops you will be planting. Dump the seeds into the appropriate cup. When it comes time to plant, one student can hold the cup while the other student uses his or her thumb and another finger to pinch out some seeds and drop them where they are to be planted in the garden. Be careful not to tip over these cups or let the wind blow them over.

9. **Plan to help with all the indoor and outdoor classroom activities.** Your expertise will be appreciated and it will be easier to work with all the supplies and the excited students.

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**TEACHERS** Please be sure to watch the Grade 2, Unit 3 Webinar on the www.peoplesgarden.wsu.edu website. It will help you to be prepared for this lesson. The video shows how much fun the students had preparing and planting their EarthBox™ container garden and how to prepare for planting a raised bed garden. Here are the steps to put everything together.
INDOORS

1. **Show the seeds, sets, transplants, and seed pieces** that represent the crops the students chose to plant from the Planning Our Food Garden lesson. Read the packages to identify special characteristics of the crop, how long it will take to grow, and how deep to plant it.

2. **Help the students to make creative garden markers.** The classroom in the video used cut-up slats taken out of old vinyl mini blinds. You may choose wooden spoons, large craft sticks, laminated index cards on sticks, or anything else you have found. Permanent markers are essential. Make sure you have assigned all the crops. The small and medium sized crops will probably need at least two stakes to mark the area where they are planted. Everyone should have the opportunity to make a garden marker with the name and a picture of the crop.

3. **Show them the tools they will be using in the garden.** See if they can identify each tool and tell what they are used for. Do the attached Tool Safety Game.

4. **Before planting the gardens,** review the following garden rules.

GARDEN RULES

1. **Start gardening activities** by standing around the outside of the garden or garden container. When you are done working in the garden, return to your original spot around the garden.

2. **Listen to all the instructions** and carefully watch the demonstrations.

3. **Take turns working in the garden as instructed.** When you are done with your turn, go back to where you were standing and watch as everyone has an opportunity to plant your garden. Make sure everyone has followed the instructions as they plant your garden.

4. **Make sure everyone has an equal opportunity to enjoy working in the garden.**

OUTDOORS

(Or indoors with container gardens on a sheet of plastic)

This may be a separate day.

1. **Move your necessary supplies** to the gardening site and use them to conduct the planting activities.

   **Necessary supplies include, but are not limited to,** the following:

   - Your garden plan
   - Instructions and supplies for the container gardens
   - Hoes and rakes for the raised bed or tilled gardens
   - Two or more trowels
   - What you are going to plant (seeds, transplants, etc.)
   - Seed shakers and/or pinch cups
   - A couple rulers or tape measures
   - Scissors
   - Square foot gardening templates
   - Garden markers
   - A bucket will help you manage your small garden supplies.

2. **Final preparation before planting**
   **Container gardens** Put the casters on your container garden and then have the students take turns reading the steps as you assemble the container gardens. Have the students take turns in groups to smooth out the soil in several of the steps. Make sure the students
keep back when you sprinkle the dolomite and the fertilizer in the EarthBox™ containers. Ask three students to help put the mulch cap on the EarthBox™.

Use the poster board square foot templates, the instructions for planting each of your crops, and figure out where you are going to plant your crops in the container garden. You may need to refer back to the sizes of plants information in the planning lessons for grades 2 and 4. You can choose to over plant your container and transplant some of the plants outdoors when the temperatures warm up. Your garden helper can be a guide and the video on the webinar shows how you can plant lots of things in one container.

Use the garden markers to identify where the different crops will be planted. Have the students take turns using closed scissors to poke holes in the mulch cap on the EarthBox™. Remove the square foot templates and stretch out the holes with the trowel or your fingers.

**Raised bed and tilled gardens** These gardens should be marked and almost ready to go. Give the students an opportunity to take turns getting any clumps out with their hoes and to smooth out the soil with their rakes.

Demonstrate how the square foot gardening templates work to mark where the plants should be planted. You may want to use the tape measures and your plan to show how the garden helpers measured out the garden spaces.

3. **It’s finally time to plant the gardens.** Crop by crop follow these steps then have students take turns planting that crop.
   
   a. Show the seed packet and seeds, sets, transplants, or seed pieces that are going to be planted. Read or tell how deep they need to be planted.
   
   b. Use the seed shakers, pinch cups, trowels and measuring devices (ruler, finger tips, trowel) to demonstrate how to plant the crop. One student can help measure the appropriate depth for planting while another student plants. One shake of the seed shakers per hole is sufficient, then carefully cover it up with a little soil. One person holds the pinch cup while another uses two fingers to pinch out a small amount of seeds and releases them in the hole, covering it with a little soil. One person uses the trowel as the other person drops in the transplant. Students work together to measure and make a shallow furrow in a row in the tilled garden. When each group of students is done, they need to move back from the garden to give room for the next students and to watch and learn how to grow each crop. The students will also be checking to see if their classmates are using the right planting methods and planting their seeds in the right spot.
   
   c. Everyone can make one last inspection of the garden before cleaning up the area before watering. Remove all the poster board templates and tools from the garden. Make sure that everything is cleaned up as much as possible. Move the tools and clean and store them good tool safety practices.
   
   d. Demonstrate how to water the garden using the appropriate watering equipment and techniques so that seeds won’t be washed out of place and that you use the appropriate amount of water. Take turns watering the garden.
   
   e. Be sure to wash your hands with soap and water and dry them thoroughly.

*Time to be patient as the garden grows!* Provide the garden with the right amount of water and protect it from animals and insects that like it just as much as you do. There are more lessons to help you grow a successful garden.
1. Make a copy of this page.
2. Cut around the 4 inch squares and cut out the circles.
3. Place one template on one corner of a poster board. Draw around the outside of the square and around the circles.
4. Use the same template four times to make a square foot gardening guide.
5. Cut around the square foot and cut out the circles.
6. Write the names of the crops in the center of the guide.
7. It is best to laminate these guides to keep them in good shape from year to year.
SQUARE-FOOT GARDENING

TEMPLATE 2

peas, bush beans
I am going to show you some right ways and wrong ways to use and store our tools. If you think
I'm showing you the right way, clap. If you think I'm showing you the wrong way, stomp your foot.

• Lift the hoe so that the blade is over your head like you are swinging a hatchet.
  
  **STOMP.**
  
  I have lifted the hoe too high. I am not chopping the soil. I am hoeing it. It doesn't work very
  well this way. Also, you may hit someone who is nearby if you swing the hoe this high in the air.

• Lift the hoe so that it is about 1 foot off the ground and bring it down in a gliding
  motion through the surface of the soil.
  
  **CLAP.**
  
  This is the correct way to use the hoe to cut through crusty soil and remove weeds.

• Repeat the same motions with the rake.

• Lay the rake down, teeth up.
  
  **STOMP.**
  
  You should never set a rake or a hoe on the ground like this. What do you think would hap-
  pen? You may want to demonstrate what would happen if someone stepped on the teeth
  of the rake or blade of the hoe. Be careful to stand to the side so the handle doesn't smack
  you in the face.

• Stand the rake and hoe, handles up, against a wall or hang them.
  
  **CLAP.**
  
  Rakes and hoes should be stood against a wall or in the shed or garage when they are not
  being used.

• Walk with the trowel blade up.
  
  **STOMP.**
  
  Always carry your tools such as this trowel with the sharp blade facing down.

• Run a short distance holding a hoe and a trowel.
  
  **STOMP.**
  
  Never run with tools in your hands.

• Pretend to wash dirt from the trowel, hoe, or shovel.
  
  **CLAP.**
  
  It is always a good idea to clean the soil off your tools before you put them away.
  This shows you are responsible for taking care of your tools.

• Pretend to fight with a student over a trowel or hoe.
  
  **STOMP.**
  
  Show respect by taking turns.
Maintaining a Healthy Gardens

Lesson seven: What do plants need to grow?

“Seeds and Sprouts” from GOT VEGGIES?, Wisconsin Department of Health Services – Nutrition, Physical Activity and Obesity Program with support from University of Wisconsin Cooperative Extension

Besides people watching over them, what do plants need to grow? Students use simple props and role play how plants need sun, soil, water, and air in order to grow. They start journals or observation pages to observe and record how plants grow. The students discover that they need the same things that plants do in order to grow. They end up preparing and eating healthy snacks made by sun, soil, water, and air.

Content objectives: Identify what plants and people need to live and grow (sun, soil, water, and air). Identify and make a healthy food from a garden.

Life skill objectives: Communication, Leadership (teamwork), Citizenship, Healthy living

Core and STEM concepts and skills:
Science: Earth and space, Life science
Language Arts: Vocabulary, Inferring, Interpreting, Sequencing, Viewing, Speaking, Listening

Healthy snack: Peas and beans from lesson or Garden Spring Rolls from GOT VEGGIES?

Additional and supporting resources: Singing in Our Garden CD, “Sun, Soil, Water and Air” by the Banana Slug String Band from www.bananaslugstringband.com
LESSON PLANS FOR 2011-12 SCHOOL YEAR     Grade 2

BEFORE THE LESSON

1. Grade 2, Lesson 7:
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit.


3. Check materials list for complete description of items needed.

4. Assemble necessary ingredients and materials for the selected recipe.

5. Remember to set up a garden watering schedule.

THE LESSON
1. Seeds and Sprouts are can be taught in one day.

AFTER THE LESSON
Additional activities are suggested for recording weather, seed or garden information in the Garden Journal.

RECIPES
Serve a seed snack harvested from the garden or purchased from your local market—fresh green beans or peas make a great healthy snack. Other delicious seed and seeded fruit snacks from the garden include corn, sunflower seeds, grapes, cherry tomatoes and many varieties of berries such as raspberries and strawberries.
Option: Spring Garden Rolls with Chef Tory’s Dipping sauce (see next page)
**Garden Spring Rolls**

**Ingredients:**
- Rice noodles
- Rice Paper
- Chef Tony’s Dipping Sauce (see below)
- Any veggies fresh from the garden – by onion, garlic, broccoli, radishes, kale, green or red tomatoes, basil, carrots or anything else that might be in season.
- Olive oil
- Suf

Harvest the vegetables from your garden and cut them into small pieces. Option One is to mix all of the vegetables in a bowl, sprinkle some salt and olive oil on top, and either sauté or bake them until they are warm and soft. Option Two is to keep all of the vegetables fresh and separate in different bowls. Both ways work great. In the meantime, cut the rice paper sheets in half, and soak them in a shallow dish or plate of water until soft (about 2 minutes). When the vegetables are ready, lay out the rice paper on plates or cutting boards, fill them with any of the fillings, roll them up, and they are ready to go.

**Kids’ Garden Tips:**
- When we run out of Chef Tony’s Dipping Sauce, we switch to balsamic vinegar and it tastes great.
- On days we make pesto, we also put it in the spring rolls for extra flavor.
- Cooking the noodles early in the morning or the night before makes set up very easy. It is also easier when the noodles are cut up.
- Cutting the rolls in half makes for less waste.

**Chef Tony’s Dipping Sauce**

**Ingredients:**
- 1 tablespoon soy sauce
- 1 tablespoon water
- 1 teaspoon rice wine vinegar
- 1 teaspoon sesame seed oil
- Fresh grated ginger
- Chopped scallions
- Honey and hot sauce to taste
- Peanuts or peanut butter (optional)

Mix all ingredients and taste for balance. Should taste deliciously sweet, spicy and tangy.

Lesson Overview

There are six main plant parts that people eat—seeds, roots, stems, leaves, flowers, and fruit. The following edible examples represent the six plant parts: bean (seed), carrot (root), asparagus (stem), spinach (leaf), broccoli (flower), and apple (fruit). This lesson is the first in a series of four Got Veggies? lessons that focus on the six main plant parts that we eat. It can be run in the garden or indoor classroom. This lesson also continues an ongoing investigation of the nutrient cycle that we began in Dirt Made Our Lunch. Guiding questions include: What do plants need to live and grow? How do plants help us live and grow? Where do nutrients come from and how do they get into our food? The answers to these questions can be found in explorations of plant development, the six plant parts we eat, and decomposition.

Objectives

Students will:

1. Identify what plants and people need to live and grow (Environmental Ed B.4.6; Nutrition Ed A.4.3; Science F.4.2, F.4.4)

2. Describe basic plant anatomy (Agricultural Ed D.4.1; Science F.4.3)

3. Understand connections between plants, people, and our natural environment (Science F.4.4)

4. Participate in a discussion (Lang Arts C.4.3)

5. Trace food from origin to table (Nutrition Ed B.4.4)
Materials

Food:
- A fresh seed snack from the garden (e.g., green beans, peas. See Tasting activity on page 23 for more suggestions)

Supplies:
- Spray bottle(s) with water
- A bucket filled with soil or brown paper towels (to represent soil)
- A paper fan, piece of cardboard, bellows, or something that can simulate wind

Preparation

1. Prepare a spray bottle filled with water, a bucket filled with soil, and a fan for the Plant Role Play activity.
2. Harvest or purchase – and wash – foods for the Tasting activity (e.g., green beans, peas. See Tasting activity on page 23 for more suggestions).

Procedure

Introduction: In order to introduce students to the connection between plants, people, and the environment, briefly discuss how plants help people by providing something healthy for us to eat. Our bodies are healthy when we eat nutritious foods. Then discuss how people—through farming and gardening—help plants to grow and be healthy. What can we do to help plants grow and produce food? We often begin by planting a seed. We can help that seed sprout and grow by helping it get the things it needs (e.g., water, nutrient-rich soil). Nature provides the basic things plants need to grow, as students learn in the following activity.
Plant Role-Play: Students become plants in order to learn what it is that plants need to grow and be healthy. We tell students that there are elements of nature that help plants grow and that they will discover what those elements are through a dramatic play activity.

Plants start as seeds, so ask students to crouch down and become a seed. Ask students to close their eyes, or turn off the lights if in the classroom, to simulate a seed that is buried in the ground. First, give students a small handful of soil, a piece of brown paper towel, or something else to represent soil. They should hold the soil as they crouch. Next, go around with a spray bottle and give all “seeds” a light misting of water. After receiving the water, encourage students to raise a hand in the air to simulate a seed sprouting through the soil. Following the water, have students open their eyes (or turn on the lights in the classroom) to receive sunlight. Tell students to rise a bit from the ground to demonstrate that they are growing. Finally, use a small paper fan (or some other representation of wind) to blow air on students, after which they can stand up to represent a full-grown and healthy plant.

Follow up by asking students what they needed to grow from a seed to a mature, healthy plant.

Answer: Sun, Soil, Water, and Air.

Chant: To reinforce what students learned in the role-play, they chant together, “Sun, Soil, Water, and Air! Everything we eat, and everything we wear, comes from Sun, Soil, Water and Air!” Begin chanting slowly and gradually pick up the tempo. Finish by slowing down and lowering voices to a whisper.
**Tasting:** Remember to have students wash or sanitize their hands. Serve a seed snack harvested from the garden or purchased from your local market—fresh green beans or peas make a great healthy snack. Other delicious seed and seeded fruit snacks from the garden include corn, sunflower seeds, grapes, cherry tomatoes and many varieties of berries such as raspberries and strawberries. Roasted pumpkin seeds, homegrown popcorn, and fennel seeds are favorite fall treats!

**Additional Activities**

**Document the growth of a tomato, squash, or bean plant by using garden journals or taking photos:** This is a fun way to follow the development of plants from seed to fruit. See Keeping a Garden Journal activity on page 38 in the À La Carte section.

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**planting**

We invite students to choose and plant from our seedling supply. Seedlings include basil, peppers, tomatoes, kale, cabbage, kohlrabi, onion, broccoli, fennel, flowers, parsley, and lavender. With a trowel in hand, kids plant their seedlings in garden beds. Many times kids help ready the garden beds for planting by pulling weeds, raking the soil, and adding compost by wheel barrow.

We teach students to gently pull the seedling from its tray and spread, or pull apart, the compacted roots. Often, kids will teach one another this process as new planters join the station. Digging a hole large enough to accommodate the plant’s roots, and spaced far enough away from neighboring plants, kids give the seedlings new homes. They gently fill in the hole, adding a bit of compost and a loving wish for good growth.

We are not done yet! The next step is to mulch the area around the seedling with hay, creating a small nest. The hay provides cool shade for the soil, keeps soil moist longer, and prevents weed growth.

— Hannah Lavold, Garden Educator, Community GroundWorks at Troy Gardens
Additional Garden-Based Activities

Keeping a Garden Journal

Keeping a garden journal is a great way for students to reflect on their experiences in the garden. Students will use their observation and creative writing skills to create a daily account of changes in the garden throughout the growing season.

Supplies: Students can purchase a journal or notebook to record their observations, or they can create a journal using loose paper and twine. To construct a journal you will need loose leaf paper, printer paper, or colorful construction paper as well as a hole-punch, twine, pen/pencil, and scissors.

Directions: Gather together the desired number of loose sheets of paper. If the paper does not already have holes, use the hole-punch to create 2-3 holes on one edge. Cut 2-3 small pieces of twine and use them to bind the paper together through each of the holes. Have students decorate the front cover of their garden journal however they choose. Students can separate their garden journal into sections either by date or by topic such as weather (Science), phenology (Science), how much produce they have harvested (Math), and notes about how the garden is growing (English/Language Arts). Students will need a pen or a pencil for recording their observations.

Weather

Have students record the weather on a daily basis so that they gain an understanding of how it affects the growth and health of plants in your garden. Weather station tools such as a rain gauge, thermometer, and wind vane provide a fun way for students to observe and measure weather-related changes in the garden.

Phenology

Have students observe and record the life cycle of both plants and animals in the garden and how they relate to the changing seasons. For example, record the day you first see a robin, seed sprout, squash blossom, ripe tomato, and frost damage on garden plants. Then have students compare these events with weather patterns to gain a better understanding of the changing seasons.

Garden Notes

Have students record general observations from the garden in a variety of creative formats. They may write poems about the spicy flavor of a radish, short fiction stories about animals in the garden, or simply how they feel in that moment sitting in the garden. Students will form a stronger connection with the garden by looking deeper into the many changes and experiences they have while they are there.
Maintaining a Healthy Garden

Lesson eight: How do we help the plants to grow in the garden?

“Salad Garden” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

What do you do in the garden while the plants grow? What can you expect from the seeds, sets, and transplants you planted? These activities will help students water the garden, tend to the weeds, and respect the growing plants. Any of the books from the Additional Resources list (below) will help the students to visualize what they will be doing to take care of their garden.

Content objectives: Understand and apply strategies to water and maintain a garden; Describe garden crops; Determine and organize garden maintenance tasks; Learn about and prepare and eat a garden crop

Life skill objectives: Critical thinking, Decision making, Problem solving, Communication, Citizenship (sharing responsibilities to improve something), Leadership (teamwork)

Core and STEM concepts and skills:

Science
Language Arts

Earth and space, Life science, Science as inquiry
Reading, Sequencing, Interpreting, Inferring, Listening, Speaking, Viewing

Healthy snack: Pick a Veggie for a tasting

Additional and supporting resources:
BEFORE THE LESSON

1. Grade 2, Lesson 8: This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit.


3. Check materials list for complete description of items needed.

4. Assemble necessary ingredients and materials for the selected recipe(s).

THE LESSON

1. ‘Know Your Crops’ and ‘Working Together in the Garden’ Activities from Salad Garden can be taught over two or more days.

2. Water the garden.

AFTER THE LESSON

Optional activities are included in the lesson plan for a making murals and singing. Additional books to consider include Jacks Garden by Henry Cole, The Little Red Hen by Paul Galdone, Eddies Garden and How to Make Things Grow by Sarah Garland, Vegetable Garden by Douglas Florian, Tops and Bottoms by Janet Stevens. Check with your library or purchase online.

RECIPE

Try different greens, such as different types of lettuce, kale, chard, collard, mustard. Offer a variety of dressings such as Ranch or Thousand Island, or consider having the children help make their own.
Outdoor classrooms such as school gardens open up a fun new world full of discovering and learning. Outdoor classroom experiences are apply/expand activities that students can do and enjoy for the rest of their lives. School gardening helps students to:

- Learn life skills such as critical thinking, decision making, problem solving, healthy lifestyle choices, communication, cooperation, responsibility, respect, service learning, learning to learn, patience, and others;
- Gain knowledge and experience and increase interest in science, health, math, social studies, language arts, and the arts;
- Apply their learner types and challenge them to try new ones such as bodily-kinesthetic, spatial-visual, logical-mathematical, linguistic-words, intrapersonal, interpersonal, music, and natural (Howard Gardener’s multiple intelligences);
- Increase vegetable and fruit consumption and physical activity;
- Grow healthy, fresh food for themselves, their families, others, or as a business;
- Identify hobbies or potential career interests;
- Set goals, plan, implement and evaluate activities;
- Identify local resources and partners to accomplish goals;
- Work as partners with caring adults to learn new skills and accomplish goals.

Corresponding lessons from Growing in the Garden:
- General Unit, Lesson 2: Gardeners and Farmers
- General Unit, Lesson 3: My Special Garden
- General Unit, Lesson 4: A Dream Garden
- General Unit, Lesson 5: What’s My Hobby or Business?
- Natural Resources Unit: Lesson 1, Sun, Soil, Water and Light
- Natural Resources Unit: Lesson 3, Get the Scoop on Soil
- Natural Resources Unit: Lesson 4, Be Loyal to the Soil
- Plants Unit, Lesson 1: Start with Seeds
- Plants Unit, Lesson 2: Plant Parts Become Me

CORRESPONDING LESSONS continued on next page
CORRESPONDING LESSONS

continued

- Animals Unit, Lesson 1: Life in the Garden
- Food Unit, Lesson 1: Pathways to My Pyramid
- Food Unit, Lesson 2: My Pyramid Hop 'n Shop
- Food Unit, Lesson 3: Garden of Good Eatin'
- Food Unit, Lesson 5: When is it ready to eat?
- Food Unit, Lesson 6: Building Food Mazes
- Food Unit, Lesson 7: Emergency Food Pantry

GETTING THE GARDEN GOING AND GROWING

For the success of your salad garden project, it is important to have the support of students, school staff, groundskeepers, administrators, parents, and a network of volunteers. Your local ISU Extension office may be able to find volunteers to help teach gardening and assist with maintaining the garden throughout the summer. These volunteers may be ISU Extension Master Gardeners, garden club members, or public garden education coordinators. Consider involving older students, 4-H'ers, parents, neighbors, and city parks and recreation program participants. Parents and "friends of the garden" can donate plants from their own gardens. The garden can be planted in the spring, and early season crops such as lettuce, spinach and radishes can be enjoyed before classes dismiss for the summer. When the students return in the fall, they will find a bounty of tasty tomatoes, peppers, cucumbers and other seasonal vegetables.

GARDEN NOTE: PREVIOUS FALL. Work with school maintenance to determine a location for a salad garden. The site should be well-drained, close to a water source, and in a sunny spot. The area designated for this garden should be at least 12' x 22'. Kill the existing turfgrass by rototilling or by spraying with a nonselective herbicide such as Roundup®. After spraying, wait at least 1 week before tilling.

If this is done in EARLY SPRING, wait until the grass is growing and then spray with a non-selective herbicide. Wait at least 1 week before tilling.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Method</th>
<th>Planting time</th>
<th>Inches between plants</th>
<th>Inches between rows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>Direct-seed</td>
<td>Mid-April through mid-May</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Spinach</td>
<td>Direct-seed</td>
<td>Mid-April through mid-May</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Radishes</td>
<td>Direct-seed</td>
<td>Mid-April through mid-May</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Carrots</td>
<td>Direct-seed</td>
<td>Mid-April through mid-May</td>
<td>1-2</td>
<td>12</td>
</tr>
<tr>
<td>Onions</td>
<td>Set or transplant</td>
<td>Mid-April through mid-May</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Broccoli</td>
<td>Transplant</td>
<td>Mid-April through mid-May</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>Direct-seed</td>
<td>After threat of frost is past</td>
<td>24-36</td>
<td>24-36</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Transplant</td>
<td>After threat of frost is past</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>(cherry and standard)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peppers</td>
<td>Transplant</td>
<td>After threat of frost is past</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Sunflowers</td>
<td>Direct-seed</td>
<td>Early May</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Seed pieces</td>
<td>Early-April through early-May</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

**MAINTAINING | WHILE THE PLANTS GROW | ONGOING ACTIVITY**

**GARDEN NOTE:** Water the garden right after you plant it and then weekly unless it rains at least an inch. Water it deeply and thoroughly while the plants are young and during the dry periods in the summer. Keep weeds under control in and around the garden. Have the students put a 1-inch layer of grass clippings around the plants to conserve soil moisture and reduce weed growth. Additional mulch layers should be added throughout the summer as the early mulch will decompose.

Scout for insects and diseases on the plants. A good resource for pest management is Iowa State University Extension publication pm-230, Insect and Disease Management in the Vegetable Garden. It is available at your local Extension office or you can order it on the website at: www.extension.iastate.edu/store.

Deer and rabbits are a problem for many gardeners. A 2-foot-tall chicken wire fence around the garden that is buried a couple inches in the soil will prevent rabbit damage. Children should be able to step over the fence. A 4-foot-high or more fence may be needed to keep deer out of your garden. There are commercial repellants on the market, but all are not effective. Your class may want to experiment with different types of deer repellants.

Students, parents, teachers, ISU Extension Master Gardeners, 4-H Clover Kids groups or 4-H clubs, other organizations, neighbors, or friends of the garden can help maintain it through the summer.
KNOW YOUR CROPS GAME

ACTIVITY 5

MATERIALS - 3" x 5" or 4" x 6" note cards
- Markers
- Chalkboard, marker board or 2 large sheets of paper
- Growing in the Garden: Outdoor Classrooms for Young Gardeners, Leader’s Guide (4H 905BLDR) and Garden Journal (4H 905B) by Iowa State University Extension 4-H Youth Development (optional)

After the garden has been planted and while you are waiting for it to grow, play the “KNOW YOUR CROPS” game to help the students remember specific things about the crops in the salad garden.

Write the name of each crop you planted in the middle of separate note cards. Write the following questions on the board or a large sheet of paper:

1. Is it a cool-season or warm-season crop?
2. Is it planted as a seed, set, transplant or seed piece?
3. Do we eat the roots, stems, leaves or flowers?

Divide the class into two teams and have them come up with team names. Write the team names on the board or another large sheet of paper. Assign a scorekeeper who will keep track of the team scores with tally marks on the board.

RULES

1. Decide which team will start.

2. Hold up a card so that the students can see the crop name.

3. The team that starts, Team One, must answer question one from the board. If the students get the answer right, they get one point and can move on to question two. If they answer that correctly, they get another point and can move on to the third question. If they answer it correctly, they get one point for getting the question right and a bonus point if they answered all three questions correctly. If they miss the first question, they do not get any points and Team Two has a chance to answer it. If the students on Team Two answer it right, they get one point. Team One has the chance to answer the second question; if the students get it right, they go on to the third question. If they answer it incorrectly, Team Two has a chance to answer it and score. Team One has the chance to answer the third question. If the students miss it, Team Two can answer it correctly for one point.

4. After all the questions have been answered for the first crop, go to the crop on the next card. Team Two has first chance at answering these questions correctly and getting the bonus point. If they miss a question, it goes back to Team One to answer. Continue the sequence of questions until you have gone through all the crops in the garden.

5. Add the scores and determine the winning team.

For another activity on seeds and transplants, refer to “Get Ready, Get Set, GROW!” in Growing in the Garden: Outdoor Classrooms for Young Gardeners (4H-905BLDR) and the activity sheet in The Garden Journal (4H-905B).
WORKING TOGETHER IN THE GARDEN

ACTIVITY 6

MATERIALS - Choose one or more of the following books about gardening tasks throughout the season: The Little Red Hen by Paul Galdone, Jack’s Garden by Henry Cole, Eddie’s Garden and How to Make Things Grow by Sarah Garland, Vegetable Garden by Douglas Florian, Tops and Bottoms by Janet Stevens

- Marker board or large sheet of paper
- 3” x 5” or 4” x 6” note cards (one per student)
- Marker

While you wait for the garden to grow, you may want to read one or more of the suggested garden books. From the books, list the gardening steps on a large sheet of paper or marker board and compare them to what needs to happen in your garden. Discuss what happened in the stories when people didn’t help out in the garden. Compare that with what might happen to your garden if everyone doesn’t help out.

Have the students identify tasks in your garden, especially for the day that you are reading the books. Write each task on a separate card. The students be draw a card to see what task they are responsible for. Make several weeding cards such as “weeding around the lettuce,” “weeding around the tomatoes,” etc. You may want to make several watering cards as well. There should be one card per student. Mix the cards up and have each student draw one. Ask them if they know what they are to do and what would happen if they didn’t do their part.

OPTIONAL ACTIVITIES AS THE GARDEN GROWS

ACTIVITY 7

OPTION 1: PAINT LIKE CLAUDE MONET

Try painting like artist Claude Monet. Have the students relax and observe their garden as they paint “impressionistic” pictures of it. You may use watercolor or tempera paints and paper. Use lap boards, empty notebook binders, or clipboards for firm surfaces and go to the garden to paint. (See Growing in the Garden, People Unit, Lesson 2, Claude Monet: Connecting Nature and Art.)

OPTION 2: CREATE A DREAM GARDEN MURAL

Create a new Dream Garden Mural. Use one long piece of butcher paper or several large pieces of paper and colorful markers. Have everyone draw their favorite thing outdoors or in a garden. Talk about what features you could actually put in a garden. (See Growing in the Garden, General Unit, Lesson 4, A Dream Garden.)

OPTION 3: SINGING IN THE GARDEN

Sing the plant parts songs from Growing in the Garden, Plants Unit, Lesson 2, Plant Parts Become Me. One song is “Flowers, Leaves, Stems and Roots” instead of “Head, Shoulders, Knees and Toes.” The other song is on the bottom of the “Roots, Stems, Leaves, Flowers” activity sheet. Then go to your garden plants and identify the parts.
LESSON PLANS FOR 2011-12 SCHOOL YEAR      Grade 2

Maintaining a Healthy Garden

Lesson nine: What do insects and other animals do with the food growing in the garden?

“Life in the Garden” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

Students become plant and animal actors as they perform a clever garden melodrama including good guys and bad guys and audience participation. If you can find *Cucumber Soup* by Vickie Leigh Krudwig, students will get in touch with the melodrama characters as they figure out how many and what kind of insects it will take to push a cucumber off an ant hill. You may want to do the melodrama again at your Salad Party or for another class.

Content objectives: Identify creatures found in the garden; Describe how creatures and plants interact in the garden; Learn about and prepare and eat a garden crop

Life skill objectives: Learning to learn, Critical thinking, Communication, Citizenship, Leadership, Healthy living

Core and STEM concepts and skills:
Science      Life science
Math         Operations and algebraic thinking, Measurement and data
Language Arts Reading, Vocabulary, Main Ideas, Factual understanding, Sequencing, Summarizing, Character development, Interpreting, Inferring, Speaking, Listening, Writing

Healthy snack: Veggie Critters

Additional and supporting resources:
BEFORE THE LESSON

1. **Grade 2, Lesson 9:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the [www.peoplesgarden.wsu.edu](http://www.peoplesgarden.wsu.edu) Educational Toolkit.

2. Check with your library for a copy of *Cucumber Soup* by Vickie Leigh Krudwig or purchase online.

3. Check materials list for complete description of items needed.

4. Assemble necessary ingredients and materials for the selected recipe(s).

THE LESSON

1. **Life in the Garden** is meant to be taught over several days.

AFTER THE LESSON

Garden Journal: Have student list insects and other creatures that they might expect to find in their garden pests.

RECIPES

Although the lesson plan does not have a time for tasting, this fun, optional activity is a nice addition.

*Ants on a Log*: Celery sticks; low-fat cream cheese, nut butter or sunflower butter; raisins, dried cranberries, or sunflower seed. OR

*Make an Insect*: Provide students with raisins or dried cranberries or sunflower seeds and vegetables such as celery stick, baby carrot, small spinach leaves, slices of radishes or cucumbers, peas, yellow cherry or grape tomato, pepper slices, etc. Put a teaspoon of peanut butter, whipped cream cheese, or cheese spread on the edge of their plates. Ask the children to use the fruits, vegetables, seeds, "edible glue", and their imaginations to create edible insects or a story about insects and plants. See suggestions on next page.
Recipes

**Ants on A Log**

Celery sticks
Low-fat cream cheese, nut or seed butter (such as almond, peanut, sunflower)
Raisins

1. Wash the celery and cut it into pieces (about 5 inches long).

2. Spread cream cheese or nut/seed butter in u-shaped part of celery, from one end to the other.

3. Press raisins into cream cheese or nut/seed butter.

4. Enjoy your ants on a log!

**Butterflies**

Celery stick
Nut/seed butter (such as almond, peanut, sunflower)
4 mini pretzels
2 small pretzel pieces for antennae
1 raisin

1. Spread nut/seed butter on celery.

2. Place pretzels in center of celery stick to make wings.

3. Place raisin at top of celery

4. Use small broken pieces of pretzel for antennae.
Banana Caterpillar

Makes 1 serving
1 banana
Chow Mein noodles or pretzel sticks
2 raisins
Apple or pineapple rings, cut in half

1. Cut through the banana, spacing cuts 1 inch apart.
2. Place ½ an apple ring (peel side up) or pineapple ring in each of the cuts.
3. For the eyes, gently press raisins into one end of the banana for eyes.
4. Place Chow Mein noodles or pretzel sticks on both sides of the banana for legs.

Recipe and photo from University of Nebraska Lincoln 4H.
http://food.unl.edu/documents/Banana%20Caterpillar.pdf
Life in the Garden  |  LESSON 2

CONTENT OBJECTIVES
Identify creatures found in the garden, Describe how creatures and plants interact in the garden

LIFE SKILL OBJECTIVES
Learning to learn by observing and listening; Communicating by reading, writing, acting, and discussing; Critical thinking; Cooperation

INDICATORS
Write a short story about plants and animals in the garden; Identify garden creatures and act out their activity in the garden; Match pictures of garden creatures to their names and what they do in the garden; Match written descriptions of garden creatures to lyrics in a book; Develop a list of ways animals, including people, interact with plants; Read aloud with fluency and expression

SUBJECT STANDARDS
Science: Life (characteristics of organisms, organisms and environments)
Language Arts: Reading, Main idea, Factual understanding, Interpreting, Inferring, Sequencing, Summarizing, Character development, Writing, Listening, Acting
Math: Number and operations, Data analysis and probability

LEARNER TYPES
Linguistic-words, Logical-mathematical, Spatial-visual, Bodily-kinesthetic, Interpersonal, Intrapersonal, Music, Natural

MATERIALS
Cucumber Soup by Vickie Leigh Krudwig
Lined paper and pencil (one each per student)
Melodrama name tags (copy, cut, possibly laminate; found at the end of the lesson)
MATERIALS LIST continued on next page
MATERIALS continued
Props for “Grady’s Garden” melodrama players (see Possible Props list below)
Melodrama “Applause” and “Boo” signs
“Grady’s Garden” script (found at the end of the lesson)
Oddhopper’s Opera: A Bug’s Garden of Verses, by Kurt Cyrus
Creature Culture activity sheet (one per student, found at the end of the lesson)
Creature Expert Cards (copy and cut one card per student, found at the end of the lesson)
Transparent tape
Plain white paper
Crayons, markers or colored pencils

Grady’s Garden Players and Possible Props
Players can also make their own props with construction paper, scissors and tape. The script has parts for sixteen players. In smaller classes, students may have to play more than one part. In larger classes, you may want to add more creatures such as aphids, honeybees, earthworms, deer, or rabbits.

Zo and Zeta Zinnia – Flower headbands, backpacks or T-shirts with flowers on them, a bouquet of bright flowers
Fruitilda – A small green ball or a yellow or orange-yellow ball to look like pumpkins or squash
Grady – A handheld trowel or garden tool
Honeybee – Bee antennae headband, yellow and black striped gloves or T-shirt, bee backpack, undersized wings
Aphid – Straw to suck juices out of the plants
Lady beetle – Black antennae headband, red and black spotted hat or cape
Earthworm – Brown hat or cap, brown T-shirt or jacket
Bean leaf beetle – Yellow antennae headband, hat, gloves, T-shirt
Squash bug – Straw to suck juice out of squash
Praying mantis – Green hat, cape, gloves, boots
Toad – Party blow-out as a tongue to capture insects
Cutworm – Scissors
Rabbit – Rabbit ears headband, cotton ball tail

INTRODUCTION

ENGAGE

SET THE STAGE
30 MINUTES

Language Arts:
Reading, Main idea, Factual understanding, Inferring, Sequencing, Character development, Writing

Life Science:
Characteristics of organisms, Organisms and environments

Math:
Number and operations, Data analysis and probability

CUCUMBER SOUP

Have the students help read and show the pictures in Cucumber Soup by Vickie Leigh Krudwig. Start a list of garden creatures on the board. Every time a new garden creature is identified in the book, have someone write the name of the creature on the board. Continue with the following questions.

What was the main idea of the story?
It was about insects and other creatures in the garden that tried to move a cucumber off an anthill.

Let’s go back to the story and see how the author set the stage or created the first scene in the beginning or introduction of the story.

What time of day was it?
Early in the morning

Where did the main event take place?
In the vegetable garden

Who were the main characters?
The ten ants
What were they doing?
Looking for food

How did the author get your attention?
She said, “Something terrible happened.”

What terrible thing happened?
A cucumber had fallen and covered the entrance to the anthill. The ants couldn’t push it out of the way so they cried for help.

How many pages did the introduction take?
Two

What happened in the middle or body of the story?
Several groups of garden creatures, mainly insects, came to help push the cucumber off the hill.

What happened at the end or conclusion of the story?
One flea wanted to help; others made fun of him, but the cucumber moved. Everyone pitched in to move the cucumber. They celebrated with cucumber soup.

What part of the story do you think is missing?
Are you wondering how the cucumber fell on the anthill?

Have the students take out a piece of paper and a pencil to write a short story, a few sentences long, about how the cucumber fell on the anthill. Talk about setting the stage in the introductory sentences. It would be early in the morning and the cucumber would still be on the vine. The rest of the beginning or introductory scene is up to the writers. The body of the story should tell how the cucumber fell off the vine. The end of the story, in this case, would lead up to the ants finding the entrance to their anthill blocked by the cucumber.

Have the students read their stories out loud. Write all the reasons why the cucumber fell on the anthill and note the most popular reason. Then continue with the following questions.

What did you learn about the characters in the book?
There are many kinds of flying and crawling creatures in the garden. Regardless of their size and abilities, they all offered to try to help move the cucumber. You shouldn’t make fun or doubt how someone (the flea) can help accomplish a task. Everyone was happy at the end because they all helped. The characters had fun celebrating by eating cucumber soup.

Why did the ants think that they could push the cucumber off the hill by themselves?
The description of ants said that they are used to carrying things that weigh much more than they do.

Clap your hands if you think there were insects in the story that did good things in the garden.
Stomp your feet if you think there were insects in the story that harmed garden plants.

You may want to read some of the insect descriptions and vote again.
Together, let’s add up the number of insects it took to move the cucumber.

10 ants
+ 9 mosquitoes
+ 8 ladybugs
+ 7 spiders
+ 6 bumblebees
+ 5 butterflies
+ 4 fireflies
+ 3 grasshoppers
+ 2 praying mantises
+ 1 flea

55 insects

There were fifty-five insects that pushed the cucumber in the garden. But one of them was not a true insect.

**Which garden creature was not an insect?**
A spider has two body sections and four sets of legs compared to three body sections and three sets of legs on insects. Spiders are arachnids.

**How many spiders were there?**
Seven

**How many true insects were there?**

\[55 - 7 = 48\text{ insects}\]

A real garden has many, many more insects! Let’s add some zeroes to this number to make it bigger.

**What number is it now?**
Write 480, 4,800, 48,000, 480,000, and 4,800,000 on the board and say the numbers out loud.

Scientists have described and given names to about 920,000 species of insects in the world, which represents almost 85 percent of all known animal species. (Write 920,000 on the board. Draw a pie chart showing 85 percent.) It is estimated that there are really 20-30 million species of insects on the earth at present – many of which need to be identified and named. Write 20,000,000 on the board.

**Which number is bigger?**

20,000,000

You are going to become some of these garden creatures and garden creature experts while we study life in the garden.

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**Do | EXPLORE**

**INVESTIGATE CONCEPTS**

30 MINUTES, POSSIBLY ANOTHER DAY

**Life Science:** Characteristics of organisms, Organisms and environments

STANDARDS continued on next page

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**“GRADY’S GARDEN” MELODRAMA**

Before starting this session, assign parts for the melodrama so that each student has a role. There can be several aphids, rabbits and even flowers. Place the name tags with the corresponding props so that you can easily distribute them when it is time.

You are going to perform a melodrama and become garden plants and some of the creatures found in the garden. The performers in a melodrama are called players. They exaggerate their emotions and actions without speaking. Show me how you can look like a “bad guy” or a villain without making a sound. Now, show me how you can look really strong, confident and heroic without making a sound.
In many stories, there are usually villains or “bad guys,” heroes or “good guys,” and other characters that have good and bad things happen to them. This melodrama is acted while a narrator reads the script. Audience participation is very important. Every time the heroes do something good, a producer holds up an “Applause” sign and everybody claps and yells, “YEAH!” Every time the villains do something bad, a producer holds up a “Boo” sign and everyone hisses and yells, “BOO!” Let’s try it. (Hold up the “Applause” sign, then the “Boo” sign.) In real life, it isn’t nice or respectful to yell “Boo” at people. In the melodrama, a boo indicates that something bad is about to happen. Fortunately, though, most melodramas have happy endings!

We are going to perform a melodrama called Grady’s Garden. In Grady’s Garden, bad insects and animals that destroy garden plants are the villains. We have five villains. (Distribute the aphid, bean leaf beetle, squash bug, cutworm and rabbit name tags and props.) Show us how you can look like villains. We have five heroes. (Distribute the honeybee, ladybug, earthworm, praying mantis and toad name tags and props.) Show us how you can look like strong heroes who help the plants. We have bright, colorful, happy plants named Zo (zoe) Zinnia, Zeta Zinnia and Fruitleda (fruit-illa). These players will have to listen closely to the story and do what the narrator says. Practice acting like a plant. Think of your feet as roots, your bodies as stems, your arms and hands as leaves and fruit, and your heads as flowers.

Who wants to be Grady the gardener?
Who wants to be the producer that holds up the signs?

The audience is very important in creating the melodrama’s mood. Because there are so many players in our melodrama, those who aren’t onstage will have to follow the directions on the signs. Let’s have the producer and audience practice.

*Distribute the name tags to the appropriate players and have them read the cues on the back before they tape the tag to their shirts.*

The beginning or introduction to the melodrama sets the stage or scene. Zo and Zeta Zinnia and Fruitleda are enjoying a beautiful, sunny day in the garden. Zo, Zeta and Fruitleda will stand in the middle of the stage and look happy as their leaves and flowers flutter in the breeze. Grady the Gardener should be with the plants working away in the soil around the plants. The producer should be near the stage so that everyone can watch the melodrama and see the “Applause” and “Boo” signs at the same time. The narrator should stand to the side or back of the room and read the script loudly, dramatically and slowly to allow the players to hear their cues and act out their parts.

Players, carefully listen to the narrator as he/she reads the story. When your character’s name is read, do as the narrator says. Do not leave the stage until the narrator says you have been eaten or you crawl, hop or fly away. Producer, when you hear the word “hero,” hold up the “Applause” sign. When you hear the word “villain,” hold up the “Boo” sign. Audience, do your part when the signs are held up. Everyone try to remember the characters that are heroes and villains. Listen and watch carefully for what the insects and animals do in the garden.

Perform Grady’s Garden melodrama. You may want to perform it more than once. It is also a good skit to share with another class.

Make two columns on a large sheet of paper, poster board or black board. Title one column “Garden Good Guys” and the other “Garden Bad Guys.” After the melodrama, have the students tape their name tags in the appropriate column and discuss the characters with the entire class.
"CREATURE CULTURE" ACTIVITY SHEETS

Use the list of garden creatures on the board as a resource for the following discussion.

What creatures were “bad guys” or villains in the melodrama and book?
Mosquito, flea, grasshopper, aphid, bean leaf beetle, squash bug, cutworm, rabbit, deer, raccoon, fungi, bacterium, virus, squash vine borer

What made them “bad guys”?
They ate and destroyed plants or they can bite animals and people.

What creatures were “good guys” or heroes?
Why?
Ladybug, praying mantis, garden spider and toad were predators that feed on other “bad” insects. Butterfly and honeybee are pollinators that help flowers form seeds. The earthworm digs tunnels in the soil to help plant roots absorb water and air.

What creatures can be good or bad in the garden?
Why?
Ants can be household nuisances, but they are good scavengers and decomposers. Butterfly caterpillars can eat crops, but butterflies are pollinators so plants can produce seeds and fruits.

Distribute the Creature Culture activity sheet found at the end of the lesson.

Look at the pictures of the garden creatures on the Creature Culture activity sheet. Some creatures seem to be eating plants, as the villains in the melodrama did. Others appear to be helping the plants, as the heroes in the melodrama did. Color the picture as close to real life as possible. While you are coloring the picture, look at the list of creatures and place the corresponding letter from the pictures on the blank line next to the correct creature’s name. Then put a smiley face next to the heroes and a sad face next to the villains.

Go over the correct responses together.

CREATURE CULTURE KEY

<table>
<thead>
<tr>
<th>Creature</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green lacewing</td>
<td>H</td>
</tr>
<tr>
<td>Tomato hornworm</td>
<td>G</td>
</tr>
<tr>
<td>Lady beetle</td>
<td>C</td>
</tr>
<tr>
<td>Squash vine borer</td>
<td>J</td>
</tr>
<tr>
<td>Praying mantis</td>
<td>E</td>
</tr>
<tr>
<td>Spider</td>
<td>B</td>
</tr>
<tr>
<td>Squash bug</td>
<td>I</td>
</tr>
<tr>
<td>Aphid</td>
<td>D</td>
</tr>
<tr>
<td>Earthworm</td>
<td>F</td>
</tr>
<tr>
<td>Honeybee</td>
<td>A</td>
</tr>
<tr>
<td>Cutworm</td>
<td>K</td>
</tr>
</tbody>
</table>
How do the creatures look or act that relates to their names?
Lacewings are light green and have lacy wings. Tomato hornworms like to eat tomato plants and have a horn on their tail end. Squash vine borers bore holes in squash vines. Praying mantises hold their forelegs like they are praying. Squash bugs like to suck the juice out of squash plants. Earthworms like to tunnel through and eat the earth. Cutworms cut roots.

What creatures on the picture are not really insects?
Garden spiders are arachnids with two body sections and four sets of legs compared to three body sections and three sets of legs on an insect. An earthworm has no legs.

ODDHOPPER’S OPERA

We have learned how animals and plants live together by reading a book, becoming players in a melodrama, writing stories, looking at illustrations, and talking with each other. These are all forms of communication. We are going to explore interactions between animals and plants through one more book titled “Oddhopper’s Opera” by Kurt Cyrus.

What is an opera?
An opera is a play that usually has music, lots of action, and tells a story. In this book, the pages are written as rhythmical lyrics and the actors, the unusual or odd creatures in the garden, are very active. They tell the story of what creatures do in the garden.

You are going to perform in this opera by reading the book and becoming garden creature experts.

Copy, cut out and distribute one creature to each student from the Creature Expert Cards at the end of this lesson. Read Oddhopper’s Opera by taking turns reading the verses/pages. Reread the book and have the students stand up if they think their garden creature is being described in the verse. Use the illustrations and the opera to confirm the guesses. Then have the expert read his/her question, have fun guessing the answers, and then have the expert read the rest of the paragraph. Add to your list of garden good guys and bad guys. After the story, have the students try to draw a picture of their insect and label it to display in a garden scene on a bulletin board.

What garden creatures have you seen where we live?
Where did you see them?
What were they doing?
Why are some insects harder to find than others?
Talk about ways that they blend into their environment.

Do you need both good guys and bad guys in the garden?
Yes.
Why?
Even the bad guys are part of the food chain. For example, aphids eat plants but lady beetles eat aphids.

The creatures we’ve been talking about are part of the animal kingdom. We’ve been discovering how they interact with the plant kingdom.
Are we, people, part of the animal or plant kingdom?
Animal

How do we interact with the plant kingdom?
*Have the students write a list of ways they interact with plants. Have them share their list with one other person, then a group. See which group has the longest list.*

We use plants for food, clothing, shelter, beauty, and many other things. We grow and harvest plants. We enjoy plants that naturally grow in prairies, wetlands, ditches, forests, and so on. People and most animals cannot survive without plants.

*You may want the students to pretend they are ants while everyone prepares the Cucumber Soup recipe at the end of the story. The suggestion for making a vegetable dip may be fun to do and serve to the class. Tasting something new may encourage the students to prepare and eat healthier snacks.*

When do you need to step in and start managing the bad guys?
When there are too many of them destroying the crops *(To learn more, go to Growing in the Garden, Garden Investigators.)*

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**BEE FACTS**

**FAVORITE COLORS**
Bees are attracted to blue, purple and yellow flowers that smell sweet. They rarely visit red flowers because they can't recognize that color.

**BUSY AS A BEE**
A honeybee can visit ten flowers per minute and stop at more than six hundred flowers before returning to the hive. It can make about ten trips a day. Each flight lasts about an hour and the trip is within 3 miles of the bee's hive.

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**RESOURCES**

### Grade 2 Lesson 9

**Lesson 9**

<table>
<thead>
<tr>
<th><strong>Read</strong></th>
<th><strong>Write</strong></th>
<th><strong>Learn</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>The quick brown fox jumps over the lazy dog.</em></td>
<td><em>She sells sea shells by the sea shore.</em></td>
<td><em>A house in the garden.</em></td>
</tr>
<tr>
<td><em>The sun sets in the west.</em></td>
<td><em>The cat sat on the mat.</em></td>
<td><em>In the garden.</em></td>
</tr>
<tr>
<td><em>The grass is green.</em></td>
<td><em>The alphabet.</em></td>
<td><em>Learn new words.</em></td>
</tr>
</tbody>
</table>

### Cowboy: The quick brown fox jumps over the lazy dog.

- The quick brown fox jumps over the lazy dog.
- The quick brown fox jumps over the lazy dog.
- The quick brown fox jumps over the lazy dog.

### House in the Garden

- A house in the garden.
- A house in the garden.
- A house in the garden.

### The Garden

- The garden.
- The garden.
- The garden.

### Learn New Words

- Learn new words.
- Learn new words.
- Learn new words.

### Sentences

- She sells sea shells by the sea shore.
- A house in the garden.
- In the garden.

### Alphabet

- The alphabet.
- The alphabet.
- The alphabet.

### Words

- Learn new words.
- Learn new words.
- Learn new words.

### Activities

- Read the story loudly.
- Practise the alphabet.
- Learn new words.

### Vocabulary

- Sea shells.
- The quick brown fox.
- The lazy dog.
- The garden.
- A house in the garden.
Grady’s garden is a beautiful, peaceful place where the bright pink flowers of Zo and Zeta Zinnia sway back and forth on their long, straight, slender stems in the golden sunshine. The Zinnias’ leaves occasionally flutter in the breeze. Fruitilda’s long, twisted vines hold a small green fruit growing near some fading blossoms. The plants enjoy each day out in the sun or in the gentle rain. They smile while Grady, the gardener, works in the garden. Grady stands back and admires the beautiful garden. Then Grady takes the tools and walks toward the house. Grady is a hero for caring for the plants in the garden. *(Hold up the “Applause” sign.)*

Here comes a honeybee, buzzing and flying toward the flowers. The honeybee flaps its little wings hard and fast. It’s on a journey to visit more than six hundred flowers before returning to its hive. The honeybee flies close to Zo Zinnia’s flower to collect nectar from deep inside. The honeybee gets a dusting of pollen on its body while it is searching for nectar. The honeybee leaves Zo Zinnia and flies over to Zeta Zinnia to collect more nectar and pollen. It sheds some pollen on Zeta’s flower. Then it flies back to Zo. The honeybee has just pollinated Zo and Zeta Zinnia. Now they can produce seeds. The honeybee is a hero for helping the plants. *(Hold up the “Applause” sign.)* The honeybee flies off to find more nectar and pollen.

Just as the plants are enjoying the sunny day, along comes an aphid. An aphid is a tiny, hungry insect. Aphids move around on stems and leaves and suck out their juices. Because they suck food instead of chewing, aphids don’t make holes in the leaves. They cause the leaves to turn yellow and brown. This makes aphids villains. *(Hold up the “Boo” sign.)* Wait, here comes a cute, little, red lady beetle, or ladybug, with black spots. As she flies and crawls around, she spots the aphid and eats it! Lady beetle saved the plants! What a hero! *(Hold up the “Applause” sign.)* Lady beetles can eat fifty or more aphids a day. The Zinnias and Fruitilda nod thank you while the lady beetle flies off to look for more aphids or other small, tasty insects.

Even smaller than aphids are teeny-tiny organisms called viruses, bacteria and fungi. We can’t see them, but they are working away in the garden and in the plants. Viruses, bacteria and fungi can be heroes when they help plants grow healthy and beautiful. *(Hold up the “Applause” sign.)* They also can be villains when they make plants sick. *(Hold up the “Boo” sign.)*
What’s that tunneling through the soil around the plants? It’s a long, slippery earthworm. The earthworm crawls around and creates tunnels near the plants’ roots. Now Zo, Zeta, and Fruitilda’s roots can easily absorb more air and water. The plants look at the earthworm to thank it while it squirms away. The earthworm is a hero for making the soil better for plants to grow strong and healthy. (Hold up the “Applause” sign.)

As the earthworm squirms away, a small, spotted bean leaf beetle lands on Zeta Zinnia’s flower. It looks around and sneers like a villain. (Hold up the “Boo” sign.) Then it flies around the garden looking for bean plants to eat. Bean leaf beetles, cucumber beetles, tomato hornworms, and slimy slugs chew holes in leaves and fruits. A squash bug flies to Fruitilda and begins feeding on the leaves by sucking out their juices. A squash bug’s favorite foods are pumpkins and squash. You can’t see it, but there’s also a squash vine borer eating away inside Fruitilda’s stem. These insects are villains because they destroy plants. The plants look as if they are in pain. (Hold up the “Boo” sign.)

Here comes a long, slender praying mantis stepping smoothly and slowly into the garden. It looks like a dinosaur standing on its back two legs with its front legs held together like it’s praying. When the bean leaf beetle gets too close, the praying mantis quickly reaches out, grabs it, and eats it! The praying mantis is a hero for saving the plants. (Hold up the “Applause” sign.) Garden creatures such as the praying mantis, lady beetle, lacewing, and spider are called predators. They are good predators because they eat insects that damage plants. They are heroes. (Hold up the “Applause” sign.) The praying mantis walks away slowly, looking for its next meal.

Fruitilda is starting to look sick because the squash bug is sucking a lot of juice from her leaves. Out hops a toad, right next to the squash bug. The toad sticks out its tongue, grabs the squash bug, eats it, and hops away. The toad is a hero for helping Fruitilda. (Hold up the “Applause” sign.) Turtles and birds such as wrens and robins also eat insects that eat garden plants.

The sun has set and the Zinnias and Fruitilda are looking tired. During the dark and dreary night, a cutworm crawls to the top of the soil. It chews off Zo Zinnia’s stem right next to the soil. The villain cutworm looks up and sneers as it watches Zo fall to the ground. (Hold up the “Boo” sign.) The cutworm takes a few more bites then crawls away.

The animals come out of the forest for a nighttime garden party. The rabbit wiggles its nose and hops to the garden. The raccoon and deer also are invited. These animals think gardens are like “potluck picnics” with an assortment of tasty foods. Animals are fun to watch, but they can be villains in the garden. (Hold up the “Boo” sign.) The rabbit starts nibbling on leaves in the garden. Just in time, Grady, the gardener, runs out of the house and over to the garden to chase away the rabbit and other animals. Grady is a hero for saving the plants from the animals that eat them. (Hold up the “Applause” sign.) Grady smiles and picks up Zo Zinnia. (By the hand) Grady takes Zo into the house and puts her in a pretty vase with water (sets her on a chair). Zo and Zeta Zinnia, Fruitilda and Grady feel happy and content. They know that the creatures and people will work together another day to find peace and harmony in the garden.

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THE END
Creature Culture

Garden creatures are difficult to find hiding in the plants and soil. Find the garden creatures in the picture and write the letter on the drawing next to the name of the creature written below.

- Green lacewing
- Tomato hornworm
- Lady beetle
- Squash vine borer
- Praying mantis
- Spider
- Squash bug
- Aphid
- Earthworm
- Honeybee
- Cutworm

😊 Draw a smiley face beside the creatures in the list that protect plants and help them grow strong and healthy.

😢 Draw a sad face beside the creatures in the list that chew or suck on the plants.
<table>
<thead>
<tr>
<th>Creatures Expert Cards</th>
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<tbody>
<tr>
<td><strong>Weevils or Snout Beetles</strong></td>
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<tr>
<td>How could you spell the name of a small or “wee” insect that is a “vil” for “villain” because it eats many different crops we work so hard go grow? Weevils are “wee” or tiny insects that live mainly underground in wet places. They are villains when they use their long snouts to burrow into all parts of plants and ruin them for us to use or eat. If you combine “wee” for tiny and “vil” for villain, you get “weevil.”</td>
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| **Aphids or Plant Lice** | **Fleas** |
| What insect can appear by the thousands on a single plant? Aphids use their straw-like mouths to suck the tasty juices from plants, causing them to shrivel and die. When they eat, they release plant juice and other wastes in the form of a sticky substance called honeydew. Other insects such as ants like to eat the honeydew. Birds and other insects such as lady beetles like to eat aphids. | Why is it important for pets and people to shower after playing on the ground outside? Fleas are tiny, wingless insects with dark-colored, flat-sided bodies. They are bloodsucking parasites that like to live on mammals. That’s how they travel into your house and start living in your carpet or in your bed. Their painful bites cause you to itch. Their eggs are laid on the ground where they hatch so that the larvae can eat organic debris such as dung or decomposing plants. They can transmit many diseases to people and pets. |

| **Bees** | **Grubs** |
| Is it a bee or a wasp? Wasps have skinny waists; bees don’t. Bees are hairy all over; most wasps are not. Part of a bee’s back legs are larger, flatter and covered with long, stiff hairs to carry pollen from plant to plant. Pollen helps many plants produce fruit and seeds. Stand still when there are bees around you and they shouldn’t bother you. | What kind of grub do grubs eat? Grubs are plump, white worm-like larvae with dark heads that live right under the surface of grass. They are eating away at the roots of the grass and can destroy large sections of your yard. You would never guess what kind of adults they become – large, hard-shelled beetles such as big orange June beetles. |

<p>| <strong>Crickets</strong> | <strong>Ground Beetle</strong> |
| Where is the trilling, chirping song coming from that keeps you awake all night long during the summer? Crickets are singing while they eat plants, insects, and even each other during the night. They eat fiber such as cardboard and draperies inside your house, too. They rub their wings together to sing their song. | Have you ever seen a beetle stuck on its back (like in the book)? Beetles have distinguishing lines down the middle of their backs that separate two hard wings. Ground beetles are usually black but sometimes iridescent and shiny. They hide under rocks and ground cover and hunt at night. Because their chewing mouth part helps them eat cutworms and gypsy moth caterpillars that destroy plants, they are considered beneficial to agriculture. |</p>
<table>
<thead>
<tr>
<th>Leaffoppers, Froghoppers and Spittlebugs</th>
<th>Dung Beetles or Tumble Bugs</th>
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<tr>
<td><strong>Do the names of these insects tell you anything about them?</strong> Leaffoppers are slender, brightly colored insects that hop and fly from leaf to leaf looking for the right leaves to eat. Froghoppers look squatty and are brown or green like frogs and hop and fly from plant to plant to eat it. Spittlebugs are the nymph or young form of froghoppers. When they suck the juice from plants, they surround themselves with bubbly-looking or foamy spit, which keeps them moist and hidden from predators.</td>
<td><strong>Do Bummer Beetle and his beetle buddies have a ball in the garden?</strong> You could say so. Dung beetles break up dung and roll pieces of it into balls. The beetles use the balls to lay eggs and store food. They are good for the earth because they bury and eat dung, which improves the nutrient content and soil structure. They also protect livestock such as cattle by removing the dung, which, if left on the ground, could provide habitat for pests such as flies.</td>
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<thead>
<tr>
<th>Katydid</th>
<th>Centipede</th>
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<tr>
<td><strong>What did Katy do?</strong> Katydid sing their name from the treetops on summer nights. They belong to the long-horned grasshopper family with a distinguishable large, green, leaf-shaped body and thread-like antennae that are longer than they are. They eat plants, but you don’t see much damage. It’s hard to tell what Katydid do.</td>
<td><strong>How many legs do centipedes really have?</strong> “Centi” means one hundred. Words with “ped” at the beginning usually have something to do with feet. Not all centipedes have one hundred feet or fifty pairs of legs, but they do have at least fifteen pairs of legs, one pair per segment. Notice how fast they run with at least thirty legs going all at the same time. Insects have three pairs of legs or six legs. Is a centipede an insect? Centipedes help in decomposition by eating rotten wood and leaf debris on the ground. You can find them hiding under rocks or logs.</td>
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<tr>
<th>Walkingsticks</th>
<th>Snails</th>
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<tr>
<td><strong>How can you describe a walkingstick?</strong> It’s pretty easy to describe a walkingstick; it’s harder to find one. They look like a stick and if you look closely, they even sway while they sit to imitate a twig in the breeze. They eat leaves of trees and shrubs, but aren’t a serious pest. They are fun to watch.</td>
<td><strong>Do you know a creature that carries its house wherever it goes?</strong> Snails, like turtles, never leave home. A snail’s shell protects it from some predators. Snails’ bodies produce a thick slime. Because of this slime, they can crawl across the edge of a razor and not get hurt. Snails move with one muscular, broad, flat-bottom foot. So can snails really “race”? Has anyone ever told you that you move at a “snail’s pace”? Is that slow or fast? Garden slugs plod along, moving only 2 feet an hour. They chew large holes as they move across leaves at night or when there is dew on the ground.</td>
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<th>Snakes</th>
<th>Frogs</th>
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<tr>
<td><strong>Why do many people scream and run away when they see a snake?</strong> We often don’t see them, but their quick movements to escape cause us to jump and scream. There are all kinds of snakes slithering around outside. Sometimes you can’t find them, but you find the skin they shed. Snakes police the garden and keep unwanted insects and small, plant-eating rodents away from the plants—they should be the ones screaming and running away before they get snatched up and eaten.</td>
<td><strong>How many times do frogs change looks, names and places they live?</strong> Let’s see. A frog starts as an egg, laid in the water. It hatches as a fish-like tadpole with a tail to swim and gills to breathe underwater. Within a few days, it starts growing legs. When its legs are developed and it has lungs to breathe, a froglet can go on the land. A young froglet’s tail starts to be absorbed and its back becomes humped. Their long, strong back legs help them leap. Frogs are similar to toads, but toads live mainly on land when they are adults. Frogs stick out their long, sticky tongues to grab insects for dinner.</td>
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</table>
**Stink Bugs**

Do stink bugs really stink or is that just an unfair name? Yes, stink bugs give off an odor when they are disturbed or when they are scaring off predators. This “stinky” smell enables them to avoid getting eaten by birds, frogs or toads. Stink bugs suck plant juices, especially the plant sap of young corn. This causes the injured leaves to become twisted and deformed.

**Flies and Maggots**

Do flies deserve the bad reputation that we give them? Why do flies look different than other flying insects? Nearly all flies have just one pair of wings compared to a double pair that other flying insects have. Flies start as eggs that are laid in places where the larvae, called maggots, like to eat. Maggots are small, legless caterpillars that live in wet places and eat rather nasty stuff. Maggots are decomposers. Adult flies suck water and nutrients from their food, which could be dung, insects, spiders, animals, people, decomposing food, and fruit. Flies can carry and transmit diseases.

**Spiders**

What makes a spider different than an insect? Spiders have eight legs and two body sections; insects have six legs and three body sections. Many spiders have two claw-like appendages called “palps” that look like another set of legs up by their mouths. Spiders spin webs of silk thread secreted from spinneret glands located on the spider’s abdomen. The web is used to catch or lure prey for food. Spiders can detect and locate the struggling prey with amazing speed and accuracy and wrap it in silk. They can eat it immediately or store it for later. They catch all kinds of insects. Spiders are food for birds and other predators.

**Birds**

Have you ever caught food in your mouth in midair? Many birds such as wrens, purple martins, Baltimore orioles, and meadowlarks do because insects are their main food source. Robins, goldfinches, sparrows, and bluebirds also eat insects. A study found that songbirds play a vital role in the health of trees by eating the insects that can cause leaf damage and stunt plant growth. We often want to attract birds to our gardens; however, not all birds are wanted guests. Some birds, such as crows and blackbirds, come in flocks as unwanted guests and roost in trees. Their droppings and feathers make messes below them that are hazardous, unsanitary and smelly.

**Cicadas**

Have you found a large, empty cicada skin on the trunk of a tree or on the ground? Have you been loudly serenaded by a cicada? Sometimes these strange insects are called “locusts,” but that name applies to a group of large grasshoppers. Cicadas are known for their unusual life cycle. The female deposits hundreds of eggs in several slits she cuts in the bark of twigs or trees. The slits cause the twigs to new growth to die. When the eggs hatch, the newborn nymphs drop to the ground, where they burrow into the soil to spend the next 2 to 17 years sucking sap from tree roots. The adults live their short lives on trees.

**Earthworms**

Should we feel sorry for earthworms? Earthworms plow the soil by making tunnels. That allows air and water to reach plant roots. Good soil can have as many as 1,000,000 (a million) worms in an area the size of a football field! When a robin tries to pull up an earthworm, the worm uses short bristles on the side of its body to hold on tight to the tunnel wall. Sometimes the robin pulls so hard that the worm breaks apart. The robin eats the front end and the hind end wriggles back into the tunnel. If a bird pulls off the first seven or eight rings of the worm’s body, new segments will grow back on the part of the worm left in the soil.

**Ants**

What are the strongest insects in the garden? Ants can carry many times their weight. They dig tunnels and build hills quickly where they live in large colonies. There are more ants than any other land creature. Some ants, such as new queens and males, have wings. Ants eat other insects and are scavengers. They themselves are a good source of food for birds and other animals.

**Slugs**

Can you imagine a snail without its shell? If so, that would be a slug— not a very pretty creature. Most slugs are about an inch long, but one species, the banana slug, grows up to 10 inches long. Slugs hide under mulch and in moist areas during the day and come out at night to chew large holes in the leaves of many different kinds of plants. Gardeners go out at night and hand-pick slugs from their plants. They also put traps out that contain something that attract slugs, such as beer or a sweet beverage. The slugs go in the trap, can’t get out and drown. There are chemical baits that are used to kill slugs.
Lesson ten: How do we manage pests in the garden?

“Garden Patrol” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

It’s time to do investigative work and to set up some garden security. Students work in groups to investigate possible garden bad guys and how they could prevent them from getting into the garden. If possible and if necessary, they can use the best plan in their school garden. You might want to talk to a local gardener. To become healthy detectives and security people, they can pick a veggie to learn about and to eat.

Content objectives: Identify garden creatures that can harm garden plants; Create ways to protect plants

Life skill objectives: Critical thinking, Problem solving, Decision making, Communication, Citizenship, Leadership, Healthy living

Core and STEM concepts and skills:
Science: Life science, Science as inquiry
Math: Operations and algebraic thinking, Measurement and data
Language Arts: Reading, Main Idea, Sequencing, Synthesizing, Interpreting, Inferring, Character development, Speaking, Listening, Viewing, Writing

Healthy snack: Cabbage with Asian Dressing or Cabbage Apple Salad

Additional and supporting resources: How Groundhog’s Garden Grew by Lynne Cherry, Eddie’s Garden by Sarah Garland
LESSON PLANS FOR 2011-12 SCHOOL YEAR      Grade 2

BEFORE THE LESSON

1. Grade 2, Lesson 10:
This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit.

2. Look for “Where You Born in a Barn?” by Chris Rowlands cassette. This is difficult to find. There are a few of the songs available from the album on YouTube.

3. Check with your library for How Groundhog’s Garden Grew by Lynne Cherry, Eddie’s Garden by Sarah Garland (or purchase online).

4. Check materials list for complete description of items needed.

5. Assemble necessary ingredients and materials for the selected recipe(s).

THE LESSON

1. Garden Patrol are meant to be taught over several days.
2. Garden Journal - Have students draw the garden in their journal with harmful pests and a pest plan.

AFTER THE LESSON

Optional activities are included in the lesson plan to investigate clues of pests in the garden.

RECIPES

Although this lesson does not include a vegetable tasting, you can fit in a recipe where is works for you. Try Cabbage with Asian Dressing or Cabbage Apple Salad (next page).
## Cabbage Slaw with Asian Dressing

### Slaw
- ½ small head Green Cabbage
- ½ small head Red Cabbage
- ½ cup grated carrot (optional)

### Directions for Slaw
Wash cabbage and carrot, if used. Thinly slice cabbage. Grate carrots, if used. Make Asian Dressing. Pour enough Asian Dressing over the slaw to coat the cabbage; toss.

### Dressing
- 1/4 cup vegetable oil
- 1/4 cup rice vinegar
- 1-2 tablespoons soy sauce
- 2 teaspoons brown sugar

### Dressing
Place all ingredients into a jar with a tight-fitting lid. Shake jar to blend ingredients. Store in the refrigerator until needed. Makes about 3/4 cup. May not need all of it for this recipe.

Recipe makes about 20 tasting servings.

Recipe from Washington State University Pierce County Extension, Square Foot Nutrition Project.
Cabbage-Apple Slaw

**Slaw**
3 cups cabbage, washed and shredded
2 cups Red Delicious apples, unpeeled, scrubbed, cored and chopped
1 cup celery, washed and sliced diagonally
1 ½ cup onion, peeled and sliced into thin rings (optional)

**Pineapple Yogurt Dressing**
1-1/3 cup low fat yogurt
2 tablespoons pineapple juice
1 ¼ teaspoon prepared mustard
1 teaspoon celery seed

**Directions for Slaw**
Combine cabbage, apples, celery, and onions (if used).
In a separate bowl, combine ingredients for pineapple yogurt dressing and mix.
Gently toss pineapple yogurt dressing with apple-cabbage mixture.

Recipe makes about 20 tasting servings.
Garden Patrol | LESSON 4

CONTENT OBJECTIVES
Identify garden creatures that can harm garden plants, Create ways to protect plants from harmful creatures

LIFE SKILL OBJECTIVES
Critical thinking, Problem solving, Decision making, Communicating in small and large groups using verbal and nonverbal communication skills, Cooperation

INDICATORS
Successfully lead a charade game so that others can learn about garden creatures; Draw a picture illustrating a garden, harmful pest and management strategy; Respond to questions to determine what can damage plants and when and how to manage pest problems

SUBJECT STANDARDS
Science: Life (characteristics of organisms, organisms and environments)
Language Arts: Main idea, Sequencing, Synthesizing, Interpreting, Inferring, Character development, Listening, Observing, Communicating in small and large groups with verbal and nonverbal skills
Social Studies: Individuals, groups and institutions

LEARNER TYPES
Linguistic-words, Spatial-visual, Bodily-kinesthetic, Intrapersonal, Interpersonal, Music, Natural

MATERIALS
“Grady’s Garden” name tags and “Creature Expert” cards (copy from Growing in the Garden, Animal Unit, Lesson 2, “Life in the Garden;” one name tag or expert card per student, see the Introduction section)
8 index cards or large sticky notes (Write one of the following creatures on each card: viruses, bacteria, fungi, squash vine borers, slugs, tomato hornworms, birds, deer; see the Introduction section)
Large sheets of paper, poster board, marker or chalkboard and markers (see the Introduction section)
Large sheets of white drawing paper (one sheet per team, see the Do section)
Markers
Sticky notes (one per student)
“Pest Control” lyrics by Chris Rowlands (one transparency or write on the board, found at the end of the lesson)
Were you Born in a Barn? cassette by Chris Rowlands
Cassette tape player
How Groundhog’s Garden Grew by Lynne Cherry or Eddie’s Garden by Sarah Garland
INTRODUCTION

ENGAGE

SET THE STAGE

15 MINUTES

Life Science:
Characteristics of organisms

Make a copy of the “Grady’s Garden” name tags and “Creature Expert Cards” found at the end of Growing in the Garden, Animal Unit, Lesson 2, “Life in the Garden.” Cut them apart and distribute them one per student. Designate three areas of the room, one for Good Guys, one for Bad Guys, and one for Both Bad and Good Guys. Have the students decide what their garden creature is and go stand in the corresponding area of the room. When everyone has moved, have the students discuss in their groups what creature they are and why they thought they belonged to the group. If the rest of the group doesn’t agree with their choice, the rest of the garden creatures should send him/her to the correct area of the room. After the groups feel satisfied with their members, have them take their name tag or expert card and tape it or write it in one column or list under Good Guy, Bad Guy, or Both on the board or on large sheets of paper taped on the wall. Make extra cards for viruses, bacteria, fungi, squash vine borers, slugs, tomato hornworms, birds, and deer and ask the students to add them to the lists.

Why are the bad guys so bad in the yard and garden?
They destroy plants and they may bite people and animals.

What would you do to manage the bad guys in your yard and garden?
Brainstorm a couple ideas and ask the students to think about it.

In this lesson, we are going to learn more about bad guys in the garden, what they do to plants, why their damage is a problem, and how we can manage them so that they won’t destroy the plants. Some of you will become Garden Scene Investigators (GSI), similar to the crime scene investigators (CSI) on television. Others of you will become Garden Protection Agents (GPA), similar to the United States Environmental Protection Agency (EPA) that protects human health and the environment.

PART 1

EXPLORE

INVESTIGATE CONCEPTS

20 MINUTES,
POSSIBLY THE NEXT DAY

Life Science:
Characteristics of organisms, Organisms and environments

Social studies:
Individuals, groups and institutions

Language Arts:
Main idea, Factual understanding, Inferring, Interpreting, Synthesizing, Sequencing, Character development, Listening, Observing, Communicating verbally and nonverbally in small and large groups

What do crime scene investigators look for when they are trying to solve a crime?
We are going to find and investigate clues to determine what is damaging plants. In our investigation, all of the bad guys on our list are suspects when we look at damaged plants. Let’s remember or think about the kind of damage they do.

Working together as a class, discuss the type of damage that each pest does and write it next to the pest on the board. For example, next to the rabbits write “eats plants” or “eats leaves.” Consider whether the bad guys have chewing mouth parts that eat away parts of plants or sucking mouth parts that cause discolored or wilted leaves. Some culprits, such as large wild turkeys and deer, trample plants as they make nests and travel in fields.

How do you think the United States Environmental Protection Agency comes up with rules and regulations to protect humans and the environment?
The EPA employs 18,000 people across the United States; many of them are scientists, engineers, and other specialists that do research to identify, understand and solve environmental problems.

We are going to use the clues from the crime scene investigators to figure out the best way to protect the plants and the environment. First, let’s read a story about garden problems and how they were solved.
At this point, you may choose to read How Groundhog’s Garden Grew by Lynne Cherry or Eddie’s Garden and How to Make Things Grow by Sara Garland. Read the questions below and decide if you want to use them during or after reading the book.

HOW GROUNDHOG’S GARDEN GREW

Who was the main character of the story?
Little Groundhog

At the first of the story, was Little Groundhog a good guy or a bad guy in the garden?
Bad guy

If you were a garden scene investigator, what clues would make you think Little Groundhog was originally a bad guy in the garden?
He was eating lettuce in a neighbor’s garden that didn’t belong to him.

Who was the woodland animal that acted like a garden protection agent?
Squirrel

What did the squirrel suggest that Little Groundhog should do to protect the neighbor’s vegetable garden and the food that was not intended for him?
Squirrel suggested that Little Groundhog should plant his own garden. When Little Groundhog didn’t know how, Squirrel said he would help.

Identify the creatures on the first page of the story and discuss whether they are good guys or bad guys in the garden. Squirrels could eat seeds and dig holes to bury nuts. Birds (a goldfinch and robin) eat insects and seeds. A field mouse eats seeds. The ground squirrel and mole could make tunnels that disturb the roots of the plants. The snake can eat insects and small rodents that eat plants. The turtle eats slugs, which are bad for the plants, but turtles also eat lettuce and worms. The butterfly sucks nectar and pollinates the flowers, but in its caterpillar stage can eat leaves and destroy plants. The honey bee is a pollinator. The praying mantis eats insects in the garden.

On the seed page, an opossum and a raccoon join the group. Why is it risky for all these animals to collect seeds to plant a garden?
They would all be good collectors of seeds, but they would also be very tempted to eat the seeds.

What did many of the woodland creatures do in the wintertime?
Squirrel went to sleep in her tree hole. Groundhog, turtle and mole are sleeping in burrows in the ground.

What does the garden look like in the winter?
In the winter, is there anything in the garden that woodland animals can eat?
There may be seeds in the sunflower heads or other flower heads. There are some plant remains for food and shelter.

Where did the animals put the seeds for the winter?
In a burrow under the ground

What did Wren and Praying Mantis say they could do to protect Little Groundhog’s garden?
They said they would eat the insects that could harm the plants.

What did Little Groundhog have to promise Wren and Praying Mantis?
Not to use bug spray or insecticides
Why don’t Wren and Praying Mantis want Little Groundhog to use bug spray?
Because it might harm them

Will all bug sprays kill birds and all insects?
No, but if you use them inappropriately it could harm animals, insects and plants that you
don’t want to harm.

What garden creatures, good guys, helped the plants to produce fruits and vegetables?
Bees, flies, butterflies

What garden creatures enjoyed the garden produce at the Thanksgiving dinner?
Squirrel, Groundhog, Skunk, Ground Squirrel or Chipmunk, Bluebird, Mouse, Turtle,
Opossum, Raccoon, Butterfly, Snake, Frog, Toad

For your personal reference, please read Lynne Cherry’s Author’s Note at the end of the story.

EDDIE’S GARDEN by Sarah Garland

What is Lily’s favorite garden creature?
Worms

Are worms good guys or bad guys in the garden?
Good guys

Why?
Lily’s Grandad said they mix the earth up, which is good for the plants.

What were the “bad guys” in Eddie’s garden?
Caterpillars, bugs such as aphids pictured on the leaves, slugs, and sometimes little sisters
who don’t quite understand gardening

What were the clues that Eddie found to determine that these were bad guys in his garden?
The caterpillars ate the lettuce. Some bugs, such as aphids, eat leaves. Slugs ate up the
plants. Sometimes Eddie got upset with his sister for playing in the garden.

What were the “good guys”?
Birds, ladybugs, hoverflies, bees, worms, people

What were the clues that Eddie found to determine that these were the good guys in his
garden?
The birds ate the caterpillars. The ladybirds or ladybugs and hoverflies ate the aphids. The
bees made honey from the flowers. People like to eat honey. Worms improve the soil for
the plants. Eddie and his Mum picked the slugs off the plants at night.

Read about pests on the last page of Eddie’s Garden. Then proceed with the following questions.

If you were garden protection agents, what could you do to protect your garden from the
following pests?

Aphids – squash them

Slugs and snails – collect them or set out saucers of sugar water to trap them

Birds – netting, windmills (for motion) or strips of rustling foil

Cats, squirrels, mice,
rabbits, dogs or other
creatures that dig in the
garden and leave deposits – netting or fencing such as chicken wire
GARDEN PATROL

Decide how you would like to divide the group into eight teams or however many needed for the number of students that you have. Write each pest name from the following list on strips of paper and put them in a bowl or envelope so that the Garden Patrol Teams can draw one. Use Post-it® notes or cut pieces of paper, one per student, for name tags.

PESTS: Rabbits, Deer, Raccoons, Birds, Moles, Ground Squirrels, Insects, Slugs

There are many ways gardeners and farmers keep the “bad guys” away from their crops. We are going to form Garden Patrol Teams to investigate and protect imaginary gardens. You will either become a Garden Scene Investigator (GSI) or a Garden Protection Agent (GPA) on your team. Once I have assigned you to your team, this is what you will do:

1. Count off starting with one. All odd number team members will become Garden Scene Investigators (GSI). All even number team members will become Garden Patrol Agents (GPA). You will each get a blank name tag. Write either GSI or GPA on your name tag so your team members know who you are.

2. Next, your team will draw the name of a garden pest out of the bowl. Talk quietly about the pest. Have you seen one before? What does it look like? What was it doing?

3. The GSI team members will have three questions to investigate and respond to before the GPA team members can respond to their own three questions. Write down the answers to your questions so you can refer to them. (The questions are listed below these instructions.)

4. After answering all six questions, the GSI and GPA team members will use the answers to plan how to lead a game of charades so that the other students can figure out your pest, how it got in the garden, what it did in the garden, and what you decided to do to manage the pest and protect the plants. Everyone in your group must have a part in acting out your charade.

5. Draw a picture illustrating your garden patrol decisions. You will show the picture after the rest of the class guesses your charade.

6. You will have 20 minutes to answer your questions, plan your charade, and draw your pictures.

Divide the group into teams. Have the teams count off and make GSI or GPA name tags. Draw pest names, one per team. As the students are discussing their pest, write the following Garden Patrol questions on the board.

GARDEN SCENE INVESTIGATORS (GSI)

1. How does the culprit get into the garden?
   (Their answers will be something like walk, fly, jump, dig, or tunnel.)

2. What kind of damage does it do to the garden?
   (Their answers will be something like suck juices out of leaves, eat holes in leaves, eat the entire plant, chew holes in the roots, tunnel underneath the plants causing the plants to collapse and die.)

3. How many of these garden bad guys does it take to cause serious damage to the plants?
GARDEN PROTECTION AGENCY (GPA)

Use the GSI responses to answer these questions.

1. When should something be done to protect the garden from the bad guys?
   (Their answers will be something like when there are too many to pick off the leaves, when you find tracks, when you see a plant has been eaten, when you plant the garden.)

2. What should be done to eliminate the bad guys from the garden?
   (Their answers will be something like fences, nets or traps. The students will need to describe what they will use and how they will use it in the garden.)

3. What method will cause the least amount of other damage to the gardener, other insects or animals, or the environment? Give your reasons why.

Reflect

EXPLAIN

DEVELOP CONCEPTS

20 MINUTES

Life Science:
Characteristics of organisms and their environments

Language Arts:
Listening, Observing, Interpreting, Inferring, Sequencing, Synthesizing, Communicating verbally and nonverbally in large groups

Play charades and show drawings. Use this as an opportunity to evaluate how well they know their pests, what kind of damage they do in the garden, how to manage them, and how they communicate what they learned. Acknowledge their creativity even if their management strategies may not be very realistic. Talk about the consequences of their choices to manage the pests. You may want to display the drawings on a bulletin board titled “Wanted: Out of My Garden” or “Garden Patrol.” Here are some tips for discussion.

1. Rabbits hop, walk or burrow their way into a garden. Gardeners keep rabbits out of their gardens with 2-foot high chicken wire fences that are buried a few inches deep. Rabbits will not jump over a fence this tall, but we can.

2. Deer walk or leap into a garden. Very tall fences, such as 6 feet tall, are needed to keep out deer. Some smells that deer are not familiar with such as human hair and fragrant bar soap will keep them away. There are some chemicals that deer don’t like the taste or smell of, called “deterrents,” that can be sprayed on plants to keep deer from eating them. Brightly colored electric fences around a garden also keep deer away. They are curious about the colored tape around the wire and put their noses on it. After getting a little shock, the deer will turn around and walk away.

3. Raccoons walk or climb over fences into a garden. They love sweet corn, berries and grapes. Electric fences give raccoons a little shock to prevent them from entering the garden. Raccoons can be lured into small cage-like traps, then taken a few miles into the country and let go. Some gardeners keep a bright light on in their gardens or play very loud music on the radio all night to scare raccoons away. Unfortunately, these tricks don’t always work.

4. Birds fly into the garden to eat berries and grapes. Crows are problems to farmers because they feed on corn by tearing open the cobs and exposing the ears to the weather. Although they cause damage to corn crops, crows are very beneficial to farmers by eating the June bugs, grasshoppers, weevils, and other insects that affect farmers’ fields. A net over fruit trees and grape vines keep the birds from reaching the fruit. Gardeners try to put all sorts of things in their gardens, including shiny objects such as aluminum pie pans, noise makers, hanging inflatable predators such as owls and snakes, and scarecrows to scare away birds. Unfortunately, these don’t always work.

5. Moles dig tunnels and eat soil insects and earthworms. They damage garden plants by disrupting their roots when they burrow through a lawn or garden. The best way to get rid of moles is to trap them.

6. Ground squirrels dig holes and tunnels under sidewalks and in gardens. They eat seeds and bulbs. They can be trapped and moved to another place away from the garden.
7. **Insects** usually fly into a garden, or they deposit their eggs there and the larvae hatch on plant leaves or in the soil. There may be only a few insects or hundreds of them. Gardeners can pick the pests off the plants, use chemicals (insecticides) to kill the insects without damaging the plants, or they rely on other insects or animals (predators and parasites) to eat the garden pests.

8. **Slugs** are snails without shells. They come out at night and chew holes in the leaves of many different kinds of plants. Gardeners go out at night and hand-pick slugs from their plants. They also put traps out that contain things that attract slugs, such as beer or a sweet beverage. The slugs go in the trap, can’t get out and drown. There are chemical baits that can be used to kill slugs.

**If you found two insects in a garden would you use the same method to get rid of them as you would if you found two hundred insects?**

No, you could easily hand pick them off.

**Why is it important to be careful when controlling pests in gardens and farms?**

So you control only the pest and don’t harm other organisms, yourself or the environment.

**Where have you seen fences?**

**How are they used?**

Around gardens to protect the plants, around farms to keep livestock in and predators out, around homes for privacy, around public places to protect the property and keep people out when the place isn’t open, etc.

**How are nets used for pest control?**

As a barrier to keep the pest from reaching the crop.

---

There may be other things that cause damage to plants that aren’t caused by a pest. As good GSIs and GPAs, we need to be aware of these things, too. Let’s see how many we can list on the board. *(Have a student write these on the board.)*

- **Wind** can blow plants over.
- **Pesticides** can drift from a field onto a garden plant and damage it.
- Too much or too little **fertilizer** in the soil
- Too much water or too little **water**
- Too much or too little **light**
- **Hail** damage will make holes in leaves or shred the leaves.
- **A late freeze** in the spring or an **early freeze** in the fall can kill or damage garden plants.

We, people, can be a harmful pest in a garden.

**What kind of damage can we do to plants?**

We can step or fall on plants and break them off, accidentally hoe or pull them up thinking they are weeds, forget to water them if it hasn’t rained, put too many chemicals on them, plant them too closely so they compete for water and space, etc.

*(Play “Pest Control” from Were You Born in a Barn? by Chris Rowlands. Then ask the following questions. You may want to copy the lyrics found at the end of this lesson on an overhead transparency or write the lyrics on the board, flip chart, or poster so the students can follow along.)*

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<table>
<thead>
<tr>
<th><strong>Apply</strong></th>
<th><strong>EXPAND</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ELABORATE IN A NEW WAY</td>
<td>15 MINUTES</td>
</tr>
</tbody>
</table>

**Life Science:**

- Characteristics of organisms and their environments

**Language Arts:**

- Listening and speaking

**Social Studies:**

- Individuals, groups and institutions
Why do farmers want to get rid of pests?
They harm cattle and crops, which they depend on to make a living for their family.

**What were some of the pest controls the farmer mentioned in the song?**
Chemicals, predators such as ladybugs, and crop rotation

**What was the farmer’s concern as he was considering which pest control to use?**
Using what is best and safest for the land, plants and people.

*(Play the song a second time to see if the students can hear all the answers.)*

There are many careers related to pest control. Let’s see how many we can list on the board.

- Animal control officer (city government)
- Farmer, gardener, grower, producer (anyone growing plants as a business)
- Home and business pest control operator (i.e., Orkin®)
- Research and development scientist (develops and tests new products and methods)
- Pesticide applicator (applies pesticides on large fields or gardens from sprayers mounted on tractors or carts)
- Aerial pesticide applicator (applies pesticides on large fields from airplanes)
- Department of Natural Resources officer
- Environmental Protection Agency agent
- Educator to help people learn about pests and what they can do to manage them
- Pesticide dealer (sells pesticides)
- Marketing

*You may want to construct a scarecrow or two for your classroom or outdoor garden.*
Whether you own a ranch or you own a farm,
You want to keep it healthy, keep it safe from harm.
But that’s not always easy to do
‘Cause when those pests get your crops
It can really bug you.

Chorus:
Pests!!! I just hate them.
Pests!!! I want to exterminate them.
Pests!!! They damage my cattle and crop.
Pests!!! Whether you like it or not,
Pests!!! They’ve all got to go with the pest control.

I’m gonna check my crops to see
Just what kind of pest control that I might need.
It might not be chemical.
There are other types of pest control.

Predatory insects like ladybugs
Can get rid of those unwanted thugs!
Crop rotation and plants like marigolds
Other alternative types of pest control
Make it safe for the plants and the people!

I’m gonna do what’s best for the land
And I’m gonna do it as safe as I can.
So when the pests get to bothering me
I’m gonna wipe them out responsibly.
OPTIMAL ACTIVITY IDEAS

OUTSIDE ACTIVITY

This activity is recommended if the weather is conducive to outdoor activities, such as early fall. Give each student several Post-it® notes and a pencil.

Let’s talk about how to be a good garden scene investigator.

How do you know when a creature has been in a garden?

It leaves clues.

Here are some clues that may lead you to the “good guys” or the “bad guys.”

· Holes chewed in the leaves mean insects or slugs may have been feeding there.
· Spots on the leaves mean there may be a disease-causing organism on that plant.
· Look for animal tracks on the soil.
· Entire plants eaten, stems bitten, or missing leaves may mean a rabbit was in the garden.
· Large webs may mean a garden spider is nearby.
· Insects often hide. Turn the leaves over and look.
· Look under mulch and rocks for insects.
· Look at plants such as those with flowers that attract insects.

We are going to walk through the garden, playground or park and look for clues indicating the presence of insects, diseases and animals. On Post-it® notes, write the names or descriptions or draw a picture of any clues or pests that you find.

Take the students outside to look for and write down clues. After returning to the classroom, have the students stick their Post-it® notes on the board in the appropriate column - “good guys” or “bad guys.” Create a separate column and title it “clues.”

Let’s find out how many garden “good guys” we found.

(Have a student read the notes in the “good guys” column.)

Let’s find out how many garden “bad guys” we found.

(Have a student read the notes in the “bad guys” column.)

What clues did we find indicating that pests were present?

(Have a student read the notes in the “clues” column. Discuss the clues and have the students try to match the clues with creatures in the other columns. Place the clues next to the appropriate “bad guy” that could be causing the problem.)

RESOURCES

Grady’s garden is a beautiful, peaceful place where the bright pink flowers of Zo and Zeta Zinnia sway back and forth on their long, straight, slender stems in the golden sunshine. The Zinnias’ leaves occasionally flutter in the breeze. Fruitilda’s long, twisted vines hold a small green fruit growing near some fading blossoms. The plants enjoy each day out in the sun or in the gentle rain. They smile while Grady, the gardener, works in the garden. Grady stands back and admires the beautiful garden. Then Grady takes the tools and walks toward the house. Grady is a hero for caring for the plants in the garden. *(Hold up the “Applause” sign.)*

Here comes a honeybee, buzzing and flying toward the flowers. The honeybee flaps its little wings hard and fast. It’s on a journey to visit more than six hundred flowers before returning to its hive. The honeybee flies close to Zo Zinnia’s flower to collect nectar from deep inside. The honeybee gets a dusting of pollen on its body while it is searching for nectar. The honeybee leaves Zo Zinnia and flies over to Zeta Zinnia to collect more nectar and pollen. It sheds some pollen on Zeta’s flower. Then it flies back to Zo. The honeybee has just pollinated Zo and Zeta Zinnia. Now they can produce seeds. The honeybee is a hero for helping the plants. *(Hold up the “Applause” sign.)* The honeybee flies off to find more nectar and pollen.

Just as the plants are enjoying the sunny day, along comes an aphid. An aphid is a tiny, hungry insect. Aphids move around on stems and leaves and suck out their juices. Because they suck food instead of chewing, aphids don’t make holes in the leaves. They cause the leaves to turn yellow and brown. This makes aphids villains. *(Hold up the “Boo” sign.)* Wait, here comes a cute, little, red lady beetle, or ladybug, with black spots. As she flies and crawls around, she spots the aphid and eats it! Lady beetle saved the plants! What a hero! *(Hold up the “Applause” sign.)* Lady beetles can eat fifty or more aphids a day. The Zinnias and Fruitilda nod thank you while the lady beetle flies off to look for more aphids or other small, tasty insects.

Even smaller than aphids are teeny-tiny organisms called viruses, bacteria and fungi. We can’t see them, but they are working away in the garden and in the plants. Viruses, bacteria and fungi can be heroes when they help plants grow healthy and beautiful. *(Hold up the “Applause” sign.)* They also can be villains when they make plants sick. *(Hold up the “Boo” sign.)*
What's that tunneling through the soil around the plants? It's a long, slippery earthworm. The earthworm crawls around and creates tunnels near the plants' roots. Now Zo, Zeta, and Fruitilda's roots can easily absorb more air and water. The plants look at the earthworm to thank it while it squirms away. The earthworm is a hero for making the soil better for plants to grow strong and healthy. (*Hold up the "Applause" sign.*)

As the earthworm squirms away, a small, spotted bean leaf beetle lands on Zeta Zinnia's flower. It looks around and sneers like a villain. (*Hold up the "Boo" sign.*) Then it flies around the garden looking for bean plants to eat. Bean leaf beetles, cucumber beetles, tomato hornworms, and slimy slugs chew holes in leaves and fruits. A squash bug flies to Fruitilda and begins feeding on the leaves by sucking out their juices. A squash bug's favorite foods are pumpkins and squash. You can't see it, but there's also a squash vine borer eating away inside Fruitilda's stem. These insects are villains because they destroy plants. The plants look as if they are in pain. (*Hold up the "Boo" sign.*)

Here comes a long, slender praying mantis stepping smoothly and slowly into the garden. It looks like a dinosaur standing on its back two legs with its front legs held together like it's praying. When the bean leaf beetle gets too close, the praying mantis quickly reaches out, grabs it, and eats it! The praying mantis is a hero for saving the plants. (*Hold up the "Applause" sign.*) Garden creatures such as the praying mantis, lady beetle, lacewing, and spider are called predators. They are good predators because they eat insects that damage plants. They are heroes. (*Hold up the "Applause" sign.*) The praying mantis walks away slowly, looking for its next meal.

Fruitilda is starting to look sick because the squash bug is sucking a lot of juice from her leaves. Out hops a toad, right next to the squash bug. The toad sticks out its tongue, grabs the squash bug, eats it, and hops away. The toad is a hero for helping Fruitilda. (*Hold up the "Applause" sign.*) Turtles and birds such as wrens and robins also eat insects that eat garden plants.

The sun has set and the Zinnias and Fruitilda are looking tired. During the dark and dreary night, a cutworm crawls to the top of the soil. It chews off Zo Zinnia's stem right next to the soil. The villain cutworm looks up and sneers as it watches Zo fall to the ground. (*Hold up the "Boo" sign.*) The cutworm takes a few more bites then crawls away.

The animals come out of the forest for a nighttime garden party. The rabbit wiggles its nose and hops to the garden. The raccoon and deer also are invited. These animals think gardens are like "potluck picnics" with an assortment of tasty foods. Animals are fun to watch, but they can be villains in the garden. (*Hold up the "Boo" sign.*) The rabbit starts nibbling on leaves in the garden. Just in time, Grady, the gardener, runs out of the house and over to the garden to chase away the rabbit and other animals. Grady is a hero for saving the plants from the animals that eat them. (*Hold up the "Applause" sign.*) Grady smiles and picks up Zo Zinnia. (*By the hand*) Grady takes Zo into the house and puts her in a pretty vase with water (sets her on a chair). Zo and Zeta Zinnia, Fruitilda and Grady feel happy and content. They know that the creatures and people will work together another day to find peace and harmony in the garden.

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<table>
<thead>
<tr>
<th>ZINNIA</th>
<th>EARTHWORM</th>
<th>BUG</th>
<th>SQUASH</th>
<th>PRODUCER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZETA</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ZINNIA</td>
<td>HONEEBEE</td>
<td>BEETLE</td>
<td>BEAN LEAF</td>
<td>NARRATOR</td>
</tr>
<tr>
<td>ZO</td>
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<tr>
<td></td>
<td>GRADY</td>
<td>CUTWORM</td>
<td>APHID</td>
<td>RABBIT</td>
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<tr>
<td></td>
<td>FRUITILDA</td>
<td>TOAD</td>
<td>LADY BEETLE</td>
<td>PRAYING MANTIS</td>
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</tbody>
</table>
## Harvesting Healthy Garden Produce

### Lesson eleven:
When and how do we harvest our salad garden? How do we clean and prepare salads? How do we plan and have a Salad Party?

“Harvesting” and “Salad Party” from SEED TO SALAD, Cornell University Garden-Based Learning and Ithaca Children’s Garden

How do you create a perfect tossed salad from the garden to your tummy? Students learn how to harvest cool-season crops, wash them and toss them into a huge tossed salad for themselves and their families for the Salad Party that they plan.

### Content objectives:
Apply harvesting, cleaning, and salad mixing strategies for salad crops; Plan and implement a Salad Party

### Life skill objectives:
Critical thinking, Decision making, Communication, Citizenship, Leadership, Healthy living

### Core and STEM concepts and skills:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Concepts and Skills</th>
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</thead>
<tbody>
<tr>
<td>Science</td>
<td>Earth and space, Life science</td>
</tr>
<tr>
<td>Math</td>
<td>Operations and algebraic thinking, Measurement and data</td>
</tr>
<tr>
<td>Language Arts</td>
<td>Viewing, Speaking, Listening, (depends on what you do for the Salad Party)</td>
</tr>
<tr>
<td>Social Studies</td>
<td>Behavioral, Economic</td>
</tr>
</tbody>
</table>

### Healthy snack:
Tossed salads

### Additional and supporting resources:
Present plays, projects, songs, and a tour of the garden during the Salad Party. Plant seeds or transplants for late-summer, early-fall harvest. Depending on climate and who is taking care of the garden over the summer, salad crops can be planted 30 to 60 days before school starts again so that students can harvest them along with the late-summer or fall harvest crops. Extension Master Gardeners are great resources.
LESSON PLANS FOR 2011-12 SCHOOL YEAR    Grade 2

BEFORE THE LESSON

1. Grade 2, Lesson 11: This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit. Please read through everything well in advance of delivering this lesson.


Please read and use these resources as guides to tell you when and how to harvest the crops from your school garden. If the students and their families have a garden or would like to start a garden, you may copy these resources to send home with the students. Please continue with your gardening through the end of the school year.

THE LESSON

1. Seed to Salad: Salad Party  It’s time to celebrate! Planning the party, harvesting salad greens, and hosting the harvest party can be carried out over several days.

2. Garden Journal - have students complete any items for their garden journal.

RECIPE
Harvest greens and other vegetables from the garden to include in the tossed salad. Select dressings or have the students make one that you select.
Harvesting is one of the nicest chores of the season. If you follow a few important, but easy tips, you will get the most of your crops. Some crops (e.g. carrots) only provide one harvest, while other crops (e.g. lettuce) can provide multiple harvests. If possible, harvest early in the morning, after the dew dries, but before the heat of the day.

**LEAFY GREENS – Lettuce & the Brassica Family**  
(including Spinach, Kale, Chard, Collards, Asian Greens, Mustards)

To harvest at peak flavor and freshness, harvest young greens when they are just a few inches long. At this stage all greens are tender and delicious eaten raw in a salad. These are called “baby greens”. Pick the largest, outside, leaves first while leaving the smaller and younger inside leaves for harvesting in a week or two. If possible, eat your greens the same day you pick them. Larger leaves, 6-12” long, are less tender and are best for cooking. Remember that greens cook down; plan about 6 cups of greens for 4 usual servings. Always wash garden greens carefully before eating or cooking to remove dirt and small insects.

**Tip:** Snip (with scissors or skilled fingers) the greens about ½-1” above the base of the plant to encourage new growth. Harvesting this way will allow you to get 3-5 cuttings of lettuce and spinach and even more from kale, chard and other hardier greens.

**Note on Lettuce:** If you planted head lettuce and prefer to harvest an entire head, wait until the entire lettuce plant is about softball - melon size and looks like the shape of head lettuce, as you know it. Don’t wait too long though - Growing head lettuce rather than harvesting baby greens often allows more time for pests and diseases to attack the crop.

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**Simple Greens Recipe**

- Wash and dry greens and cut larger leaves into pieces about 3 inches long.
- Heat a bit of olive oil in pan with a clove of chopped garlic or a few tablespoons of chopped onion. Cook 2-3 minutes.
- Add greens and a dash of water. You may keep the greens plain or drizzle with a dash of soy sauce or balsamic vinegar. Cook 3-4 minutes until softened.
- Remove from heat, place into bowl. Sprinkle with slivered almonds, sunflowers seeds and dried cranberries, or chives chopped chives from your garden. Serve cold or warm.

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**LEGUMES – Peas, Snow Peas, Beans**

Harvest peas with 2 hands, holding the vine with one hand while snipping the entire pod off the vine with your other hand. Harvest when fully mature, about 2” long for peas and 4” long for beans, depending on the variety planted. Harvesting encourages new growth, so be sure to pick off over-ripe pods you may have missed earlier on. Continue to harvest from the same vines as the legume ripens.
Peas and young beans can be eaten raw, added to salads, or lightly steamed or sautéed.

**Cucumbers & Squash (Cucurbit family)**
Harvest cucumbers as they ripen to the desired size. For pickling, fruits should be 4 to 5 inches long, for eating fresh; most varieties grow to 7-8 inches long. Cucumbers will develop a bitter taste if they are allowed to over-ripen. (Note: Some varieties such as European or Dutch cucumbers can grow much longer. This is another reason why clear labeling of the plants in the ground is useful.)

To ensure cucumber vines continue to produce heavily all season long, it’s best to harvest daily to prevent them from becoming overgrown.

Even though huge zucchini squash are impressive, they will be more flavorful if they are picked when they are smaller.

*Tip*: Use a sharp knife or pair of scissors when harvesting, and leave a short length of stem on each fruit.

**Roots—Carrot, Beets, Radish, Potato**
It can be difficult to determine if root crops are full grown and ready to harvest because they grow underneath the soil. You may recall, most seed packets will tell you how many “Days to Harvest”. This is the number of days it takes from planting to harvesting. If you can keep track of when you planted the seeds (maybe you wrote it down in the garden journal or it’s listed on the label that next to the plant in the ground), you’ll know about when they are ready. That said, visual clues are always helpful. Roots start to lift themselves up out of the ground as they develop. You’ll see radishes, beets and carrots creep a bit (< 1/4 inch) above the soil giving you a clue about how wide they are getting.

*Tip*: Radishes and beets are easy to pull out of the ground whole. Carrots often break off, leaving half of that sweet orange snack for the worms. To harvest them whole, use a digging fork to loosen the soil around the root and pull it out at the base of the greens. For radishes and beets, grab the plant right at the base of the stem, loosen the root a bit by rocking it back and forth, and then pull. If the whole thing does not come up, gently use a digging fork as you would for carrots.

For potatoes, you can start gently digging for new potatoes once the plants start to bloom. Wash and cook new potatoes immediately, as they do not store well at all. If you are planning to harvest potatoes to store for a while, wait until the tops of the plants start to yellow and die back. Then gently dig around the perimeter of the plant and dig up the tubers. If you are

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Enjoy cucumbers raw, in a salad or try making some pickles! For easy and safe refrigerator pickle recipes, contact your local Cooperative Extension office.

*Did you know?*
Beet greens are edible and incredibly nutritious. You can harvest a few from each plant when small and add them to salads, or wait until you harvest the root and cook them up like you do kale, chard or other greens.

8/6/2012
planning on storing them, don't wash them! Let them sit out in a cool place for a few days to cure, then gently rub off any dirt, and store in a cool, dark place.

**FRUITS – Strawberries, Tomatoes, Peppers, Eggplant**

Similar to cucurbits, fruits like to be harvested when ripe and harvesting regularly encourages new production. Use a scissors or be very careful to snip eggplant and peppers from the stem without damaging the fruit. Leaving a small stem on the harvested fruit will help keep it ripe and ensure you don’t bruise it when harvested. Carefully pick tomatoes from the plant. For strawberries, grasp the stem just above the berry between the forefinger and the thumbnail and pull with a slight twisting motion. Carefully place the fruit into your containers.

**HERBS – Basil, parsley, mint, cilantro, oregano, rosemary, tarragon, sage, chives, lavender, thyme & more.**

Herbs are grown for their leaves, flower, roots or seed. Most commonly, culinary herbs are grown for their leaves and should be harvested before they flower. Flowering can cause the foliage to develop a bitter flavor. For example, while chives are quite attractive in bloom – and their flowers are edible and delicious – the stems tend to become tough and woody after bloom. Some general guidelines for harvesting herbs:

- Begin harvesting the herb when the plant has steadily been producing new growth. Harvesting generates the plant to continue to produce. Just be sure to leave enough leaves so the plant can continue to photosynthesize. Don’t be afraid to harvest. Up to 75% of the current season's growth can be harvested at one time!
- Harvest herbs before flowering, otherwise, leaf production declines because the plant will put its energy towards flowering and producing seed to reproduce. *Tip:* Pick off flowers buds as you notice them develop.
- ‘Annual’ herbs (basil, cilantro, chives) will have to be planted each year. They have soft stems and can be harvested until frost. Perennial herbs (rosemary, lavender) have somewhat woody stems and can be clipped until about one month before the frost date.
“Healthy Gardens, Healthy Youth”
People’s Garden School Pilot Project

The Extension Partnership including:
Washington State University Extension
Cornell University Cooperative Extension
Iowa State University Extension and Outreach
University of Arkansas Extension

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Growing and Harvesting Produce
A school garden provides an opportunity for children and volunteers to learn about how to handle food safely. The following are some food safety tips to follow when growing and harvesting produce.

- Ensure that all persons, including staff, students, and volunteers receive basic food and gardening safety training instructions according to local health regulations. The following topics are recommended:
  - Handwashing and personal hygiene
  - Cleaning and sanitizing garden equipment and containers used to hold produce
  - Handling produce during harvest, washing, and transportation
  - Glove use
- Ensure that volunteers are covered by the school district insurance policy in the event of accident or injury.
- Require signed permission slips for all student gardeners. Permission slips should list potential hazards of working in a school garden and identify any allergies the child may have.
- Do not allow anyone to work in the garden while sick, or until 24 hours after symptoms, such as vomiting or diarrhea, have subsided.
- Ensure that all harvesters wash hands thoroughly in warm, soapy water for at least 10 to 15 seconds, and then rinse with potable water. Ensure that all open cuts or wounds on hands, arms, or legs are properly covered prior to participating in the harvest.
- Require harvesters to wear closed-toed shoes to prevent cuts, stings, or other injuries.
- Consider using single-use disposable gloves when harvesting, or handling, fresh produce as an extra precaution.
- Harvest the garden regularly and remove any rotten produce.
Food Safety Tips for School Gardens, continued

- Use cleaned and sanitized food grade containers, such as plastic bins or buckets, to hold harvested produce. Do not use garbage bags, garbage cans, and any container that originally held chemicals. These types of containers are made from materials that are not intended for food use.
- Clean harvesting tools, such as knives, scissors, etc., with soap and potable water immediately before and after each gardening session.

Using School Garden Produce in your School Meal Program
- Check with your local health department to ensure that local regulations permit food from gardens to be served as part of school meals.
- If the harvest from the school garden will be used in the school meals program, the school garden coordinator should work cooperatively with the school nutrition director to plan and implement the garden.
- Discuss food safety practices in the garden with school garden coordinators. Consider asking gardeners to document their practices. Use the information in this document as a guide to identify appropriate practices.
- Accept produce harvested from school gardens only when school nutrition staff is present to receive it. All produce dropped off or left when staff is not present should not be used in the school meal programs.
- See Best Practices: Handling Fresh Produce in Schools for guidelines on receiving, storage, preparation, and service of fresh produce in schools.
- Reject produce that does not meet school nutrition program standards.
- Receive and inspect produce harvested from school gardens according to the same procedures used to inspect produce from the district’s distributors.
- Do not use any produce that has been noticeably contaminated by animals or insects.
- Refrigerate garden produce immediately, unless the particular item is normally held at room temperature.
- Store, prepare, and serve school garden produce separately from other sources of produce to maintain traceability.
- Document service of school garden produce on the menu management/food production record. See Ensuring Traceability of Fresh Produce for more information.
- Ensure that liability for a potential foodborne illness caused by produce grown in school gardens is covered by your school district.
How do you harvest garden produce?

When and how to harvest

There is a difference between “mature” and “ripe” garden produce that determines when to harvest them. A mature fruit or vegetable is one that has reached a sufficient stage of development that, after harvesting, is or will be at the best stage to eat. A vegetable or fruit is ripe when it is at its prime edible state. For example, pears, bananas, and sometimes tomatoes are harvested when they are mature, yet they may still be green in color. A few days after harvest, they “ripen” to the stage at which we like to eat them.

Beginning gardeners and children often pick vegetables, such as peppers, eggplant, carrots, cucumbers and potatoes, before they have reached the best stage for harvest. At a small stage, these crops are technically mature, but harvesting them too early results in low yields and less to eat. There are some exceptions and it depends on how you are going to use them.

Early harvested, small potatoes – called “new potatoes” – are a tasty treat in early summer. Cucumbers are sometimes harvested early at a small size and used for pickles.

If you want a bell pepper for slicing or stuffing, it is best to wait to harvest it when it has reached its full size. A full-sized green tomato will ripen to red, orange, or yellow; and, if left on the plant, a full-sized green bell pepper will ripen into red, yellow, or even purple, depending on the variety.

Crops that are harvested and eaten at their peak ripeness are typically tastier and have a better texture than those eaten before they are ripe or when they are over ripe. As much as you don’t want to harvest crops too early, you don’t want to let them become over ripe in the garden. Crops that are left in the garden too long may become soft or even begin to rot. They are wasted and no longer edible.

General Information continued on the next page.
Crops that continue to produce for several weeks in the summer, such as green beans, zucchini, cucumbers, peppers, and tomatoes, need to be harvested regularly to keep them producing and setting on more fruits. The plant will set fewer fruit if they are left on the plant too long and become large and over ripe.

Some leafy crops, such as spinach, leaf lettuce, and chard can be cut about an inch and a half to two inches above the ground and they will grow back. This can be done two or three times in the spring. These plants cannot withstand the heat and long days of the summer. At that time remove the plants entirely from the garden and plant another crop, such as green beans, for a fall harvest. Make sure there are enough days remaining in the growing season (before the first average fall frost in your area) for that crop to mature.

Seed packages, plant labels, and garden catalogs often give the “approximate” number of days for a crop to mature. Growing conditions, such as weather, moisture, and weed competition affect this number. So it should only be used as a guide. Work with the youth to figure this out together.

To help you to be watchful of the best stage for harvest, you may want to use the Approximate Harvest Dates chart found towards the end of this lesson.

**Harvest Tools**
- Scissors are best for the students to cut leaf lettuce and spinach
- Pruning shears may work better for harvesting zucchini, squash, pumpkins, peppers and eggplant
- Buckets and/or bags for harvest
- Garden fork for carrots, potatoes and sweet potatoes
- Trowel for loosening soil around root crops and onions

**Food Safety and Cleaning**
At harvest time, make sure everyone practices good food safety. Wash hands thoroughly before and after picking vegetables. The harvest containers should be clean and free from soil and old plant residue. Gallon-sized bucket can be lined with plastic grocery bags which will make hauling and clean up easier and insure clean harvest containers.

Clean your vegetables before you put them in the refrigerator. Rinse leafy vegetables (lettuce, spinach, chard, cabbage and kale) in clean cold water, preferably in a strainer to drain the excess moisture. Then store in airtight bags. Tomatoes, peppers, melons, squash, and cucumbers, can be rinsed off and air dried. Rinse and rub (not scrub) the soil from root crops such as carrots and beets. Soil residue on onions, garlic, potatoes and sweet potatoes should be rubbed off after they are cured (see Storing Vegetables). Never wash or soak them in water.

**Storing Vegetables**
Different crops have different storage needs. Some, such as potatoes and onions, need to be “cured” before they are stored. Curing is a treatment that increases their storage life. Once crops are harvested their quality starts to deteriorate. To slow that process, most vegetables need to be refrigerated almost immediately. If that is not possible, put them in a cool, shady location. Do not leave them sitting in bags in the hot sun.
**APPROXIMATE HARVEST DATES**

Please record the harvest information about the crops you are planting in your garden. You may find this information on the seed packet, the tag for the transplant, in garden catalogues, on the Internet, or at your local extension office. Besides using visual clues, this will help you to determine when the crops may be at the best stage to harvest.

<table>
<thead>
<tr>
<th>CROP</th>
<th>DAYS TO MATURITY</th>
<th>PLANTING DATE</th>
<th>ESTIMATED FIRST HARVEST DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: radishes</td>
<td>28</td>
<td>April 20</td>
<td>May 18</td>
</tr>
<tr>
<td>Example: zucchini</td>
<td>48</td>
<td>June 15</td>
<td>August 3</td>
</tr>
</tbody>
</table>
## Harvesting and Storing Vegetables

### General Information Continued

(Adapted from ISU Extension Publication, PM 731 Harvesting and Storing Vegetables)

<table>
<thead>
<tr>
<th>Crop Harvest Guide</th>
<th>Harvest Times</th>
<th>Optimum Storage Conditions, °F</th>
<th>Approx. Storage Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snap Beans (bush or pole)</td>
<td>Pick often to keep plants producing more beans.</td>
<td>Cool Refrigerate: 40 - 45°</td>
<td>7 – 10 days</td>
</tr>
<tr>
<td>Harvest the pods when they are almost full-sized but before the seeds begin to bulge. Hand pick with small stem attached to the pod. Do not break pod.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>One time harvest. Clean garden area after all beets are harvested.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>4 months</td>
</tr>
<tr>
<td>Pull or dig beets when roots are 1 to 1½ inches in diameter. Cut tops to ½ inch above root.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td>Tender side shoots, 1 to 3 inches across, will develop after the central head is removed. After those are harvested, remove the plants from the garden.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>10 – 14 days</td>
</tr>
<tr>
<td>Cut when flower heads are blue-green and about 6 to 7 inches across but before small yellow flower buds start to open. The stems below the flower head and small leaves are also very nutritious.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>1 to 2 months</td>
</tr>
<tr>
<td>Cut when heads become large and solid. Don’t delay because heads are prone to cracking when they get large.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantaloupe (Muskmelon)</td>
<td>One plant can produce 2 to 5 fruit, not all at once. Check often once they start to mature.</td>
<td>Cool Refrigerate: 40 - 45°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>The skin between the netting turns from green to orangish-yellow. The fruit will separate easily from the stem.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrots</td>
<td>One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>3 or more months</td>
</tr>
<tr>
<td>Dig when roots are ¾ inch or more across. Be careful so that you don’t break the roots when digging. Remove tops to ½ inch above the root.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### CROP HARVEST GUIDE

<table>
<thead>
<tr>
<th>CROP</th>
<th>HARVEST TIMES</th>
<th>OPTIMUM STORAGE CONDITIONS, °F</th>
<th>APPROX. STORAGE PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CUCUMBERS</strong></td>
<td>Pick slicing cucumbers when they are 6 inches long and while they are still bright green and firm. Cut fruit from the vine with pruning shears. Leave about ½ inch of stem attached to the fruit. Check plants often once they start bearing. Keep fruit harvested for continuous production.</td>
<td>Moderate Refrigerate: 45 - 55°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td><strong>Eggplant</strong></td>
<td>Harvest anytime after the fruits are 2 inches across until they are 4 to 6 inches in diameter (depends on the variety). Light thumb pressure will leave a dent at the proper harvest stage. Cut from plant with pruning shears. Leave about 1 inch of stem on the fruit. Check plants often once they start bearing. Keep fruit harvested for continuous production.</td>
<td>Moderate Refrigerate: 45 - 55°</td>
<td>1 week</td>
</tr>
<tr>
<td><strong>Garlic</strong></td>
<td>Pull in mid-summer when bottom leaves begin to dry. Cure the bulbs in a warm ventilated area in single layers for 10 days. Remove the tops about 1 inch above the bulb. One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>Up to 6 months</td>
</tr>
<tr>
<td><strong>Kohlrabi</strong></td>
<td>Pull plants when stems swollen to 2 to 3 inches in diameter. Remove leaves and roots. One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>Up to 2 months</td>
</tr>
<tr>
<td><strong>Lettuce</strong></td>
<td>Leaf lettuce should be cut when the leaves are 4 to 6 inches long. Cut about 1 ½ inches above the ground for re-growth to occur. Cut and it will come back for one or two more harvests, then remove spent plants.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td><strong>Onions (green)</strong></td>
<td>Any standard onion can be used as a green onion and harvested young. Harvest when 6 to 8 inches tall. One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>CROP HARVEST GUIDE</td>
<td>HARVEST TIMES</td>
<td>OPTIMUM STORAGE CONDITIONS, °F</td>
<td>APPROX. STORAGE PERIOD</td>
</tr>
<tr>
<td>--------------------</td>
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</tr>
<tr>
<td><strong>ONIONS (dry)</strong></td>
<td>One time harvest. Clean garden area after harvest.</td>
<td>Cold (after curing) Refrigerate: 32 - 40°</td>
<td>3 months (use before they sprout)</td>
</tr>
<tr>
<td>Harvest when the tops fall over and begin to dry. Pull with tops on and dry them in a protected place for 3 to 4 days. Cut tops to 1 inch above the bulb and store in shady area in mesh bags or single layers for further curing until stems tighten up and outer scales are dry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PEAS</strong></td>
<td>Check plants often once they start producing seed pods. Keep pods harvested for extended production.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Pick peas with edible pods such as snow peas when pods are just filled, but before the seeds become hard and starchy. Store peas in the pod. Harvest snap peas when the pods are beginning to plump and while the pods are still glossy and smooth.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PEPPERS</strong></td>
<td>Check plants often once they start bearing. Keep fruit harvested for continuous production.</td>
<td>Moderate Refrigerate: 45 - 55°</td>
<td>2 to 3 weeks</td>
</tr>
<tr>
<td>Harvest when the pepper is large, firm, and crisp. Fully ripe peppers are slightly sweeter and may be red, orange, yellow or other colors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** POTATOES**</td>
<td>One time harvest. Cure potatoes in a cool shady location for two weeks. Clean garden area after harvest.</td>
<td>Cool Refrigerate: 40 - 45°</td>
<td>New potatoes only store for a few weeks. Large, cured potatoes can be stored in a dark location for 3 or more months</td>
</tr>
<tr>
<td>New (small) potatoes can be dug in early summer when the vines are lush and green. Large potatoes are dug as soon as the plants die. Be careful not to cut the potatoes when digging by placing the fork at least 8 inches from the stem of the plant.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RADISHES</strong></td>
<td>One time harvest. Clean garden area after harvest.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Pull when the roots are 1 to 1½ inches in diameter, remove tops about ½ inch above the root.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CROP HARVEST GUIDE</td>
<td>HARVEST TIMES</td>
<td>OPTIMUM STORAGE CONDITIONS, °F</td>
<td>APPROX. STORAGE PERIOD</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>----------------------------------------------</td>
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</tr>
<tr>
<td>Spinach</td>
<td>Cut and it will come back for one or two more harvests, then remove spent plants</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Summer squash (Zucchini)</td>
<td>Check plants often once they start bearing. Keep fruit harvested for continuous production.</td>
<td>Cool Refrigerate: 40 - 45°</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>Check frequently when they reach maturity. Harvest all at once or within a few days.</td>
<td>Cold Refrigerate: 32 - 40°</td>
<td>1 week</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>Harvest all at once. Cure for 1 week in a warm, shady location.</td>
<td>Moderate Refrigerate: 45 - 55°</td>
<td>3 or more months</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Check plants often once they start bearing.</td>
<td>Cool room 55 - 65°</td>
<td>4 to 7 days</td>
</tr>
<tr>
<td>Watermelon</td>
<td>Check plants often once they start bearing.</td>
<td>Moderate to cool room 45 - 65°</td>
<td>2 to 3 weeks</td>
</tr>
</tbody>
</table>
Seed to Salad: Salad Party

Time to celebrate! After weeks of planning and then tending to your gardens, it’s important to have a good time during the harvest with a party. Here is another opportunity to involve the youth in decision-making—in this case, planning the salad party. You may only need to gather bowls, utensils, and salad dressing for a great harvest party.

Keep in mind

- Similar to planning an assembly, begin with questions to find out what interests the students.
- Don’t dismiss any ideas.
- Collect all ideas in a brainstorming session and then return to them to see what is feasible and how you plan to make things happen.
- If you have extra money set aside for this part of the program, consider sharing the amount with the youth in the group so they can help inform how that money will be spent.

Questions to consider

- Where will we have our salad party?
- How long will the party last? How long will it take to harvest, wash, and prepare the salad? How long would we like to eat and hang out?
- Who should be invited to the salad party? Is it just for youth that grew the gardens or do we want to include others?
- If we are inviting others how should we do so?
- What supplies do we need? Who will get them?
- What is our budget? How will we spend it?
- What would we like to do besides harvest and eat at the salad party?
- What name would we like to give the party?

Salad parties come in all shapes and sizes. The three case studies below describe three different parties, two held in a school program and one held in an after school program at the Ithaca Children’s Garden.

Salad Party Examples

West Village 4-H at the Ithaca Children’s Garden
Youth in the West Village 4-H Club started their Salad Garden project in late April. They meet everyday after school at West Village, which is about 10 minute walk from the Ithaca Children’s Garden. One afternoon each week, they spent an hour at the Garden working on the salad gardens they had designed and planted.
West Village 4-H at the Ithaca Children’s Garden (continued)
Their program was designed to finish the second week in June. The first week in June, after watering and weeding tasks were complete, the group planned a salad party for the following week. The youth invited their families and made invitations to take home.

A vote decided what two types of salad dressings would be available. Although most of the vegetables were growing well, the carrots were still too small to eat. The group asked if they could have extra carrots from the grocery store to supplement. A vote was also taken to decide what beverages would be available.

The following week, youth arrived, some with parents and siblings joining them. Each youth harvested about half of their salad garden, washed and dried the greens and vegetables and helped prepare a communal salad. While everyone ate salad we shared our favorite part of the salad garden project. Once finished, youth were supplied with bags to harvest the remainder of their plots to take home and share with their families.

Northeast Elementary All-School Salad Party
Although only twenty students were active in the “garden club” that met several times each week for the Seed to Salad program, the whole school was aware of the project. The garden plots were located along the path from the school to the playground and students had a chance to observe the gardens changing over the course of the spring.

Both the school and the students were interested in a Salad Party that would involve the entire school. We realized that what was growing in the small plots would not feed over 400 people. With the help of a teacher, donation requests were sent to a local hydroponic lettuce producer and two local grocery stores. The response was tremendous: 10 cases of lettuce and enough gift certificates to provide the entire school with salad.

Youth active in the garden club brainstormed a list of supplies and teachers purchased them.

Since it was difficult to find a time when all grade levels would be at school at the same time, the principal suggested we take the Salad Party on the road and stage the party at the all-school field trip to a local pool.

Set up under a series of awnings from 11am-1pm, students active in the garden club took shifts serving salad to nearly every student, parent, and teacher at the pool. Several students came back for second and third helpings.

Northeast Elementary Garden Club
Fueled from the success of the all-school salad party, youth active in the garden club were eager to celebrate the harvest as a group. The day after the all-school party, the garden club met during an extended lunch and recess period to harvest, wash, and prepare salad from their plots at the school. Then, they celebrated!
Seed to Salad: Harvesting Tips

When it’s time to make salad, here are harvesting tips that are simple and fun:

- Harvest with kid-size scissors. It’s hard to pick lettuce and greens without tearing up the roots. It also makes them easier to wash, since you’re not pulling out soil. Using scissors, cut lettuces and greens just above the soil.

- Have plenty of bowls handy for harvested lettuce and greens.

- Large plastic storage tubs are ideal for washing lettuce and greens. Fill about half way with water, add a little lettuce and greens at a time, swish around and remove. Place lettuce and greens in colanders and shake to get rid of excess water. Refill with water as it becomes dirty.

- Become human salad spinners! Gather a dozen or so clean pillowcases. You may want to invest in some inexpensive ones reserved for your Seed to Salad project. Add a couple handfuls of lettuce that has been washed and drained in colanders to the pillowcase. Close, grip and start spinning.

- Keep salad bowls separate from harvest bowls. Keep a couple large bowls reserved for clean, dry lettuce and greens.