Learning in the School Garden

School Garden Unit

Lower Elementary
K – 2nd Grades

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Plan & Plant Garden Guide

LESSON: The Things Plants Need

GRADE: Kindergarten **TIME: At least three 45 minute sessions**

SUMMARY:

Today students will plan their future garden. They will begin by discussing what plants need for survival. As they gather information and make decisions for their garden, students will record their plans on a class garden map. Finally, they will plant their garden and get ready to watch it grow!

GARDEN TASK*: Planning and Planting*

OBJECTIVES: Iowa Core

Science

Energy

- **K-PS3-1.** Make observations to determine the effect of sunlight on Earth's surface.

From Molecules to Organisms: Structures and Processes

- **K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive.

Earth and Human Activity

- **K-ESS3-1.** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Social Studies

- **SS-K-2.G.1** Understand the use of geographic tools to locate and analyze information about people, places, and environments.
    - Understand representations of locales and regions on maps and globes.

21st Century Skills

- **21.K-2.ES.1** Communicate and work appropriately with others to complete tasks.
- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.

MATERIALS & RESOURCES:

- *Growing Vegetable Soup* by Lois Ehlert
- *Eating the Alphabet* by Lois Ehlert (optional)
- *In Mary's Garden* by Tina & Carson Kugler
- Notecards, pencils, and crayons
- Clipboard for each student
- Chart paper
- Tape
- Empty seed packets – 1 per group
- Seeds or seedlings
- Trowel or hoe – 1 per group
- Garden journal notebooks

Management tip

Plan to complete all activities outside in or near the school garden, weather permitting. Materials could be easily transported in backpacks carried by student leaders. Consider storing tools in a small shed near the garden. Before going outside, discuss boundaries, expectations for student behavior, attention getting signals, and specific tasks. Review again when outside.

PRESENTATION / INTRODUCTION:

What do plants need to grow? Discuss student ideas. Introduce and read *Growing Vegetable Soup* by Lois Ehlert. After reading, add additional ideas to your list of what plants need.

Today students will plan their future garden, ensuring plants will have what they need to grow. They will make decisions about plants, spacing, and timing, as they create a garden map. After they have planned their garden and created their map, they will plant their garden and get ready to watch it grow!

DIRECTIONS:

1. **Activity 1 - Mapping the space**: Invite children to get to know their school garden space, observing key features – water access, compost, rabbit fencing, amount of space, soil, sunlight, etc.
    - Each child will choose one area of the garden that they wish to observe and draw; perhaps one will draw a raised bed, another will draw the tool shed, or the water hoses, etc. Distribute notecards, clipboards, pencils, and crayons and have students spread out so that they can explore, observe, and sketch their chosen areas.

    Expert advice

    If the goal of the garden is to produce food or beauty, don't do it with kids! Remember, the goal is for the kids to learn. Focus on their academic goals, not on producing food.

    - When students are finished, add the student work to chart paper to create a class map of the garden. Have students provide input as to where the notecards should be placed in relationships to each other: Is the vegetable bed near or far from the pollinator garden? Is the compost bin to the right or left of the supply shed?
    - As cards are added to the map, discuss how each component is useful in the garden. Observe how much sunlight the garden receives. Does our garden provide things plants need?

2. **Activity 2 – Getting ready to plant:** To prepare for planting day, discuss the different tasks that must be done. Seed packets are a good resource for information. Model reading a seed packet to find information such as planting dates, planting depth, required sunlight, and special instructions. Also, refer to the Iowa State Extension file, **"Planting a home vegetable garden,"** for a table with planting recommendations. https://store.extension.iastate.edu/Product/Planting-a-Home-Vegetable-Garden
    - Have students divide tasks into smaller roles, and determine job descriptions for each student in the class. For example, perhaps one group will take the task of planting the pea plants. One person in the group could hoe, another place the seeds, another covers the seed with soil, and a final student waters the area. Each student should create a

notecard nametag for themselves showing their role and tasks they will complete.

- While planning the specifics for planting day, help students make connections to the yearly cycle for the garden. First we plan and plant, then we will maintain the garden, finally we will harvest and celebrate. Watch this video: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.gardenatoz/think-garden-a-year-in-the-garden/ On the class map, include student sketches of what they hope their plants will look like.
- For more information about planting with students, please see additional information located at the end of this lesson.

3. **Activity 3 – Planting Day:** Model using the tools and planting the seeds. Refer to the garden map and plan to ensure every child has a job and is ready to make discoveries in the garden. Extra staff or parent/community volunteers could be helpful on planting day. Have fun!

Tool safety
Role play with students procedures for getting out, using, and storing garden tools. For example, pointy ends of trowels and shovels should always be down. Students will only walk while carrying tools. Teachers will pay close attention to students using tools and will give other jobs to students not following procedures.

REFLECTION / GARDEN JOURNAL PROMPT:

1. **Make a garden journal**: Each student can make a garden journal out of a recycled notebook. Encourage students to decorate the covers with a collage of recycled materials, perhaps including garden catalog photos.

2. **Adopt-a-Plant journal prompt:** Each child will adopt a plant to observe and document weekly throughout the garden season. Have them sketch their seed in the ground; provide extra seeds for them to closely observe. Sketch and label the different things the plant will need to grow and thrive.

School Garden Unit
Maintain Garden Guide

LESSON: How Does Your Garden Grow?

GRADE: Kindergarten **TIME: 45-minute sessions as needed**

SUMMARY:

Students will chart their sun and weather observations. Using this data along with a daily scavenger hunt in the garden, they will determine when to water, weed, and care for their garden, ensuring plants are getting all the things they need. In their garden journals, they will sketch their observations of the garden.

GARDEN TASK*: Maintain*

OBJECTIVES: Iowa Core

Science

From Molecules to Organisms: Structures and Processes

- **K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive.

Earth Systems

- **K-ESS2-1.** Use and share observations of local weather conditions to describe patterns over time.

Earth and Human Activity

- **K-ESS3-1.** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Energy

- **K-PS3-1.** Make observations to determine the effect of sunlight on Earth's surface.

21st Century Skills

- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.
- **21.K-2.ES.4** Develop initiative and demonstrate self-direction in activities.

MATERIALS & RESOURCES:

- Chart paper labeled "Weather Chart"
- Scavenger Hunts – laminated copies for each child or group
- "Rainmakers" – recycled plastic containers with holes in the bottom for watering
- 60 counters (or poker chips, buttons, etc.)
- Garden journal notebooks / colored pencils
- Garden gloves (optional)

PRESENTATION / INTRODUCTION:

Once our garden is planned and the seeds have been planted, the learning fun is just beginning. What type of weather does our garden need? Each day chart the amount of rain and sun the garden receives. What patterns do you notice? Why are these important? How can gardeners help? Observe and discuss plants in the garden that did not receive the proper amount of sunlight or water.

In small groups, students can use their senses to complete the Daily Garden Scavenger Hunt. What do our plants need today? Weed, water, and thin as needed.

Management tip
Ensure there is a role for every child. Small groups can work together in a chosen area. Review expectations prior to letting them work in the garden.

DIRECTIONS:

1. **Weeding**: Gardeners should pull weeds to ensure their plants get the sunlight, water, space, and nutrients from the soil that they need. Weeding is easiest when weeds are small, so short but frequent weeding sessions are helpful.
    - As seedlings first grow, students may have difficulty differentiating the plants and weeds. Point out patterns the plants were planted in (rows, clusters, etc.). Also refer to the seed packages or online resources for photos of baby plants. Making garden signs with photos can be helpful.
    - As weeding could become tedious, make it into a game with challenges. Who can pick the largest pile of weeds? See how many kinds of weeds they can find. Have students search for the smallest weed, largest weed, longest root, etc.

2. **Watering**: As a class, observe and chart the weather daily. After several days without rain, test the ground by inserting a trowel or dowel a few inches. If it comes out clean, the soil is dry. Damp soil will cling to the trowel. Ask students to observe plants. Plants' leaves will begin to wilt or turn colors if they are lacking water. **Generally, plants will need water whenever less than an inch of rain falls in a week. If it rains, do not water that day.** Watch the following video for additional information: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.water/think-garden-the-importance-of-water/

Management tip

Handing water hoses to children can be too tempting. Consider having buckets of water available so students can water plants by filling "rainmakers," recycled yogurt or orange juice jugs with their tops cut and holes poked in the bottoms with nails. Water gently falls to ground like a rain storm, reducing puddles and drowning of seedlings.

Expert advice

Make it a goal to avoid watering the garden. Mulching around small plants not only cuts down on weeds but also helps the soil hold water. Wet newspapers, cardboard, or straw are recommended mulching materials, two or three inches deep.

3. **Thinning**: Some plants need to be thinned, which means removing some plants to allow more room for others to grow. For example, carrots will not have space or nutrients to grow to full size unless they are thinned. Refer to seed packages for details about the amount of space plants need and thinning dates. Students may be interested to see what happens if a few plants are not thinned.
    - **Human Carrots Game**: Students sit on the ground about six inches to the next nearest person. Evenly distribute 60 counters on the ground. Explain that the counters represent nutrients in the soil that plants need to survive and thrive. When you say, "Go," students will pick up as many counters as they can. After this first round, students will notice they each only got a few counters.
    - Half of the students should stand up and move to the side to become observers. Repeat the game with the same number of counters. Were the carrots able to get more nutrients this time? Why? Why is it helpful to thin the carrots?

- Repeat again with some students representing weeds. How could we help our carrots if we pulled the weeds?
- Play a variation including water and sunlight. Throw slips of blue paper (rainwater) and yellow paper (sunlight) to "rain" on the group like confetti. See how many slips they collect with all the plants as compared to a few. Discuss that it's easier for plants to get the sunlight, water, and nutrients needed when thinned.

4. **Pests and disease**: Not all bugs are bad. Encourage students to examine plants closely so they get to know what a healthy plant looks like. Then, they will be able to spot changes in the plant such as yellow or brown spots, which can be signs of disease. Iowa State Extension offices can be a source of information about specific plants: http://www.yardandgarden.extension.iastate.edu/Hortline.htm This video helps students understand bugs that are pests and helpers. http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.pests/think-garden-garden-pests-and-helpers/

5. **Think ahead to summer break**: If students will not be maintaining the garden during the summer, consider these ideas:
   - **Garden Guardians**: Have community volunteers and parents sign up to maintain the garden for a week or two.
   - **Mulch**: Cover the ground around the plants with wet newspapers or straw to cut down on weed growth and help hold water.
   - **Plant for fall**: Plant produce that will be ready to harvest in the fall such as popcorn, pumpkins, potatoes, eggplant, etc.
   - **Weed well before any breaks**: Any tiny plants before break will be quite tall when students return.

6. **Additional lesson ideas in the garden:** Go to http://www.teachers-going-green.com/teachers-going-green/clean-and-green/kindergarten and download the following lessons:
   - Collaboration with Nature
   - Litter is Waste Out of Place
   - Composting with Worms

Expert advice

Be courteous to custodial staff. Encourage students to wash their hands outside. Place a rug near the door and remind students to brush off dirt and leave mud outside.

- Prairie Bug Hunt
- Color Hunt Lesson
- Be the Bees Pollination Game
- Map the Species in Your Neighborhood

REFLECTION / GARDEN JOURNAL PROMPT:

1. **Adopt-a-Plant journal prompt:** Each child will adopt a plant to observe and document weekly throughout the garden season.
   . Sketch what they see while maintaining the garden.
   a. Label the things the plant needs to grow and thrive.
   b. Examine and reflect on examples of plants that didn't have all the items needed for survival – for example, what did a plant look like without enough water? Too much water? Not enough sunlight?

Expert advice

To help students remember which plant they "adopted" have students choose a button. Gently tie a loose string and that button around their plant. Their button can remind them which plant to observe and sketch.

My Daily Garden Scavenger Hunt

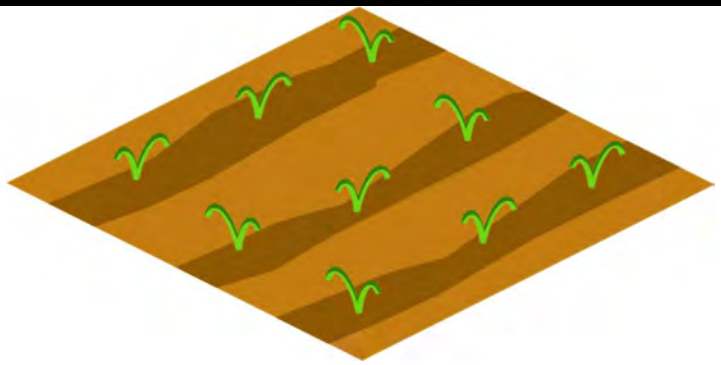
Look for…

Sun

Healthy leaves

Weeds – Pull these!

Touch…



Will **soil** stick in a ball? If not, it's too dry. Water the plants!

Taste…

Not yet!!
Taste **ripe produce** soon!

My Daily Garden Scavenger Hunt

Look for…

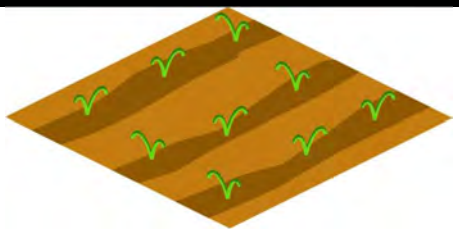
Sun

How tall is the seedling compared to you?

Weeds - Pull these!

Healthy plants

Touch…



Will **soil** stick in a ball? If not, it's too dry. Water the plants!

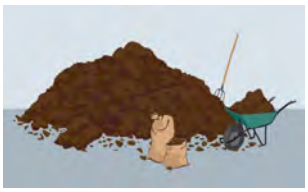
Taste…

Not yet!!
Taste **ripe produce** soon!

Smell…

Flowers

Herbs



Compost

Hear…

Be still and listen. Can you hear a pollinator? A bird?

School Garden Unit
Celebrate Harvest Garden Guide

LESSON: Celebrating Garden Plants

GRADE: Kindergarten **TIME: 45 minute sessions as needed**

SUMMARY:

As students planned, planted, and maintained their garden, they focused on what plants need to survive. Today they will expand their focus to how garden helps animals, including humans, survive. They will also explore other benefits of gardens. In the garden, they will learn how to harvest produce, sort and count it, eat it in tasty recipes, and plan a garden party to celebrate their learning.

GARDEN TASK*: Celebrate Harvest*

Management tip

Plan to complete all activities outside in or near the school garden. Many materials such as trowels, harvest baskets, and kitchen tools could be stored in a small garden shed. Other materials could be easily transported in backpacks carried by student leaders.

OBJECTIVES: Iowa Core

Science

- **K-LS1-1.** Use observations to describe patterns of what plants and animals (including humans) need to survive.
- **K-ESS3-1.** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

Mathematics

- **K.CC.C.6.** Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group.

21st Century Skills

- **21.K-2.ES.3** Learn leadership skills and demonstrate integrity, ethical behavior, and social responsibility.
- **21.K-2.ES.5** Work productively and are accountable for their actions.

MATERIALS & RESOURCES:

- Examples of unripe, ripe, and overripe fruits and vegetables
- *The Vegetables We Eat* by Gail Gibbons
- Chart paper for tracking produce
- Harvest baskets or bags
- Trowels
- Spray bottles
- Garden gloves (optional)
- Bucket of soapy water or outdoor sink
- Kitchen tools for recipes – bowl, spoon, kitchen scissors or knives, plates and napkins, seasonings, additional ingredients, etc.
- Notecards / pencils
- Garden journal notebooks / colored pencils

Expert advice

Remember that the success of the garden is not measure by how much produce was grown, but by how much the students learned. Even plants that did not produce fruits and vegetables are valuable in the garden as compost that provides nutrients in the soil for next year's garden.

PRESENTATION / INTRODUCTION:

In previous lessons we have discussed thing plants need for survival. Now let's talk about animals, including humans. How does a garden provide things animals and people need for survival? Gardens provide lots of tasty things that help bodies grow strong, but how do we know when it's time to harvest and eat it?

Show students produce that is unripe, ripe, and overripe. Have them observe the color and size differences. Have them touch and smell it. What differences did you notice? Does the produce in our garden look like any of these? How can we determine if produce is ready to harvest? What indicators should we look for?

Read *the Vegetables We Eat* by Gail Gibbons. Pages 1-20 discuss various types of vegetables and why humans eat them. How does our garden provide things people need? Discuss both the produce as well as other benefits of gardening (opportunities to learn about science, art inspiration, an opportunity to get outdoors, etc.).

Expert advice

Let them try their produce – even raw green pumpkin! Some students wanted to try it, we did not stop them, and it was a learning experience they will not soon forget.

DIRECTIONS:

Management tip
Ensure there is a role for every child. Small groups can work together in an area of the garden or have specific cooking roles. Perhaps each child picks, washes, and tears up one leaf of lettuce.

1. **Harvest:** Visit the garden every few days and have students check for ripe produce. Students will work in the garden in small groups to harvest items that are ready. Use chart paper to graph the number of items harvested each day. Additional ideas are located at the end of this lesson.

2. **Eat it in the garden!** Many recipes can be found online. Check out this school garden recipe book listing produce alphabetically: http://dcgreens.org/wp-content/uploads/2013/10/Fun-Cook-Book.pdf Other easy ideas:
   - **Lettuce buffet** (fall and spring): Harvest several types of greens and arrange them on a plate as a lettuce salad.
   - **Garden salsa** (summer)**:** Mix chopped tomatoes, peppers, onions, cilantro, garlic, and black beans with salt and pepper. Each student receives a spoonful on a lettuce leaf to fold up and enjoy.
   - **Flavored water:** Add crumpled mint leaves to a glass or bottle of water. Shake and enjoy! Or try slices of strawberries or cucumber.
   - **Garden pasta salad**: Mix precooked whole wheat pasta with chopped broccoli, cucumber, summer squash, and Italian dressing.
   - **Cucumber and tomato salad** (late summer and fall): Mix cucumber, cherry tomatoes, and Italian dressing.

3. **Celebrate**: As a culmination to the kids' hard work in the garden, host a garden party. Facilitate as students plan. Invite administrators, custodians, staff, parents, community volunteers, and other students to taste and see the students' work. Customize to your setting, but ideas include:
   - Eat! Feature some of the students' favorite recipes using their produce.
   - Make art to take home – garden signs, wind chimes, sun prints, or mosaics are a just a few ideas.
   - Plant something – in the garden or to take home.
   - Display garden photographs taken by students as well as their journal entries and planning maps.

- Publicly thank volunteers for their efforts.
- Put them to work – encourage students to show guests how to harvest or pull up plants for a compost pile.

REFLECTION / GARDEN JOURNAL PROMPT:

1. **Adopt-a-Plant journal prompt:** Students will sketch and label their plant and its produce. Also have them sketch what that produce looks like as children eat it – is it used in a recipe?

   Ask them to reflect on their drawings throughout the garden season. What weather patterns did you notice this season? How did the weather help the plants have what they need? How did the gardener help?

2. **Draw a map of a future dream garden:** Based on what you learned from this garden project, what would your dream garden look like? What would you include or do differently? Save these and share with students next year!

1st Grade
School Garden Unit

School Garden Unit
Plan & Plant Garden Guide

LESSON: Planting Baby Plants

GRADE: 1st grade **TIME: At least three 45-minute sessions**

SUMMARY:

Today students will plan their future garden. They will begin by discussing parent plants and their offspring – seeds and seedlings. As they gather information and make decisions for their garden, students will record their plans on a class garden map. Finally, they will plant their garden and get ready to watch it grow!

GARDEN TASK*: Planning and Planting*

OBJECTIVES: Iowa Core

Social Studies

- **SS-K-2.G.1** Understand the use of geographic tools to locate and analyze information about people, places, and environments.
    - Understand representations of locales and regions on maps and globes.

Science

From Molecules to Organisms: Structures and Processes

- **1-LS1-2.** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

21st Century Skills

- **21.K-2.ES.1** Communicate and work appropriately with others to complete tasks.
- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.

MATERIALS & RESOURCES:

- Seeds for observation and sorting
- *Plant Secrets* by Emily Goodman and Phyllis Limbacher Tildes
- *Eating the Alphabet* by Lois Ehlert (optional)
- *In Mary's Garden* by Tina & Carson Kugler
- Notecards, pencils, and crayons
- Clipboard for each student
- Chart paper
- Tape
- Empty seed packets – 1 per group
- Seeds or seedlings
- Trowel or hoe – 1 per group
- Garden journal notebooks

Management tip

Plan to complete all activities outside in or near the school garden, weather permitting. Materials could be easily transported in backpacks carried by student leaders. Consider storing tools in a small shed near the garden. Before going outside, discuss boundaries, expectations for student behavior, attention getting signals, and specific tasks. Review again when outside.

PRESENTATION / INTRODUCTION:

Look around and make observations. What plants live in the area around our garden? Point out different plants such as trees, bushes, grass, newly sprouted grass, etc. Are these full-grown plants or seedlings (baby plants)?

A seedling forms from a seed. Read *Plant Secrets.* Distribute seeds to students and encourage observation and time for sorting. Today we will plan how we can plant these seeds in our garden. We will make decisions about plants, spacing, and timing while we create a garden map. Then, in time we will get to see them grow into seedlings and then parent plants producing seeds for next year's plants.

DIRECTIONS:

1. **Activity 1 - Mapping the space**: Invite children to get to know their school garden space, observing key features – water access, compost, rabbit fencing, amount of space, soil, sunlight, etc.
    - Each child will choose one area of the garden that they wish to observe and draw; perhaps one will draw a raised bed, another will draw the tool shed, or the water hoses, etc. Distribute notecards,

clipboards, pencils, and crayons and have students spread out so that they can explore, observe, and sketch their chosen areas.

- When students are finished, add the student work to chart paper to create a class map of the garden. Have students provide input as to where the notecards should be placed in relationships to each other: Is the vegetable bed near or far from the pollinator garden? Is the compost bin to the right or left of the supply shed?

Recommended resource

For additional support setting up a new outdoor classroom or garden, check out the U.S. Fish & Wildlife Service planning guide: https://www.fws.gov/cno/pdf/HabitatGuideColor.pdf

- As cards are added to the map, discuss how each component is useful in the garden. Does our garden provide things plants need to grow into seedlings and then into seed producing parent plants?

2. **Activity 2 – Getting ready to plant:** To prepare for planting day, discuss the different tasks that must be done. Seed packets are a good resource for information. Model reading a seed packet to find information such as planting dates, planting depth, required sunlight, and special instructions. Also, refer to the Iowa State Extension file, **"Planting a home vegetable garden,"** for a table with planting recommendations. https://store.extension.iastate.edu/Product/Planting-a-Home-Vegetable-Garden
    - Have students divide tasks into smaller roles, and determine job descriptions for each student in the class. For example, perhaps one group will take the task of planting the pea plants. One person in the group could hoe, another place the seeds, another covers the seed with soil, and a final student waters the area. Each student should create a notecard nametag for themselves showing their role and tasks they will complete.
    - While planning the specifics for planting day,

Tool safety

Role play with students procedures for getting out, using, and storing garden tools. For example, pointy ends of trowels and shovels should always be down. Students will only walk while carrying tools. Teachers will pay close attention to students using tools and will give other jobs to students not following procedures.

help students make connections to the yearly cycle for the garden. First, we plan and plant, then we will maintain the garden, finally we will celebrate harvest. For more information, watch this video: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.gardenatoz/think-garden-a-year-in-the-garden/ On the class map, include student sketches of what they hope their plants will look like.

- For more information about planting with students, please see additional information located at the end of this lesson.

3. **Activity 3 – Planting Day:** Model using the tools and planting the seeds. Refer to the garden map and plan to ensure every child has a job and is ready to make discoveries in the garden. Extra staff or parent/community volunteers could be helpful on planting day. Have fun!

Expert advice
If the goal of the garden is to produce food or beauty, don't do it with kids! Remember, the goal is for the kids to learn. Focus on their academic goals, not on producing food.

REFLECTION / GARDEN JOURNAL PROMPT:

4. **Make a garden journal**: Each student can make a garden journal out of a recycled notebook. Encourage students to decorate the covers with a collage of recycled materials, perhaps including garden catalog photos.

5. **Adopt-a-Plant journal prompt:** Each child will adopt a plant to observe and document weekly throughout the garden season. Have them sketch their seed in the ground; provide extra seeds for them to closely observe. What do baby plants need to survive?

School Garden Unit
Maintain Garden Guide

LESSON: Helping Young Plants Survive

GRADE: 1st grade **TIME: 45-minute sessions as needed**

SUMMARY:

Students will go on a daily scavenger hunt in the garden. Based on their observations they will determine when to water, weed, and care for their garden. In their garden journals, they will sketch their observations of the garden.

GARDEN TASK*: Maintain*

OBJECTIVES: Iowa Core

Science

- **1-LS1-2.** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- **1-LS3-1.** Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

21st Century Skills

- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.
- **21.K-2.ES.4** Develop initiative and demonstrate self-direction in activities.

MATERIALS & RESOURCES:

- Scavenger Hunts – laminated copies for each child or group
- "Rainmakers" – recycled plastic containers with holes in the bottom for watering
- 60 counters (or poker chips, buttons, etc.)
- Garden journal notebooks / colored pencils
- Garden gloves (optional)

PRESENTATION / INTRODUCTION:

Once our garden is planned and the seeds have been planted, the learning fun is just beginning. Begin each trip to the garden with students completing and discussing the Garden Scavenger Hunt.

- Are our baby seedlings growing? What are they doing to survive? How can we gardeners help them survive?
- How tall are the seedlings compared to students? Observe the changes over the weeks. How else are seedlings different than mature plants?

DIRECTIONS:

1. **Weeding**: Gardeners should pull weeds to ensure their plants get the sunlight, water, space, and nutrients from the soil that they need. Weeding is easiest when weeds are small, so short but frequent weeding sessions are helpful.
    - As seedlings first grow, students may have difficulty differentiating the plants and weeds. Point out patterns the plants were planted in (rows, clusters, etc.). Also refer to the seed packages or online resources for photos of baby plants. Making garden signs with photos can be helpful.
    - As weeding could become tedious, make it into a game with challenges. Who can pick the largest pile of weeds? See how many kinds of weeds they can find. Have students search for the smallest weed, largest weed, longest root, etc.

2. **Watering**: As a class, observe and chart the weather daily. After several days without rain, test the ground by inserting a trowel or dowel a few inches. If it comes out clean, the soil is dry. Damp soil will cling to the trowel. Ask students to observe plants. Plants' leaves will begin to wilt or turn colors if they are lacking water. **Generally, plants will need water whenever less than an inch of rain falls in a week. If it rains, do not**

Management tip
Handing water hoses to children can be too tempting. Consider having buckets of water available so students can water plants by filling "rainmakers," recycled yogurt or orange juice jugs with their tops cut and holes poked in the bottoms with nails. Water gently falls to ground like a rain storm, reducing puddles and drowning of seedlings.

water that day. Watch the following video for additional information: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.water/think-garden-the-importance-of-water/

Expert advice

Make it a goal to avoid watering the garden. Mulching around small plants not only cuts down on weeds but also helps the soil hold water. Wet newspapers, cardboard, or straw are recommended mulching materials, two or three inches deep.

3. **Thinning**: Some plants need to be thinned, which means removing some plants to allow more room for others to grow. For example, carrots will not have space or nutrients to grow to full size unless they are thinned. Refer to seed packages for details about the amount of space plants need and thinning dates. Students may be interested to see what happens if a few plants are not thinned.
    - **Human Carrots Game**: Students sit on the ground about six inches to the next nearest person. Evenly distribute 60 counters on the ground. Explain that the counters represent nutrients in the soil that plants need to survive and thrive. When you say, "Go," students will pick up as many counters as they can. After this first round, students will notice they each only got a few counters.
    - Half of the students should stand up and move to the side to become observers. Repeat the game with the same number of counters. Were the carrots able to get more nutrients this time? Why? Why is it helpful to thin the carrots?
    - Repeat again with some students representing weeds. How could we help our carrots if we pulled the weeds?
    - Play a variation including water and sunlight. Throw slips of blue paper (rainwater) and yellow paper (sunlight) to "rain" on the group like confetti. See how many slips they collect with all the plants as compared to a few. Discuss that it's easier for plants to get the sunlight, water, and nutrients needed when thinned.

4. **Pests and disease**: Not all bugs are bad. Encourage students to examine plants closely so they get to know what a healthy plant looks like. Then, they will be able to spot changes in the plant such as yellow or brown spots, which can be signs of disease. Iowa State Extension offices can be a source of information about specific plants:

http://www.yardandgarden.extension.iastate.edu/Hortline.htm This video helps students understand bugs that are pests and helpers. http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.pests/think-garden-garden-pests-and-helpers/

5. **Think ahead to summer break**: If students will not be maintaining the garden during the summer, consider these ideas:
    - **Garden Guardians**: Have community volunteers and parents sign up to maintain the garden for a week or two.
    - **Mulch**: Cover the ground around the plants with wet newspapers or straw to cut down on weed growth and help hold water.
    - **Plant for fall**: Plant produce that will be ready to harvest in the fall such as popcorn, pumpkins, potatoes, eggplant, etc.
    - **Weed well before any breaks**: Any tiny plants before break will be quite tall when students return.

Expert advice
Be courteous to custodial staff. Encourage students to wash their hands outside. Place a rug near the door and remind students to brush off dirt and leave mud outside.

6. **Additional lesson ideas in the garden:** Find these lessons and more at http://www.teachers-going-green.com/teachers-going-green/clean-and-green/1st-grade
    - Curious About Clouds
    - Prairie Soil Explorers
    - Mapping Our Neighborhood Pollinators
    - Kids Speak for the Soil
    - Hide a Penny
    - Unbelievable-Fantabulous, 10yd Hike

REFLECTION / GARDEN JOURNAL PROMPT:

7. **Adopt-a-Plant journal prompt:** Each child will adopt a plant to observe and document weekly throughout the garden season.
    - Sketch what they see while maintaining the garden.

- Include examples of plants that didn't have all the items needed for survival – for example, what did a plant look like without enough water? Too much water? Not enough sunlight?
- What do plants need to survive?
- How are young plants different than mature plants?

Expert advice

To help students remember which plant they "adopted" have students choose a button. Gently tie a loose string and that button around their plant. Their button can remind them which plant to observe and sketch.

My Daily Garden Scavenger Hunt

Look for…

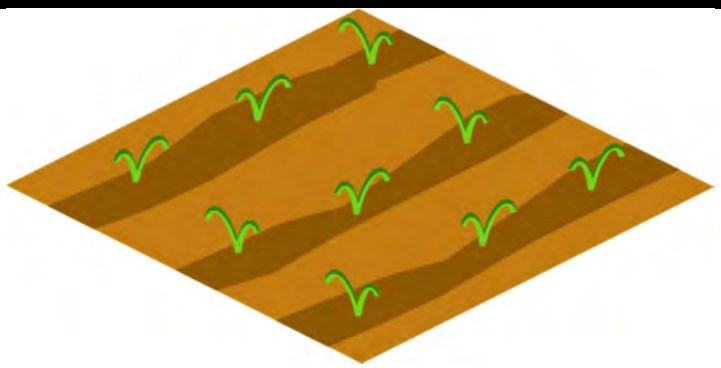
Sun

How tall is the seedling compared to you?

Weeds - Pull these!

Healthy plants

Touch…



Will **soil** stick in a ball? If not, it's too dry. Water the plants!

Taste…

Not yet!!
Taste **ripe produce** soon!

My Daily Garden Scavenger Hunt

Look for…

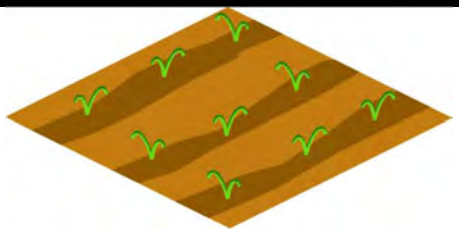
Sun

How tall is the seedling compared to you?

Weeds - Pull these!

Healthy plants

Touch…



Will **soil** stick in a ball? If not, it's too dry. Water the plants!

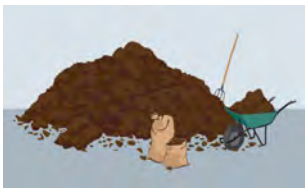
Taste…

Not yet!!
Taste **ripe produce** soon!

Smell…

Flowers

Herbs



Compost

Hear…

Be still and listen. Can you hear a pollinator? A bird?

School Garden Unit
Celebrate Harvest Garden Guide

LESSON: Comparing Plants

GRADE: 1st grade **TIME: 45-minute sessions as needed**

SUMMARY:

Today students will use senses to observe unripe, ripe, and overripe produce. They will examine seeds in produce and discuss ways mature plants help baby plants grow. In the garden, they will learn how to harvest produce, sort and count it, eat it in tasty recipes, and plan a garden party to celebrate their learning. Finally, they will reflect on their learning in the garden and make future recommendations.

GARDEN TASK*: Celebrate Harvest*

Management tip

Plan to complete all activities outside in or near the school garden. Many materials such as trowels, harvest baskets, and kitchen tools could be stored in a small garden shed. Other materials could be easily transported in backpacks carried by student leaders.

OBJECTIVES: Iowa Core

Science

- **1-LS1-2.** Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- **1-LS3-1.** Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

Mathematics

- **1.MD.C.4.** Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than another.

21st Century Skills

- **21.K-2.ES.3** Learn leadership skills and demonstrate integrity, ethical behavior, and social responsibility.
- **21.K-2.ES.5** Work productively and are accountable for their actions.

MATERIALS & RESOURCES:

- *The Vegetables We Eat* by Gail Gibbons
- Chart paper for tracking produce
- Harvest baskets or bags
- Trowels
- Spray bottles
- Garden gloves (optional)
- Examples of unripe, ripe, and overripe fruits and vegetables
- Bucket of soapy water or outdoor sink
- Kitchen tools for recipes – bowl, spoon, kitchen scissors or knives, plates and napkins, seasonings, additional ingredients, etc.
- Notecards / pencils
- Garden journal notebooks / colored pencils

Expert advice

Remember that the success of the garden is not measure by how much produce was grown, but by how much the students learned. Even plants that did not produce fruits and vegetables are valuable in the garden as compost that provides nutrients in the soil for next year's garden.

PRESENTATION / INTRODUCTION:

Show students produce that is unripe, ripe, and overripe. Have them observe the color and size differences. Have them touch and smell it. What differences did you notice? Does the produce in our garden look like any of these? How can we determine if produce is ready to harvest? What indicators should we look for?

Garden produce is important for a few reasons. One is that we get to eat it! Read *The Vegetables We Eat* by Gail Gibbons. Pages 1-20 discuss various types of vegetables and why humans eat them. Another reason is it important is that it often, but not always, contains seeds. Cut open produce and have students find and observe seeds. How do mature plants help baby plants survive? How are these mature plants similar to the baby plants that will grow from those seeds? How are they different?

DIRECTIONS:

1. **Harvest:** Visit the garden every few days and have students check for ripe produce. Students will work in the garden in small groups to harvest items that are ready. Use chart paper to graph and analyze the number of items harvested. Additional ideas are located at the end of this lesson.

2. **Eat it in the garden!** Many recipes can be found online. Check out this school garden recipe book listing produce alphabetically: http://dcgreens.org/wp-content/uploads/2013/10/Fun-Cook-Book.pdf Other easy ideas:
    - **Lettuce buffet** (fall and spring): Harvest several types of greens and arrange them on a plate as a lettuce salad.
    - **Garden salsa** (summer)**:** Mix chopped tomatoes, peppers, onions, cilantro, garlic, and black beans with salt and pepper. Each student receives a spoonful on a lettuce leaf to fold up and enjoy.
    - **Flavored water:** Add crumpled mint leaves to a glass or bottle of water. Shake and enjoy! Or try slices of strawberries or cucumber.
    - **Garden pasta salad**: Mix precooked whole wheat pasta with chopped broccoli, cucumber, summer squash, and Italian dressing.
    - **Cucumber and tomato salad** (late summer and fall): Mix cucumber, cherry tomatoes, and Italian dressing.

Expert advice

Let them try their produce – even raw green pumpkin! Some students wanted to try it, we did not stop them, and it was a learning experience they will not soon forget.

3. **Celebrate**: As a culmination to the kids' hard work in the garden, host a garden party. Facilitate as students plan. Invite administrators, custodians, staff, parents, community volunteers, and other students to taste and see the students' work. Customize to your setting, but ideas include:
    - Eat! Feature some of the students' favorite recipes using their produce.
    - Make art to take home – garden signs, wind chimes, sun prints, or mosaics are a just a few ideas.
    - Plant something – in the garden or to take home.
    - Display garden photographs taken by students as well as their journal entries and planning maps.
    - Publicly thank volunteers for their efforts.
    - Put them to work – encourage students to show guests how to harvest or pull up plants for a compost pile.

REFLECTION / GARDEN JOURNAL PROMPT:

4. **Adopt-a-Plant journal prompt:** Students will sketch and label their plant and its produce. Also have them sketch what that produce looks like as children eat it – is it used in a recipe?

   Ask them to reflect on their drawings throughout the garden season. How are seedlings and mature plants different? How are they similar? How does a parent plant help a baby plant survive?

5. **Draw a map of a future dream garden:** Based on what you learned from this garden project, what would your dream garden look like? What would you include or do differently? Save these and share with students next year!

2nd Grade
School Garden Unit

School Garden Unit
Plan & Plant Garden Guide

LESSON: Investigating Sunlight and Water

GRADE: 2nd grade **TIME: At least four 45-minute sessions**

SUMMARY:

Today students will plan their future garden. They will begin by discussing things they think plants need for survival. As they gather information and make decisions for their garden, students will record their plans on a class garden map. They will include test plots to investigate if plants need sunlight and water to grow. Finally, they will plant their garden and get ready to observe the plants grow!

GARDEN TASK*: Planning and Planting*

OBJECTIVES: Iowa Core

Science

Ecosystems: Interactions, Energy, and Dynamics

- **2-LS2-1.** Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Social Studies

- **SS-K-2.G.1** Understand the use of geographic tools to locate and analyze information about people, places, and environments.
    - Understand representations of locales and regions on maps and globes.

21st Century Skills

- **21.K-2.ES.1** Communicate and work appropriately with others to complete tasks.
- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.

MATERIALS & RESOURCES:

- *The Curious Garden* by Peter Brown
- *Eating the Alphabet* by Lois Ehlert (optional)
- *In Mary's Garden* by Tina & Carson Kugler
- Notecards, pencils, and crayons
- Clipboard for each student
- Chart paper
- Tape
- Empty seed packets – 1 per group
- Seeds or seedlings
- Trowel or hoe – 1 per group
- Garden journal notebooks

Management tip

Plan to complete all activities outside in or near the school garden, weather permitting. Materials could be easily transported in backpacks carried by student leaders. Consider storing tools in a small shed near the garden. Before going outside, discuss boundaries, expectations for student behavior, attention getting signals, and specific tasks. Review again when outside.

PRESENTATION / INTRODUCTION:

What do the plants need to grow? Read *The Curious Garden*. The story does not tell us how much sunlight or water is necessary – how much do you think they need? What do you think might happen if they have too much? Not enough? How could we test these ideas?

Today we need to plan our garden. We will make decisions about plants, spacing, and timing while we create a garden map. We will also be designing test plots to investigate your ideas about how much sunlight and water plants might need to grow.

DIRECTIONS:

Expert advice

If the goal of the garden is to produce food or beauty, don't do it with kids! Remember, the goal is for the kids to learn. Focus on their academic goals, not on producing food.

1. **Activity 1 - Mapping the space**: Invite children to get to know their school garden space, observing key features – water access, compost, rabbit fencing, amount of space, soil, sunlight, etc.
    a. Each child will choose one area of the garden that they wish to observe and draw; perhaps one will draw a raised bed, another will draw the tool shed, or the water hoses, etc. Distribute notecards,

clipboards, pencils, and crayons and have students spread out so that they can explore, observe, and sketch their chosen areas.

b. When students are finished, add the student work to chart paper to create a class map of the garden. Have students provide input as to where the notecards should be placed in relationships to each other: Is the vegetable bed near or far from the pollinator garden? Is the compost bin to the right or left of the supply shed?
c. As cards are added to the map, discuss how each component is useful in the garden. Note areas of the garden that would receive more sunlight than others. How might the amount of sunlight affect our plants?

2. **Activity 2 – Preparing the investigation:** Along with planting, maintaining, and harvesting the garden, students will be conducting an investigation: ***Do plants need sunlight and water to grow?***
   a. **Ask questions**. Have students further develop the research question. As a class, choose two or three questions to investigate.
   b. **Gather more information**. Seek recommendations in seed packets, books and online resources. What would happen if we did not follow the recommendations for sunlight and water?
   c. **Discuss components of a fair test**. How could they add "test plots" to their garden so they could find the answers to their questions? Model designing two plots where the only different is the amount of sunlight or water. Ensure the same types of seeds are planted, same soil, same fertilizer, etc.
   d. **Add the test plots to the garden map.** Refer to the garden map to determine areas that receive differing amounts of sunlight or water.

3. **Activity 3 – Getting ready to plant:** To prepare for planting day, discuss the different tasks that must be done. Also, refer to the Iowa State Extension file, **"Planting a home vegetable garden,"** for a table with planting recommendations. https://store.extension.iastate.edu/Product/Planting-a-Home-Vegetable-Garden
   a. Have students divide tasks into smaller roles, and determine job descriptions for each student in the class. For example, perhaps one group will take the task of planting the pea plants. One person in the group could hoe, another place the seeds, another covers the seed with

soil, and a final student waters the area. Each student should create a notecard nametag for themselves showing their role and tasks they will complete.

b. While planning the specifics for planting day, help students make connections to the yearly cycle for the garden. First, we plan and plant, then we will maintain the garden, finally we will harvest and celebrate. For more information, watch this video: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.gardenatoz/think-garden-a-year-in-the-garden/ On the class map, include student sketches of what they hope their plants will look like.

c. For more information about planting with students, please see additional information located at the end of this lesson.

4. **Activity 4 – Planting Day:** Model using the tools and planting the seeds. Refer to the garden map and plan to ensure every child has a job and is ready to make discoveries in the garden. Extra staff or parent/community volunteers could be helpful on planting day. Have fun!

Tool safety

Role play with students procedures for getting out, using, and storing garden tools. For example, pointy ends of trowels and shovels should always be down. Students will only walk while carrying tools. Teachers will pay close attention to students using tools and will give other jobs to students not following procedures.

REFLECTION / GARDEN JOURNAL PROMPT:

5. **Make a garden journal**: Each student can make a garden journal out of a recycled notebook. Encourage students to decorate the covers with a collage of recycled materials, perhaps including garden catalog photos.

6. **Adopt-a-Plant journal prompt:** Each child will adopt a plant from each test plot to observe and document weekly throughout the garden season. Have them divide their page in half and sketch their seed in the ground; provide extra seeds for them to closely observe. Above their sketch, record the date and the amount of sunlight and water the plants are receiving. Then, write their predictions based on prior experience with plants. Which plants do they predict will thrive? Why?

School Garden Unit
Maintain Garden Guide

LESSON: Diverse Life in the Garden

GRADE: 2nd grade **TIME: 45-minute sessions as needed**

SUMMARY:

Students will go on a garden scavenger hunt, observing weather conditions and the diversity of life. Based on their observations they will determine when to water, weed, and care for their garden. They will observe their investigation test plots and begin to draw conclusions about the importance of sunlight and water for plants. Finally, in their garden journals, they will sketch their observations.

GARDEN TASK*: Maintain*

OBJECTIVES: Iowa Core

Science

- **2-LS2-1.** Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- **2-LS4-1.** Make observations of plants and animals to compare the diversity of life in different habitats.

21st Century Skills

- **21.K-2.ES.2** Recognize different roles and responsibilities and is open to change.
- **21.K-2.ES.4** Develop initiative and demonstrate self-direction in activities.

MATERIALS & RESOURCES:

- Scavenger Hunts – laminated copies for each child or group
- Garden gloves and "rainmakers" – recycled plastic containers with holes in the bottom for watering
- 60 counters (or poker chips, buttons, etc.)
- Garden journal notebooks / colored pencils

PRESENTATION / INTRODUCTION:

Start each trip to the garden with students completing and discussing the Garden Scavenger Hunt. Discuss the wide variety of plants (including weeds!) and creatures in the garden. How do these compare to other habitats?

Check on the investigation test plots. Observe the plants, looking at color, size, number of leaves, etc. What differences are you noticing? Why? Considering these observations, do you think plants need sunlight and water to grow?

Based on the scavenger hunt observations, plan how students can maintain their plants today.

DIRECTIONS:

1. **Weeding**: Gardeners should pull weeds to ensure their plants get the sunlight, water, space, and nutrients from the soil that they need. Weeding is easiest when weeds are small, so short but frequent weeding sessions are helpful.
    - As seedlings first grow, students may have difficulty differentiating the plants and weeds. Point out patterns the plants were planted in (rows, clusters, etc.). Also refer to the seed packages or online resources for photos of baby plants. Making garden signs with photos can be helpful.

2. As weeding could become tedious, make it into a game with challenges. Who can pick the largest pile of weeds? See how many kinds of weeds they can find. Have students search for the smallest weed, largest weed, longest root, etc.

3. **Watering**: As a class, observe and chart the weather daily. After several days without rain, test the ground by inserting a trowel or dowel a few inches. If it comes out clean, the soil is dry. Damp soil will cling to the trowel. Ask

Expert advice

Make it a goal to avoid watering the garden. Mulching around small plants not only cuts down on weeds but also helps the soil hold water. Wet newspapers, cardboard, or straw are recommended mulching materials, two or three inches deep.

students to observe plants. Plants' leaves will begin to wilt or turn colors if they are lacking water. **Generally, plants will need water when less than an inch of rain falls in a week. If it rains, do not water that day.** Watch the following video for additional information: http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.water/think-garden-the-importance-of-water/

4. **Thinning**: Some plants need to be thinned, which means removing some plants to allow more room for others to grow. For example, carrots will not have space or nutrients to grow to full size unless they are thinned. Refer to seed packages for details about the amount of space plants need and thinning dates. Students may be interested to see what happens if a few plants are not thinned.

Management tip
Handing water hoses to children can be too tempting. Consider having buckets of water available so students can water plants by filling "rainmakers," recycled yogurt or orange juice jugs with their tops cut and holes poked in the bottoms with nails. Water gently falls to ground like a rain storm, reducing puddles and drowning of seedlings.

   - **Human Carrots Game**: Students sit on the ground about six inches to the next nearest person. Evenly distribute 60 counters on the ground. Explain that the counters represent nutrients in the soil that plants need to survive and thrive. When you say, "Go," students will pick up as many counters as they can. After this first round, students will notice they each only got a few counters.
   - Half of the students should stand up and move to the side to become observers. Repeat the game with the same number of counters. Were the carrots able to get more nutrients this time? Why? Why is it helpful to thin the carrots?
   - Repeat again with some students representing weeds. How could we help our carrots if we pulled the weeds?
   - Play a variation including water and sunlight. Throw slips of blue paper (rainwater) and yellow paper (sunlight) to "rain" on the group like confetti. See how many slips they collect with all the plants as compared to a few. Discuss that it's easier for plants to get the sunlight, water, and nutrients needed when thinned.

5. **Pests and disease**: Not all bugs are bad. Encourage students to examine plants closely so they get to know what a healthy plant looks like. Then, they will be able to spot changes in the plant such as yellow or brown spots, which can be signs of disease. Iowa State Extension offices can be a source of information about specific plants: http://www.yardandgarden.extension.iastate.edu/Hortline.htm This video helps students understand bugs that are pests and helpers. http://iptv.pbslearningmedia.org/resource/thnkgard.sci.ess.pests/think-garden-garden-pests-and-helpers/

6. **Think ahead to summer break**: If students will not be maintaining the garden during the summer, consider these ideas:
    - **Garden Guardians**: Have community volunteers and parents sign up to maintain the garden for a week or two.
    - **Mulch**: Cover the ground around the plants with wet newspapers or straw to cut down on weed growth and help hold water.
    - **Plant for fall**: Plant produce that will be ready to harvest in the fall such as popcorn, pumpkins, potatoes, eggplant, etc.
    - **Weed well before any breaks**: Any tiny plants before break will be quite tall when students return.

7. **Additional lesson ideas in the garden:** Find these lessons and more at http://www.teachers-going-green.com/teachers-going-green/clean-and-green/2nd-grade
    - Celebrating Urban Birds
    - Field Trip to Your Square
    - Older Than Dirt
    - Who Will Pollinate Our Garden?
    - Birds of a Feather
    - Hide a Penny
    - Sound Map

Expert advice

Be courteous to custodial staff. Encourage students to wash their hands outside. Place a rug near the door and remind students to brush off dirt and leave mud outside.

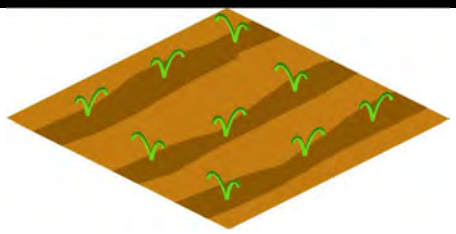
REFLECTION / GARDEN JOURNAL PROMPT:

8. **Adopt-a-Plant journal prompt:** Each child will adopt a plant to observe and document weekly throughout the garden season.
    - Sketch what they see while maintaining the garden.
    - Observe the plants in their test plots. Sketch and label plants that received different amounts of sunshine or water. How does sunlight and water affect a plant?
    - Compare the plants in the garden to those in the school yard (or another green space). How are they similar? How are they different? How are the animals similar or different in these two habitats?

Expert advice

To help students remember which plant they "adopted" have students choose a button. Gently tie a loose string and that button around their plant. Their button can remind them which plant to observe and sketch.

My Daily Garden Scavenger Hunt

<table>
<tr><td rowspan="2"> 
Look for…</td><td> 
Sun</td><td> 
How tall is the seedling compared to you?</td></tr>
<tr><td> 
Weeds - Pull these!</td><td> 
Healthy plants</td></tr>
<tr><td> 
Touch…</td><td colspan="2">3 plants in the garden</td><td>3 creatures in the garden</td></tr>
<tr><td> 
Taste…</td><td colspan="3"> 
Will soil stick in a ball? If not, it’s too dry. Water the plants!</td></tr>
<tr><td colspan="4"> 
Not yet!!
Taste ripe produce soon!</td></tr>
</table>

School Garden Unit
Celebrate Harvest Garden Guide

LESSON: Pollinators in the Garden

GRADE: 2nd Grade **TIME: 45-minute sessions as needed**

SUMMARY:

Today students will use their senses to observe unripe, ripe, and overripe produce. They will examine the seeds in the produce and learn about pollinators. In the garden, they will learn how to harvest produce, sort and count it, eat it in tasty recipes, and plan a garden party to celebrate their learning. Finally, they will reflect on their learning in the garden and make recommendations for next year.

GARDEN TASK*: Celebrate Harvest*

Management tip
Plan to complete all activities outside in or near the school garden. Many materials such as trowels, harvest baskets, and kitchen tools could be stored in a small garden shed. Other materials could be easily transported in backpacks carried by student leaders.

OBJECTIVES: Iowa Core

Science

- **2-LS2-1.** Plan and conduct an investigation to determine if plants need sunlight and water to grow.
- **2-LS2-2.** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Mathematics

- **2.MD.D.10.** Draw a picture and a bar graph to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presenting in a bar graph.

21st Century Skills

- **21.K-2.ES.3** Learn leadership skills and demonstrate integrity, ethical behavior, and social responsibility.
- **21.K-2.ES.5** Work productively and are accountable for their actions.

MATERIALS & RESOURCES:

- *The Reason for a Flower: A book about flowers, pollen, and seeds* by Ruth Heller
- Chart paper for tracking produce
- Harvest baskets or bags
- Trowels
- Spray bottles
- Garden gloves (optional)
- Examples of unripe, ripe, and overripe fruits and vegetables
- Bucket of soapy water or outdoor sink
- Kitchen tools for recipes – bowl, spoon, kitchen scissors or knives, plates and napkins, seasonings, additional ingredients, etc.
- Notecards / pencils
- Garden journal notebooks / colored pencils

PRESENTATION / INTRODUCTION:

Show students produce that is unripe, ripe, and overripe. Have them observe the color and size differences. Have them touch and smell it. What differences did you notice? Does the produce in our garden look like any of these? How can we determine if produce is ready to harvest? What indicators should we look for?

It is pretty amazing that plants can create so many tasty fruits and vegetables. Cut open one fruit and have students locate the seeds. Why are those seeds there? How did they get there? Read *The Reason for a Flower* or other books about pollination to learn how seeds and fruits are formed. Why are pollinators important? Some fruits such as raspberries and apples require a pollinator like a bee or hummingbird to bring pollen, while other plants like corn, peas, and tomatoes complete a similar process without pollinators. For six additional lessons about pollinators check out http://www.teachers-going-green.com/teachers-going-green/resources/story-county-conservation

DIRECTIONS:

1. **Harvest:** Visit the garden every few days and have students check for ripe produce. Students will work in the garden in small groups to harvest items

that are ready. Use chart paper to graph and analyze the number of items harvested. Additional ideas are located at the end of this lesson.

2. **Eat it in the garden!** Many recipes can be found online. Check out this school garden recipe book listing produce alphabetically: http://dcgreens.org/wp-content/uploads/2013/10/Fun-Cook-Book.pdf Other easy ideas:
   - **Lettuce buffet** (fall and spring): Harvest several types of greens and arrange them on a plate as a lettuce salad.
   - **Garden salsa** (summer)**:** Mix chopped tomatoes, peppers, onions, cilantro, garlic, and black beans with salt and pepper. Each student receives a spoonful on a lettuce leaf to fold up and enjoy.
   - **Flavored water:** Add crumpled mint leaves to a glass or bottle of water. Shake and enjoy! Or try slices of strawberries or cucumber.
   - **Garden pasta salad**: Mix precooked whole wheat pasta with chopped broccoli, cucumber, summer squash, and Italian dressing.
   - **Cucumber and tomato salad** (late summer and fall): Mix cucumber, cherry tomatoes, and Italian dressing.

Expert advice

Let them try their produce – even raw green pumpkin! Some students wanted to try it, we did not stop them, and it was a learning experience they will not soon forget.

3. **Celebrate**: As a culmination to the kids' hard work in the garden, host a garden party. Facilitate as students plan. Invite administrators, custodians, staff, parents, community volunteers, and other students to taste and see the students' work. Customize to your setting, but ideas include:
   - Eat! Feature some of the students' favorite recipes using their produce.
   - Make art to take home – garden signs, wind chimes, sun prints, or mosaics are a just a few ideas.
   - Plant something – in the garden or to take home.
   - Display garden photographs taken by students as well as their journal entries and planning maps.
   - Publicly thank volunteers for their efforts.
   - Put them to work – encourage students to show guests how to harvest or pull up plants for a compost pile.

REFLECTION / GARDEN JOURNAL PROMPT:

6. **Adopt-a-Plant journal prompt:** Students will sketch and label their plant and its produce. Also have them sketch what that produce looks like as children eat it – is it used in a recipe?

   Ask them to reflect on their investigation drawings throughout the garden season. How did plants grow differently with different amounts of sunlight or water? How much water would you recommend plants receive? How much sunlight? Why? What ideas do you have for future investigations?

7. **Draw a map of a future dream garden:** Based on what you learned from this garden project, what would your dream garden look like? What would you include or do differently? Save these and share with students next year!

Expert advice

Remember that the success of the garden is not measure by how much produce was grown, but by how much the students learned. Even plants that did not produce fruits and vegetables are valuable in the garden as compost that provides nutrients in the soil for next year's garden.

Tips for Gardening with Kids
School Garden Unit

Tips for Planting a Garden with Kids

- **Where should we plant?** On the class map, have students label areas that provide the things plants need. These would be the best areas for them to plant.
    - Make special note of sunlight in the garden. Why is sunlight important when planning a garden? Visit the garden at different times of a sunny day and have student observe whether the garden beds are sunny or shaded. Most garden plants want at least 6-8 hours of direct sunlight. As students plan their garden, discuss planting a few seeds in the shade so students can see the effect of sunlight on plants. *For more information, check out the chart at the end of the lesson.*
    - Also consider the garden soil. It must have nutrients for plants to grow and should not contain hazardous materials such as lead. Soil tests can be done through the county Extension offices: https://www.extension.iastate.edu/content/county-offices The Extension also has a free publication " Garden Soil Management" https://store.extension.iastate.edu/Product/Garden-Soil-Management Also consider other safety precautions in the garden: http://nfsmi.org/documentlibraryfiles/PDF/20110822025700.pdf

Scattering, rows, square foot?

There are as many methods for planting the garden as there are gardens. When working with children, it can be advantageous to plant in rows. This will make it easier to differentiate plants from weeds later. String can be used as a guide to create straight rows.

Recommended resource

For additional support setting up a new outdoor classroom or garden, check out the U.S. Fish & Wildlife Service planning guide: https://www.fws.gov/cno/pdf/HabitatGuideColor.pdf

- **What should we plant?** Let students make this choice and label the plants on the class garden map, considering the following factors.
    - **Use what you have** – Often seeds or seedlings will be donated or discounted for schools. Work with parents and community partners.
    - **Plant and harvest dates** – If students are not at school during the summer, avoid growing vegetables like tomatoes with large summer

harvests. There are many options that can be planted and harvested before school is out for the summer. Likewise, other produce can be planted after school starts in the fall. See the infographic titled "**What to Plant in Your School Garden"** located at the end of this lesson.

Incorporate fun structures

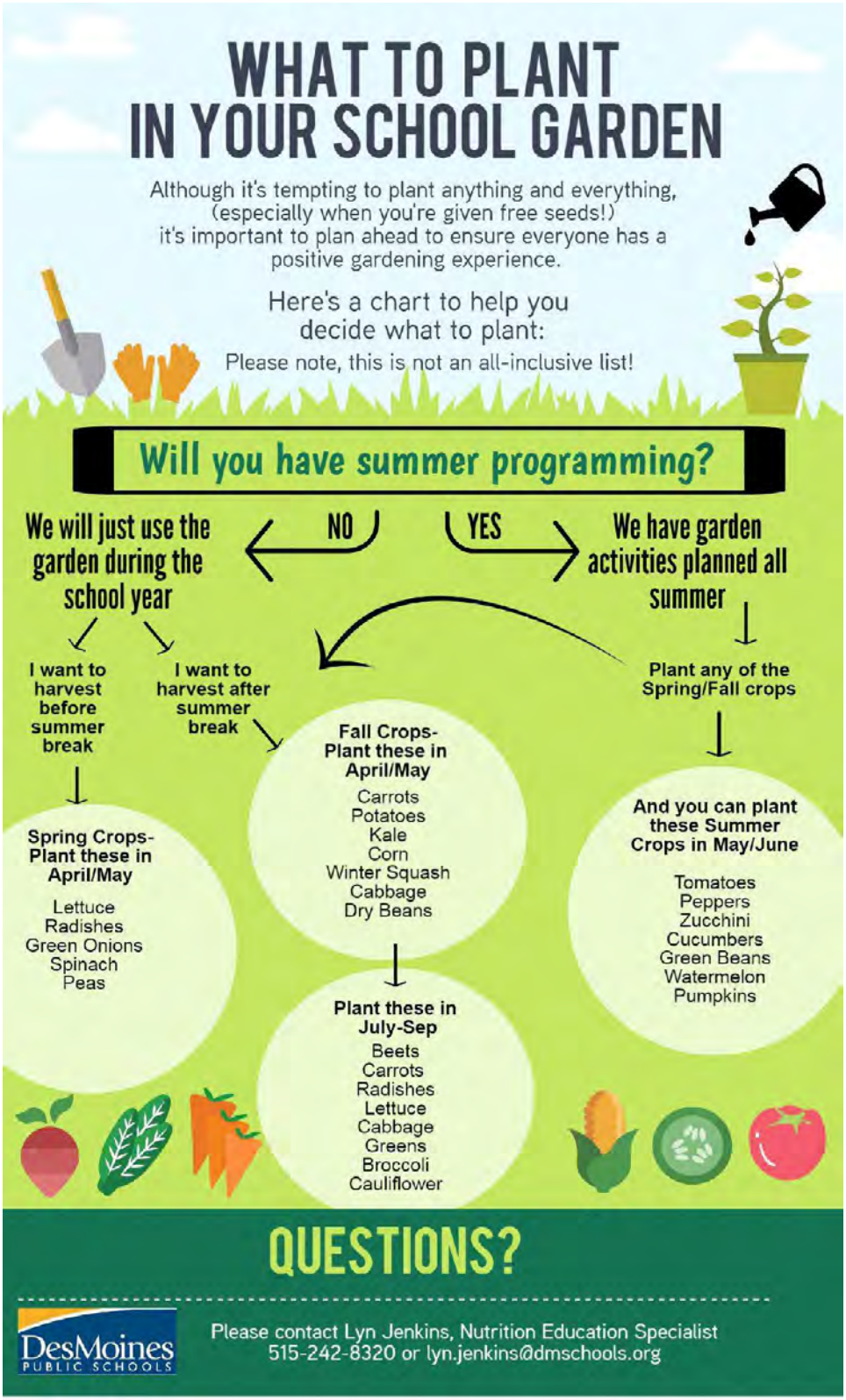
Adding art in the garden is a great way to invest students in the project and keep them engaged. For inspiration, read *In Mary's Garden* about sculptor Mary Nohl transforming her garden with art. Perhaps students could design sculptures or signs to mark different vegetables. They could create reading spots using logs or stones within the garden. Pizza box mosaics or tunnels with vines planted around them are other ideas.

- **Perennials –** When planning, consider any perennial plants already in the garden such as raspberries, strawberries, asparagus, and herbs. If these are not already in the garden, they are a great addition!
- **Fine motor skills** – With young students, keep their developing motor skills in mind when determining types of plant.
- **Let students choose**, given the above perimeters. Brainstorm fruits or vegetables that students would like to plant. Read *Eating the Alphabet* by Lois Ehlert for additional ideas. On a notecard, ask each child to sketch and write about a fruit or vegetable they would like to plant. Gather these notecards in a jar. Pull them out one by one and discuss which plants would be a good fit given our climate, dates, budget, etc. Create a class list. Take a class vote by giving each child three stickers. They may place their sticker next to three items they would like to plant. The plants with the most stickers will be selected. As students decide on plants to include in their garden, add them to the class garden map.
- **Companion plants –** When mapping out the garden, show students the "Companion Planting" chart at the end of the lesson. Plants, like people, influence one another. They may enhance flavor, repel or trap pests, or interfere with growth. Discuss that some types of plants can help others when they are planted next to each other. For additional information view charts at http://chemung.cce.cornell.edu/resources/companion-planting

- **When should we plant?** Planting dates depend on frost dates. Refer to seed packages for information about particular plants. Consult Iowa State

Extension's free publication "Planting and harvesting times for garden vegetables" https://store.extension.iastate.edu/Product/Planting-and-Harvesting-Times-for-Garden-Vegetables

- **Additional teacher resource:** Learn more about managing a school garden with videos from Garden for Every School. http://www.teachers-going-green.com/teachers-going-green/school-gardens/8-manage-your-garden



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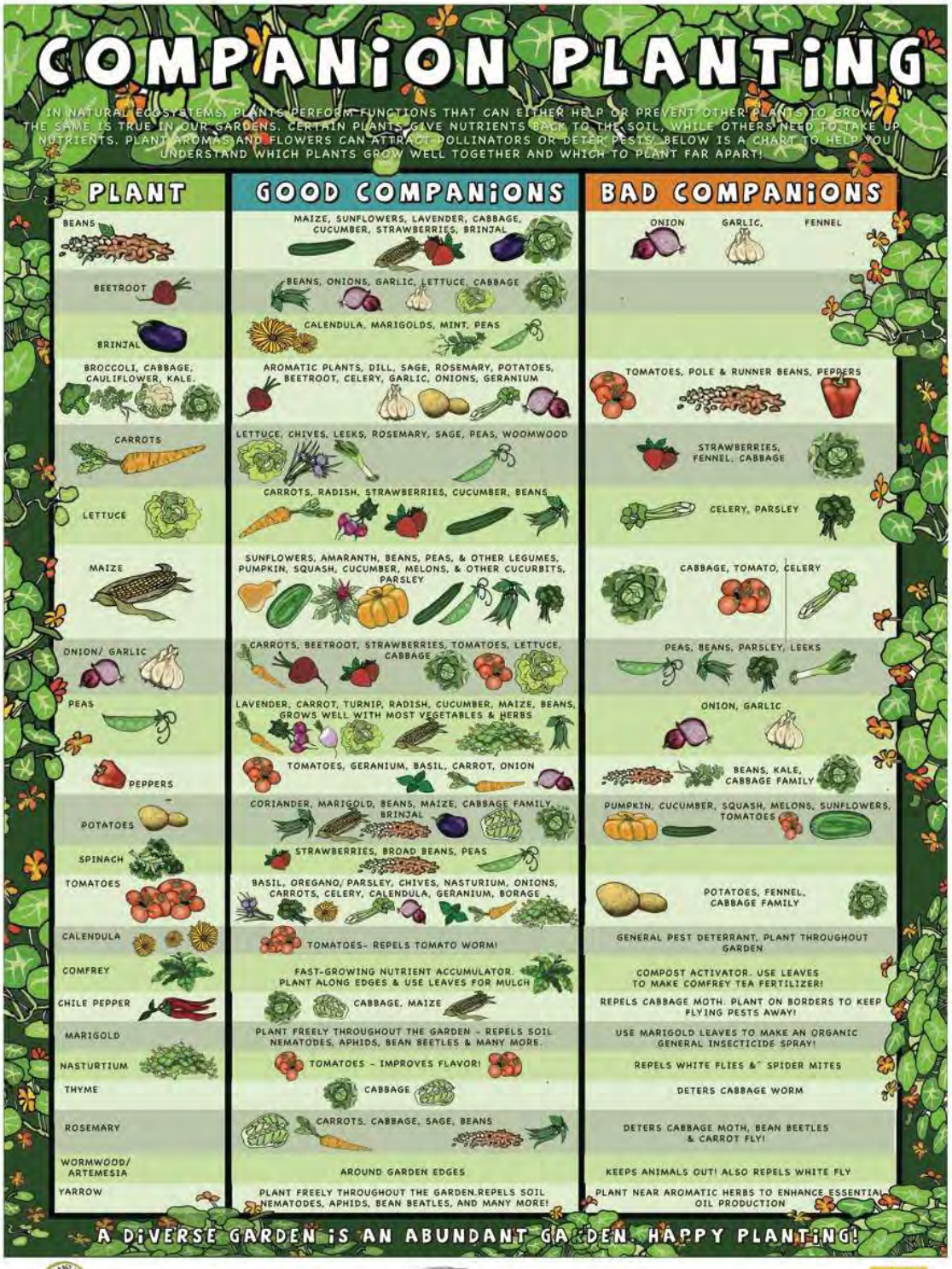

Where should we plant?

Think about sunlight!

For more information: http://thegardeningcook.com/sun-or-shade/

Harvesting Produce with Kids

1. **Is it ripe?** Produce will ripen at different times throughout the growing season. Encourage students to observe produce at different stages of ripeness. They can also compare grocery store produce to garden. What differences did you notice? How can we determine if produce is ready to harvest? Seed packets are another source for harvest information.

2. **Harvest methods:** How will we collect the fruits and vegetables? What tools will we need? Different crops require different harvesting methods. The main three ways to harvest are ***cutting*** (lettuce, herbs, etc.), ***digging*** (potatoes, carrots, etc.), and ***picking at will*** (peas, beans, berries, etc.).
    a. **Leafy greens** such as lettuce and spinach will grow quickly compared to some other plants, and can have many harvests. Students may gently tear off leaves, or snip leaves with child sized scissors to ensure the whole plant is not pulled out.
    b. **Potatoes and root crops** such as carrots and radishes are as fun as finding buried treasure. Use a trowel or digging fork to unearth them. Potatoes can be dug when the flowers or leaves of the plant have faded. Be careful not to slice them when digging. Have a couple of buckets of water available for scrubbing and rinsing.
    c. **"At will" crops** such as peas, beans, tomatoes, and berries can be nibbled on throughout the harvest. Teach students to harvest carefully with two hands: one keeping the vine or branch steady and the other gently pulling the fruit.

How much do we harvest?

The amount to harvest depends on how many students are in the garden and when they will return. Ten leaves of lettuce is a generous salad for young children. On the other hand, finger salsa can be made with one piece of tomato and a snip of green onion piled on a piece of green pepper.

3. **How do we harvest?** Empower students by having them make decisions and do the work. Create procedures so tools are easy to get out and put away. Role play the following procedures for harvesting food, for example:
    - During an introductory class meeting, students make decisions, facilitated by the teacher: What produce should be harvested today? What produce will each group pick? How much should they pick? What tools will they need? What should they do with their produce - wash it and eat it? Or collect it for a class recipe?
    - After reviewing harvest and safety procedures, students wash their hands in the bucket of soapy water.
    - From the tool shed, get the harvest baskets and any tools needed, such as trowels to go on a potato "treasure hunt."
    - Go to the designated area of the garden and harvest the amount decided upon during the class meeting.
    - Use spray bottles or buckets of water to wash produce.
    - Eat it with fingers or use kitchen tools from the shed to make simple garden recipes.

Tool safety
Review procedures for getting out, using, and storing garden tools. For example, pointy ends of trowels and shovels should always be down. Students will only walk while carrying tools. Teachers will pay close attention to students using tools and will give other jobs to students not following procedures.

4. **Food safety**: Proper hygiene is important. Students may view the following videos for potential hazards and precautions:
   http://www.safeproduce.cals.iastate.edu/elementary/
   For additional safety guidelines, view the USDA's "**Food Safety Tips for School Gardens**"
   http://nfsmi.org/documentlibraryfiles/PDF/20110822025700.pdf
   When serving produce to students, review the USDA's "**Best Practices: Handling Fresh Produce in Schools**"
   https://www.fns.usda.gov/sites/default/files/foodsafety_bestpractices.pdf

For more tips and hints, check out *How to Grow a School Garden* by Arden Bucklin-Sporer and Rachel Kathleen Pringle.