Lesson Five: How Do You Plan a Garden and Our Healthy Garden Plan

For January

“Our Healthy Garden Plan” from GROWING IN THE GARDEN: LOCAL FOODS AND HEALTHY LIVING, Iowa State University Extension and Outreach. Students decide what cool season and warm season crops they want to grow by making and eating Lettuce Wraps and Fresh Garden Salsa. Using science and math concepts, they create their own Healthy Garden Plan, markers to go with it, and a calendar.

Content objectives: Identify and select locally grown fruits and vegetables to plant, grow, harvest and eat; use a variety of mathematical and science concepts and skills to create local garden plans and calendars.

Life Skill objectives: Healthy lifestyle choices, Critical thinking, Communication, Citizenship, Leadership, Decision making, Problem solving,

Core and STEM concepts and skills:
Science Science as inquiry, Earth and space, Life science
Math Operations and algebraic thinking, Numbers, Measurement and Data, Geometry, Mathematical practices
Language Arts Reading, Speaking, Listening, Viewing
Social Studies Economics, Geography

Healthy snack: Lettuce Wraps with Salsa

Additional and supporting resources: Cooperative Extension Master Gardener’s Program can be a resource for developing your garden plan.
LESSON PLANS FOR 2012-13 SCHOOL YEAR, GRADE 5

January: How do you plan a garden the second year?

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Recipes: Lettuce Wrap and Salsa, See the Do section in the lesson
BEFORE THE LESSON

1. Grade 5, January: Planning the Garden, Year 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 Educational Toolkit.

2. Gardening Tips for Working With Kids, Healthy Gardens, Healthy Youth Partnership
   How do you plan a garden? Iowa State University Extension and Outreach
Master Gardeners and extension educators created the tip list based on their experiences gardening with kids for this project and for related summer programs. You may want to make a copy to keep handy throughout the gardening season. The garden planning document reviews the basics about starting tilled, raised bed or container gardens. You may want to read through it to see what you need to do for year two of this project. You may want to add more soil to the raised beds. Talk with your Extension Educator about obtaining additional tested soil.

3. Have a planning meeting
A few weeks before doing the planning lesson, have a meeting with the all the adults that were involved in the fourth grade gardens and that want to be involved in the fifth grade gardens. Make copies of the Gardening Tips for Working With Kids to distribute at the meeting. You are about to use the same classroom planning lesson as the fourth grade teachers used, skipping some of the preliminaries and getting right down to the business of planning the fifth grade gardens. You may want to watch the planning lesson video recorded for the 4th grade lesson on the Healthy Garden, Healthy Youth YouTube Channel. With that in mind, here are the basic topics to discuss at the meeting. Someone should be recording the information to be used for this year’s gardens and planning experiences.

   A. After last year’s experience in preparing the gardens and planning the gardens with the students’ help, are there any experiences, recommendations, changes or suggestions to pass on for the second year of gardening?

   B. Are there some chores to do in the gardens before they are ready for the fifth graders? List the chores and make a plan to get them done. To assure that the students, teachers, school and community have positive and sustainable gardening experiences, your state probably has some grant money budgeted for the year two gardens.

   C. The students will start their garden planning with a question about what they want to do with the produce they harvest in the garden. Some possibilities could be growing food for the school lunch program, their families, Grow a Row for the Hungry, the local food pantry, or to sell. Does anyone have some suggestions or thoughts about the purpose of the 5th grade garden?

   D. 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? Students have been and will continue to do a lot of the food preparation for these lessons.
E. 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 of the lesson. Poster board works the best. It is nice to have at least two of each size. They will be used in the planning lesson.

F. The students will be using garden grids, charts, and calendars to plan their fifth grade garden. 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.

4. Garden Journals
If they haven’t done so already, 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. Provide 1” vinyl binders or sturdy plastic folders with 3-ring binders so that 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. See The Lesson section, Garden Journal Page, for more details. Your extension service may have other suggestions for garden journals.

5. Taste testing
Prepare to make the Lettuce Wraps and the Garden Salsa found in the Do section of the lesson. The students can help to make the salsa or you can buy a comparable salsa at the store. The Lettuce Wraps should include the cool season crops suggested in number 3. If there is another recipe that would better suit the warm season crops suggested in number 3, then substitute that recipe. You may want to go to the Harvest lessons for warm season crop recipe ideas.

THE LESSONS
1. Our Healthy Garden Plan is a lesson that you can divide into more than one day. Some of the students have done at least parts of this lesson. For fifth graders, we are skipping over some of the activities and concentrating on other parts that might have been missed. Here are the activities that we recommend.

A. Replace the Introduction section with the following questions.
   
   By a show of hands, how many of you planted the school garden last year?
   What did you grow?
   How did things turn out?
   Based on your experiences, what would you like to plant this year? (Make a list of the crops they would like to plant.)
There are lots of ways we could use the vegetables (and fruits) that we will grow besides just eating it ourselves. What are some other meaningful ways that we could share what we harvest? (Make a list of the student’s ideas. Add in the ideas from number 3 in the Before the Lesson section. Discuss the options and take a vote on what the class wants to do with their garden produce.)

B. Go to the “Garden Choices Through Taste Testing” activity in the Do section. Explain to the students that they will be taste testing to see what crops they might like to grow. First they will taste the Lettuce Wraps and decide on cool season crops. Then they will taste the Salsa or another recipe and decide on warm season crops. Remind the students about what they chose to do with their garden produce as they vote on the crops they want to grow.

C. The next activities can be done on a different day. With help from Master Gardeners or other garden experts, make the 5th grade garden plan according to the activities in the Reflect section.

D. Make the Garden Labels and start the Garden Calendar in the Apply section.

AFTER THE LESSON
1. Have the students keep their garden plans in their Garden Journals. On the back of the page, have the students write down what they are going to do with the garden crops. Then have them list the crops that the class chose to grow. If their idea was not the one that was chosen, or if one of their crops did not survive the vote, have them write down their idea and the crops they wanted to grow. If the class discovered that all the crops would not fit in their garden space, have them note that as well. Suggest that they could grow their own crops at home or in a neighborhood or community garden and use the harvest in multiple ways.
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.
Sample Gardening Session

1. Meet in gathering area
   a. Remind everyone about behavior expectations.
   b. Chat a bit – What’s up?
   c. Give garden plan for the day
   d. Split into smaller groups if necessary
   e. Have a planned garden activity for each group with an adult supervisor

2. Garden projects
   a. Planting
   b. Weeding
   c. Pest patrol
   d. Watering
   e. Harvesting
   f. Washing
   g. Cutting (if necessary)

3. Snack time
   a. Make their own snacks
   b. If there is nothing to harvest, consider produce from farmer’s markets
   c. Focus on fruits and vegetables
   d. Send ideas home to the families

4. Activity session – see lessons for ideas for games, songs, stories, plays, crafts

5. Go home!
LESSON CONTENTS
General Information
Our Food Garden Plan (Grades K through 4)
Our Healthy Garden Plan (Grades 4 and up)

GENERAL INFORMATION
GETTING STARTED
Gardens may become as prevalent on school grounds as swing sets. In a recent National Gardening Association Survey, What Gardener’s Think, 97 percent of 2,500 households surveyed said they thought schools should provide gardens and hands-on gardening activities for kids. Of that total, 39 percent felt that gardening activities should be implemented in schools whenever possible, and 19 percent felt that they should be implemented in every school.

Having at least one advocate for school gardening is a key factor for success. Who might be a school garden advocate where you live? Is it a teacher, food service director, administrator, school nurse, board member, parent, grandparent, PTO, school organization member, student, community garden coordinator, local food producer, or a service organization? You need their energy and inspiration to plan your garden. However, they should not be expected to do everything. It is important to have support from several representatives of the school system and the community.

The more community support you have for your garden, the more likely it will become a permanent part of your community. Many types of support can be found in your neighborhoods. Extension Master Gardeners and Master Conservationists have had extensive training and are expected to contribute volunteer hours back to their communities by sharing their expertise. There are 4-H Club members that are interested in gardening and are developing their healthy living, communication, citizenship, and leadership skills which would contribute positively to your gardening experiences. Contact your local county extension office to identify and invite Master Gardeners and 4-H’ers to participate in your garden project. Your local high school may have Future Farmers of America (FFA) members or student leaders interested in garden-related topics. Many communities have garden clubs, senior groups, service organizations, churches, institutions, agencies and after-school programs that could enhance your gardening program. Invite them into your gardening conversations and planning sessions.

SITE SELECTION
A school garden serves several functions. It can be considered an outdoor classroom where children explore and interact with nature through first hand experiences. It can also be a park-like place for recreation and fresh air. Similar to the swing set or soccer field, a garden is a fairly permanent fixture on the school ground. With that in mind, there are several factors that should be considered when finding the best location for a school garden.

General Information continued on the next page.
Checklist for locating a school garden

- **Sun.** The site should receive at least eight hours of full sunlight per day.
- **Drainage.** Don’t locate the garden in a low area on the school ground or a spot that doesn’t drain well. Watch the area after a heavy rainfall. Does the water sit in a puddle for an hour or more or does it soak in and drain quickly?
- **Soil.** A loam soil is ideal for a garden, but not always possible. Find the best possibility; if your site has poor soil, consider using raised beds or containers.
- **Water.** Locate the garden within a hose-reach of an outdoor spigot. To be productive, garden crops require at least an inch of water per week.
- **Away from play areas.** Although you don’t want the garden in a remote location where no one sees it or is a long hike to get there, you also don’t want it where children play or walk.
- **Check underground.** Before digging anywhere, be sure that nothing, such as cables or other lines, are buried in that area. Call your local utilities to mark where buried lines are located. In some state, this service is provided free of charge. (If you live in Iowa, see the side column).
- **Tool storage.** Find an indoor area close to the garden where tools can be safely stored when not in use. A large, locked and weather-proof container placed next to the garden will work.
- **Possible locations.** Besides at schools, children’s gardens for after-school programs or summer programs can be located at community garden sites, fair grounds, empty lots, arboretums or parks, or near public buildings such as libraries, churches, extension offices, etc.

For more information on school gardening or after school programs, refer to **A ToolKit: How to Start a School Garden** by Alliance for a Healthier Generation. A link to this publication can be found at [www.extension.iastate.edu/growinginthegarden](http://www.extension.iastate.edu/growinginthegarden) or go directly to [www.HealthierGeneration.org](http://www.HealthierGeneration.org).

**SITE PREPARATION FOR TILLED GARDENS**

A tilled garden is a traditional garden tilled in existing soil, similar to a field. Gardens come in many sizes and shapes. The size and type of a children’s food garden depends on the soil, available space, and financial resources. Often times it is better to start small. The number of classrooms or children that will be participating in the garden and the number of volunteers available to help maintain it will help determine the size. If the garden is too large, it quickly becomes an overwhelming task. For these reasons, a 20’ x 40’ food garden is recommended. Tilled gardens allow for wide flexibility in the types and quantities of crops that are grown. Long rows of beans, lettuce, tomatoes, and squash can be planted to provide a sizeable harvest.

Prepare the site. If the site you have selected was previously a grassy play area, the sod will need to be removed. Plan ahead. It is best to prepare the garden site the previous fall so that it is ready to till and plant the following spring.

*Don’t forget to have the area checked for underground utility lines before digging!*

1. Measure and stoke the designated area and use a string to outline the area. Although plowing or tilling the sod can be done, it is often difficult to destroy all the clumps of sod and they often re-grow, creating weed problems later in the season. A non-selective herbicide, such as Roundup®, can be applied to kill the grass followed by tilling a week or two later.
2. Do not work the soil when it is too wet because dense clods of soil will form which will be difficult to work out and will impede good germination of garden seeds. To determine if the soil has the right amount of moisture, take a handful and squeeze it gently. If it forms a tight clump or “ball”, it is too wet. If the “ball” crumbles under pressure, it is ready to be tilled or prepared for planting.

3. Have the soil tested for fertility in the fall or prior to planting in the spring. This will help you determine your fertilizer needs. Many state land grant universities have soil testing laboratories. Contact your local county extension office to find a soil testing lab in your state. For information on taking a soil sample for testing, refer to Soil Sample Information Sheet for Horticulture Crops, available for download at: www.extension.iastate.edu/store/. Use the search box to locate publication number “ST 0011”. This might be an excellent activity for a middle school classroom to perform. The results from the soil test will be returned with fertilizer recommendations. If your garden site is “reclaimed” land within a city, it is important to have the soil on the site tested for potentially hazardous materials.

4. Soil texture can be improved by mixing in some compost, especially if the soil has too much clay or sand. If compost is applied, be sure it is well decomposed and work it thoroughly into the soil. Don’t apply too much - an inch-thick layer will go a long way. Although compost can be purchased, you may find that your city has free compost available for gardeners. It would be good learning experience if your include a compost pile in school garden project.

5. Apply the recommended amount of a complete analysis fertilizer, such as a 10-10-10, just prior to working the garden soil in the spring. A general recommendation is 20 pounds of 10-10-10 per 1,000 square feet of garden space. (Six raised garden beds that are 4 feet by 8 feet would typically require about 4 pounds of this fertilizer.)

Many of these steps are integrated into the student activities in this unit.

PLANNING WHAT TO PLANT IN A TILLED GARDEN
Planning what to plant in your tilled garden involves determining what you want to plant, how much to plant, when to plant it and how to plant it. What to plant depends on how you intend to use the garden produce. Will you prepare it for students to taste in a classroom? Will you give it to the school kitchen staff to prepare as samples or vegetable servings for the students’ lunches? Your answers affect the quantity of each crop you intend to grow. When determining the use, be sure to take into consideration the quantity of each crop the garden has the potential to grow and when it will be in season. The garden schedule and planting plan may include planting quick-maturing crops, such as leaf lettuce, green onions, radishes, and spinach in the spring. In early summer, plant crops that will come into production when the students are back in school, late August and September, such as tomatoes, peppers, green beans, and squash. Information on the labels for transplants and seed packages will tell you approximately how many days are need from planting to maturity for each crop. Count back that many days from the first day of class in the fall to determine the optimum planting day so that crops will be ready when the students return to school.

There are numerous resources available to guide you through planning and planting a garden. Your state’s university extension likely has publications online to help you select the right varieties and planting times for your area. The lessons and additional resources pages in this unit will help you to plan what to plant. Local Master Gardeners, garden experts, and local food producers are also excellent resources.
RAISED BED GARDENS

Raised beds are gardens framed with lumber, bricks, or concrete blocks. They are typically 4 feet wide and any length, depending on the size of the lumber used to construct the bed. Many commercial kits for raised beds are 4 feet wide and 8 feet long. They can be any height, although most are 6 to 12 inches tall. Do not use pressure-treated lumber, such as Wolmanized wood for raised beds that will produce food crops. Railroad ties are not recommended for edible gardens. Cedar lumber is durable and has its own natural preservatives. Pine can be used provided all sides are painted with exterior latex paint or treated with a suitable, safe wood preservative. Raised bed frames made of recycled plastic are long lasting and durable. They do not require maintenance and do not splinter.

Raised beds offer a good alternative to traditional tilled gardens. Advantages of raised beds include:
1. You can garden in areas with poor soil conditions.
2. You can control the soil mixture in the raised beds to improve drainage and nutrient content.
3. It is easy to plant, weed, water, and harvest working from outside of the raised beds.
4. The narrow beds enable reaching in to do the work so that no one walks in the garden resulting in less foot traffic and compaction of the soil and reduces the risk of stepping on plants where the plant roots will be growing.
5. You can plant more crops and increase yields because there are no walkways through the raised beds.
6. The soil in the beds warms up faster in the spring enabling earlier planting.
7. Watering is more efficient because the water is directed to the plant beds and not the walkways. Plants can be planted closer together to shade the soil and reduce the amount of water evaporation from the soil.

In addition to choosing a site that receives full sun, a site for raised beds needs to be level.

You may want to consider watering by using a simple drip irrigation system. These watering systems are readily available and can make watering much more efficient, effective, and tidy. The drip lines emit a small amount of water over a long period of time and the foliage is not wetted, reducing the incidence of foliage diseases. Drip irrigation kits can be found at home improvement stores and garden centers.

Mulching conserves soil moisture and helps to control weeds. Several materials make good mulches. Grass clippings make a good mulch when spread in two inches thick. Avoid clippings from chemically-treated lawns. Newspapers also do a great job preventing weed growth and will decompose by the end of the season. Overlap four to six sheets of black and white newspapers between the plants and rows. Water it well and cover it with a thin layer of grass clippings or soil to hold it in place.

MATERIALS AND SUPPLIES
50’ Tape measure
Stakes for markers
Six raised bed kits or lumber and brackets
Mallets or hammers
Landscape fabric (based on plan below - at least 800 square feet)
Soil mix (½ cubic yard per 4’ x 8’ raised bed, see Step 4, check with your city for access to free compost)
Wood mulch (see Step 5, check with your city for access to free mulch)
1. Stake out the area where each raised bed garden will be located. Include a walkway between each bed. (See an example of a layout in the diagram below). The walkways should be at least four feet wide or wide enough to maneuver a wheelbarrow or wagon down it, and allowing four feet around the entire area. Although the beds will smother grass under them, you may want to destroy the sod in the walkway areas. This can be done with a non-selective herbicide, such as Roundup® a week before installing the raised beds and walkways.

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Raised Bed    4' Walkway    Raised Bed
4' Walkway    Raised Bed    4' Walkway
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Raised Bed Diagram

2. Lay landscape fabric in the walkways between the beds and four feet around the beds to prevent weed growth and allow for easier maintenance. When installing the raised beds, tuck the ends of the landscape fabric under the side walls as they are being placed. This will secure the fabric so that it doesn’t come loose on the edges. Use landscape pins to hold the outer edges and overlapped pieces of fabric in place.

3. Construct the frames for the raised beds, set them in place, and secure them with corner stakes.

4. Fill the beds with soil mix. A good fill for raised beds is a combination of two-thirds topsoil and one-third compost. Check with the city to see if they have free compost available. (If compost is not available, peat moss can be substituted but it is expensive.) Topsoil and compost is often sold and delivered by the cubic yard. Each 4’ x 8’ x .67’ (8”) bed will need approximately .8 cubic yard of soil mix. With that in mind, six beds will require 5 cubic yards of mix, of which 3.5 cubic yards are topsoil and 1.5 cubic yards are compost. Mix it together well. Fill the beds to within one inch of the top; settling will occur.

5. Cover the landscape fabric with wood mulch. To determine the amount of mulch you will need, follow the instructions in the box below.

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CALCULATING VOLUME OF SOIL FOR RAISED BEDS

Multiply the length (in feet) times the width (in feet) times the depth (in feet) to determine the volume of soil required in cubic feet.

Divide this figure by 27 (number of cubic feet in one cubic yard) to determine the volume in cubic yards.

Take your answer times the number of raised beds you will have.

EXAMPLE RAISED BED DIAGRAM IN #1:

(4’ x 8’ x .67’) / 27 = .8 cubic yards soil per bed

6 beds x .8 cubic yards = 4.8 or about 5 cubic yards
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CALCULATING VOLUME OF MULCH FOR WALKWAYS

Mulch can be purchased in bags on a cubic foot basis or in bulk on a cubic yard basis.

Multiply the length (in feet) times the width (in feet) of the outside edge of the walkways around the garden area to get the total number of square feet.

Subtract from that number, the total area or square feet of all your raised beds. This will give you the total area or square feet of your walkways.

Take this figure times the depth of your mulch (in feet, 3 inches = .25 feet) to obtain cubic square feet. Twenty-seven cubic feet is the same as one cubic yard.

EXAMPLE RAISED BED DIAGRAM IN #1:

(28’ x 28’) – (4’ x 8’ x 6 beds) = 784 – 192 = 592 sq feet.

This is the total area that needs to be covered by mulch.

At a 3” depth, this is 0.25 feet x 592 sq feet = 148 or about 5 cubic yards of mulch.

To convert into cubic yards:

150 ft³ (1 yd³ / 27 ft³) = 5.5 or about 5 yards³ of mulch

This will weigh between 600 to 900 pounds depending on the type of mulch.
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PLANNING WHAT TO PLANT IN A RAISED BED GARDEN

Although a 4’ x 8’ raised bed garden offers only 32 square feet of growing space, it can produce a surprisingly large amount of produce. Planning what, when, where, and how you are going to plant is important before you purchase the seeds and plants. Raised bed gardens can often be planted earlier than traditional gardens because the soil in the raised bed warms up and dries out more quickly in the spring. You may want to plant cool season crops in late April so that you can have a salad garden party before school is out in late May or early June.

Raised bed gardens are narrow so that nearly all of the activities in the garden can be done outside the bed by reaching in. This avoids the need for walkways or wide spaces between the rows for walking and allows you to put plants closer together. Another strategy to make the most of the available space is to use the “Square Foot” method of gardening, developed by Mel Bartholomew. There are square foot gardening templates in the back pocket of this curriculum. Lesson 4A provides instructions on the square foot method of gardening. You may want to use the templates as patterns to transfer it to sturdy poster board. Refer to the resources below for additional information.

The lessons in this unit will provide opportunities for students to engage in planning and preparing the gardens in anticipation of planting.

CONTAINER GARDENS

Plants can be grown in containers or pots that can be placed inside, outside, or both. They can be placed on a dolly enabling them to be easily moved. You may want to plant container gardens to start some or your garden crops indoors in late winter or early spring. After the weather warms up and the threat of frost is past, the containers can be moved outside.

A good container for plant growth must meet the following four criteria to successfully grow plants.

1. Sturdy
2. Clean
3. Room for roots
4. Adequate drainage

The following items can be adapted into container gardens.

<table>
<thead>
<tr>
<th>Planter</th>
<th>Bucket</th>
<th>Wheelbarrow</th>
<th>Hanging basket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay pot</td>
<td>Wagon</td>
<td>Ceramic pot</td>
<td>Strawberry jar</td>
</tr>
<tr>
<td>Eggshell</td>
<td>Paper cup</td>
<td>Old pan</td>
<td>Old bowl or teacup</td>
</tr>
<tr>
<td>Bathtub</td>
<td>Old shoe or boot</td>
<td>Child’s plastic swimming pool</td>
<td></td>
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</tbody>
</table>

Fill container gardens with quality potting mix. Do not use soil straight from a field or garden area. It may grow crops well in the field, but when put it in a container, this soil will become very heavy and compact with small pore spaces for air and water.

Container gardens can be fed with slow-release fertilizer beads that are added to the soil mix in the container prior to planting. Some slow-release fertilizers feed the plants for three months and others may only require application once every six months. The amount to add is determined by the volume of soil in the container. Slow-release fertilizers are advantageous and easy because they release a small amount of fertilizer every time the soil is watered.
The soil in container gardens should be kept moist but not soggy or saturated. It dries out more quickly as the plants grow because the space in containers becomes more limited and the roots can’t spread out or grow deeper to find water.

The soil in container gardens needs to be checked nearly every day. Clay, or terra cotta, pots dry out more quickly than plastic containers and need water more often because they are porous. Also, be aware that soil in small containers set in sunny locations dries out quickly. When fruit or vegetable plants dry out, they wilt. Flowering and fruited plants will drop their blossoms and fruits. Leafy vegetables will develop brown or dried leaf edges.

There are unique types of container gardens, such as EarthBox® (www.earthbox.com) and Global Buckets (www.globalbuckets.org) that are somewhat self-watering and feeding gardens. EarthBox® containers are commercially available gardening systems developed to meet the needs of gardeners who lack space and quality soil for successful gardening. Global Buckets are similar in concept, but can be made from materials found at home, school or a hardware store.

These container garden systems provide:
• Good soil (or a “soil-less” potting mix) that is well-drained and provides good air and water movement
• An adequate and regular supply of water
• Fertilizer for good plant growth
• Soil cover (plastic mulch) to reduce evaporation and prevent weed growth

EarthBoxes® and Global Buckets water the plants by wicking water from a reservoir below the soil medium. There is usually enough water for the plants; however, it is a good idea to occasionally check the moisture level in the soil and add some when necessary.

Iowa State University Extension Publications available to download as pdf files:
Go to: www.extension.iastate.edu/store

Pm-731, Harvesting and Storing Vegetables
Pm-819, Planting a Home Vegetable Garden
Pm-534, Planting and Harvesting Times for Garden Vegetables
Pm-870A, Small Plot Vegetable Gardening
Pm-607, Suggested Vegetable Varieties for the Home Garden

## Our Healthy 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, Communication (listening, asking, and responding to questions), Citizenship (teamwork), Leadership (sharing an idea to improve something)

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

### 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

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

### MATERIALS
- Too Many Pumpkins by Linda White
- Garden Grid (one copy of two pages per group, see the Introduction and Reflect sections found at the end of this lesson.)
- Pencils
- Rulers
- Seed Catcher (one per student, found at the end of this lesson)
- Lettuce Wrap ingredients and supplies (See the TEACHER’S NOTES following this Materials List and of the Do section.)
- Small plates (one per student)
- Napkins (one per student)
- Salsa ingredients, chips, and supplies (See the TEACHER’S NOTES following this Materials List and the Do section, Fresh Garden Salsa recipe is found at the end of this lesson)
- Square-foot gardening templates and one poster board (Use the poster board to make one example of each template, found at the end of this lesson)
- Plant Spacing for Square-foot Gardening (see Reflect section, found at the end of this lesson)

*Materials continued on the next page.*
MATERIALS CONTINUED
Cool and Warm Season Crops (project on screen or interactive board, found at the end of this lesson)
Plant Spacing for Rows in the Garden (see Reflect section, found at the end of this lesson)
Raised Bed Garden Plan (sample, found at the end of this lesson)
Tilled Garden Plan (sample, found at the end of this lesson)
Paint sticks, wooden spoons, recycled plastic, used vinyl blind slats, or any creative re-usable materials for garden labels (two per crop, see Apply/Expand section)
Thin or medium line permanent markers in various colors
Garden Calendar (copy and post where everyone can see it, see Apply/Expand section, found at the end of this lesson)

TEACHER’S NOTES: Here is a list of potential local partners who can provide expertise, time, energy, supplies, and/or funding: School staff, volunteers, and older students (from classrooms, foodservice, maintenance, administration, high school organizations); extension staff, volunteers, and organizations (such as master gardeners, 4-H club members, nutrition programs such as EFNEP, specialists or agents); local foods producers; gardeners; farmer’s market vendors; local foods restaurants; grocery store produce managers; local organizations, businesses, and interested and knowledgeable individuals of all ages and cultures. These people can help you use this lesson and apply the activities to where you live and your garden program.

The Do/Explore section includes taste-testing activities with Lettuce Wraps and Fresh Salsa. You will need cool season crops such as lettuce, spinach, radishes, and onions for the Lettuce Wraps. Garden fresh salsa may be purchased in the produce department at your local grocery store, or you can have your class make salsa using the Summer Garden Salsa recipe found at the end of this lesson. See the TEACHER’S NOTES at the beginning of the Do/Explore section.

INTRODUCTION
ENGAGE
SET THE STAGE
30 MINUTES

TEACHER’S NOTE: Plan to have students work with a partner or small group for this activity.

Raise your hand if you have seen a carpenter or construction worker building a home or other building.

Do they have a plan for what they are building?
Yes.
What is the plan called? Hint: It starts with a color.
Blueprint

Why do you think they need a blueprint plan?
So several people can work together and know where to build the walls, add plumbing and electricity, etc.

Could they build the structure without a blueprint?
Maybe, but it may not turn out as it was intended, and there may be a lot of mistakes. It will probably take them longer, too.

Planting a garden is a bit like building a house. A good plan will make the job easier and will result in a productive garden.

???
What kind of help would a plan provide a gardener?

*Write the answers on the board.* A garden plan will:
- Help the gardener determine what kind of and how many plants or seeds to buy
- Assure the plants have plenty of room to grow
- Help determine what supplies and how much are needed
- Help a gardener determine how much produce to expect from the garden
- Help a gardener know when the crop will be ready to eat

**PLAN A GARDEN FROM A BOOK**

We are going to read *Too Many Pumpkins* by Linda White, a story about a woman who doesn’t plan what grows in her yard.

*Read the story, Too Many Pumpkins by Linda White, and ask the class the following questions:*

**Rebecca Estelle grew a little bit of everything in her garden except what?**

Pumpkins

**Why?**

She was tired of pumpkins because that is all she ate when she was young.

**Did Rebecca Estelle have a plan for her pumpkin patch?**

No, she didn’t intentionally plant the pumpkins.

**Did the pumpkins grow well?**

Yes, very well.

**What was the problem with the pumpkins?**

There were too many, and they took over the entire yard.

**How did she solve the problem?**

She made pumpkin treats and jack-o-lanterns and shared them with neighbors and friends.

**Do you think she will include pumpkins in her garden plan next year?**

Yes.

**How do you know?**

She saved some of the seeds.

Let’s plan Rebecca Estelle’s garden for next year. I am going to assign each of you a partner or group. Your group will have 5 to 7 minutes to plan Rebecca Estelle’s garden for next year.

*Assign partners or groups, distribute one Garden Grid per group. Have the students take out their pencils and rulers.*

**What vegetables did Rebecca Estelle plant in her garden?**

Let’s go back to the story and list the crops that Rebecca Estelle plants in her garden and add pumpkins. *(These are found on the first page of the story.)* “Every year at springtime, Rebecca
Estelle planted just enough seeds in her garden to grow vegetables for the long winter. She planted carrots, beans, tomatoes, peas, corn, and rutabagas.” (Write the crops on the board.) Please write these vegetables in the empty space on the right hand side of your garden grid. Work with each other to draw a plan for Rebecca’s garden on your garden grid. You may use any plan you would like but be sure to include all the vegetables on your plan. You will have 5 to 7 minutes. Do it any way you like. (Avoid telling students how to make their plan. Let them come up with their own garden plan as a pretest.)

It’s time to share your garden plans. How did your group do?
Give each group 1 minute to show and tell about their garden plan, or use the “garden gallery” method by having students hold up their plans at the same time so everyone else can see. Ask them to look for similarities and differences.

What problems did you have while you were designing Rebecca’s garden?
Possible answers include:
• Couldn’t agree with partner
• Didn’t know how much space each plant needed in the garden
• Didn’t know how many plants we needed to grow
• Didn’t know how to use the garden grid
• What is a rutabaga anyway?

How could we figure out how to resolve these problems before we make our own garden plans?
Possible answers include:
• Use some of the good ideas from the plans we just made.
• Find people to help us who know what they are doing.
• Look at plant seed packages or plant labels.
• Do an online search for information on the crops.
• Look at someone else’s garden plan and garden.

Have the students put their names on their garden grids and collect them. Explain that they will be using them again.

Do EXPLORE

INVESTIGATE CONCEPTS
20 MINUTES
POSSIBLY ANOTHER DAY

TEACHER’S NOTES: Copy the Seed Catcher pattern and instructions found at the end of this lesson, one per student. See the Lettuce Wraps recipe in this section and the Fresh Garden Salsa recipe at the end of the lesson to purchase ingredients. Wash and precut samples and store them in bags. Save a whole lettuce leaf, spinach leaf, radish, and green onion 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.

SEED CATCHERS

Distribute the Seed Catcher patterns and have the students use their scissors to cut them out. Follow the instructions and make the seed catchers together, step by step. Give the students time to take turns using their new seed catchers and reading the tips about gardening.

What was your favorite gardening tip?
Ask three or four students to share the tip from their seed catchers.
What did you learn by making and playing with your seed catchers?

*Possible answers include:*

- You have to follow step by step instructions before you can make the seed catcher work.
- There were lots of steps and decisions to make before you could read the garden tip.

*They might repeat the tips.*

**What was the first decision you had to make to start playing with your seed catchers?**

Someone had to choose a food that grows in a garden.

**What was the first decision Rebecca made about gardening?**

She chose what food she wanted to grow in her garden.

We will start our own garden plan by first deciding what we want to grow and eat.

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**GARDEN CHOICES THROUGH TASTE TESTING**

*Make sure that everyone washes their hands and that the demonstration table is washed. Set up the table with the ingredients (see Lettuce Wraps recipe), cutting board, knife, gloves or tongs, paper plates, paper towels, and napkins. Have the student volunteers put the paper plates out on the table so that they can place one sample of each 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 plate until they are told.*

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**LETTUCE WRAPS**

Makes 24 samples

1. **Prepare the ingredients.**

   - *Save one of each vegetable to show to students before cutting.*
   - 1 bundle of Romaine or leaf lettuce *(enough for one leaf per student)*
   - 12 large *(tear in half)* or 24 small spinach leaves
   - 6 radishes *(slice thinly)*
   - 6 green onions *(slice the white part and 1½ inches of the green part into thin rings, discard the roots and the tops)*
   - Squirt bottle of ranch dressing

2. **Have each student do the following.**

   Lay the lettuce leaf in the center of the paper plate.
   Lay the spinach leaf or leaves on top of the lettuce leaf.
   Put the radish slices on the spinach.
   Put the onion slices on the radish slices.
   Squirt a line of ranch dressing across the layer of veggies. *(Adult should help.)*
   Roll up the wrap or fold one side over the other.

**EAT IT!**
COOL SEASON CROPS: LETTUCE WRAPS

We are going to make Lettuce Wraps so we can taste some early, cool season vegetables.

**Why are some vegetables called “cool season crops”?**

*Possible answers from students could include:*

- They are neat or awesome.
- They don’t like heat.
- They grow best when it’s cool outside.
- They like to be in the refrigerator.

Cool season crops grow best when they are planted outside as soon as the soil can be worked. These crops tend to dry up and die when hot summer weather arrives. If there is enough light, these crops could also be started or grown indoor containers. In the book we read, Rebecca’s garden did not have any of these crops because she was growing crops to save through the winter.

We are going to taste some cool season vegetables that 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 them and cut them into sample sizes. Before we make our lettuce wraps, let’s see if you can identify the vegetables on your plates.

*Show one vegetable at a time. Start with the largest lettuce leaf. Have students tell what it is. Continue naming the other vegetables. As vegetables are identified, have students stack them on their lettuce leaf. Give each student a squirt of ranch dressing, if desired, then show how to roll everything up into their own Lettuce Wraps.*

**How did you like your Lettuce Wraps?**

*Raise your hand if you tried a vegetable that was new to you.*

*Have the students name the ingredients in the lettuce wraps. Write them on the board or a large sheet of paper, leaving space for tally marks. Have them vote for their top three favorite vegetables in the wraps. The most popular choices could be the cool season crops they grow in their garden.*

WARM SEASON CROPS: SUMMER GARDEN SALSA

**TEACHER’S NOTES:** As time allows, you can continue with the warm season crops and salsa tasting or save this activity for another day. You need to allow 10 minutes extra if you make the Summer Garden Salsa recipe with your class. Students can cut ingredients on plastic plates using plastic knives. Mix ingredients in a large bowl or ice cream pail.

We are going to taste test some warm season crops.
Using what we learned about cool season crops, why might these foods be called warm season crops?

Possible student answers include:

- They like warm weather.
- They taste hot and spicy.
- They don’t grow well in cool weather.
- They grow best during warm weather.

Warm season crops thrive in warm, sunny summer weather. These crops could also be planted inside in containers, then transplanted outside when the temperatures warm up. Some local producers are planting warm season crops in greenhouse-type buildings, called high tunnels, so their crops will be ready to eat earlier. Consumers enjoy eating summer vegetables early because they have waited a long time for the vine-ripened, just-picked flavor.

Fresh garden salsa contains many warm season vegetables that we could grow. The garden salsa we are testing was made or purchased at ____________________. I will put a serving of salsa and some chips on each of your plates. Then you can taste it.

Raise your hand if you have eaten fresh salsa that is usually sold and stored in a cooler or refrigerator.

Raise your hand if you have eaten processed salsa that is usually found in a jar on a shelf until it is opened and then stored in a refrigerator.

Is it one of your favorite foods?
More salsa is consumed in the United States than ketchup.

What are the ingredients in our fresh salsa?
We can read the ingredient label or the ingredient list on the recipe. Let’s look at each ingredient and add them to the list of warm season crops from Rebecca’s garden in “Too Many Pumpkins.”

Show uncut examples of each vegetable in the salsa. You may want to cut up small samples to taste. List the vegetables from the salsa and the “Too Many Pumpkins” book on the board or a large sheet of paper. Have the students vote for their top three choices. Put a star by the three to six crops that received the most votes. These are the crops they could plant in their garden.

Which vegetables had the most votes?
Which ones had less?

Class could make a bar graph plotting the results of the tally voting.

We will want to remember our favorites when we plant our garden. It is also important to plant a variety of crops so we can harvest in spring, summer, and fall.
TEACHER’S NOTES:

- Select the Garden Grid, found at the end of this lesson, that best suits the type of garden you will grow – tilled, raised bed, or container such as EarthBox™. Copy one per student or pairs of students and one or two as working copies for the entire class. Have the same pairs or small groups of students that worked on Rebecca’s garden from the Introduction section work together on these garden plans.

- Everyone will need to see the list of crops that they chose to plant from the Do/Explore section and the Cool and Warm Season Crops Guide found at the end of this lesson. They will also need to see the “Plant Spacing for Rows in the Garden” and the “Plant Spacing for Square Foot Gardening” charts found at the end of this lesson. Use poster board to prepare an example of each of the square-foot garden templates found at the end of the lesson.

- It would be best if students measure the actual gardens they will be planting. If not, have the measurements available.

- With help from garden experts in your community such as extension master gardeners, local producers, garden store employees, and local gardeners such as parents and grandparents, use the list of crops you want to grow and discuss what varieties are their favorites and how much they typically harvest from the crops on the list. Although you can find the information you need online, you miss the connection with the community and their local experiences growing fruits and vegetables.

Now that we have identified what we want to grow in our garden, we are going to make a plan.

Redistribute the Garden Grids with another copy of the 10’ x 15’ grid or the raised bed and container gardens on the back of the sheet. Have the students write the crops they will be planting in the margins of the new grids.

Take another look at your plans for Rebecca’s garden and think about what you learned about the fruits or vegetables we want to plant in our garden.

**What information do you think you need to help you make new plans for our actual garden?**

**Discuss answers with your partner or group and be ready to share them with the rest of us.**

Give them 3 minutes for discussion then have each group share one thing they need to know. Have all the students raise their hands if they feel that information would also help them. Then write it on the board. Possible answers include:

- How many plants will we need?
- How much space do we have?
- How big will the plants grow?
- How do you arrange the crops in the garden – rows, sections, mounds or small hills, etc.?
- Could we grow an early crop, harvest it, and then plant something else in the same spot?

Let’s start with finding out how much space we have in our garden.

Look at the Garden Grid and note how each square equals 1 square foot. Measure 1 square foot on the floor as an example of what it will be in the garden.

**How many feet long is the garden grid?**

The length of the garden grid depends on which one you will be using. The large grid is 15 feet, the raised bed is 4 feet, and each container has 14 inches of space to plant things.

**How many feet wide is the garden grid?**

The width of the garden depends on which one you will be using. The large grid is 10 feet, the raised bed is 8 feet, and each container has 29 inches of space to plant things.
Use one copy of the appropriate garden grid and work with the students to identify the type and sizes of the gardens they will be planning and growing. If possible, measure your actual gardens and make sure the grids will work for your plans.

**NUMBER OF PLANTS**

Unless you have large gardens, you probably won’t have enough room to grow large amounts of crops for the students and their families. You may want to help them figure out how many plants they will need for everyone to have a sample. Encourage them to grow more at home or in a community or neighborhood garden.

Discuss each of the crops you will be planting. Students, Master Gardeners, and other experienced gardeners can provide their knowledge and experiences to figure out how many fruits or vegetables come from one plant. Upon consensus from the group, record the numbers of the plants you will need next to the crops on the main list and have the pairs or groups write them next to the crops on their garden grids.

**AMOUNT OF SPACE PER PLANT**

If you are using large container or raised bed gardens, you will want to use the Plant Spacing for “Square-foot Gardening” chart. If you are using a traditional tilled garden in the ground, you will want to use the “Plant Spacing for Rows in the Garden” chart. Both charts are found at the end of the lesson. When talking about square-foot gardening, show the square-foot gardening guides made from the templates found at the end of the lesson.

Work together and use the charts to mark the plants on the garden grid. You may use dots and label them or draw a picture of the fruit or vegetable to mark them on the grid. Point out that the squares on the chart are the same as the squares on the garden grid; they both represent 1-foot squares. Leave 1 foot between rows or follow the space guides on the row guide. Square-foot gardens are planted with square-foot grids. Raised bed gardens are usually planted in square feet and don’t require walkways because gardeners are working from outside the bed. If the plants you chose do not appear on the grid, help the students to find a plant on the chart that grows similarly to the missing one and requires about the same amount of space in the garden. Refer to the sample Raised Bed Garden Plan and Tilled Garden Plan for help in planning your garden using the garden grids.

**OPPORTUNITY TO DOUBLE CROP**

Using the Cool and Warm Season Crop guides at the end of the lesson and what the students learned about the cool and warm season crops they tasted, discuss how to expand the use of your garden by double cropping. Put a “C/F” for “cool” and “fast” in front of the crops you chose that can be harvested in time to use the space for another crop to grow. In some locations you can grow cool, then warm, then more cool season crops during the same gardening season.

**CREATE GARDEN PLANS**

Creating a garden plan is similar to putting a puzzle together. The pieces of the puzzle are the crops that you want to plant in the garden. Be sure you start lightly with pencil so that you can erase. You may want to display the Sample Raised Bed Garden Plan and Tilled Garden Plan, found at the end of this lesson.
If you use dots to represent plants, you will have to label them with the name of the crop written nearby. If you can draw a picture of the fruit or vegetable to represent each plant, you don’t have to label them. You can use both dots and labels and pictures depending on how much space you have.

Allow 10 minutes for this activity and walk around to offer help. If they aren’t completely done after 10 minutes, assure them that everyone will help each other to come up with the best plan.

Select a group of students who believe they have figured out the garden plan or puzzle using all the crops. Have them show their plan to the rest of the group. Compare their garden plan with others. Identify the best qualities of the students’ plans. Combine those qualities together on a new garden grid to use when the students mark and plant their real garden.

TEACHER’S NOTES:

1. Prepare garden labels ahead of time. If you are using vinyl blind slats, use heavy scissors to cut vinyl blind slats into 8 to 10 inch sections. Cut points at one end of the blind slats and paint sticks. Each garden row or section of square-foot gardening space will need two garden labels. Write crop names on paper strips and place them in a bowl or envelope so students can draw out their crop. For example, if you are planting lettuce, you should write lettuce on two strips of paper.

2. In the upper left hand corner of each day on the Garden Calendar, write the date. You may want to do that on just the months when you will be planning, planting, maintaining, and harvesting your garden. Everyone will be working together to mark significant gardening dates on the calendar, so enlarge it on the wall or larger sheets of paper.

3. You may want to show examples of commercially available garden calendars from the Internet or from your local extension office or garden store.

GARDEN LABELS

Now that we have our garden puzzle/plan put together, we need to make garden labels for each crop.

Why do we need garden labels for our garden?
- So we remember what we planted.
- So we can show people where each crop is located if we don’t have our garden plan.

How many garden labels will we need for each row or section?
Two – one at each end of the row or two per section

Distribute garden markers, one per student, depending on the number of crops. Each student will also need a thin line permanent marker.

I have given each of you sticks to make garden markers. Will these be good for outdoor use?
Yes.
Why?
Wood is somewhat waterproof and plastic is very waterproof.
What did I make at one end of each stick to help us push it into the ground?
Points

I will walk around and let each of you draw out a name of a fruit or vegetable crop for your garden label.

Using permanent markers, draw a picture of your fruit or vegetable at the top of the label (not the pointed end) and then neatly print the crop name below the picture. (If you are using wooden spoons, draw on one side of the spoon and print the name on the other side.)

Why did I give you permanent markers?
Because the plant labels will get wet and the names could wash off if the marker isn’t permanent.

Collect the garden labels and keep them until planting day.

GARDEN CALENDAR

Project or display the Garden Calendar so that everyone can work with it. Show examples of garden calendars and have students read the activities, planting dates for the different crops, tips for maintenance, and harvest dates that are written on the calendar. Use your seed packets, planting guides, the Dool and Warm Season Crops guide found at the end of this lesson, or help from local garden experts to start writing dates about your garden on the master Garden Calendar. Throughout the planting season, the class can write gardening tips in the calendar squares. This would be a good whole group activity once a week. Log items like planting dates, weeding times, watering days, harvesting, weather, temps, and tasting. If students have gardeners in their families, they might get fun garden tips from them to add to their calendar pages.

SHARING YOUR ABILITY TO CREATE GARDEN PLANS

Where can you use your new garden planning knowledge and skills?
Possible answers include:
- For a garden next year
- At home
- Neighborhood or community garden
- Help with gardens at community centers, senior living homes, residential facilities, etc.
- To write up the steps and put it in your school news, in a local newspaper, etc.
- To share with beginning gardeners
Garden Grid

4' x 8' RAISED GARDEN

1 square foot

15" x 30" EARTHBOX™ CONTAINER GARDENS

14"

29"
1. Cut along the solid dark lines and place face down.

2. Fold the square in half diagonally, corner to corner, to form a triangle. Crease the fold firmly. Unfold and repeat in the opposite direction to leave an “X” fold through the center.

3. Fold each corner point into the center of the “X” to form a smaller square.

4. Flip the square over so you don’t see any of the cut edges and fold each corner into the center of the “X” to form a smaller square.

5. Fold the square in half to form a rectangle. Unfold and repeat the process the other direction.

6. Put your thumbs and first or index fingers into the four pockets left by your folds. Try moving your fingers to move the four pockets in two directions.

7. Ask someone to select one of the four garden crops on the pockets. Move the seed catcher back and forth as you spell out the crop. Ask them to choose a number. Move the seed catcher back and forth as you count out the number. Ask them to choose another number. Take your fingers out of the seed catcher, open the flap, and read the garden tip under the number they chose.

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**SEED CATCHER**

1. **Plant zucchini** seeds outdoors at the right time because the soil has to be warm enough for the seeds to grow.

2. **Onions** can be planted three ways: seeds, small green plants, small dry “sets.”

3. **Peas** take four months to grow; plant seeds in May.

4. **Pumpkins** take four months to grow; plant seeds in May.

5. **Tomato** plants will produce hundreds of tomatoes!

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*The Native American Three Sisters Garden contains: beans, corn, and squash.*

*Grow in the Garden: Local Foods and Healthy Living Lesson 4b | Our Healthy Garden Plan Grade 5-6 Lesson 5 January*
**FRESH GARDEN SALSA**

4 to 5 large tomatoes, seeded and coarsely chopped  
1 small fresh jalapeno chile, seeded and minced *(optional)*  
1 clove garlic, minced  
¼ cup finely chopped onions  
2 tablespoons finely chopped cilantro  
2 tomatillos, husks removed, finely chopped *(optional)*  
Juice from 1 small lime  
¼ teaspoon salt  
¼ teaspoon freshly ground black pepper

In a large bowl, combine all the ingredients. Stir together until well blended.  
Cover and chill for 30 minutes or more before serving.  
Keeps for up to 4 days in the refrigerator.  
Makes about 2 cups.

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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.
4-H Youth Development

Growing in the Garden: Local Foods and Healthy Living

Our Healthy Garden Plan | Lesson 4b

Square-Foot Gardening

Template 2

peas, bush beans
**PLANT SPACING FOR SQUARE-FOOT GARDENING**

*Use the following key to plan how much space plants need when they are planted in squares.*

<table>
<thead>
<tr>
<th>CROP</th>
<th>NUMBER OF PLANTS in each square</th>
<th>OR</th>
<th>NUMBER OF SQUARES for each plant</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>onions</td>
<td>16</td>
<td></td>
<td></td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>lettuce spinach</td>
<td>16</td>
<td>16</td>
<td></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>peas</td>
<td>9</td>
<td></td>
<td></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>cauliflower, cabbage, broccoli</td>
<td></td>
<td>4</td>
<td></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>radishes</td>
<td>16</td>
<td></td>
<td></td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>carrots</td>
<td>16</td>
<td></td>
<td></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>sweet corn (must be planted in a block at least 10’ x 5’ for good pollination)</td>
<td>1</td>
<td></td>
<td><img src="image7.png" alt="Image" /></td>
<td></td>
</tr>
<tr>
<td>potatoes</td>
<td></td>
<td>2</td>
<td></td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>zucchini squash pumpkins</td>
<td></td>
<td>9</td>
<td></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>bush beans</td>
<td>9</td>
<td></td>
<td></td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
<tr>
<td>peppers</td>
<td></td>
<td>1½</td>
<td></td>
<td><img src="image11.png" alt="Image" /></td>
</tr>
<tr>
<td>tomatoes</td>
<td></td>
<td>9</td>
<td></td>
<td><img src="image12.png" alt="Image" /></td>
</tr>
<tr>
<td>cucumbers</td>
<td></td>
<td>9</td>
<td></td>
<td><img src="image13.png" alt="Image" /></td>
</tr>
</tbody>
</table>
PLANT SPACING FOR GARDEN ROWS

The following key will help you plan how much space your crops will need in rows and between rows. Use a string stretched along the row as a guide to make straight rows.

\[ \text{_____} = 1 \text{ foot} \]

Example of onions set 3” apart in a 1 foot row on a garden grid

<table>
<thead>
<tr>
<th>Crops</th>
<th>Early Planting</th>
<th>Mid-May Planting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spacing</td>
<td>Spacing</td>
</tr>
<tr>
<td></td>
<td>between plants</td>
<td>between rows</td>
</tr>
<tr>
<td>onions sets or plants</td>
<td>3”</td>
<td>1 foot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lettuce seeds</td>
<td>Thin to 2”</td>
<td>1 foot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>peas seeds</td>
<td>3”</td>
<td>2 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>broccoli cabbage cauliflower plants</td>
<td>18”</td>
<td>2 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>radishes seeds</td>
<td>Thin to 2”</td>
<td>1 foot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>carrots seeds</td>
<td>Thin to 1”-1½”</td>
<td>1 foot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sweet corn seeds</td>
<td>6”-8”</td>
<td>2 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>beets seeds</td>
<td>Thin to 1”-1½”</td>
<td>1 foot</td>
</tr>
</tbody>
</table>

Grade 5-6 Lesson 5 January
GROWING IN THE GARDEN: LOCAL FOODS AND HEALTHY LIVING
OUR HEALTHY GARDEN PLAN | LESSON 4b
# Garden Calendar

<table>
<thead>
<tr>
<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>
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</tr>
</tbody>
</table>

**JULY**

<table>
<thead>
<tr>
<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>
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<td></td>
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</tbody>
</table>

**AUGUST**

<table>
<thead>
<tr>
<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>
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<td></td>
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</tr>
</tbody>
</table>

**SEPTEMBER**

<table>
<thead>
<tr>
<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>
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<td></td>
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</tr>
</tbody>
</table>

**OCTOBER**

<table>
<thead>
<tr>
<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>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOVEMBER**

<table>
<thead>
<tr>
<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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DECEMBER**

<table>
<thead>
<tr>
<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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Cool and Warm Season Crops

## Cool Season Crops*

<table>
<thead>
<tr>
<th>VEGETABLE</th>
<th>DAYS TO HARVEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beets</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Broccoli (transplants)</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Carrots</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Cabbage (transplants)</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Cauliflower (transplants)</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Collards</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Kale</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Lettuce</td>
<td>30 - 40</td>
</tr>
<tr>
<td>Mustard greens</td>
<td>40 - 60</td>
</tr>
<tr>
<td>Green onions (sets or transplants)</td>
<td>35 - 45</td>
</tr>
<tr>
<td>Peas</td>
<td>50 - 75</td>
</tr>
<tr>
<td>Potatoes</td>
<td>110</td>
</tr>
<tr>
<td>Radish</td>
<td>30 - 35</td>
</tr>
<tr>
<td>Spinach</td>
<td>35 - 40</td>
</tr>
</tbody>
</table>

*These cool season crops can be planted as soon as the soil can be worked in early spring and some can be harvested before school dismisses in May or June. Plan to harvest some of these crops a week or two before school is out so that you can plant warm season crops that will be ready for harvest when the students return to school in August or September. To determine if you have enough time to harvest a crop from your garden, count back on the calendar from a potential harvest date. If possible, plant early maturing varieties.

## Late Summer Planting

The cool season crops listed above, except for potatoes, can also be grown successfully in the fall. Plant the broccoli, cabbage, cauliflower, and kale so that they mature around the average first frost date in your area; count back from that date for the appropriate planting time. Wait until the daytime temperatures average no higher than 80 and the evening temperatures are in the 60s or below.

## Warm Season Crops*

<table>
<thead>
<tr>
<th>VEGETABLE</th>
<th>DAYS TO HARVEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snap beans</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Sweet corn</td>
<td>65 - 110</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>50 - 70</td>
</tr>
<tr>
<td>Eggplant</td>
<td>75 - 80</td>
</tr>
<tr>
<td>Muskemelon or cantaloupe</td>
<td>90 - 120</td>
</tr>
<tr>
<td>Onions, dry (sets or transplants)</td>
<td>90</td>
</tr>
<tr>
<td>Okra</td>
<td>70 - 90</td>
</tr>
<tr>
<td>Peppers</td>
<td>70 - 75</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>140 - 150</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>90 - 120</td>
</tr>
<tr>
<td>Summer squash and zucchini</td>
<td>60 - 75</td>
</tr>
<tr>
<td>Winter squash</td>
<td>90 - 120</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>70 - 80</td>
</tr>
<tr>
<td>Tomatillos</td>
<td>70 - 80</td>
</tr>
<tr>
<td>Watermelon</td>
<td>85 - 120</td>
</tr>
</tbody>
</table>

*Warm season crops are planted after the threat of frost is past in the spring. For most parts of the country, they will not be ready to harvest until after school has dismissed for summer. However, if you plant it just before summer recess or a few weeks later, they will be ready for harvest when the students return and later into the fall. You may want to count back from the day school begins to determine the optimum planting time. Remember, if you plant these crops to grow through the summer, you will need someone to be responsible for the general care and watering of the garden.