Getting Started in the School Garden

2017-18 Professional Development Workshop Series

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WHOLE KIDS FOUNDATION

KAISER PERMANENTE®

WEST COUNTY DIGS
a project of
Earth Island Institute

Garden Building Blocks & Resources

Soil

It all starts with soil... Good soil is key to a successful garden. There are a couple of local soil suppliers:

American Soil and Stone - 2121 San Joaquin Street, Bldg. A, Richmond (510) 292-3000
Local Hero Veggie Garden (For veggie growing garden beds)
Clodbreaker & Wondergrow compost (for amending soil)

Acapulco Rock & Soil - 3251 Jacuzzi St., Richmond (510) 526-3800
Super Blend & Planting mix (for Veggie growing garden beds)
Clodbuster & General Landscaping Mix (for amending soil)

Berkeley Indoor Garden - 844 University Ave, Berkeley (510) 549-2918
BushDoctor Coco-Loco potting mix (for seed starting)
*They also have lots of seed starting supplies

Garden Beds

There are many materials to build garden beds out of, use what you have but keep in mind if you're growing food in them there shouldn't be any toxins that can leach into the soil and plants.

- Untreated redwood is best to build food growing beds. Build at least 1 ft deep x desired length x 3-4 ft wide (this allow you and students to reach the center)
- Use gopher wire on the bottom and make sure there is at least 6 inches on the inside of beds securely attached so they can't climb over.
- Eagle Scouts, parent volunteers and local high school communities can be helpful in building.

WC DIGS

Seeds & Plants

Annies Annuals - 740 Market Ave, Richmond, CA 94801 (510) 215-3301

Peaceful Valley - (good for on-line orders) (888) 784-1722

Eastbay Nursery - 2332 San Pablo Ave, Berkeley, CA 94702 (510) 845-6490

Watershed Nursery - 601 Canal Blvd, Richmond, CA (510) 234-2222

Other resources:

- Digs Growing Strong Starts Greenhouse plant giveaway
- Collecting seeds with students to grow the next year

Water

Plan for Irrigation & a battery timer. Build your garden close to a water source that can be attached to irrigation.

Urban Farmer Store - 2121 San Joaquin St., Richmond, CA (510) 524-1604
This store can be very helpful when laying out irrigation and purchasing materials. They also offer a 10% discount to schools.

Irrigation Equipment Company - 2818 Eighth St Berkeley, CA (510) 841-9651
Free assistance and 30% discount.

Storage/Tools

Have a safe, sturdy, secure place to store tools near the garden. Make sure that there is a code that trustworthy garden users can share or a key and lock box.

Other School Garden Planning Resources

Csgn.org

Wholekidsfoundation.org

Kidsgardening.org

http://acmg.ucanr.edu/Your_Garden_Month-by-Month/

The Edible Schoolyard Garden Infrastructures and Systems (http://edibleschoolyard.org)

LEAVES:

Form & Function

Learning Botany through art and observation. Students will create a scientific drawing, learn about chlorophyll and photosynthesis, and use natural pigments to enhance their art and bring their learning to life.

Profiencies, Vocabulary and Concept Mastery

Botany
Photosynthesis
Cholorphyll
Basic Leaf Structure
Visual Arts

Requirements

Materials: Leaf characteristic PDF, paper, pencils, clip-boards, leaves
Time: 15-60 minutes
Space: can be done indoors or in the garden or playground
Participants: 3rd grade- adult

Directions

Prepare: Print out enough "Leaf Characteristic" sheets for the group to share. Identify or harvest leaves that students are free to pick and use. Gather materials.

Explain: Tell students that the scientific study of plants is called Botany. Use the guiding questions and answers to help with discussion. Tell them that each student is going to choose a leaf that they want to study. Ask them to tell what they know about leaves, photosynthesis and chlorophyll. Tell them that leaves are like solar panels and each leaf has different characteristics

Tell them to study their leaf and use the PDF to decide its: SHAPE, MARGIN, TIP, BASE, and VENATION (structure of the veins)

Ask them to trace or draw their leaf and to include and label all of the characteristics. When finished, have them crumple their leaf and use the chlorophyll to color in their picture

Guiding Questions (With Answers)

What is photosynthesis?

Photosynthesis is the name for a plant's ability to capture energy from sunlight to produce food.

The cholorphyll are like the solar panels…they convert sunlight into energy for themselves!

Plants have different types of pigments besides chlorophyll. Some of them also assist in absorbing light energy. These different pigments are most noticeable during the fall. During that time, plants make less chlorophyll and the other colors are no longer hidden beneath green.

Why are Leaves Green?

Chlorophyll is the reason why plants are green. Colors are different wavelengths of light. Chlorophyll captures red and blue wavelengths of light and reflects the green wavelengths. .

Why don't plants have pigments that allow them to capture all wavelengths of light?

If you've ever gotten a sunburn you know firsthand that sunlight can be damaging. Plants can also be damaged from excess light energy. Luckily, there are non-chlorophyll pigments in plants that provide a 'sunscreen'.

How does photosynthesis help humans and the health of our planet?

In the process of photosynthesis, carbon dioxide from the air is converted into energy-rich carbon compounds called carbohydrates. As this happens, oxygen is given off into the air, providing the oxygen that we breathe.

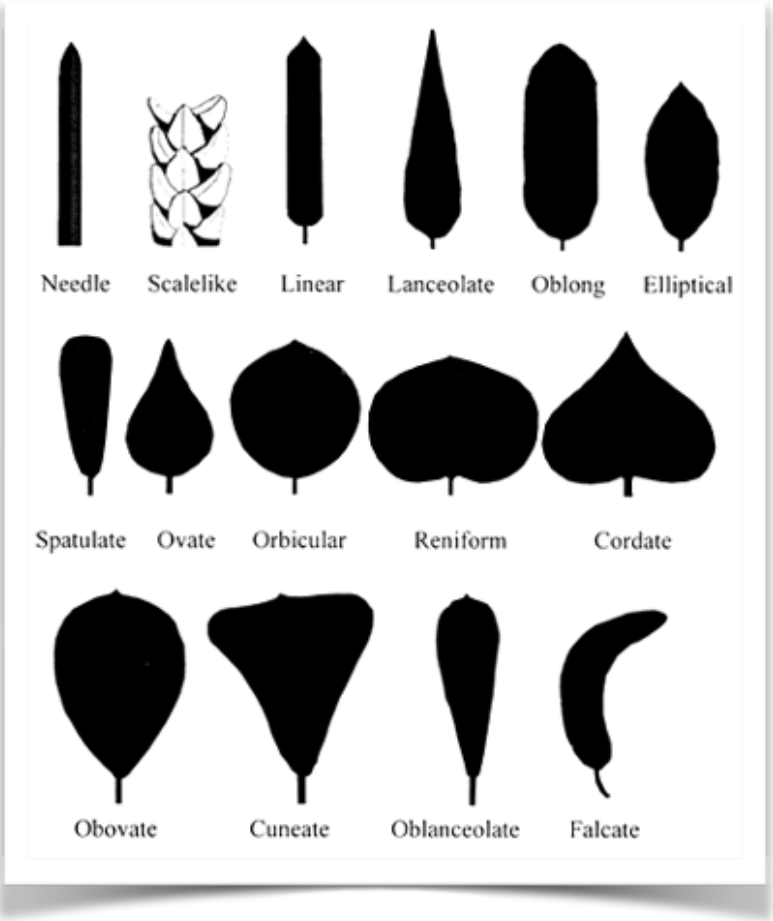
One of the important strategies for combatting climate change is to stop cutting down trees that create our oxygen….and to bloom more green plants and algeas that can convert all of the carbon dioxide into pure oxygen.

Plants are some of the most efficient air purifiers. Sleeping with houseplants in your room is a great way to stay healthy and make sure that the air you are breathing is clean and pure.

Leaf Characteristics

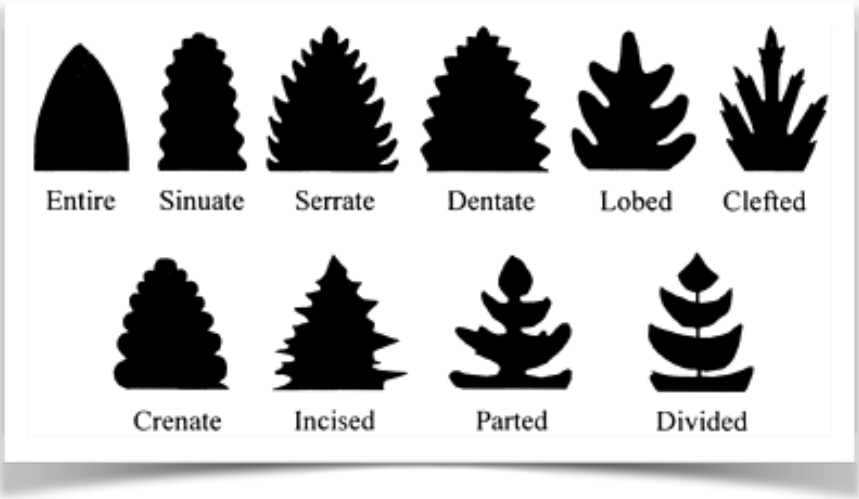
Leaf Shapes:

Which of these shapes is most like your leaf?



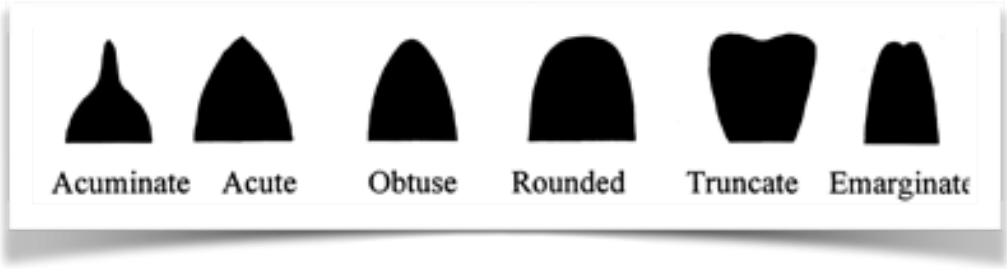
Leaf Margins:

What is the pattern of the edge of the leaf?



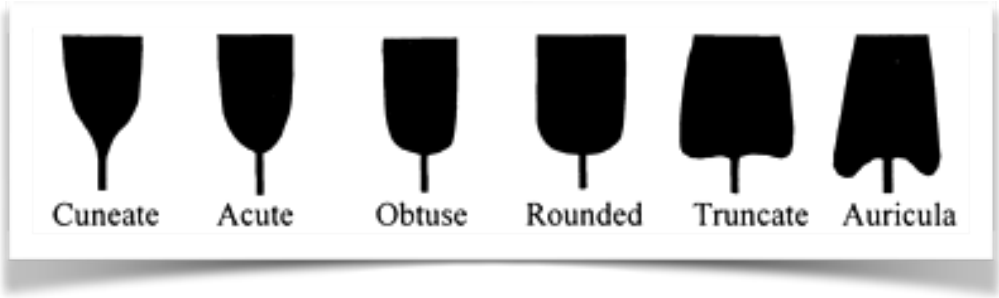
Leaf Tips:

What is the shape of the tip of the leaf?



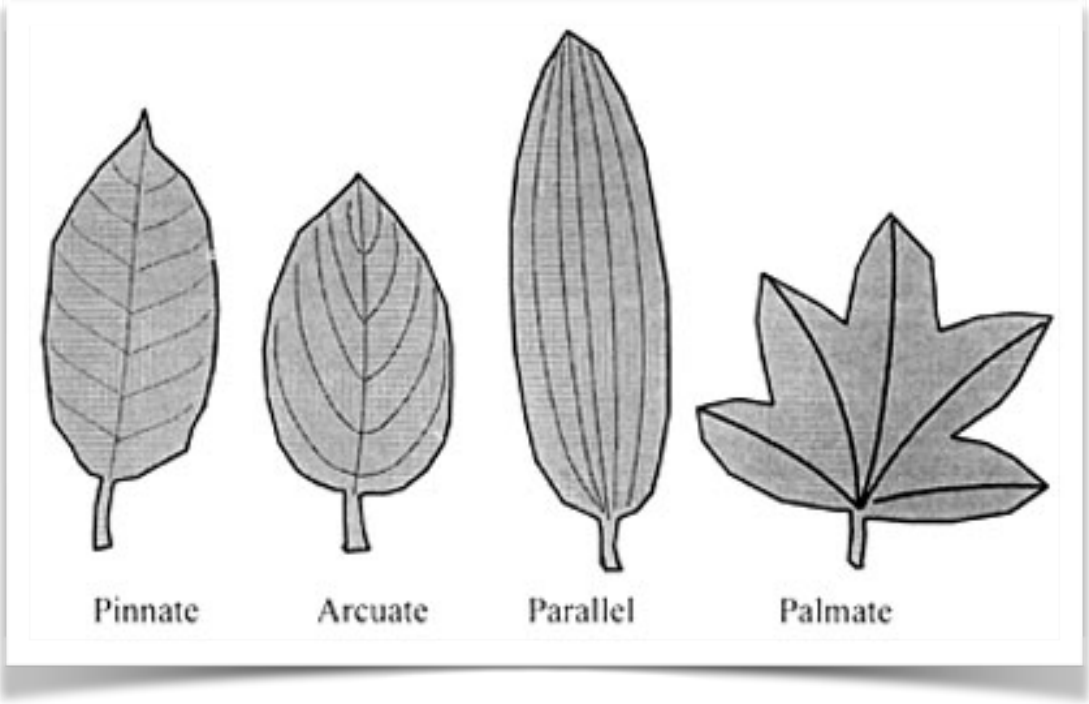
Leaf Bases:

What does it look like where the stem meets the leaf?



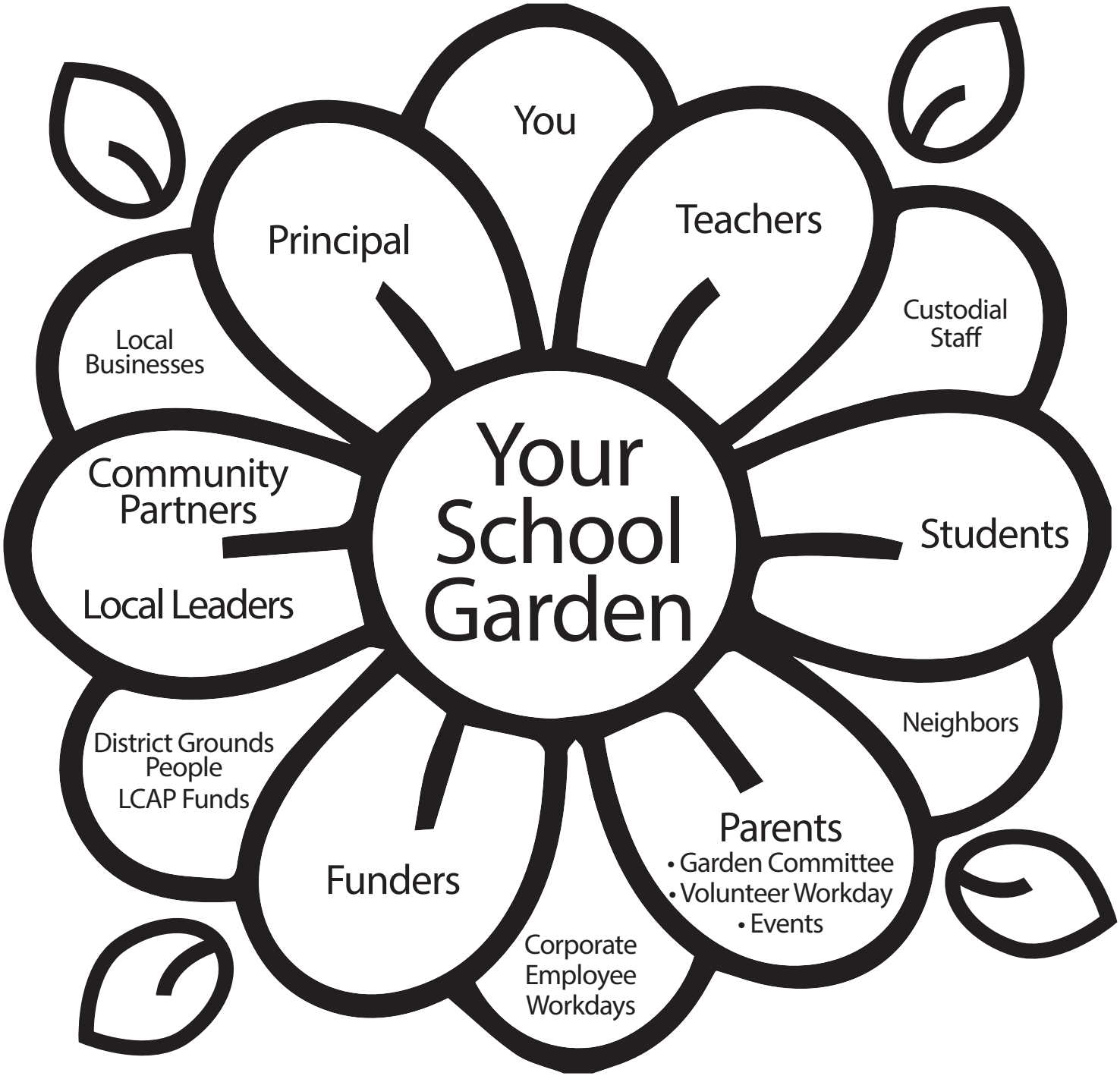
Leaf Venation:

What is the pattern of the leave's veins?



WCS DIGS Classroom Activity

Growing a School Garden Program



• Start Small • Keep It Simple • Make a Plan
• Involve Students, Families, Teachers & Community

WC DIGS PD Workshop

Egg Cartons in the Garden

The following two activities use egg cartons and natural materials from the Garden or landscape to teach math and science while exploring the natural world. If egg cartons are not available, use cups or trays.

Soil Discovery:

Profiencies, Vocabulary and Concept Mastery

Organic matter: Carbon-based compounds, originally derived from living organisms (dead leaves, roots, dead animals)
Minerals: a solid inorganic substance of natural occurrence. (rocks, crystals, sand)
Tool Safety (trowels)
Hyposthesis: What kinds of things do you think you will find?
Catagorizing
Presenting to others

Requirements

Materials: Egg cartons, trowels, soil, (optional) magnifying glasses
Time: 15-60 minutes
Space: can be done in the garden or playground
Participants: Kindergarten through 5th grade (great for younger students)

Directions

Prepare: Tell students about safety with trowels and for older students, explain about the difference between organic matter and minerals. Let them know that both types of materials are found in the soil. Hyposthesize about what types of things might be found in the soil if we look closely.

Explain: Have students dig in the soil. They may want to use magnifying glasses but it is not necessary. Give students the challenge of finding 12 different categories of items that make up the soil. Have them fill the egg carton with each type of item in each section. Give them time to walk around and share with 3 different classmates their soil "treasure". Create a closing "ceremony" where everyone returns their special items to the soil. Share out about what sorts of things were found and try to classify them as mineral or organic compounds.

Questions for Unpacking:

Did you find anything that surpirsed you? Is there more organic matter or mineral matter? How can you tell if something is organic or inorganic? What is your favorite thing that you found? What did you learn?

Collecting and Using Math Manipulatives

The purpose of this activity is to support any other math lesson where groups of 10 can be used.

Profiencies, Vocabulary and Concept Mastery

Sorting and Counting: sums of 10, factors of 12
Observation and Visual Arts: finding and using natural objects in creative ways
Collaboration with others: working in small groups to acheive a goal

Requirements

Materials: Egg cartons, a place to collect things from nature
Time: 15-60 minutes
Space: can be done in the garden or playground
Participants: Kindergarten through Adult

Directions

Prepare: Put students in groups of three or four and give each group an egg carton. Have them decide how to devide the “egg sections” of the carten evenly amongst themselves. Brainstorm small items they could find in nature: ideas of small stones, flower petals, leaves, small sticks.

Explain: Give the students time at the beginning of a math class to go out and fill the egg carton with 12 sets of 10. Ask them to choose 12 things from the garden or landscape that are small enough that 10 of them fit into one "egg" on the carton. Remind them to be gentle and not to over-harvest from living plants. Tell them to take care that their items are in good shape.

Links to Learning: When students are done collecting, Have them use their items in class as they would use other math manipulatives.

Ideas for activities:

On the desk, have students create rows of their items using sums of 10. Ask them to fill the desk and finish the lesson by taking photos of each group's work to display in he classroom.

Collaborate with teachers of younger grades than yours. Using the manipulatives, have students create equations on their desks for younger students to walk around and try to solve...

Questions for Unpacking:

What did you like about this activity? What was the favorite thing you found? When you were looking for items, did you notice anything interesting in the garden? How did it go working with your group? What were the challenges? What were the strengths of each group member?

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.* ***Zuchini*** *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 demonstration, but not necessarily practical for making pizza.*

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 you would tomatoes.*

* = 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)							

*Planting and Harvest Tips: 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.*

*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 usk and puncture kernel with your fingernail. If the kernels are fat and milky, the ear is ready to harvest. Eat raw, steamed, or boiled.*

* = 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)		

Planting and Harvesting Tips: ***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.*

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)						

Planting and Harvesting Tips: 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 Secton 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.*

* = 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)												

*Planting and Harvest Tips: 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.*

Salad Garden Beds

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Lettuce (50 days*)												
Spinach (50 days)												
Carrot (55-75 days)												
Beet (45-60 days)												
Nasturtium (40)												
Radish (35 days)												
Celery (90 days*)												

*Planting and Harvest Tips: **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.*

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