

Creating and Sustaining Your School Garden

A Workshop for Developing School Garden Programs

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Outdoor Classroom Management





Six of One, Half Dozen of the Other

DESCRIPTION

Groups of students use multiple senses to find and classify contrasting objects in the natural environment.

OBJECTIVE

To use the senses to identify and classify objects in the garden laboratory.

MATERIALS

✿ One egg carton per group of three

PREPARATION

On the bottom of each egg carton write two words. One should be a likely quality of a garden object, such as “wet.” The other should be its opposite (“dry”). Use words that will encourage students to use their senses, such as dark/light, rough/smooth, dull/colorful, scented/unscented, scratchy/soft, etc. Label each carton with different opposites. To discourage unsupervised tasting, avoid opposites that refer to taste.



CLASS DISCUSSION

What senses can we use to explore opposites in the garden? In this activity you will be searching for objects that have a specific quality, and those that have the opposite quality. What are some examples of opposites?

ACTION

1. Divide the class into groups of three. Tell the class that each group will get a special collecting container in which to collect 12 items. They shouldn't let any other group see the secret information on the bottom of the carton.

2. Distribute the cartons and demonstrate to each group how the opposites should be placed, with six of each category in a long row. On the bottom of the carton are secret words that tell what category of objects to collect. Every group will be collecting different opposites.
3. Remind students to handle everything gently and to take only small specimens. Allow enough time for students to explore the site and gather the items.
4. When groups are finished, have them exchange cartons and try to determine the opposite categories that the other group collected without looking on the bottom of the carton.
5. Discuss strategies that groups used for identifying the other group's classification.

WRAP UP

What things that you collected felt the scratchiest, looked the most colorful, had the strongest scent, etc.? (*Include an answer from each group about the best example in each category.*) How did you find objects for each category?

Tips for Managing Kids in a Garden Setting

The school garden is a unique learning environment, with activities that are more structured than recess, but also more physical and open-ended than those done in the classroom. Therefore, it is essential for teachers to clarify for themselves and their students what type of behaviors are appropriate to this environment, and then to design learning opportunities that encourage appropriate behaviors.

Helpful Tips

1. **Before leaving the classroom**, explain the special circumstances involved in visiting the school garden to the kids—they are outside but it's not recess, lunch, or PE. Use language to distinguish the garden from the play yard, such as a “garden classroom.”
2. Foster students' sense of ownership and buy in.
 - When choosing students' first garden activity for the year, start with something highly engaging, like harvesting and eating Six Plant Part Burritos or feeding the worms in the worm bin.
 - Provide plentiful opportunities for students to harvest and eat from the garden, and also to use tools they can manage.
 - Look for opportunities to provide students with choices. They may be able to choose, for example, which chore to work on or which seeds to plant.
3. Comfort is really important. For many children, this is a new and possibly strange environment.
 - For kids—provide a shaded area where students can gather for instruction. For garden work, provide kid-sized gloves available and hats if possible. Bring drinking water if possible.
 - For adults—try wearing knee pads, gloves, aprons, hats, sunglasses to stay comfortable in the garden setting.
 - For parents – let them know to send kids in clothes they can get dirty on garden days.
 - Reassure students that most plants and critters in a garden are friendly, and point out the ones to be avoided.
4. Establish clear rules and consequences, and review them regularly. Discuss the following:
 - Proper tool use and ways to avoid danger with tools
 - Running in the garden
 - The difference between “people places” and “plant places”
 - Keeping voices at a reasonable level
 - Care with plants and how to avoid damage to garden spaces
 - Picking and eating only with clear permission from an adult

5. Use team building activities to encourage teamwork and cooperation between students. Revisit this theme regularly with quick ice breakers or team building activities.
 - Work in small groups. Having ten or fewer kids per group is extremely helpful.
 - Develop a series of activities or stations that groups can rotate through.
 - Pair focused individual quiet tasks with more active group garden tasks.
 - A class set of clipboards for individual activities helps keep students focused on the task at hand.
 - Recruit volunteers to reduce the student-to-adult ratio when possible.
 - Design the garden so that it is easy for kids to be successful and abide by the rules.
 - Create and maintain clear and wide paths.
 - Label tools and store them neatly and safely.
 - Make sure the tools are the appropriate size for kids.
 - Label plants or plant areas (such as themed areas, e.g., natives, herbs, the Principal's Corner, etc.).

Sample Class Rotation Schedule for an Outdoor Classroom

Sample Station Rotation Schedule A:

Splitting the class between the garden and the classroom

Time	Classroom	Garden
10-10:40	Ms. G's Kinder Class (Group A)	Ms. G's Kinder Class (Group B)
10:40-11:00	RECESS	
11:00-11:40	Ms. G's Kinder Class (Group B)	Ms. G's Kinder Class (Group A)
	LUNCH	
12:20-1:00	Mr. K's 1st Grade Class (Group A)	Mr. K's 1st Grade Class (Group B)
1:05-1:45	Mr. K's 1st Grade Class (Group B)	Mr. K's 1st Grade Class (Group A)

Sample Station Rotation Schedule B:

Entire class in garden with two groups rotating between independent and teacher-led activities

Time	Group A	Group B
10:00-10:05	Whole Group Introduction: Seeds	
10:05-10:20	Seed Scavenger Hunt (Individual)	Seed Sowing with Teacher
10:20-10:35	Seed Sowing with Teacher	Seed Scavenger Hunt
10:35-10:40	Whole Group Wrap Up: Tasting Edible Seeds	

Soil and Planting



Soil and Bed Preparation

To forget how to dig the earth and to tend the soil is to forget ourselves.

~ Mohandas Gandhi

Introduction to Soil

Soil composition

Soil is made from decomposed rock particles, air, water, living organisms, and organic matter from decomposing plants and animals. Soils differ in the quantities and characteristics of each of these components, but all five are essential for healthy soil.

Soil texture and type

Soil type is generally classified by the size of the broken down rock particles in the soil. Sand has a large particle size, silt has a medium particle size, and clay has a very fine particle size. The proportion of sand, silt and clay particles determines the texture of your soil and affects drainage and nutrient availability.

Soil water-holding capacity

Sandy soils have large particles and a very low water-holding capacity—water drains through them quickly. Clay soils have very fine particles and a very high water holding capacity. Knowing this is important because it tells you something about how often and how much you will need to water your plants.

Soil structure is determined by how individual soil particles aggregate. Good soil structure allows for water, oxygen, and microorganisms to penetrate the soil and that, in turn, increases the amount of nutrients available to plants. Structure can be influenced greatly by management. Consistently adding compost to a soil will improve its structure, increase its water-holding capacity, and make it easier to work in the long run.

Soil testing

A professional soil test provides a wealth of information about your soil, including its type, pH level (relative acidity or alkalinity) and nutrient levels. If you are starting a new garden and have concerns about potential soil toxins, such as lead, in your area, a soil test that screens for common environmental toxins is a good idea.

Keeping garden soils fertile

Soil fertility, in part, determines a soil's capacity to produce. Fertility management should focus on feeding the soil (including the organisms in the soil), so that the soil can feed the plants. Three key methods for feeding the soil are:

- Compost
- Cover crops
- Addition of other amendments

Compost

Compost adds plant nutrients, organic matter and beneficial microbes to the soil. Adding a very thin layer (just more than a sprinkling) of good quality compost can supply most or all of the nutrients needed to maintain soil fertility and healthy plants season after season. Increasing a soil's organic matter content by adding compost can improve soil tilth, allowing for increased water and air penetration. If you are using compost to improve tilth, add about ¼-inch thick over the surface and then mix it in to the soil. This is much more than is required to simply maintain soil nutrient level.

Cover crops

Cover cropping is the practice of planting an area with plants that will cover the soil surface to prevent or reduce erosion and then, once turned back into the soil, will improve soil structure and fertility. This practice has many benefits for the soil, as well as potential benefits for pest management. Cover crops increase soil organic matter, fix atmospheric nitrogen into a form that plants can utilize, improve soil structure and soil-water relations, prevent (or reduce) erosion and nutrient leaching, and compete with weeds.

Cover crops can be chopped into the soil or can be removed and turned into compost. Ideally cover crops are used before they set seed. If you turn them into the soil, expect to wait about three weeks for the cover crops to break down before planting in the bed. Most cover crops are relatively easy to grow and can be interesting, low-maintenance annuals in the school garden.

There are two types of commonly grown cover crops: legumes and grasses.

Easy cover crops for school gardens

	Legumes	Grasses
Winter	vetches bell or fava beans peas berseem clover	oats wheat barley rye
Summer	cowpeas (black eyed peas)	Sudan grass sorghum annual buckwheat oats rye

Preparing soil for planting

Your primary goal is to loosen the soil so that roots, water, and oxygen can easily penetrate the soil environment. Soil that has been prepared well will exhibit a nice "crumb" structure, and will be easy to penetrate with a tool when damp. Secondary goals are to mix in compost or other soil amendments and to build a bed or "plant place" that is distinct from paths or "people places." Making this distinction clear for children can prevent them from compacting the soil or trampling plants in the beds.

Pre-irrigate to prepare the soil

The amount of moisture in your soil before you start digging is the most important factor in determining how effective your work will be. Ideally, it should be about as moist as a wrung out sponge. Why?

- Too little water and the ground will be hard. Clods won't break up easily. The beneficial "crumb" structure of the soil is also fragile when the soil is too dry and can break down into dust if the soil is worked when too dry.
- Too much water and the ground will be heavy. Mud will stick to your implements and you may tire yourself out just moving the weight of water in the soil. The crumb structure of the soil is also fragile under wet conditions and can easily become compacted when worked.

Irrigate areas well at least two days before you plan to work them. Test the soil for the right moisture level by making a ball of soil in your hand. If the soil is wet enough to stick together when squeezed but then dry enough to break apart into small pieces when tapped, you are at the right moisture level for preparing your bed.

Suggested steps for “single digging” a bed

This means loosening the soil one implement depth below the surface. Single digging can be easy and fun, after the first few times your soil is worked and once you have had crops growing in it for a few seasons.

1. Clear all plants and other debris off the bed.
2. Thoroughly wet the bed as described above.
3. Thoroughly loosen the soil using a digging fork or spading fork. If children are helping with bed prep, consider using hand trowels instead of large tools.
4. Rake the surface smooth and level and rake up the edges of the bed so that they are clearly defined.
5. Add compost and any other amendments to the surface.
6. Work in amendments using a hula hoe.
7. Re-rake the surface so that it is flat and smooth and re-rake the edges of the bed.

Other methods of bed preparation for difficult or never-before worked soils

When first putting in garden beds, you may want to consider using a rototiller. While rototilling may not be child-friendly or ideal for your soil in the long run, it can be a great way to get the beds started initially.

You may also consider “double digging,” which means loosening the soil two implement depths below the surface of the soil (up to 2 feet deep). This is a lot of work! It is great for a bed when it is first dug, but you do not need to do this every time you prepare the bed. The most effective method of doing this is described and illustrated in John Jeavons, *How to Grow More Vegetables Than You Ever Thought Possible*.

Purchasing soil

If you are starting your garden from scratch and constructing raised beds, soil can be one of your biggest expenses. Soil is usually sold in cubic feet or cubic yard

measurements. If you need large quantities of soil, you can look for a soil company in your area that can deliver to your school site. Delivery of soil will take some coordination as the delivery truck will need direct access to garden, and/or you'll need to move large quantities of soil by hand to the desired place in the garden. Local hardware companies and nurseries sell bags of soil for amending or filling beds in different cubic feet quantities.

Tips for purchasing soil

- Purchase organic soil to ensure that the soil is safe for children to handle.
- Do some research and cost estimates on how much soil you need to fill your raised beds or amend your current soil. You can engage students in measuring the volume of raised beds to see how much soil is needed.
- Be cautious when accepting soil donations from others' yards or other unverified sources. While it could save money, you might be introducing soil infested with weed seeds or chemicals.

Soil Measurements

27 cubic feet = 1 cubic yard

10'x 3'x 1.5' raised bed (10 feet long, 3 feet wide, 1.5 feet high) needs 1.66 yards of soil

Tips for working the soil with kids

- Always discuss, demonstrate, and review safety rules with children before handing tools out. Suggested rules include holding the point down, putting tools away when not in use, and keeping the metal parts below the hips.
- When working with a large group of children or small children, consider using hand trowels instead of large tools to prepare the soil.
- Make sure every student has his/her own job, whether it is adding compost to the soil, breaking up clods, or pulling out stubborn weeds.
- Make sure students are spaced safely apart so they are not interfering with each other's tools.
- When kids are working with tools, refrain from working so that you can keep your eyes on all of them. Enforce the rules consistently, and provide an alternative activity for any student who is not using tools safely.
- Musical Shovels: A fun digging activity is to circle students around the area that needs to be worked and have them turn the soil in front of them while music plays (or is sung by everyone). When the music stops, students rotate to a different position. This is fun, and keeps the soil from being over dug in some spots.

OUTDOORS ✿ GRADES 4-6 ✿ FALL, SPRING ✿ PROJECT



The Nitty-Gritty

DESCRIPTION

Through a simple process, students separate soil into its three major components: sand, silt, and clay.

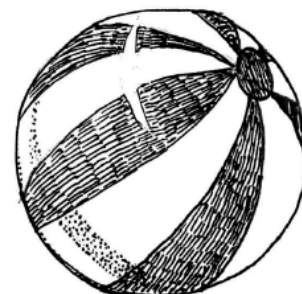
OBJECTIVE

To explore the composition of garden soil and determine its quality.

TEACHER BACKGROUND

Soil is composed of a blend of various-sized particles. The proportion of sand to silt to clay is one factor that determines the quality of the soil. Sand, silt, and clay may seem to be uniformly categorized as small particles, but there is a great difference in the size of each of them, and this difference affects soil quality. If a particle of sand were the size of a beach ball, then silt would be roughly the size (and shape) of a Frisbee, and clay would be roughly the size and shape of a dime (see illustration, right).

Gardeners describe soil types in many ways: heavy, light, sandy, clay, loam, rich loam, and so on. Scientists and horticulturists classify soil types by the proportion of sand, silt, and clay particles they contain, based on the sizes of mineral particles. The texture of the soil is determined by the blend of these various-sized particles. Classifying the soils in our garden will give us some indication of the problems we are likely to encounter in working with them: *Soil that has too much clay is hard to work* and *Soil that has too much sand dries out fast*. Through the years it is possible to change the texture of soil by adding amendments such as sand and compost to balance the proportions.



sand (beach ball size)



silt (Frisbee size)



clay (dime size)

MATERIALS

- ✿ One glass quart jar with a lid per group of five
- ✿ One piece of masking tape per group
- ✿ One trowel per group
- ✿ Markers
- ✿ Soil samples gathered by student groups during activity
- ✿ Water
- ✿ One Clay, Silt, Sand Chart (blackline master) per group, p. 388

CLASS DISCUSSION

What have we learned about how soils are made? (*They are made when materials break down.*) Are all soils the same? (*no*) Why would some be different from others? (*They are made from different types of materials, during different weathering processes, and in different climates.*) Do you think all soils are good for growing food? (*no*) What might make some soils better than

others? (*good drainage, ability to hold nutrients, easy to dig, lots of living things*) In this activity, we are going to do a simple demonstration to determine the parts of soil. We will find out if it will be hard or easy to dig and if it holds water.

ACTION

1. Divide the class into groups of five. Give each group their materials.
2. Fill each quart jar about $\frac{2}{3}$ full of water.
3. Demonstrate how to take a soil sample. First dig a few inches (2 to 7 cm) below the surface. Then carefully scoop up soil for the sample.
4. Help each group select a different location in the garden or schoolyard to take soil samples.
5. Instruct each group to add soil to their jar until it is almost full, then put the lid on the jar.
6. Have groups label the jar lids with the group name and soil location.
7. Have students shake each jar vigorously. Let the soil settle. Have each group observe their jar. What do they see happening? (*In a short time the heaviest sand particles sink to the bottom and the sand layer becomes visible, but the silt and clay particles will take hours to settle.*)
8. Place the jars in a location where they may be easily observed. Be sure no one lifts the jars to observe them.
9. In 24 hours the soil will be completely layered. Have each group describe the layers. Which layer is on the bottom? (*one with the heaviest, biggest particles*) Is that the same for each group? Which layer is the thickest? (*Answers may vary.*) How do you think the thickest layer will affect your soil for gardening?
10. Each group can use the Clay, Silt, Sand Chart, p. 388, to determine their soil name. Then have them mark off the layers on a piece of paper held up to the jar, as shown on the chart, and compare each one to the chart. If the particles divide into about 40% sand, 40% silt, and 20% clay, the soil is called **loam** — a very good kind of soil to have. If the soil falls into other classifications, you could add sand or organic matter to change its classification.

WRAP UP

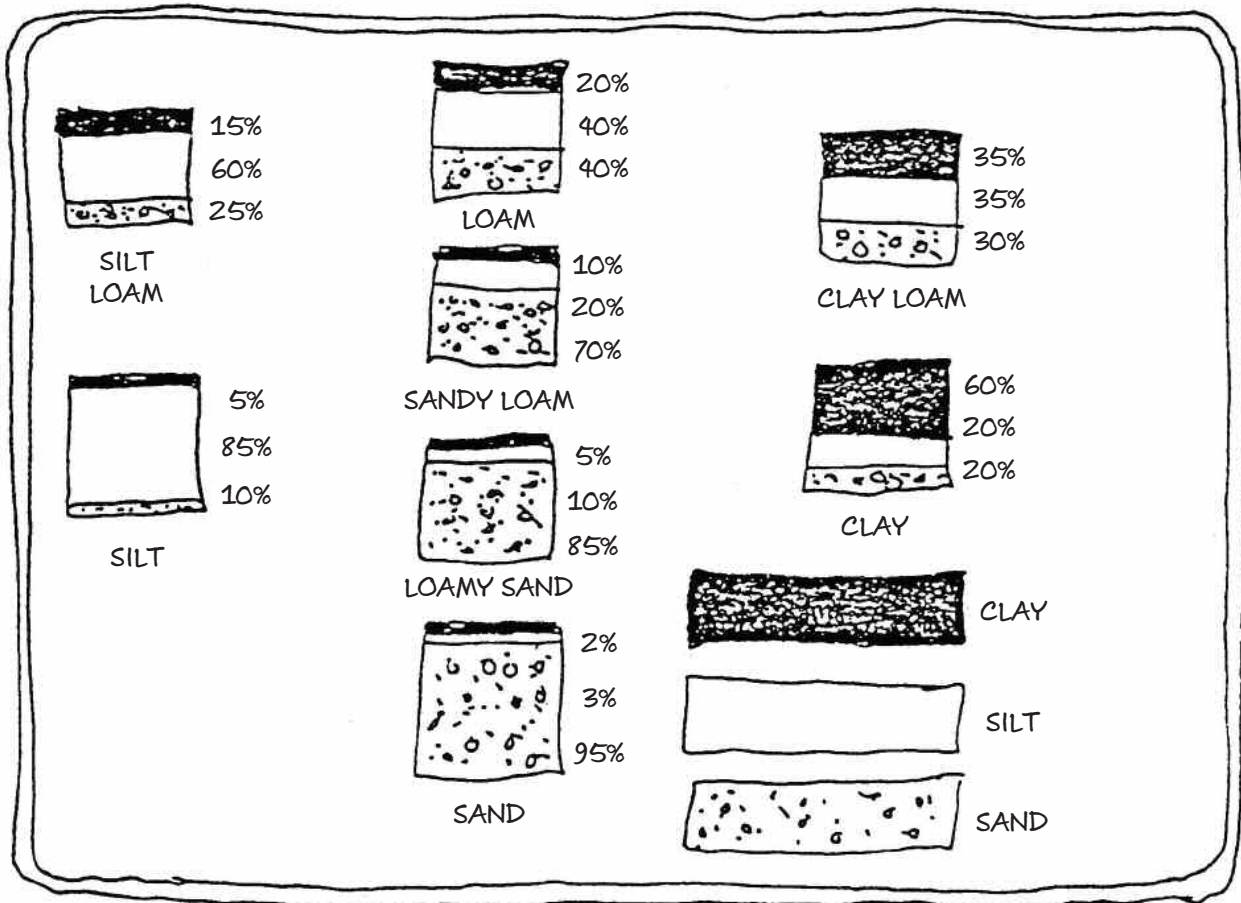
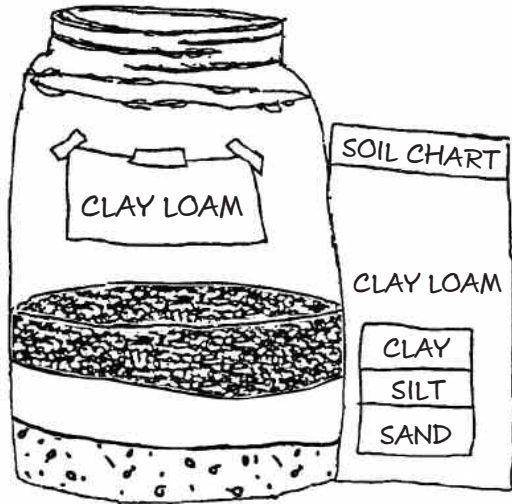
Were all of the soils the same? How did they differ? What are the three different particles in soil? Which is the biggest? Which is the smallest? What do you predict will make your soil better for gardening? Why? Which soil sample will be easiest to dig? Which will not let water drain?

DIGGING DEEPER

Keep a soil history from year to year for comparison.

🍏 Clay, Silt, Sand Chart

(From: The Nitty-Gritty, p. 85)



Basic Garden Tools

Essential Garden Tools for a School Garden

Basic garden tools

Wheel barrow (\$80-\$130)
50ft-100ft kink resistant hose (\$35-\$60)
Fan sprayer hose attachment (\$3)
Watering cans (\$8-\$10)
Scissors

Adult tools:

Long handled shovel (spade) (\$15)
Metal soil rake (\$15)
Digging fork (\$20-\$30)

Children sized tools:

Hand trowels (\$8)
Short D-handled shovels (\$10-\$15)
Short D-handled 4-tined cultivators (\$10-\$15)
Class set of clipboards

Other Good Garden Tools

Leaf Rake (\$10-\$15)
Long handled hoe (\$15)
Hula hoe (\$18)
Adult and children's sized gloves (rubber coated) (\$4-\$6)
Short and long handled pruners (\$10-\$60)
Push broom (\$15-\$20)
Tool cleaning brush (you can use a BBQ brush)
Buckets: large and small for moving soil, mulch, and starting seeds
Plant labels
Twine & stakes
Harvest baskets
Thermometer
Magnifying glasses

Garden Bed Types

Advantages and Disadvantages

In-Ground Beds	Raised Beds	Containers
<ul style="list-style-type: none"> • Garden beds dug directly in the ground level with the soil surface. There may be a visible edge or physical border, but the soil surface is not significantly higher than surrounding areas. • This system relies mainly on the existing soil, although amendments such as compost or other fertilizers may be added to improve the soil. • Typically these beds are no more than 3 feet wide so students can easily reach into the middle of them to work the soil, weed, or harvest without stepping in them. <p>Pros:</p> <ul style="list-style-type: none"> • Little requirement for materials to start. No building materials, no imported soil. • Easy to expand or change the layout of your garden. • With a decent soil, these are very easy to dig and prepare. • Makes good use of the vast resource of water and nutrients provided and stored in the existing soil. <p>Cons:</p> <ul style="list-style-type: none"> • Needs a site with workable, uncontaminated soil. • May be difficult to install gopher wire so that it is effective. 	<ul style="list-style-type: none"> • Essentially in-ground beds with a significantly raised edge or border. This allows the soil in the bed to be built up or improved soil to be brought in and added above the existing soil. Strictly speaking “raised beds” do not have a solid bottom, although structures with wood borders and solid bottoms are often referred to as such. • Borders are made from materials such as redwood, plastic lumber, cinder block, broken blocks of salvaged concrete (“urbanite”), or logs. Avoid using railroad ties or pressure-treated woods—both contain materials toxic to humans. • Raised beds are generally no more than 3 feet wide so that students can reach into the middle without stepping in them. <p>Pros:</p> <ul style="list-style-type: none"> • Can be good in areas with poor soil. • They create clear bed borders and add definition to garden design. • Can be made wheelchair accessible. Other users may find the higher soil surface level more convenient to work as well. • Edges can be designed as seating areas. • Possible to install gopher wire to bottom edge of frame before filling with soil. <p>Cons:</p> <ul style="list-style-type: none"> • Requires found and/or purchased materials to construct the edges. Can be costly. • May require purchased soil or soil moved from another area. • Edges can make digging and preparing the soil more awkward. 	<ul style="list-style-type: none"> • Containers are varying sizes and differ from raised beds in that they have bottoms. Planting containers need drainage holes and should be made from materials that hold up well when wet and left outdoors. Ceramic, recycled plastic, and other types of plastic containers are available at nursery centers. Other cast-off containers can work well so use your imagination (old bathtubs, sinks, wheelbarrows). • Large plants such a tomatoes or squash should be grown in larger containers that can hold over 4 gallons of soil. Smaller containers are suitable for shallow-rooted crops such as lettuce, spinach, onions, strawberries and herbs. • Containers require a “light” planting mix rather than soil. You may make your own: 1/3 compost, 1/3 coco pith, and 1/3 horticultural sand. <p>Pros:</p> <ul style="list-style-type: none"> • Can be used on top of asphalt or where there is no soil. • Location is relatively flexible. They can be strategically placed to beautify school grounds. • Tall containers can be wheelchair accessible. • Small containers or containers on wheels can be moved inside to protect from weather or vandalism. • Good for areas with limited space. <p>Cons:</p> <ul style="list-style-type: none"> • Requires initial cost of container and/or purchased materials to construct the containers. Can be costly. • Requires special soil mix that must be purchased or made from purchased ingredients. • Containers need to be watered and fertilized more often than in-ground beds.

Seeding and Transplanting

*One for blackbird, one for the crow,
one for the cutworm, and one to grow.*

~ American saying

Indoors or Outdoors?

What crops are best started indoors in containers?

Plants that can tolerate root disturbance and will benefit from a jump on the season are best to start indoors. You can find this information on seed packets and in planting guides.

- Cool weather crops such as broccoli, cauliflower, and cabbage can be transplanted into the garden up to a month before the last danger of frost.
- Warm weather crops, like tomatoes, peppers, and melons, should be transplanted into the garden after all danger of frost is past in your area.
- Flowers planting requirements vary, so check the seed packets. You can find your average last frost dates by asking local gardeners or your Cooperative Extension Office (Master Gardeners).

What crops are better started outdoors?

Some crops prefer to be started directly in the garden. Root crops such as carrots, radish and beets don't transplant well, nor do other crops such as corn, beans, peas, squash, melons, and cucumbers.

Sometimes, caring for seeds directly sown in the garden is a challenge at schools (e.g., protecting them from pests, keeping seed beds watered). In that case, you can start corn, beans, peas, squash, melons, and cucumbers in containers. However, you should do so in larger individual containers rather than the pricking out method described above.

Seeding Outdoors

Direct sowing methods

Seeds planted directly in the garden can be drilled (poked), broadcast (sprinkled) or planted in little furrows (lines). Refer to the seed packet for suggested methods of sowing seeds.

- **Drilling seeds** is as simple as poking a hole in the soil to the appropriate depth and then covering it with soil.
- **Broadcasting seeds** is a common method for grass or wildflower seeds. Broadcasting involves sprinkling seeds over the planting area and covering them with soil or lightly "scratching" in the seed.
- **Furrow seeding** is often used with crops such as carrots, beets or radishes. Dig a shallow furrow in the soil where you want your seeds to go and then drop in a line of seeds. Cover the seeds and pat gently. Furrow-planted crops may need to be thinned to the recommended spacing listed on the seed packet. Thinning is done once the plants begin to grow.

Moisture needs for direct sown seeds

After you have directly sown your seeds in the ground, it is important to keep them moist until they germinate.

- Use a watering method that delivers a “gentle spring rain,” e.g., watering can or hose fan attachment. It may take many passes of light sprinklings to be sure the soil is moist beyond the depth of the newly planted seed.
- Avoid flooding your newly planted area as this can wash away seeds and/or cause your soil to form a “crust” on the top, which makes it difficult for some seeds to push through the soil.
- Keep an eye on your seedbed, and keep it constantly moist. Depending on the weather, you might need to water daily.

Pest protection for young seedlings

Young sprouts are often tempting to birds and other critters! Try covering your seedbeds with floating row cover, bird netting, upside down strawberry baskets, or by hanging bird flash tape over your bed.

Tips for sowing seeds with kids

- Help younger students to properly space their plantings. A few kid-friendly measuring techniques include
 - **using a sowing string:** before planting, stake down a string with knots or tape marking where the seeds should be sown.
 - **using “farmers’ measurements”:** before planting in the garden have children measure the distance from thumb to pinkie on their open hand and use their hand as a spacing guide.
 - **using marked trowels as rulers:** have kids measure and mark inches on their trowels and use it as a ruler.
 - **pre-“drilling” holes in the soil:** kids place their seeds into holes that are poked in the soil, or place large seeds on the soil surface where you want them to be planted.
 - **using sticks to mark spots where you want a seed:** have the student remove the stick and plant a seed.
- Another rule of thumb is “the smaller the kid, the bigger the seed.” Larger seeds are easier for younger children to count and sow. Otherwise you might have 50 radishes sprouting where you only wanted a few.
- Make sure you demonstrate the depth the seed needs to be planted at. Kids can use the knuckles on their forefinger as a marker of depth. You can also make drilling sticks by marking pencils or chopsticks every quarter inch and using these to poke the seeds into the soil.
- If working with many kids at one time have some students be the “inspector” whose job is to make sure the seeds are planted and at the right spacing.

Seeding Indoors in Containers

Why start seeds indoors

Starting seedlings indoors allows students to observe plant germination and provides a more controlled environment for young plants.

Seeding containers

Select any type of container that is about 2-3 inches deep with drainage holes.

- Yogurt containers, small milk cartons and similar small containers work well.
- Nurseries often donate used, empty, plastic six-packs designed for seed starting.
- Paper pots are a resourceful container choice. See “Making Paper Pots” handout.
- If you wish to save space, you can sow seeds close together in wider containers called “flats” and then transplant them into individual containers once plants are 1-2 inches tall.

Seed starting mix

It is best to use seed starting mix because it is light, absorbent, weed-free and sterile.

- Typical potting soil may be too light for consistent soil to seed contact.
- Garden soil is often too heavy for proper transplant root development.
- You can purchase seed starting mix, or make your own: Mix
 - one part horticultural sand
 - one part compost
 - one part coco pith fiber

Planting seeds

Before planting, wet the soil mix completely so that it is as damp as a wrung out sponge.

- Fill containers then tap them to settle the soil.
- A good rule of thumb is to plant seeds about two to three times as deep as they are wide. You will also find the recommended planting depth on seed packets.
- A few types of seeds need to be closer to the top of the soil. They either require light to germinate or are very small. For these, press them gently into the top of the soil without covering them (check the seed package).
- After planting to the appropriate depth, water seeds with a gentle spray of water, let the water soak in; repeat so that water is sure to penetrate to the depth of the seed.

Germinating seeds

Seeds are living organisms and, with proper conditions, they will sprout to life. Seeds need moisture, warmth, and, in some cases, light to germinate (sprout). Once seeds sprout, these same factors are essential for healthy seedling development.

- **Moisture.** Be sure to keep the soil surrounding your germinating seeds moist, but not soggy. Check frequently by gently probing to the depth of the seed or young root to make sure the soil is moist below the surface. Water seedlings when they

need it rather than on a regular schedule. Gently sprinkle them regularly so they don't dry out. A spray bottle works well in the classroom.

- Once seeds have sprouted, have students test soil moisture with a finger, and water only when the top 1/2 inch of soil is dry.
- **Fertilizing.** If you use a rich seed starting mix, your plants may have all the nutrients they need to get established. However, if your seedlings start to fade in color or appear weak, you can add organic fertilizers once their first true leaves have formed. Be careful not to overdo it. The right amount of fertilizer will keep seedlings looking dark green (rather than pale yellow), but too much can be harmful. A good rule of thumb is to fertilize with half the recommended dose once every 10 to 14 days. Students may want to experiment to discover for themselves the consequences of too much of a good thing!
- **Warmth.** When starting seeds in the classroom, temperatures will usually not fall below the 60 degrees needed to germinate most seeds.
- **Light.** Most seeds germinate best in a dark, warm environment, surrounded by soil. There are a few types of seed that need light to germinate (check seed packets) and should be covered with little or no soil. Seedlings, or baby plants, grow best with 14 to 16 hours of light a day, much more than windows can supply in late winter. Seedlings grown on windowsills tend to be “leggy,” and therefore will generally grow better under fluorescent lights. To prevent stretched, leggy stems, the lights should be kept within a few inches of the top leaves.

Transplanting

Transplanting to larger containers

If you planted many seeds in a container close together to save space, you will have to move or “prick” them out to individual containers with more space.

- Wait until after the first true leaves appear (after the cotyledons).
- Gently tease out closely planted seedlings with a Popsicle stick, or butter knife.
- Then transplant them to individual containers where they have more space.
- Lift seedlings by their cotyledons or leaves rather than by stem.

When are your plants ready to transplant?

Your seedlings are ready to be transplanted when they have at least two sets of true leaves and their root system is established enough to hold soil around them.

Hardening off

"Hardening off" refers to getting small seedlings accustomed to harsher outdoor conditions before moving them outdoors permanently. Do this by setting them outside for

progressively longer periods each day, starting with a few hours and increasing to a full day over the course of a week or so.

Transplanting pointers

Transplant your seedlings into moist garden soil that is neither too dry nor too soggy. Ideally, it will be about as moist as a wrung out sponge. Refer to the planting guide or seed packet to determine the appropriate spacing of your plants.

- If your transplants are root-bound, with a large mass of roots at the bottom of the plant, gently break up the root ball before transplanting.
- Transplant your plants to the same depth that they were in their containers.
- Water transplants with many passes using a gentle spray, letting the water seep in between passes, or by trickling water directly around the base of the transplants.
- Water thoroughly so that the soil and water settles around the roots. Use your finger to make sure there is moisture at the depth of the roots. Unless directed otherwise, students may stop watering when they see that the soil surface is wet.
- Avoid transplanting during midday heat if possible.
- Protect your transplants from pests like birds by covering the young plants with upside down strawberry baskets, upside down nursery trays, netting or floating row cover (thin, lightweight fabric).

Tips for transplanting with kids

- As with sowing seeds, you can have children measure the distance from thumb to pinkie on their open hand to use a spacing guide. We call this their “farmers’ measurements.” You can also have them measure and mark inches on their trowels to use as a garden ruler.
- For transplants that grow into large spaces (e.g., cabbages, lettuce) mark the spaces to be planted ahead of time with labels, sticks, or hand trowels. Students can bring out rulers or use their “farmers’ measurements” to help you map the bed. This will allow you to check the spacing and correct any errors before any plants have gone in the ground.
- To demonstrate why small plants need to be spaced so far apart, place 4” plastic nursery pots upside down in configurations to represent full-grown plants.
- Often times you have more kids than seeds or transplants to put in the ground. One way to ensure all students can participate in planting is to pair them up into “planting buddies” where one digs the hole and the other places the plants/seed in the ground and both cover with soil.

Making Paper Pots

Students can make their own mini paper pots and these can be transplanted directly into the garden. The basic idea is to wrap a newspaper strip around a mold, squish the bottom, fill it with soil and use it to plant a seed in.

Materials

- Commercial potmaker molds are available from Lee Valley tools <http://www.leevalley.com> or <http://www.kidsgardening.com>. Alternatively, you can use a small unopened V-8 juice can.
- Newspaper, cut into strips 3 inches wide by 10 inches long
- Scissors
- Bag of seed starting mix
- Watering can
- Nursery tray or container to hold and support paper pots.

Instructions

1. Students place the strip of newspaper lengthwise in front of them and then place the mold at the end of the newspaper strip closest to their own body in such a way as to be able to roll the mold along the paper strip. Leave about 1 inch of the newspaper hanging over the mold's bottom.
2. Roll the mold along the strip, rolling the paper around it (not too tight, not too loose).
3. When the newspaper is entirely around the mold, twist and fold the extra 1" of paper at the bottom over onto itself.
4. The commercial wooden mold has a matching bottom piece. If using it, take the top, place it on the bottom, and turn it while pressing down. "Push and turn, push and turn" we say to the children. If using a V8 juice can, do the same on a flat table surface.
5. Gently ease the newspaper "pot" off its mold. Fill with soil to the top of pot. Plant a seed by poking a hole in the dirt with the index finger, sticking the seed in and covering. (Optional: write student's name on newspaper pot.)
6. Place pots in a tray right up against each other so that they support each other. Water pots after you have placed them in a supportive tray. If students plan to take them home, put them in a small container. Milk cartons cut long-ways with drainage holes make a great "4-pack."
7. You can use normal office paper to make more durable pots. Have kids decorate the strip of paper with rubber stamps and garden wishes before rolling into a pot. Tape the bottom of the pot if necessary.

Transplanting paper pots: When the plant is about 3-5" tall, transplant it into garden. It is possible to transplant the newspaper pot directly into the ground. The newspaper will eventually decompose. With younger kids, this is an easier method—to have them transplant the whole pot in the garden. However, it is better for the plant's root system to take the seedling out of the paper pot to transplant it, as the roots will have an easier time establishing themselves in the ground. If students plant their whole paper pot in the ground, make sure that no part of the paper is exposed above the soil. Paper exposed to air can wick the moisture from the soil leaving a dried out little plant.

Keep It Growing



Watering

Gardening requires lots of water, most of it in the form of perspiration.
~ Cecil Roberts

Water is the most basic plant growth requirement.

Plants use a lot of it! It comes in through the roots and exits through small openings in the leaves. A plant is like a big vacuum, continually sucking water from the ground and depositing it into the atmosphere. When water is limited, the plant responds by growing less and producing less. Without enough water, garden plants will ultimately die.

Know your soil type.

Soil type has a big impact on how water moves and how much is available for uptake by the plant roots. In a sandy soil, water moves quickly and vertically. In a loam soil, it moves at a moderate speed and flows both downwards and sideways. And in a clay soil, water moves very slowly and as far horizontally as vertically and may take a long time to penetrate deeply.

Water thoroughly and deeply.

When you irrigate, make sure water soaks the soil well below the surface into the zone where the roots are growing. Depending upon the plant type and growth stage, this may be either a few inches or several feet down. Deep, thorough irrigation encourages roots to grow even deeper, increasing their ability to mine water and nutrients and anchor themselves firmly. When seeds are first planted and when seedlings are young, watering must be frequent and does not need to go deep. Once plants are past the seedling stage, water more thoroughly and less often.

How do you know if your plants need more water?

Visually checking on them is the first step. If you see the leaves looking dull or less vibrant, that can be the first sign that plants need more water. Wilting indicates that water is seriously limited. These could also be symptoms of damage caused by a pest or disease, so you should also check the soil moisture. How soil appears on the surface is no indication of what is available to the roots, so use a trowel or soil core to get below the surface where the roots are.

The squeeze test can also help you determine whether the soil needs water. Dig down a few inches and grab a handful of soil. You need to water when

- Sandy soil won't retain its shape when squeezed into a ball
- Loamy soil looks dry and won't form a loose ball under pressure
- Clay soil won't form a ball unless squeezed.

Three general methods of irrigation

When you choose an irrigation method, remember to consider the growth stage of your plant, your soil type, and the resources (supplies, water source, funding, people) you have available.

Sprinkler or Overhead

This refers to any method that deposits a spray or mist to the plant and soil surface. You can achieve this with a watering can, a fan sprayer attached to a hose, an oscillator (lawn sprinkler) or various other sprinkler or mister systems. This method can be fun and satisfying for the young gardener. It's also great for seed beds or small transplants with shallow roots. However, in California's dry climate, this is generally not the best method for a thorough, regular, irrigation of mature plants. Also, when using any sprinkler system, be aware that water may be falling in paths or other non-crop areas and causing weeds. Additionally water that ends up in paths can lead to muddy paths and puddles.

Furrow or Flood

This is any method where water is applied in large quantities and slowly soaks into the soil. It is more suitable for in ground garden beds. Much of California's large-scale crop irrigation uses this method, and you can see water moving down long furrows across huge fields.

The furrow method can be used to good effect in a garden setting to provide deep thorough irrigation. It generally requires moving soil to build dirt berms (walls) to create a basin or contained area that holds the water until it soaks into the soil. Water typically comes from the end of a garden hose. This method requires very little in the way of material resources, but a good amount of people and kid power to set up and manage, and is more effective in silt or clay soils rather than sandy soils.

Flood or furrow irrigation can provide a great project for upper elementary and middle school kids to give them a chance to work with soil and water flow. It's also a great way to study ancient civilizations, as most early agriculturalists relied on some version of flood or furrow irrigation.

Drip Method

This refers to systems that slowly drip water onto the soil surface using a tube or weepy hose. This is the method with the potential to effectively provide the majority of water needs in garden settings. It is efficient and allows for thorough irrigations. Systems are easily designed to keep water out of non-crop areas to prevent future weed problems.

The challenge of drip is that it generally requires more knowledge, confidence and supplies to set up than the other two methods. The simplest drip system is a "leaky" or soaker hose run through a planted area, attached to a garden hose. A more complex system waters several beds and can include drip-line, filters, pressure regulators and system timers.

Tips for watering with kids

Watering is a garden activity that many students enjoy. Before sending them out with a watering can or hose, make sure they understand a few watering basics:

- It's best for the plants if students make many passes with a gentle spray of water, rather than flood an area.
- Teach them to check that they have watered to the level of the roots rather than just the surface.
- If you have a large garden, you generally cannot rely on watering cans as your primary means of irrigation.
- If you have kids watering with watering cans or bottles consider having a large wide filling bucket that kids can dip their containers in to fill. This is often much easier and manageable for kids than filling with a hose or spigot.

Weed Management

A weed is a plant whose virtues have not yet been discovered.
~ Ralph Waldo Emerson

What is a weed?

A weed is any plant growing where it is not wanted. Remember, "One gardener's weed is another gardener's wealth." The plants that we generally all agree are "weeds" are typically hardy, reproduce easily, and are very competitive with other plant species.

Why do we weed? What do we hope to accomplish?

We weed to reduce competition for sunlight, water, soil nutrients and space for the crop plants. We also weed to eradicate plants that we know are serving as habitat for garden pests. And finally, we weed to get rid of plants that we consider ugly or a nuisance.

In defense of weeds

Sometimes weed species are providing an important beneficial function in the garden. Weigh the potential benefits against problems they may be causing.

Weeds

- provide ground cover to otherwise bare soil
- improve the soil through root penetration and/or increased organic matter
- can provide habitat for birds, worms, insects (good and bad), and other critters
- can be powerful medicinal plants. Some are edible.
- can provide additional learning opportunities in an instructional garden

Weed prevention strategies

Prevention is the best strategy! Follow these guidelines to prevent weed problems:

- Water only where you want to see plants growing. As much as possible, keep irrigation water off non-crop areas.
- Mulch paths heavily with a material that keeps weed seeds from germinating and seedlings from emerging. A good choice is cardboard or landscape fabric covered with wood chips.
- Eliminate weeds when they are small, and relatively easy to pull out.
- As a last resort, remove bad weeds before they go to seed or otherwise propagate.
- Stay ahead of any perennial weeds in your garden such as Bermuda grass or nutsedge. Because perennials survive year-round, they can quickly become a persistent nuisance.

Weed elimination methods

You have to choose which of these works best with your weeds, your weedeaters, and the current conditions in your garden, such as soil moisture and weather:

- Hand pulling
- Digging
- Hoeing
- Mulching (with *some* species this works even once weeds are growing if you pile enough stuff on top of them)
- Mowing or using a Weedeater
- Solarizing (this works best if you use clear plastic during warm months)

Making your weeding efforts count

Particularly in school gardens, you may be working with a large group of helpers one week and with none the next, so consider the following to make your efforts worthwhile:

- **Soil moisture.** Is it appropriate for your chosen weed removal technique? For pulling you want a loose, wet soil. For scraping or cutting weeds off at the surface you generally want a dry surface.
- **Tool choice.** Which tool will most effectively do the job and is it sharp and ready to go? The people who weed for a living would never consider heading to the field with a dull hoe or without their sharpening tool in their back pocket.
- **Prioritize timely weed projects.** If you have a limited supply of labor at one time, choose which weeds should be given highest priority and tackle those first.

Recycling weeds

If the weeds you have removed do not have seeds or will not re-root easily, they can serve as great mulching or compost material. Pile them around beds, trees or other perennials where you want to cover bare soil, either to prevent new weeds from germinating or where to keep the soil shaded, cool, and wet during hot months. If you have a functioning aerobic compost system that stays hot (135°F and above) for several days, even seedy weeds can go into it because seeds will be killed by the heat. If you are not sure that your compost is maintained at a high temperature, it is best not to include weed seeds or other persistent weeds in your compost pile.

Getting to know your weeds

The weeds and best methods for their control are different in every area and every garden. Get to know your own by examining them, researching them and considering these questions:

- Where are its seeds, and what do they look like?
- Do you know, or can you guess, if it propagates from seeds?
- What types of spaces does it seem to “like” in the garden?
- Are there many individuals of this weed growing?

- Does it appear to be warm season or cool season?
- Do you know, or can you guess, if it is an annual or a perennial?
- From what you can tell about it right now, what methods and/or tools would you suggest or try in order to control it?

Some bad weeds to look out for in California school gardens

- Bermuda grass
- Nutsedge
- Morning glory (bindweed)
- Foxtail
- Mallow (cheeseweed)
- Johnson grass
- Star thistle

Tips for weeding with kids

- When planning to have kids weed in the garden, be sure to water the weedy areas well so that the weeds come up easily. Kids get frustrated easily if they can't pull the weeds out, but feel great satisfaction if they can!
- Give kids a weeding demo. Assign a "Weed Manager." Designate sections for different groups. Have buckets ready.
- Have kids count their weeds; make a weed chart.
- Teach kids the difference between noxious weeds that cannot be composted and those that are OK to compost.

Critters and Critter Control

*“Though snails are exceedingly slow,
There is one thing I'd like to know.
If I out-run 'em round the yard,
How come they beat me to the chard?”*
~ Allen Klein

Remember, healthy plants will have fewer pest problems. Keeping soils fertile and irrigating adequately will also prevent many pest problems from occurring.

Follow these steps to ecologically sound pest control:

Start by monitoring.

To keep pest problems to a minimum, start by regular monitoring. Insect and disease problems are easiest to fix if caught early. Check plants for pests like aphids, scale or the larval stages of several pest species. Look out for leaf spots that can be a sign of fungal or bacterial disease. When you have identified a pest problem try to find out what is causing the damage. This can be an exciting investigative activity for your students. Decide whether the damage is significant enough to warrant action.

In an instructional garden, choose to tolerate some plant damage. Observing species interactions or the unchecked impact of a pest can be as important as harvesting a crop and is part of the learning process for your students. Many plant pests have natural predators, and if you remove the pests, your students will never get to see the predators in action.

Discourage excess moisture on foliage.

Most fungal and bacterial diseases infect plant surfaces only if there is moisture present. In regions where the growing season is humid, give plants enough space so air can circulate freely. Water in the morning hours, so the water can evaporate during the daylight hours. Drip irrigation is also a good way to water without getting leaves wet. Plants such as tomatoes, potatoes, squash, and cucumbers should not be watered from above, although this is somewhat less of a concern in arid climates.

Healthy soil makes healthy plants.

Just like well-nourished humans, plants are able to avoid sickness when well nourished. Test your soil and maintain proper fertilization for healthier plants.

Look for disease and pest resistant varieties.

Many crop varieties are bred to be less susceptible to disease and pest problems. Information on resistance is generally available in the variety descriptions in catalogs and on seed packets.

Choose crops that are appropriate for your region and season.

Many plants will succumb to pest attacks if they are grown in the wrong climate zone or during the wrong time of year. You can avoid pest problems if you start by doing your research and making careful choices.

Clean up your garden.

Diseases and pests can remain on infected and dead plant material where they can survive until attacking another host crop. Remove infected plant leaves, keep weeds to a minimum, and clean up the garden regularly.

Encourage beneficial organisms.

Make the garden inviting to beneficial species such as ladybugs, wasps, lacewings, and birds that are known to feed upon pests. Plant appropriate habitat species. Plants in the mint family, the sunflower (composite) family, and the carrot (umbel) family will attract good insects to your garden. Choose perennials that have consecutive flowering periods so that something is in bloom for as much of the year as possible. Limit the use of insecticides that can kill beneficials as well as pests. Add a bird feeder or a water feature, such as a fountain or bath to attract birds.

Practice crop rotations.

Pests and diseases that affect certain crops build up in the soil if the same crop is grown in the same location repeatedly. By planting different crops in a location on a three-year cycle, you can avoid many problems.

Use non-chemical pest control methods and/or install barriers to pests.

There are many fun and effective non-chemical pest control methods that are particularly appropriate in school garden programs.

- Hand-picking pests is a method that is rarely viable in commercial operations but effective when you have 20 children with bright eyes and small fingers.
- Row covers can keep flying pests off an entire bed.
- Sticky barriers can provide a barrier to ants.
- A board laid on the soil is good for collecting snails and slugs. Turn it over daily and pick off the mollusks that have gathered there.
- A short section of old hose or rolled up newspaper will attract nighttime marauders like earwigs.
- Mix one tablespoon of liquid dishwashing soap with a quart of water and spray the soapy solution on plants. This is good for taking care of aphids and whiteflies.

And what about those vertebrate pests?

Often the most damaging pests to our gardens are rabbits, squirrels and gophers. These can be very difficult to deal with. When properly secured, row cover is an effective barrier to non-burrowing vertebrates. Gophers can be kept out of beds lined underground with gopher baskets or hardware cloth (screen). Most traps and poisons are potentially dangerous to children and other species and must be used with discretion. Check regulations at your school and district to find out what is allowed.

Tips for controlling critters with kids

- As mentioned above, hand picking can be a fun way to control pesky pests—just be sure that what kids hand-pick is safe. Snails are a favorite.
- Use some of the benign methods such as rolled up newspaper to capture critters.
- Kids will enjoy turning over a board to find creepy crawlies.
- Teach kids to distinguish between beneficial insects and pests (aka “good” bugs and “bad” bugs). The more they learn, the less likely they will be to indiscriminately squish small insects.

Curricular Connections

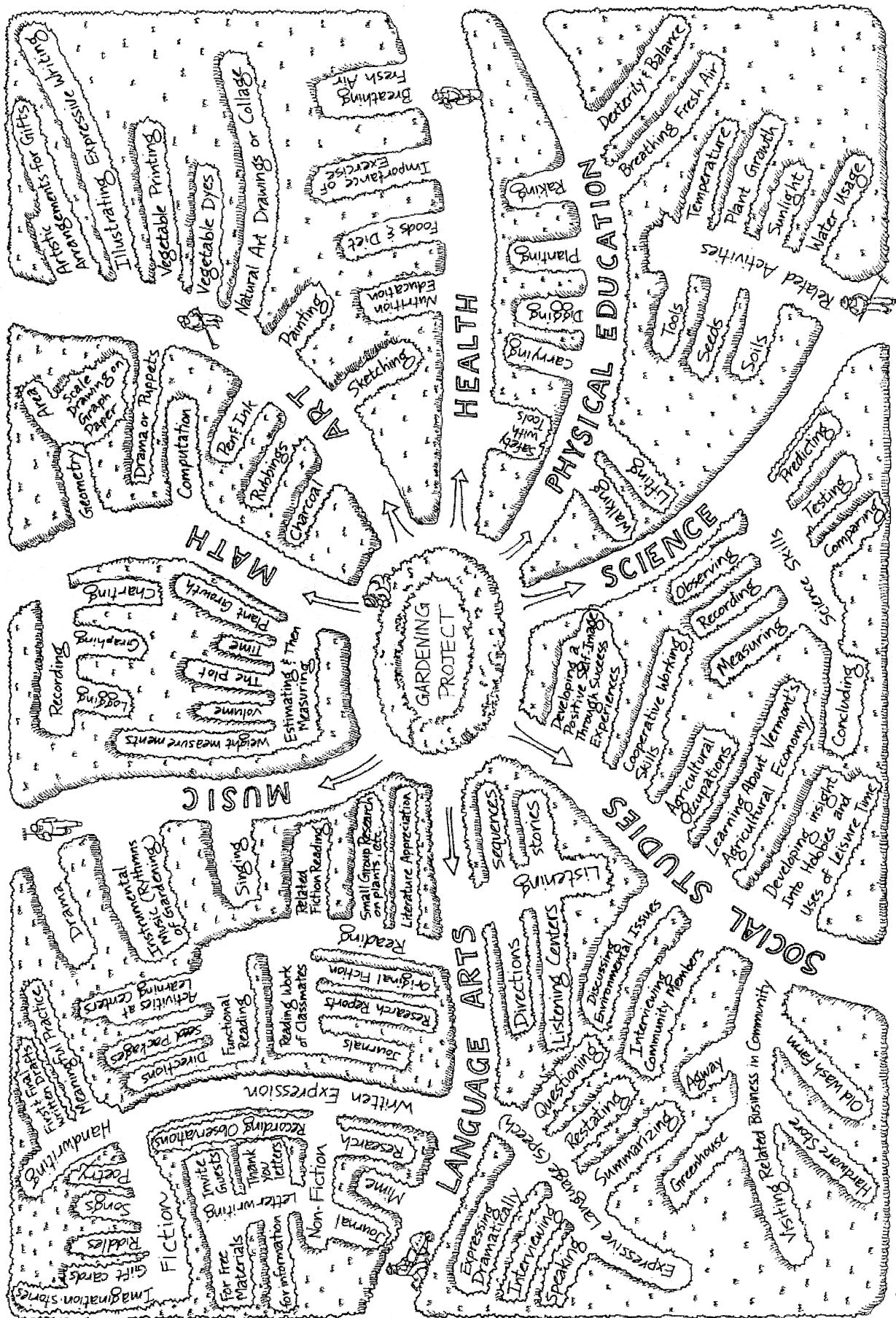


Curricular Connections

Overview of Garden-Based Learning Educational Resources

- **California State Content Standards** Download at: <http://www.cde.ca.gov>
- **Gardens for Learning** “Linking Gardens to School Curriculum” pages 20 – 28.
 - **Linking State Standards to your School Garden** – This supplement to *Gardens for Learning* developed by Agriculture in the Classroom links the activities listed in *Gardens for Learning* to California State Standards. This document is downloadable for free.
- **Garden Pathways Map** is a visual representation of ideas about all the directions curricular applications can take in the garden.
- **A Child’s Garden of Standards** published by California Department of Education is a useful online resource for teachers. It links activities from various garden-based learning teaching materials to the CA state content standards. It is downloadable for free.
- In addition to garden-based lessons, there are many children’s literature books relevant to gardening and life cycles. Agriculture in the Classroom has an extensive grade-specific list on their website.
- A few of our favorite garden-based teaching materials are listed below. For a searchable list of free online resources, visit the CSGN website (www.csogn.org).

Title	Grades	Availability; Cost	Description
The Growing Classroom	2-6	\$39.95 from Life Lab	Comprehensive; easy to use; supports science and math
Twigs	Elementary	\$25 from Cooperative Extension of San Mateo County	Very easy to use; great for primary; good connections to nutrition
Botany on Your Plate	K-4	\$21.95 from National Gardening Association	Lessons with a horticultural approach to math, science and the arts
Math in the Garden	K-8	\$29.95 from National Gardening Association	Grades K-8, Hands-on math activities in to use the garden
Life Lab Science	K-5	\$79-\$189/grade level from Life Lab	Comprehensive K-5 garden-based science curriculum
Kids Cook Farm Fresh	2-7	Free download	Seasonal recipes and information about crops, local farms and farmers
Harvest of the Month	PreK-12	Free download	Activities and recipes focused around seasonal crops.
Nutrition to Grow On	Upper Elementary	Free download	Nutrition in the garden.
WE Garden	Elementary	Free download	10 garden-based science lessons



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Educational Tie-Ins: Interview a Lesson

Name of teaching material:
Name of activity:
Subject area, content standard and/or other learning objective:
Brief description of activity:
How could you integrate this activity into your existing curricula or lesson plans?
Extensions, cross-curricular connections, and/or any other ideas about this activity:

Educational Tie-Ins: Interview a Resource

Name of teaching material:
Grade level(s):
Theme(s):
Connected to Content Standards? Which Ones?
Where is it Available? Cost?
What are your impressions? How could you integrate this resource with your existing curricula or lesson plans?

Choosing Plants and Planting Times



Introduction to Annual and Perennial Plants

Nature does not hurry, yet everything is accomplished.
-Lao Tzu

What are Perennial Plants?

Perennial plants are plants that last two or more seasons. Perennial plantings serve as a foundation for your school garden and can have various purposes such as:

- ❖ attracting wildlife and providing habitat for beneficial insects (pollinators and predators) both of which connect to science content
- ❖ food production (herbs, fruit trees, shrubs, and vines)
- ❖ medicinal uses (teas, tinctures, salves, and balms)
- ❖ ornamental uses (dried floral crafts, cut flowers)
- ❖ providing year round color and foliage
- ❖ providing year round plant material for studying and projects

Perennial plants are usually easier to maintain than annual vegetable crops and, once planted, perennials provide a place of beauty and interest for years to come.

There are many considerations to take into account when selecting perennials:

- ❖ Evergreen vs. deciduous: Do you want a plant that stays green all year or one that drops its leaves in winter?
- ❖ Flowering/fruiting months and colors: It makes most sense to choose plants that will fruit or flower when school is in session.
- ❖ Size and structure: Will the mature size of the plant fit properly in the space available?
- ❖ Uses of plants: Will they be for culinary herbs, ornamental uses, medicinal uses, habitat, food production, special theme or study purposes?
- ❖ Light requirements: Will the plant receive the appropriate amount of light throughout the year?
- ❖ Appropriate climatic zones: Will the plant survive your winter cold?

Climate Zones for Perennial Plants

To determine which plants are suitable for a climate zone, gardeners refer to hardiness charts or “climate zones.” There are two zone charts that are commonly used in the western region:

- ❖ USDA Zones
- ❖ Sunset Western Garden Zones

The USDA Zones range from 1-13, with **1** being the coldest and **11** being the warmest. In California most locations fall between zones **7-10**.

The Sunset Garden Zones are similar to the USDA Zones, but are more detailed allowing for a more specific match of a plant's ideal environmental preferences and a location's climate. There are 24 Sunset zones and the *Sunset Western Garden Book* is an indispensable resource that lists thousands of plants, their zones and growing information for the Western US.

To determine your specific zone, ask a local nursery professional, contact your County Master Gardener (www.mastergardeners.org), or view the "Know Your Zone" maps on the following page. To find out what zone a particular plant will thrive in, refer to the plant label, your nursery professional, or a resource such as the *Sunset Western Garden Book*.

Here are a few more points to consider when planting perennials:

- ❖ “Herbaceous” perennial plants die back to the ground in the winter and re-grow in the spring. “Woody” plants maintain their branching structure during the winter and may be evergreen or deciduous. “Evergreen” perennials keep their leaves during the winter. Keep these characteristics in mind when planning your garden's design.
- ❖ Evergreen perennials can be planted any time of the year, but often the best time of year is in the fall. This allows plants root systems to get established before their growing season and to take advantage of winter rains.
- ❖ Bare root perennials such as fruit trees and vines should be planted in the dormant season (winter or late winter months if your ground is frozen).
- ❖ Most bulbs are planted in the fall for spring blooming dates; they are a great option for school gardens.

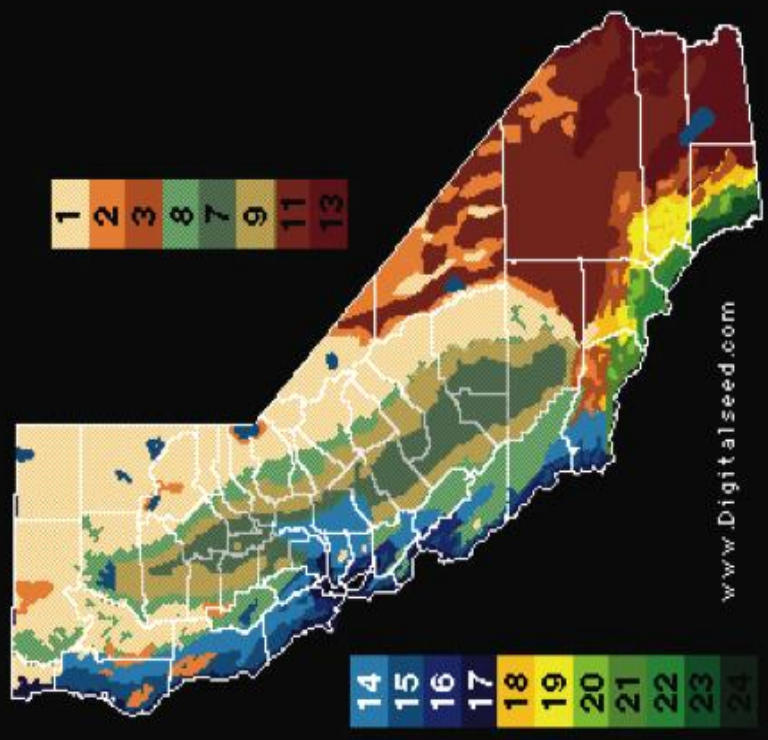
Know Your Zone

Cold tolerance or "plant hardiness" is an important consideration when selecting plant varieties for your garden. There are two commonly used climate zones used to gauge temperatures in a particular area. The USDA has established plant hardiness zones for the country. When selecting plants it is important that the plant is suitable for your zone. Zone information for plants can often be found on plant labels or from nursery staff. Sunset's Western Garden Book has created their own zone. Keep that in mind when using their books in garden planning.

USDA Plant Hardiness Zones



Sunset's Western Garden Book Zones



What are Annual Plants?

Annuals plants are plants the live their whole life cycle (from a planted seed to a mature plant that flowers and fruits and makes a seed again) in a year or less. Annual plants make up most of our vegetable crops, and most of them can be harvested within 2 to 3 months after sowing. Bi-annual plants are similar to annuals but they may live up to two years before coming to the end of their lives.

Annuals are generally classified as either “warm season” or “cool season” crops.

- ❖ Cool season crops thrive in cool areas or during cooler months of the year.
 - Generally they are the root, stem, leaf, and flower bud crops.
 - Many of these crops can “over winter” in mild winter areas if planted in the fall, or can be planted in early spring for a late spring harvest.

- ❖ Warm season crops thrive in warm areas or during the hotter months of the year.
 - Generally they are the fruit and seed crops.
 - They are often planted in mid-late spring to summer and harvested in the summer and fall.

School Year Planting Options

Cool Season Crops		Warm Season Crops	
<ul style="list-style-type: none"> • Late Summer/Fall Planting Harvest late-fall through winter. • Early Spring Planting Harvest before school ends. 		<ul style="list-style-type: none"> • Late Spring (or Summer*) Planting Harvest when returning to school in fall. (Have a plan in place for summer weeding, watering, and harvest.) 	
Best to sow directly into Garden Beds	Best to plant transplants into Garden Beds	Best to sow directly into Garden Beds	Best to plant transplants into Garden Beds
Beets Calendula (edible flower) Carrots Garlic Nasturtium (edible flower) Onions Peas Radish Spinach	Asian Greens Broccoli Cabbage Cauliflower Chard Collards Kale Kohlrabi Lettuce Nasturtium (edible flower) Onions	Amaranth Corn Cucumbers* Melons Popcorn Potatoes Pumpkins Shelling Beans Snap Beans* Summer Squash* Sunflowers (with edible seeds) Winter Squash	Eggplant Onions Peppers Tomatoes

Average Last (Spring) and First (Fall) Frost Dates in California Cities

From www.victoryseeds.com/frost/ca.html

City	Last Frost	First Frost
Auburn	4/13	11/14
Alturas	7/16	8/9
Bakersfield	3/3	11/20
Barstow	4/15	10/29
Berkeley	1/19	12/26
Bishop	5/25	9/26
Blythe	3/1	11/28
Boca	8/5	7/29
Burney	7/15	8/12
Chico	4/23	10/30
Death Valley	2/11	11/30
Eureka	3/14	11/15
Escondido	3/30	11/12
Fairfield	3/27	11/11
Fresno	4/1	11/7
Klamath	4/27	10/28
Livermore	4/27	11/3
Lodi	3/31	11/2
Lompoc	4/11	11/7
Long Beach	2/11	12/8
Los Angeles	2/11	12/8
Marysville	3/16	11/14
Mineral	7/14	8/7
Modesto	3/28	11/10
Monterey	2/11	12/11
Mt. Shasta	6/13	9/12
Napa	4/28	11/9
Needles	3/2	11/30
Nevada City	6/4	9/24

City	Last Frost	First Frost
Ojai	4/9	11/5
Orick	5/18	10/4
Orland	4/15	11/8
Oxnard	2/9	12/24
Palmdale	5/2	10/27
Palm Springs	3/6	11/18
Palo Alto	3/30	11/9
Pasadena	2/3	12/13
Paso Robles	4/18	10/7
Petaluma	4/25	11/5
Pismo Beach	3/11	12/1
Placerville	5/18	10/22
Pomona	4/1	11/16
Red Bluff	4/2	11/14
Redding	5/10	10/31
Sacramento	3/23	11/14
San Diego	3/30	11/12
San Francisco	1/24	12/8
San Luis Obispo	3/27	11/22
Santa Barbara	2/26	12/4
Santa Rosa	5/1	11/5
Tahoe City	6/30	8/22
Tulelake	7/6	8/14
Ukiah	4/29	10/25
Upland	4/14	11/21
Visalia	3/17	11/8
Willows	4/23	11/8
Yreka	5/31	9/25

Plant Hardiness Definitions

From www.digitalseed.com/gardener/climate/hardiness.html

Hardy Not injured by light frosts and seed will germinate at rather low temperature. May be planted about two weeks to a month before the average date of the last killing frost in the spring. In general, these plants can safely be planted as soon as the soil can be worked into condition. **Includes: onion sets, smooth peas, cabbage plants (well-hardened), kale, kohlrabi, Brussels sprouts, spinach, turnip, radish, asparagus, rhubarb.**

Half-Hardy May be planted about the time of the last killing frost. The seeds of this group will germinate at rather low temperatures, but the young plants are injured by frost. **Includes: lettuce, beet, carrot, chard, parsley, parsnip, heading broccoli, early potatoes, onion seeds, garden peas, celery plants, cauliflower plants.**

Tender Injured by light frost and does not thrive at low temperatures even though frost does not occur. These shouldn't be planted until all danger of frost is past. **Includes: snap bean, tomato, sweet corn, sweet potato.**

Very Tender Does not thrive until the soil has become warm and the seed will rot in the ground unless the soil is warm. **Includes: eggplant, pepper, cucumber, watermelon, muskmelon, lima bean, squash, pumpkin.**

Planting Annual Plants

Gardeners use planting charts (for an example, see *Gardens for Learning* pages 65-68) or the information found on seed packets to determine when to plant annual plants. Most planting charts and seed packets refer to weeks before or after average frost dates as a guide for when to sow seeds or plant (set) transplants outdoors.

The “average last frost date” of the season lands in the late winter or spring. The “average first frost date” lands in the fall or early winter. Planting charts and seed packets will usually instruct you to plant seeds directly into the garden or transplant seedlings a certain number of weeks before a first frost and before or after a last frost.

Contact your local Master Gardeners (found at www.mastergardeners.org) or a local nursery professional, or use *Creating and Sustaining Your School Garden's "Average Last and First Frost Dates in California Cities"* to find out your region’s frost dates.

Planning Your School's Edible Harvest

One of the most challenging aspects of planning a school garden harvest is that most crops are ready for harvest in the summer months, when schools are out of session. With a bit of planning, however, you can create a crop harvest schedule that fits with your school year.

Crop planting charts and seed packets list the “Days to Harvest” of the crop that you are planting. The days to harvest are an approximation of how many days it will take for your plant to go from a newly sown seed to an edible treat. Planning your sowing and harvest dates is as simple as selecting seasonally appropriate crops and noting the days to harvest of the particular crop. Of course there are many other variables like the weather, irrigation, fertilization, and pests that may accelerate or retard a plant's growth, but all of those variables are learning opportunities for gardeners. View the *Creating and Sustaining Your School Garden Crop Harvest Planning Chart* for specifics on planning a school year harvest.

Once you have chosen which crops to plant, read the *Creating and Sustaining Your School Garden Vegetable Planting and Harvesting Tips*, or refer to an online planting guide at www.csgn.org/csystg to learn more about growing and harvesting your crops.

Planning a Fall Harvest

One mistake many new school gardeners make is planting a garden that matures during summer while students are away. In order to plant vegetables that are ready to harvest in the fall, plant longer “days to harvest” vegetable varieties and plant them in the late spring or early summer. Read the "days to harvest" listing on the back of seed packages and plan accordingly.

Another suggestion is to plant crops that can dry in the garden like popcorn, winter squash (pumpkins), or shelling (dry) beans. Popcorn can dry in the field for weeks once mature, whereas sweet corn needs to be harvested within a week or two for a tasty harvest. Also remember that many fruiting vegetables need to be harvested to keep producing throughout the summer, so make sure your summer garden guardians harvest regularly to encourage continual fruiting.

Try planting some of these crops in late May or June and come back to school with something to harvest.

Shelling Beans (dry beans)	Peppers
Sunflowers (Edible or Birdseed)	Eggplant
Winter Squash	Melons
Popcorn	Tomatoes
Pumpkin	Parsnip
Potatoes	Health Master Carrots
Amaranth	

Edible Theme Gardens

Many successful school garden programs have learned that planting an edible theme garden is a good way to pique students' interest, grow healthy food and connect to the classroom via cultural studies. For example, the Native American **Three Sisters Garden** demonstrates the interdependence of corn (which uses nitrogen added to the soil by the beans), beans (which grow up the corn stalks), and squash (which covers the ground and reduces weed growth). Another popular example is a **pizza garden**, in which everything needed to make a pizza can be grown (add a statue of a cow to represent the source of cheese and a pig the "pizza meat" animal).

Crop Harvest Planning Chart

Plant carrots in January and you'll never have to eat carrots.

~ Author unknown

Average Frost Dates

Most seed packets and planting guides recommend the number of weeks to plant or transplant (set out plants) before or after the average first or last frost date in your area. Refer to the average frost date chart and write your average frost dates below:

Last Frost (Spring):	First Frost (Fall):
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2012

January	February	March	April
Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
May	June	July	August
Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
September	October	November	December
Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Su Mo Tu We Th Fr Sa 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

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Planning Planting and Harvest Dates

1. Review the school year planting options list for a summary of school year planting/harvest windows.
2. With your average frost dates noted refer to a seed packet or planting guide for more specific details on when to plant.
3. Use a seed packet or planting guide to find the **number of days until harvest**. "Days to Harvest" are based on the day that the seed is first put into soil (container or direct sown).
4. Chose a crop and fill out the chart below selecting a harvest date when school is in session.

Crop	Planting Date	Number of Days to Harvest	Target Date for Harvest
<i>Example: Lettuce</i>	<i>March 10th</i>	<i>50 days from direct seed</i>	<i>May 30th</i>

Keep in mind the weather and a number of other factors can affect the number of days to harvest. If you are planting a transplant, you can subtract about 20-30 days off the "days to harvest" found on seed packets and planting guides. Note: some seed packets (such as tomatoes and peppers) state the days to harvest from setting out a transplant.

Suggested Perennials and Perennial Themed Gardens

Plant	USDA Zone	Culinary	Ornamental	Insectary	Medicinal	Flower Color	Flowering Times	Evergreen or Deciduous
Sage <i>Salvia</i> Various types	6-10	☼	☼	☼		Various	Depends on Variety	E/D
Rosemary <i>Rosmarinus officinalis</i>	1 -9	☼	☼	☼	☼	Blue	Early Spring-Summer	E
Penstemon <i>Penstemon strictus</i>	4-9		☼			Various	Spring	E
Jerusalem Sage <i>Pulmonaria fruticosa</i>	1-3		☼	☼		Yellow	Spring	E
Lambs Ear <i>Stachys byzantina</i>	4-8		☼	☼		Purple	Spring	E
Peruvian Lily <i>Alstroemeria</i>	1-7		☼			Various	Spring- Summer	D
Artichoke <i>Cynara scolymus</i>	7-11	☼	☼			Purple	Spring-Fall	E
Society Garlic <i>Tulbaghia violacea</i>	7-10	☼	☼			Purple	Spring - Summer	E
Rhubarb <i>Rheum</i>	3-9	☼ <small>Leaves are toxic</small>	☼			Greenish-white	Late Spring - Summer	D
Kangaroo Paw, Cat's Paw <i>Anigozanthos flavidus</i>	9-10		☼			Various	Late Spring - Summer	E
Mints Various types	4-11	☼	☼	☼	☼	Violet-Lavender	Late Spring - Summer	E
Yarrow <i>Achillea</i>	3-9		☼	☼	☼	Various	Late Spring - Summer	D
Coreopsis	4-10		☼		☼	Yellow, Orange, Red	Spring - Fall	E
Honeysuckle <i>Lonicera</i>	4-10		☼	☼	☼	Yellow, Red	Late Spring - Summer	E
Common Sorrel <i>Rumex acetosa</i>	3-11	☼	☼	☼	☼		Late Spring	D

Plant	USDA Zone	Culinary	Ornamental	Insectary	Medicinal	Flower Color	Flowering Times	Evergreen or Deciduous
Oregano <i>Origanum</i>	4 - 5	☼	☼	☼		Light Purple, Pink, White	Summer	E
Lemon Verbena <i>Akitsu truogtkka</i>	8-10	☼	☼		☼	White	Summer	D
Thyme <i>Thymus</i>	5-11	☼		☼		White, Pink, Purple	Summer	E
Lemon Balm <i>Melissa Officinalis</i>	4-5	☼			☼	White	Spring - Summer	E/D
Lavender <i>Lavandula</i>	5-10	☼	☼	☼	☼	Purple, White	Summer	E
Catnip <i>Nepeta cataria</i>	4-8		☼	☼		White	Summer - Fall	D
Milkweed <i>Asclepias</i>	3-9			☼		Pink, Yellow, Orange	Summer - Fall	D
Shasta Daisy <i>Leucanthemum</i>	4-10		☼	☼		White	Spring - Summer	E
Cape Fuschia <i>Phygelius</i>	7-9		☼			Orange, Red, Yellow	Spring – Late Fall	E
Butterfly Bush <i>Buddleia davidii</i>	5-9		☼	☼		Purple, Pink, Yellow White	Spring - Fall	E
Asters	3-9		☼	☼		Various	Summer - Fall	E
Scabiosa columbaria <i>Pincushion flower</i>	5-9		☼	☼		Red, Blue, Lavender, White	Spring - Summer	E/D
Bulbs	Varies		☼			Various	Choose for school year blooming	D
Lion's Tail <i>Leonatus leonurus</i>	8-10		☼			Orange	Summer - Fall	E
Comfrey <i>Symphytum officinale</i>	4-9		☼			Blue, Pink, White	Spring - Summer	D
Santa Barbara Daisy <i>Erigeron karvinskianus</i>	5-9		☼	☼		Pink, White, Violet	Spring - Fall	E
Lantana <i>Lantana camara</i>	8-11		☼	☼		Various	Year-round	E

Re-seeding Annuals

Although these are not technically perennial plants, they sure act like them! They come back year after year from seeds they dropped the previous years.

Amaranth
Coreopsis
Cosmos
Fever Few
Marigolds
Mullein *Verbascum*
Nigella

Poppies
Snap Dragons
Stock
Sunflowers
Sweet Peas
Zinnias

These have edible flower petals:

Bachelor Buttons
Borage
Calendula
Nasturtiums
Violas

Perennial Themed Gardens

Many educational gardens are arranged by themes that connect with student's studies. Here is a list of suggested theme gardens. With a little research and thought, you can easily create a planting list to support these themes.

Alphabet Garden – plant something for every letter in the alphabet
Zoo Garden – plants with animal characteristics (i.e. lambs ears, tiger lily)
Craft Garden – plants that can be used for art
Edible Flower Garden – flowers with edible flower parts
Nectar Suckers – flowers with good nectar sources to suck from
Medieval Garden – plants grown and used during the medieval times
Fairy Tale Garden – plants from a favorite story
Rainbow Garden – plant all the colors of the rainbow
Herb or Tea Garden – culinary and tea plants
Cut Flower Garden – plants grown for making bouquets
Butterfly or Pollinator Garden – plants that attract pollinators or butterflies

Prehistoric Garden – relatives of plants that were around when the dinosaurs roamed the earth (non-flowering plants)
Sensory Garden – plants that smell and feel good
California History or Mission Garden – plants used during the mission period
Medicinal Garden – plants traditionally used for medicine
Stinky Garden – plants with strong smells
Cultural Garden – plants that have traditionally been grown by a particular culture or ethnic group
Bog Garden – plants adapted to wet areas
Succulent Garden – plants adapted to dry areas
Carnivorous Garden – plants adapted to eat insects for nourishment

Selecting Fruit Trees and Vines for California School Gardens

*“Today is the second best day to plant a tree.
The best day to plant a tree was 10 years ago.”*

Planting a fruit tree or vine is an investment in your garden’s future. When selecting a tree for a school garden there are a few basic concepts to understand so that you can make the best choice. Consider consulting a fruit tree expert to discuss the conditions described below.

When will the tree set fruit?

Choose varieties that will make fruit while students are in session. There are many varieties of each type of fruit. Different varieties produce fruit at different times throughout the season.

Select the appropriate tree size for your garden site.

Many trees can be purchased on rootstocks that will help determine the tree’s ultimate height. Dwarfing rootstocks can keep some varieties of fruit trees under 8 feet.

Select appropriate varieties for your climate zone.

Stone fruits (peaches, nectarines, plums, apricots, cherries) can be grown in areas with average annual minimum temperatures below -10°F. Pome fruits (apples, pears, and relatives) can be grown in areas with average annual minimum temperatures below -20°F. Citrus should be grown in warmer areas, where average annual minimum temperature is no lower than 30°F.

Select appropriate varieties for the average chill hours in your region.

Many fruit trees need a specific number of “chilling hours” (temperatures between 32°F - 45°F). Trees that do not receive their proper amount of chill hours during the winter may experience delayed foliation or have problems flowering and forming fruit.

The number of necessary chill hours for fruit trees will vary by variety. For example: an “Anna” Apple has a low chill factor requiring only 200 hours, while the “Gravenstein” Apple needs 700 cumulative chill hours to fruit well. Most of Northern California receives between 800 and 1,500 hours of chill each winter. Southern California may only receive 100-400 hours.

Plant your tree in an area with good drainage.

Shallow, poorly drained sites will produce small, weak plants that have lower yields, more pest problems, and require special water management practices. Notice where water accumulates or puddles in the winter and avoid planting trees in those areas.

Fruit Trees and Vines for California School Gardens

(listed in order of fruiting season)

Fruit Name <small>* These trees require minimal pruning and maintenance expertise.</small>	USDA Zone	Best Time To Plant	Harvest Time Dates may vary by variety	Tree Height Tree height varies by rootstock and pruning	Evergreen or Deciduous
Pear	5-8	Best to plant from bare root tree in winter	Summer - Fall	Dwarf height 8-10 ft, Standard 30ft	D
Apples	5-9	Best to plant from bare root tree in winter	Summer - Fall	Dwarf height 8-12 ft, Semidwarf 12-18 ft Standard 18-22ft	D
Grapes	4-8	Best to plant from bare root tree in winter	Summer - Fall	10-15 ft vine, Grow on trellis or fence	D Vine
Pineapple Guava *	7-10	Fall As container plant, can plant year round	Fall - Winter	4-12 ft	E
Kiwi Fruit	8-10	Fall, can plant year round, need male and female for fruit production	Fall - Winter	15 -25 ft vine, Grow on trellis or fence	D Vine
Almond	7-9	Best to plant from bare root tree in winter	Fall	12-15 ft	D
Walnut	4-9	Best to plant from bare root tree in winter	Fall	20-50 ft	D
Pomegranate *	7-11	Best to plant from bare root tree in winter	Fall - Winter	5-12 ft	semi - D
Persimmon *	7-10	Best to plant from bare root tree in winter	Fall - Winter	12-18 ft	D
Citrus *	8-11	Fall Container plant, can plant year round	Late Fall - Spring depending on variety	6-25 ft , depending on variety	E
Cherries	4-8	Best to plant from bare root tree in winter	Early Spring	10-30 ft	D
Apricot or Aprium	4-8	Best to plant from bare root plant in winter	Late Spring - Summer	12-20 ft	D
Fig *	7-11	Fall Container plant, can plant year round	Spring and Fall, depending on your region	15-30 ft	D
Raspberries *	3-9	Best to plant from bare root tree in winter	Late Spring – Fall, depending on variety	4-6 ft	D
Plum or Pluot	4-8	Best to plant from bare root plant in winter	Late Spring - Summer	15-40 ft	D
Blackberries *	5-8	Best to plant from bare root plant in winter	Summer - Fall	3-6 ft	D

Growing California Natives

What are native plants?

A native plant is a plant that is native to a specific region, where it has grown naturally and co-evolved with other life forms. Native plants make up the foundation of an ecosystem and have specific inter-relationships within it, such as providing food and shelter for a wide variety of organisms. Since the arrival of European people and the plants and seeds they introduced, native plants have had new competition for survival. In some areas, native plant populations have been replaced by "invasive" species that out-compete the natives for the sun, soil, and water. For this reason, restorative landscaping with natives has become quite a popular practice.

Growing native plants in your garden can provide many benefits.

Native plants are found in all types of climatic zones, so you will always be able to find a plant suitable to your growing conditions. For this reason, native plants are often easier to care for. By growing endemic native plants, you can begin to restore the natural biodiversity of your region. Other benefits include the following:

- Native plants can attract animal and insect populations in your garden by providing the habitat that nature originally provided for them.
- Native plants selected from your growing region will need little or no additional irrigation once the plant is established.
- Because native plants have evolved with other plant and animal species from their region, the amount of pest disturbance is usually lower.

Tips for planting natives

Natives are best planted from late fall through early spring. Taking advantage of winter rains helps get plants off to a good start. To increase your rate of success of direct sown seeds, it is advisable to irrigate until seeds have germinated and made early growth. With perennial plantings, supplemental irrigation is suggested through the first summer. After they are established, native plants should require relatively low maintenance.

When direct sowing seeds such as wildflowers, it is important to create a good seedbed to promote firm soil to seed contact, provide consistent moisture, and keep weeds under control. One method of weed control is to pre-irrigate the seedbed to be planted to sprout your weed seeds and then remove them. After you remove the weeds, try not to till your soil, as you might bring up more weed seed. Once you have sown your seeds in a well-prepared seedbed, a gentle tamping can help to ensure soil to seed contact.

Choosing natives

When purchasing native plants, it is best to buy from nurseries that specialize in native plants. Native plant nurseries often collect seed and propagate plant material from plants that are acclimatized to your particular region.

Vegetable Planting and Harvest Tips

Taken from *The Growing Classroom*

Beans, Bush

- Keep sowing every 2 weeks for constant supply of beans. Plants may stop producing beans during extreme heat but will begin again when temperatures decrease.
- Pick beans before you can see bean swelling in pod. Be sure to pick beans frequently (3-5 days) so the crop keeps producing.
- Sensitive to transplanting, consider sowing directly in garden.
- Eat raw, steamed, boiled, or pickled in vinegar.

Beans, Pole

- A pole bean is a climbing variety and needs support of a pole, trellis or fence to grow.
- Pole beans often produce for a longer period than other beans.
- Pick beans before you can see bean swelling in pod.
- Pick beans frequently (every 3-5 days) for continual harvest.
- Sensitive to transplanting, consider sowing directly in garden.
- Eat raw, steamed, boiled, or pickled in vinegar.

Beans, Shelling

- Shelling beans are grown until the bean and pod is dry. Let the beans completely dry on the stem before harvesting.
- Place dried bean pods on tarp and have kids stomp on them to remove pod or place in sack and strike sack to break beans from shell. Some kids like to hand shell each pod.
- These beans need to be boiled to eat.

Beets

- Sow seed directly in garden every 10 days for continual harvest.
- Thin plants when they are young.
- When beets are 1-2.5 inches in diameter, pull the roots.
- Beets will get woody when overly mature. Beets will keep in ground during frosts.
- Eat raw, pureed, baked, steamed, boiled, or pickled in vinegar. Beet greens may be cooked like spinach.

Broccoli

- Broccoli is a cool season crop that grows best in full sun.
- Pick broccoli when heads form into tight, firm clusters.
- Cut off the head with 6 inches of stem attached. Side heads will form after first head is cut.
- Eat florets and stems raw, boiled, or steamed.

Brussels sprouts

- Plant Brussels sprouts in spring for a fall harvest. Exposure to frost improves flavor and sweetness.
- To harvest, twist sprouts off the stem when 1.5" wide and start with lower ones first. Remaining sprouts will keep on plants through part of winter.
- Eat boiled or baked.

Cabbage

- Plant in mid-summer for a fall harvest. In mild areas sow in fall for a early spring harvest.
- Harvest cabbage heads when they have formed tight, firm heads.
- Eat raw, boiled, steamed, or pickled as sauerkraut.

Carrots

- Sow seed directly in the garden. Thin crowded plants when small.
- Harvest carrots at almost any time in the growth cycle. Carrots will keep in the garden after the first frost, right up until ground freezes in winter.
- If needed, loosen carrots with digging fork before pulling.
- Eat raw, boiled, steamed, baked, pureed, or pickled in vinegar.

Cauliflower

- Tie outer leaves around head to protect cauliflower from the sun.
- Cauliflowers are cool season crops that are ready to harvest when the flowerets are tightly formed and dense. Cut the head off the main stem.
- Eat raw, cooked, boiled, or pureed.

Celery

- Requires a lot of nutrients and water.
- Harvest after the stalks have reached a foot or more.
- The inner stalks are more tender and taste best uncooked.

Chard

- Cut the outer leaves close to ground when 8-10" tall. Make sure to leave 4-6 leaves on the plant so it can continue to grow.
- Refrigerate chard for up to two weeks.
- Cook by boiling, steaming, or stir-frying.

Corn (sweet)

- Sensitive to transplanting, consider sowing directly in garden.
- For good pollination plant in blocks at least 4 feet by 4 feet.
- Ears are ready to harvest about 20 days after the silks appear or when they turn brown.
- Peel back the husk to and puncture a kernel with your fingernail. If the kernels are fat and juice is milky - white, the ear is ready for eating.
- Eat raw, steamed, or boiled.

Corn (pop)

- Sensitive to transplanting, consider sowing directly in garden.
- Do not plant sweet corn in same garden with popcorn; the quality of sweet corn will be reduced if cross-pollinated by popcorn.
- Allow the kernels to dry in field as long as possible before winter rains.
- Harvest kernels when hard and the husks dry. Remove the husks and place the ears in mesh bags and hang in a warm, dry location.
- Once a week, shell a few kernels and try popping them; when test kernels are popping well store ears in cool dark dry place or remove kernels and store in airtight containers.

Cucumbers

- Mound soil into hills; plant 3 seeds per hill.
- Try growing cucumbers vertically on a trellis to increase air circulation and sunlight.
- Cucumbers are tastiest when harvested young before the seeds fully develop.
- Harvest lemon cucumbers when they are light green with just a blush of lemon color.
- Eat raw or pickled

Eggplant

- In northern gardens where growing season is short, start with large transplants.
- Eggplant may develop a bitter flavor when grown in stressful conditions. Pick them while the skins are glossy and before seeds form inside.
- Cut stem, rather than pull from plant.
- Soak eggplant in water for 15 minutes or salt and let sit before cooking to reduce bitterness. Eat baked, pureed, stuffed, or roasted.

Garlic

- Harvest when half to three-quarters of the leaves turn yellow - brown.
- Remove flower stalks to encourage efficient bulb growth.
- Loosen soil beneath bulb before pulling.
- Tie garlic together in bundles of 6 to 10 bulbs; hang them for four to six weeks in shaded, dry, area to cure.
- Mince and use in any dish as flavoring.

Kale

- Pluck leaves of kale on the outside of plant when leaves are 10" or longer.
- To keep the plants in production, avoid cutting center bud or leaves. Frost enhances the flavor.
- Eat pureed, boiled, steamed, or baked in a casserole.

Kohlrabi

- For best texture, harvest kohlrabi bulb when it reaches 2-3 inches in diameter. Bulbs become tougher as they grow and age.
- Pull or slice at base. Bulbous stem and leaves are edible, peel off skin around bulb before eating.
- Eat raw, steamed, boiled, or pureed.

Leeks

- Plant transplants when 4" high.
- Harvest leeks when they are about 1 inch in diameter and before they make their flower stalk.
- Slice open lengthwise and rinse inner leaves.
- Eat in soups, salads, baked dishes, or as a substitute for chive.

Lettuce

- Lettuce prefers cooler weather, in hot weather plant lettuce may go to seed prematurely (bolting).
- Harvest outer leaves of leaf lettuce early to encourage growth.
- Head lettuce is ready to harvest when heads are firm and tight.

Melons

- Sensitive to transplanting, consider sowing directly in garden. Melons grow best in hot weather. Harvesting the perfectly ripe melon is not always easy, refer to seed packet information for particular varieties.
- **Cantaloupes:** Pick when heavy and tan. Look for "netting" that is hard and raised and a crack that forms around the stem where it touches the fruit. The stem should slip easily off the vines with a quick pull, but should not have fallen off by itself.
- **Honeydews:** Should have a slight yellow blush and get a bit softer on at the blossom end.
- **Watermelons:** Develop a dull green cast and have a light patch at the bottom that changes from green to light yellow when mature. Also, the leaf on the tendril nearest the fruit turns brown and withers. The skin should be hard, difficult to pierce with a fingernail.
- Eat right in the garden for ultimate satisfaction.

Onion

- Harvest when tops fall over and tips of leaves start to turn brown.
- Pull onions, shake off any soil, but do not wash them or pull off outside wrapper leaves. Store in dry area to cure for about a week.
- Use raw, blanched, sautéed, baked, or just about any dish.

Parsley

- Long germination and growth period.
- Soak seeds over night before planting.
- Harvest parsley as soon as plants are growing vigorously.
- Snip outer stems from plants; they will produce new growth.
- Parsley dries and freezes well. Can be eaten dried or fresh.

Peas

- Sensitive to transplanting, consider sowing directly in garden. Harvest peas daily to encourage vines to keep producing.
- **Shelling Peas:** Pick them when the pods are rounded and the peas have filled in pod, but before they grow tough. Pods are not edible.
Snap Peas: Pick when their edible pods begin to grow rounded, plump and juicy, but before they get tough.
Snow Peas: Pick them when the pods have grown to 2-3 inches but are still flat.
- Eat raw, boiled, steamed, or stir - fried.

Peppers

- Sensitive to cold and harsh sun. In extreme heat, shade peppers by planting in a dense block.
- Peppers are edible when they're green, but most don't develop full flavor and mineral content until they turn from green to orange, yellow, or red.
- Eat raw, baked, stuffed, or sautéed

Potatoes

- When foliage starts to wither and die, the tubers should be fully grown and ready to harvest in a couple of weeks. Let soil dry down a bit to help cure potato skin and dig up with a spading fork before first frost. Do not wash potatoes before storing; rather just brush off dirt.
- Potatoes that are nicked or bruised during harvest don't store well, so eat as soon as possible.
- "New potatoes" can be harvested before the plant begins to die back. New potatoes should be washed and eaten shortly after harvest.
- Always cook potatoes, the raw starch is mostly indigestible. Boil, steam, or bake. Leaves are not edible.

Pumpkin

- Pumpkins prefer to be sown directly from seed in hills, 3 - 4 seeds per hill. Leave plenty of room for vine sprawl (6 feet for bush types and 10 to 12 feet between vining sorts).
- Do not pick pumpkins until the vine begins to turn brown and dry. Then cut vine 3 - 4 inches above pumpkin.
- Leave pumpkin in sun for a week or two to cure. Eat baked, boiled, or pureed. It is easiest to remove pumpkin flesh from skin after baking.

Radish

- Sow seed directly in garden every 10 days for continual harvest.
- Spring radishes should be checked frequently because of quick maturation. Will get woody when over-mature. Pull radish roots when 1-2 inches in diameter.
- Eat raw, stir-fried, or pickled in vinegar.

Spinach

- Sensitive to transplanting, consider sowing directly in garden.
- Plant every two weeks for continual harvest.
- Harvest larger outer leaves early in morning when crisp, or cut whole plant at base.
- Keep cool. Will "bolt" and go to seed in hot weather.
- Wash well. Eat raw, pureed, stir-fried, steamed, boiled, or in baked dishes.

Squash, Summer

- Sensitive to transplanting, consider sowing directly in garden.
- Pick frequently when fruits are small. Skins should be tender enough to poke fingernail through.
- Pick zucchini no larger than 6-7", patty pan squash at 2-3", and round zucchini at 3-4".
- Skin can be eaten along with the inside. Eat raw, boiled, baked, roasted, or in soups.

Squash, Winter

- Sensitive to transplanting, consider sowing directly in garden.
- Grow throughout the season and harvest when plant materials die back in fall and the squash skin is hard.
- Most winter squash store well. After harvest, store in cool dry.
- Eat boiled, baked, steamed or pureed in soups. It is easiest to remove squash flesh from skin after baking.

Tomatoes

- Prefers warm weather although nighttime temperatures over 90 degrees can prevent fruiting.
- Harvest when fruits are full color.
- Eat raw, stuffed, stewed, boiled, baked, or pureed. Leaves are not edible.
- Great crop to comparative taste fresh vs. store bought.

Edible Theme Bed Planting and Harvesting Calendar
for Schools in California's Central Coast Region

The colorful lines on this calendar represent each plant's growth cycle, from when to plant the seed through when to harvest the crop. The approximate number of days the plant will take to grow from seed to first possible harvest are noted in parentheses. Actual days to harvest will depend on seed varieties, plant care, weather, and climate.

Pizza Garden Bed

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
					Tomatoes (70-90 days*)						
					Onions (100-140)						
						Zucchini (50 days)					
						Basil (40 days)					
					Peppers (80-100 days*)						
						Wheat (90 days)					

Planting and Harvesting Tips: **Tomatoes** prefer warm weather, although nighttime temperatures over 90 degrees can prevent fruiting. Harvest when fruits show bright colors. Leaves are not edible. **Onions** should be harvested when tops fall over and leaf tips start to turn brown. Pull onions and shake off soil, but do not wash or remove outer skin. Store in a cool, dry area to cure. **Zucchini** needs a lot of space to branch out. Pick fruits when they are 4-6" long or when it is still possible to penetrate skin with thumbnail. **Basil** likes full sun. Start harvesting leaves when plant is 12: tall or more. Cut off desired amount of leaves and chop. **Peppers** are sensitive to harsh sun and cold. In extreme heat, shade peppers by planting them in the shadow of taller crops, or plant them in a dense cluster. Edible when they're green, full of flavor when yellow, orange or red. **Wheat** grows quickly. Harvest when grass stalks turn yellow and kernels are dry. Wheat is only usable once ground into flour. A lot of wheat is required for pizza dough, so the wheat grown in the garden is a good

Salsa or Tomato Sauce Garden Bed

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
					Tomatoes (70-90 days*)						
					Onions (100-140)						
						Cilantro (45 days)					
					Peppers (80-100 days*)						
						Tomatillos (80 days)					

Planting and Harvesting Tips: See Pizza Bed Section for information on **tomatoes, onions, and peppers**. **Cilantro** grows best in direct sun in cooler climates. It will not make it in hot summer heat. Harvest bunches of leaves when plant is bush-like. Cut from plant with scissors. Chop leaves finely and use as seasoning. **Tomatillos** prefer to be started in containers 4-6 weeks before being transplanted into the garden. They are ready to harvest when fruit is plum and husk splits open slightly. Plant at least 2 feet apart. Fruits can store in cool place for 2-4 weeks. Peel off husk and prepare as

* = For the plants with asterisks, the noted days to harvest are based on planting transplants rather than seeds.

Edible Theme Bed Planting and Harvesting Calendar
for Schools in California's Central Coast Region

Soup Garden Bed											
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
								Tomatoes (70-90 days*)			
								Onions (100-140 days)			
								Carrots (55-75 days, can wait longer)			
								Peppers (80-100 days*)			
								Winter Squash (90-120 days)			
								Parsnip (100 days)			
								Potato (70-120 days)			
								Shelling Beans (75-95)			
								Corn (80-100 days)			
<p><i>Planting and Harvest Tips:</i> See Pizza Bed Section for tomatoes, onions, and peppers, and Grazer's Garden Bed section for carrots. Winter squash seeds prefer to be sown directly into the garden soil. Grow in the summer and harvest when plants die back and squash skins are hard. Most winter squashes store well if kept in a cool, dry place. To prepare, cut open, remove seeds, bake or boil, remove skin, and enjoy! Parsnips grow best in deeply worked soil. Prepare roots for eating in the same way as carrots. Potatoes are ready to harvest when plant begins to wither and die. Let soil dry out a bit to help cure potato skins. Dig out with spading fork before the first frost. Do not wash potatoes before storing in a cool, dark place; simply brush off dirt. Potatoes that are nicked or bruised during harvest store less well, so eat these ones first. Boil, steam, or bake potatoes. Raw potatoes are indigestible, and potato leaves are also inedible. Shelling beans can be harvested when the beans and pods have dried completely on the plant.</p> <p>To shell, place pods on a tarp and have students stomp on them; or place pods in a sack and strike the sack; or work together to shell by hand. Soak and cook beans before eating. Corn seeds prefer to be sown directly into garden soil. For good pollination, plant in blocks at least 4 feet square. Ears are ready for harvest about 20 days after the silks appear, or when the silks turn brown. Peel back husk and puncture kernel with your fingernail. If the kernels are fat and milky, the ear is ready to harvest. Eat raw, steamed, or boiled.</p>											

* = For the plants with asterisks, the noted days to harvest are based on planting transplants rather than seeds.

Edible Theme Bed Planting and Harvesting Calendar
for Schools in California's Central Coast Region

Winter Stir Fry Garden Bed											
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			Broccoli (50 days*)						Broccoli (50 days*)		
			Cauliflower (50-70 days*)						Cauliflower (50-70 days*)		
			Carrots (55-75 days)						Carrots (55-75 days)		
			Chard (55-70 days)						Chard (55-70 days)		
			Snow Peas (60-75 days)						Snow Peas (60-75 days)		
<p><i>Planting and Harvesting Tips:</i> Broccoli grows best in the full sun of a cool season. Pick broccoli when heads form into tight, firm clusters. Cut off the head with 6 inches of stem attached. Side heads will form after the first head is cut. Cauliflower does best if you tie the outer leaves around the heads to protect them from the sun. Harvest heads once the florets are tightly formed and dense. Cut the head off the main stem. See Grazer's Bed section for information on carrots. Chard leaves should be cut from the outside in when 8 to 10 inches tall. Leave 4 to 6 leaves on the plant to continue to grow. Refrigerate chard for up to two weeks. Boil, steam or stir fry to eat. Snow peas are ready to harvest when pods are 2-3 inches long and still flat. Eat peas and pods.</p>											
Three Sisters Garden Bed											
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
					Popcorn (90-110 days)						
					Winter Squash (90-120 days)						
					Pole Beans (75-95 days)						
<p><i>Planting and Harvesting Tips:</i> We choose to use popcorn and winter squash instead of sweet corn and summer squash because both of these can grow through the summer, dry on the vine, and be harvested once students are back in school and even into October. See Soup Garden Section for more information on winter squash. To prepare popcorn, remove from cob. Place oil, popcorn and salt in a large, metal mixing bowl. Cover with heavy-duty aluminum foil and poke 10 slits in the top with a knife. Place the bowl over medium heat and shake constantly using a pair of tongs to hold the bowl. Continue shaking until the popcorn finishes popping, approximately 3 minutes. Dry or shelling pole beans are ideal here, and will need the support of a pole, trellis, or fence to grow. Pole beans often produce for a longer period than other beans. Sow directly into the garden soil. Pick before you can see bean seeds swelling in the pods, and pick frequently (every 3 to 5 days) for a continual harvest. Shell and eat raw, steamed, boiled.</p>											

* = For the plants with asterisks, the noted days to harvest are based on planting transplants rather than seeds.

Edible Theme Bed Planting and Harvesting Calendar
for Schools in California's Central Coast Region

Grazer's Garden Bed											
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
				Tomatoes (70-90 days*)							
				Carrots (55-75 days, can wait longer)							
				Snap Beans (50-70 days)							
				Peppers (80-100 days*)							
				Cantaloupe (75 days)							
<p><i>Planting and Harvest Tips:</i> See Pizza Bed Section for information on tomatoes and peppers. Carrot seeds should be sown directly into garden soil. Thin crowded plants when they are small. Harvest almost any time during growth cycle. Carrots will keep in the garden after the first frost, until the ground freezes in winter. If needed, loosen carrots with a digging fork before pulling. Cantaloupe vines need space to grow; plant at least 1 foot apart. Melons require full sun and lots of water. Allow to ripen on vine. Harvest when they pull off vine easily and have a strong fragrance. Eat soon after harvesting.</p>											
Salad Garden Beds											
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			Lettuce (50 days*)					Lettuce (50 days*)			
			Spinach (50 days)					Spinach (50 days)			
			Carrot (55-75 days)					Carrot (55-75 days)			
			Beet (45-60 days)					Beet (45-60 days)			
			Nasturtium (40)					Nasturtium (40)			
			Radish (35 days)					Radish (35 days)			
			Celery (90 days*)					Celery (90 days)			
<p><i>Planting and Harvest Tips:</i> Lettuce prefers cool weather. You can shade plants in hot weather, to prevent it from bolting (producing seed and turning bitter) prematurely. Harvest outer leaves of leaf lettuce early to encourage growth. Harvest head lettuce when heads are firm and tight. Spinach also prefers cool weather and can also be shaded in hot weather. Harvest large outer leaves in the morning, when they are crisp. Alternatively, harvest all leaves at once and allow plant to regrow. See Grazer's Garden Bed Section for information on carrots. Beets should be thinned when plants are young and harvested when roots are 1-2.5 inches in diameter. Beet roots can survive light frosts. Nasturtiums enjoy full sun. Flowers and leaves are edible! Radishes grow quickly, so check frequently and harvest when they are 1-2 inches in diameter. Celery requires a lot of nutrients and water. Harvest when stalks are 12 or more inches long. Inner stalks are more tender and taste better raw.</p>											

* = For the plants with asterisks, the noted days to harvest are based on planting transplants rather than seeds.

Designing Your School Garden



Garden Design Scavenger Hunt

Please think of the children first. If you ever have anything to do with their entertainment, their food, their toys, their custody, their childcare, their health care, their education, listen to the children, learn about them, learn from them. Think of the children first.

~ Mister Rogers

1. Find two places where art has been incorporated in the garden.
2. Find areas for groups to gather and to teach lessons.
3. What types of composting systems are used in the garden?
4. Find an area planted with perennials that provides habitat for garden wildlife.
5. Find an area where tools and equipment are stored.
6. Find different types of signs used in the garden. Think of the pros and cons of each type of sign.

7. Find some examples where recycled/reused materials are utilized in the garden.

8. Find an area where you could observe and record the weather.

9. Find areas where annual flowers and food crops are grown. What type of beds or containers are they growing in?

10. Where are the water sources in the garden? What type of irrigation is used in the garden?

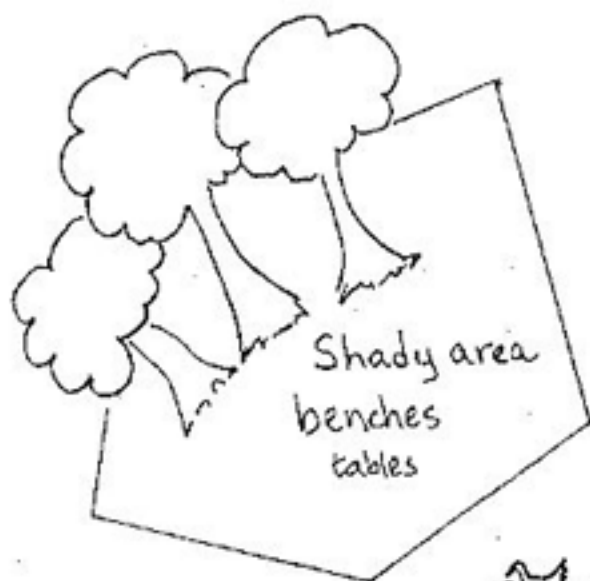
11. Find an area for washing hands or vegetables.

Instructional School Garden Elements

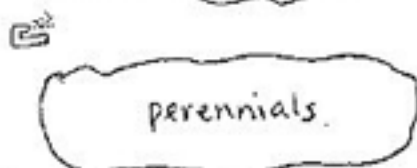
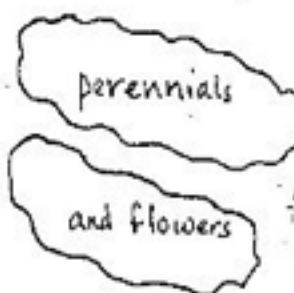
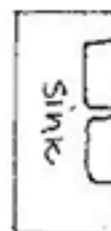
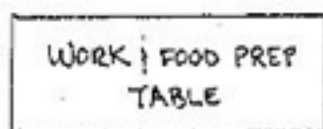
List the basic elements of your garden and areas you would like to add or improve.

Garden Element	What do you have in your garden?	What do you want in your garden?
Gathering area		
Annual flowers and vegetables		
Perennial herbs, flowers, trees, or fruits		
Elements for pest control: insectary plants, row cover, netting or gopher wire		
Greenhouse or seed starting area		
Tool shed/storage		
Composting area/worm bins		
Food prep area		
Sink		
Special features: weather station, pond, art, other?		
Theme beds: pizza, birds, butterflies, literature, other?		

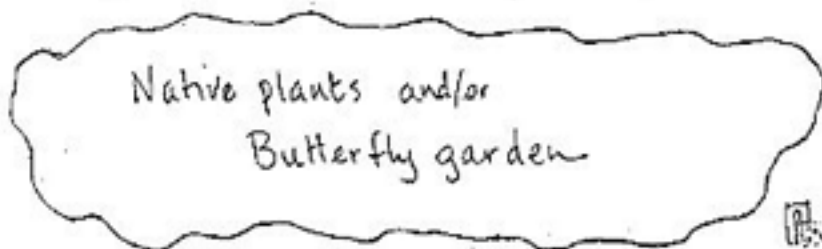
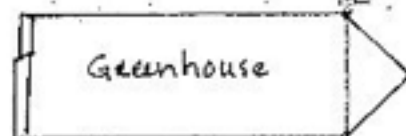
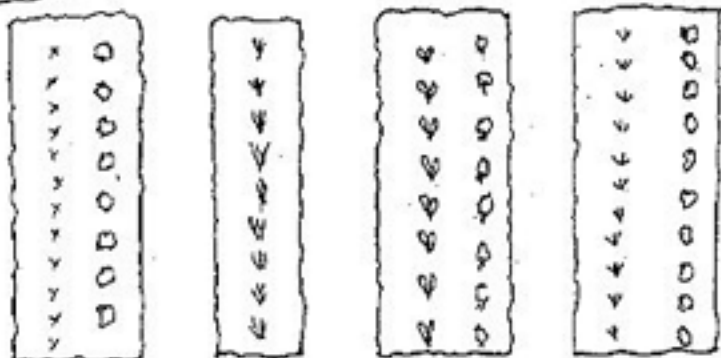
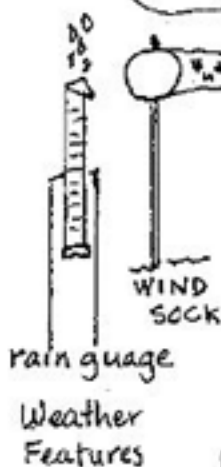
SAMPLE GARDEN



Annuals/flowers



Annual Beds



Planning Your School Garden Program



Developing a Vision for your School Garden Program

Working individually, finish these thoughts:

a. A school garden program will be good for our school because...

b. In our school garden students will

Learn about.....

Experience.....

If you are here with a school team, share answers to the previous prompt and then together discuss the prompts below. If you are here on your own, think about your school team and their shared ideas and respond to these prompts from your perspective.

a. List 3-4 shared ideas that inspire your team to develop a school garden program.

b. Develop a shared vision for your school garden. Describe what that includes.

Building a Support Network

Who can be a resource for your garden program?	How can you involve these people to build a team?	How can you keep people involved?
<ul style="list-style-type: none"> • Parents • Teachers • Principals • Cafeteria Managers/ Food Service Directors • Grounds & maintenance • School nurses • Office support staff • Students • Neighbors • Businesses • Farmers • Youth groups and service organizations • City and county agencies • Garden groups, organizations 	<ul style="list-style-type: none"> • Back to school night • First PTA/PTO meeting • Meet with teachers • Request time at teachers' staff meeting • Talk to grounds people often! • Email lists, phone trees • Flyers • Notices in school bulletins • Other publicity/media • Give garden plots for after school use • Garden with them • Organize: <ul style="list-style-type: none"> ○ Communication ○ Newsletter ○ Offer extra credit ○ Face-to-face ○ Tie in to school events ○ Personal invitations 	<ul style="list-style-type: none"> • Hold regular meetings • Put notices in school bulletins • Write a garden newsletter (or garden corner in school newsletter) • Involve everyone in decision-making (especially students) • Create visible signage around the school • Have kids make art for the garden • Hold events—social events; work parties; seasonal festivals; events for school community; events for larger community • Develop a system that volunteers can plug into easily • Post tasks to make working in garden easy • Field trips for the garden team (e.g. farmers markets, other gardens) • Make room for participants' input • Establish a clear, easy plan for on-going maintenance • Find ways to integrate garden with curriculum • Solicit media attention • Solicit help from local businesses • Research and write grants • Hold plant sales • Extend gratitude/ acknowledgements • Pay the coordinators!! • Make a school garden website • Have a teacher in-service day in the garden • Have regular garden work parties • Remember to eat food from the garden

Breaking it Down to Build it Up: Planning Your Next Steps Forward

Restate one goal your team has agreed to accomplish by next season (fall or spring): _____

List each task required to accomplish this goal	Materials/resources needed for each task (include cost estimate)	Lead Person/Assistant	Date to be completed
1.			
2.			
3.			
4.			

Restate one goal your team has agreed to accomplish by one year from now: _____

List each task required to accomplish the goal	Materials/resources needed for each task (include cost estimate)	Lead Person/Assistant	Date to be completed
1.			
2.			
3.			
4.			

Year-Round Garden Guidelines and Tasks

This guide provides general suggestions for common plantings and garden tasks throughout the year. These can vary based on climatic zones.

	FALL: Sept, Oct, Nov	WINTER: Dec, Jan, Feb	SPRING: Mar, Apr, May	SUMMER: Jun, Jul, Aug
Garden tasks through the seasons	<ul style="list-style-type: none"> • Check and repair irrigation • Inventory tools • Weed garden paths and open areas & cover in deep layers with wood chips or other path material • Mulch cold-sensitive perennials • Make & check plant labels • Save seeds on spring summer flowers or chosen warm season crops • Collect plant material and make compost piles • Plant cover crop seed • Plant perennial flowers and shrubs • In colder areas, protect plants from frost 	<ul style="list-style-type: none"> • Prune trees & shrubs • Rejuvenate perennial areas by adding compost around plants • Cut back dead flower stalks on all perennial herbs and ornamentals • Add compost and mulch around base of fruit trees • Cover plants that are frost sensitive • Order seed and plan for spring garden • Stay ahead of winter weeds • Maintain worm composting • Plan for spring perennial plantings 	<ul style="list-style-type: none"> • Flush, check, and make any repairs or modifications to irrigation systems • Watch for and treat aphid and other insect pest problems • As flowers develop, remove dead flowers to keep new blossoms coming • Reapply mulch around perennials to protect against summer heat • Mulch heavily around annuals that you want to maintain through summer • Get your aerobic compost system going • Protect young seedlings from late frost and/or birds with netting or row cover 	<ul style="list-style-type: none"> • Set up watering schedule • Water and weed • Cut back dead flower stalks on all perennial herbs and ornamentals • Start seeds for fall & winter plants indoors • Make a plan for fall perennial plantings of herbs, natives, habitat gardens, etc. • Enjoy the harvest!
Planting options	<ul style="list-style-type: none"> • <u>Annuals:</u> Lettuce, spinach, chard, radish, potatoes, carrots, beets, peas, fava beans, broccoli, bulbs, sweet peas, snap dragons, pansies, calendula • <u>Perennials:</u> Herbs, California natives, habitat plants and ornamentals 	<ul style="list-style-type: none"> • <u>Annuals:</u> Broccoli, spinach, lettuce, kohlrabi • <u>Perennials:</u> Fruit trees, raspberries, blackberries 	<ul style="list-style-type: none"> • <u>Annuals:</u> Tomatoes, cherry tomatoes, potatoes, peppers, eggplant, beets, carrots, chard, summer squash, zinnias, cosmos • <u>Perennials:</u> Herbs, California natives, citrus, habitat plants and ornamentals 	<ul style="list-style-type: none"> • <u>Annuals:</u> Pumpkins, corn, ornamental corn, winter squash, summer squash, gourds, tomatoes, beans, sunflowers, basil, zinnias, cosmos

Year-Round Garden Guidelines and Tasks

	FALL: Sept, Oct, Nov	WINTER: Dec, Jan, Feb	SPRING: Mar, Apr, May	SUMMER: Jun, Jul, Aug
Harvest options	<ul style="list-style-type: none"> • <u>From previous season:</u> Pumpkins, corn, ornamental corn, winter squash, summer squash, gourds, tomatoes, beans, sunflowers, basil, zinnias, cosmos • <u>From this season:</u> Lettuce, spinach, chard, radish, potatoes, carrots, beets, peas, fava beans, broccoli • <u>Perennials:</u> grapes, kiwi, apple, pear, persimmon, pomegranate 	<ul style="list-style-type: none"> • <u>From previous seasons:</u> Spinach, broccoli, chard, potatoes, fava beans, Lettuce, • <u>Perennials:</u> Citrus 	<ul style="list-style-type: none"> • <u>From previous seasons:</u> Broccoli, spinach, lettuce, chard, kohlrabi, peas, fava Beans • <u>From this season:</u> Cherry tomatoes, carrots, chard, summer squash, potatoes • <u>Perennials:</u> Cherries, berries 	<ul style="list-style-type: none"> • <u>From previous seasons:</u> Cherry tomatoes, tomatoes, carrots, peppers, eggplant, beans, summer squash, potatoes • <u>From this season:</u> Tomatoes, basil • <u>Perennials:</u> Various tree fruits
Program Tasks	<ul style="list-style-type: none"> • Organize School Garden Team and meet to develop year's plan • Revisit vision for school garden • Set goals for school year • Fall Event • Recruit Garden Team members 	<ul style="list-style-type: none"> • Check-in on funding needs and efforts • Inventory and replace tools • Solicit potential collaboration with school cafeteria 	<ul style="list-style-type: none"> • Spring celebration • Plan for summer maintenance • Collect year's lesson plans and activities into one place • Thank people! 	<ul style="list-style-type: none"> • Long-term planning • Training for teachers and volunteers

Additional Notes

