8.

PLANTING, HARVESTING, AND COOKING IN THE GARDEN

Food-system gardens force us to realize that eating is an agricultural activity. The work that goes into producing food is hidden from us in the grocery store and this prevents us from connecting to what we eat in a deeper way. What fuels our bodies? How much food do we need? Where does our food come from? How much energy is needed to feed a family? How does the land provide? What is the real cost of growing a meal? School gardens illustrate what a food system looks like, from planting to harvest. They teach important lessons about how we nourish ourselves. In this chapter we will discuss techniques for using a school garden to teach about food systems. We will discuss ways to negotiate planting, harvesting, and cooking with students; what crops are handy in this setting; and what tools are useful during this process. These gardening tasks require care, but with strategic planning and preparation students are adept at taking them on. Certain crops are must haves in the school garden as they are easy to grow, easy to clean, and easy to prepare. Along with a primer on these must-have edibles, we will also provide several tried and true recipes that have been tested and approved by many students over the years in the back of the book.

EASY SCHOOL GARDEN CROPS

Cole crops	*Snowy winter planting times*	*Rainy winter planting times*
Broccoli	June–August	February–September
Brussels sprouts	June–August	April–June
Cauliflower	June–August	March–April, September–October
Collards	June–August	January–February, July–September
Kale	June–August	January–February, July–September
Greens	*Snowy winter planting times*	*Rainy winter planting times*
Arugula (rocket)	April–August	Year round
Chard	April	Year round
Lettuce	April–June, July	Year round
Mustard	April–June	January–March, July–September
Spinach	April–June	January–March, September–December
Root crops	*Snowy winter planting times*	*Rainy winter planting times*
Beets	April–June	February, September
Carrots	May–June	April, August–September
Radishes	April–September	Year round
Tubers	*Snowy winter planting times*	*Rainy winter planting times*
Potatoes	April–June	March
Sunchokes	April–May	Year round
Alliums	*Snowy winter planting times*	*Rainy winter planting times*
Bunching onions	April–May	July–September
Garlic	March–April	October–November
Leeks	April–May	Year round
Legumes	*Snowy winter planting times*	*Rainy winter planting times*
Beans	May–June	April–July
Peas	May–June	Year round
Sun-loving fruits	*Snowy winter planting times*	*Rainy winter planting times*
Cucumber	May–June	April–June
Peppers	May–June	May–June

Sun-loving fruits (cont.)	*Snowy winter planting times*	*Rainy winter planting times*
Squash (many varieties)	May–June	March, June
Tomato	May–June	May–June
Edible flowers	*Snowy winter planting times*	*Rainy winter planting times*
Borage	May–June	Year round
Calendula	May–June	January–June
Nasturtium	May–June	January–May
Sunflower	May–June	February–August
Perennial herbs	*Snowy winter planting times*	*Rainy winter planting times*
Rosemary	May–June	Year round
Thyme	May–June	Year round
Sage	May–June	Year round
Mint	May–June	Year round
Chives	May–June	Year round
Oregano	May–June	Year round
Annual herbs	*Snowy winter planting times*	*Rainy winter planting times*
Parsley	April, August	Spring, fall
Coriander (cilantro)	June	January
Dill	April–June	April–June
Basil	June	May–July

PLANTING

Planting vegetables from seed or from small seedlings is a delicate task. While it may be daunting to do this with an excited class of second graders, a little breakage here and a little seed drowning there will not matter much. Students love this part of gardening. Planting is a necessary experience for student and while it *does* require a bit of care, they will learn to plant properly with good instruction and demonstration. Often it is a student's first experience tending a garden, so be prepared and plant a little extra. Excess can be given away to a food bank or sold at a school event.

Students planting mustard seeds.

Healthy seedlings, ready to be planted out.

Two effective planting methods are direct seeding or planting with seedlings. Most crops can be directly seeded in a school garden, but you may bring your garden a few weeks closer to harvest by planting out seedlings purchased at a local nursery. A good nursery will carry a wide variety of vegetable seedlings for you to choose from. Established garden projects sometimes decide to invest in a greenhouse and produce their own seedlings.

A note on class management when planting

Both direct seeding as well as planting seedlings require similar student management. Divide your class into smaller groups when planting. Have one or two tasks or activities on hand that the other students

Harvesting broccoli. *Photo by Linda Myers*

Student management during planting:

- ✓ *Divide the class into smaller groups and rotate them.*
- ✓ *Have a menu of activities for the remaining students.*
- ✓ *Encourage parent volunteer help on planting day.*
- ✓ *Discuss crop details at planting site with smaller group.*
- ✓ *Broadcast tiny seeds.*
- ✓ *Individually plant larger seeds.*

can easily do while one group is planting with you and requiring all your attention. If you have parent volunteers they can lead one of these tasks. It is easier to explain the planting process and demonstrate the care it requires to a smaller group of six to ten students. Plan to discuss the crop you are working with at the planting site: the seed size in relation to seed depth; the time until germination and harvest (if direct seeding); or the number of days until maturity (if planting seedlings). The back of a typical seed packet has specific information; have your students find and share it with the group if their age and literacy level allows. Take advantage of the smaller audience and ask questions that encourage deeper thinking: "Why do we need to space the chard plants like this?" or "What is happening to the seed before it germinates?"

Direct seeding

Direct seeding means planting seeds outside in the garden soil without first starting them in a greenhouse. Planting a seed directly in the ground begins a life cycle that students will continue to observe throughout the school year from germination to flower to seed again. Broadcast seeding is useful for manipulating tiny seeds (carrots, radishes, beets, lettuce, and spinach). Larger seeds such as squash, peas, and beans can be individually planted by students. Soil temperature is an important factor in seed germination. Pay attention to when you plant during the year, the climate, and the weather conditions as these factors will affect germination rates. Seed packets usually mention the

SEED SAVING

In a school garden some crops and flowers should be left to go to seed. Students should understand that pulling a carrot out of the ground interrupts the life cycle of that plant. However, if students are encouraged to leave a few carrots undisturbed they will see the plant shift from root growth into seed production. Another teaching opportunity will arise later in the collection of seeds from the flowers. Seed saving is a powerful activity for students in the garden; it is a life skill.

Easy seed saving plants: calendula, coriander, godetia, sunflower, beets, chard, nigella

Seed saving at a glance:

- Threshing and winnowing: separating seed from husk and then from chaff
- Storage: properly preserving seeds to prevent spoilage
- Germination testing: forcing seeds to germinate to test viability
- Record keeping: what was planted; when and where the seed was collected

See chapter 9, "Year-Round Garden Lessons and Activities," and Resources for seed-saving activities and seed suppliers.

Seed screens are easily made.

ideal soil temperature for a particular seed. Don't forget that tiny seeds need constant moisture; they won't survive a long dry spell.

Broadcast seeding means randomly sowing seeds over a prescribed area by throwing them; and it is a useful method for tiny, hard to manipulate seeds. It can also be a good method for small radish, beet, and spinach seeds. Let students help you prepare the bed. Have them rake the area clean of large debris and pull back a thin layer of soil to expose the planting surface. Hand out a pinch of seeds to each student as they encircle the area. Demonstrate how to evenly distribute the seeds over the surface, then have the students do the same. Distribute the soil on the margins of the bed in the same fashion to cover the seeds. End by lightly tamping the soil with everyone's hands before watering. Broadcast seeding provides an alternative to traditional rows of carrots or lettuces, and is a great time saver when working with younger students.

If you do want to plant carrots or lettuce in rows, place the tiny seeds in a small bowl and add a little bit of fine horticultural sand and mix. This is a good way to provide a little "weight" to the seeds and it also distributes the seeds nicely as the students place this mixture in rows along small trenches.

Germinated seeds that have been broadcast will require some thinning. Students are capable of doing this and I admire their small clever fingers when they do this task. Reference the seed packet for spacing requirements and demonstrate how to carefully reduce the number of

Students planting lettuce seeds.

Photo by Diana Samuelson

Sturdy trellises can be lashed together by students using twine and branches.

sprouts. Some crops *can* remain somewhat bunched however—lettuce lends itself well to a method called "cut and come again." The first round of leafy greens can be cut, preserving the crown, and a second growth of leaves will provide a harvest a few weeks later.

Large seeds are easy to plant with students of any age. One or two fingers are all you need to dig a small hole to the appropriate depth and plant large seeds. (Planting depth should be approximately one and a half to two times the width of the seed.) Peas, beans, and cucurbits such as squash or gourds all have large seeds. Demonstrate where to plant, appropriate spacing, and how to mound the soil if needed. Peas or beans that climb require a trellis. Have students make one out of bamboo poles or even discarded tree branches.

Each year brought a different style of trellis to the garden. After pruning the massive pines on the school grounds, we lashed the leftover bendable branches together to create funky looking archways over the beds. We weaved twine in between the branches for snap peas to climb. Another year we were more organized and parent volunteers helped drive tree stakes into a few of the beds. Chicken wire was then spread across the gap and nailed to the stakes. These trellises were very sturdy and lasted several years with sweet peas and sugar snap peas constantly adorning them.—RKP

Seedlings

Many crops are more convenient to plant as seedlings as it saves time. Developing a relationship with your local nursery can have its benefits. Often nurseries will offer discounts to school programs and you can obtain young plants at a reduced cost. Cole crops (cabbage family, which includes broccoli), chard, tomatoes, and peppers mature faster in the garden if planted as seedlings. This is also true of alliums such as onions, leeks, garlic, and chives. Look for robust green leaves on stout plants when selecting seedlings from the nursery. Nursery plants that have been sitting too long often look stressed: too tall for their small containers, root hairs protruding from the bottom of the pot, and yellow leaves at their base.

Teach students how to correctly remove a young plant from its pot by massaging the base and gently pushing from the bottom of the pot while not pulling the stem. Take note of the roots; if they are tightly bound show the students how to gently untangle them. This prepares the plant for new growth and prevents it from becoming root bound. Dig a hole that reflects the size of the seedling's root mass. Place the seedling in the hole and gently pull the soil over the area and press

down firmly. Explain that tamping around the base of the plant eliminates any air pockets that could dry out the roots. Have the students plant the other seedlings in the same fashion. Check each planting with the students to ensure it has been sufficiently tamped down and is as upright as can be, and have them give the seedling a generous drink of water before moving on.

DIRECT SEED VERSUS SEEDLINGS

Direct seed	*Seedlings*
Arugula (rocket)	Broccoli
Beans	Brussels sprouts
Beets	Cauliflower
Carrots	Chard
Cucumber (or seedlings)	Collards
Lettuce	Garlic (cloves)
Mustard	Leeks
Peas	Onions
Radishes	Peppers
Spinach	Potatoes (tubers)
Squash	Sunchokes (tubers)
Turnips	Tomato

Healthy seedlings adapt quickly to their new home.

Planting potatoes and sunchokes

Kids listen with wide eyes when you explain how potatoes grow. They are easy to plant and grow to become buried treasure for students. They also illustrate another fascinating plant reproductive scheme. Botanically, potatoes are underground stems and their "eyes" are buds from where the new plant will grow. In school gardens, potatoes are most often grown from seed potatoes, which are small walnut-sized tubers that will produce a new plant. Once the potato is buried the buds grow to the surface in search of the sun. The new leaves then photosynthesize and send the energy to be stored underground as more potatoes. Purchase a bag of certified disease-free seed potatoes and have the students bury them in trenches in a bed. Space them at least ten to twelve inches apart and at least four inches below the surface of the soil. Mound the soil around your plant to keep new tubers covered as they only form on the stem above the original seed

potato. New potatoes turn green if they are exposed to the sun for a period of time and this green area produces a toxin that can be harmful to ingest.

Sunchokes (or Jerusalem artichokes) are also grown from tubers. This sunflower species is noted for its edible tuber that can be peeled and eaten raw or boiled and pureed into a hearty soup. The flavor of sunchokes resembles artichoke hearts, and they are legendary for their rather "windy" effects. Tubers can be ordered from seed catalogs, but are often shared among gardeners. They are buried in the ground, approximately two or three inches deep and one foot apart. Sunchokes grow into tall cheerful stalks with sunflowers. They bloom throughout the summer and are harvested in the fall.

NURTURING THE CROP

Once the crops are in the ground, the process of caring for and protecting them begins. Generally, remember that caring for crops requires routine tasks, all of which should be done by the students. Regular watering, weeding, mulching, thinning, and being vigilant about other critters enjoying and destroying your plants are activities that students enjoy.

HARVEST

The thrill of harvesting in the garden generates a lot of excitement; students gather the bounty, amazed by what sun and soil can produce. Without good preparation, though, the chaos and excitement can overwhelm the process. Teaching harvesting rituals, careful hygiene, and a proper order of events on harvest day will help you in the long run. For instance, students should know that after you have finished your introduction, they are to go to the bucket of soapy water to wash their hands. They know to get the container of scissors from the shed and place it on the cooking table, and they will be able to find the cutting boards, salad spinner, and plates and forks for their fellow students. Students feel independent and empowered when they can negotiate the garden systems on their own. Teaching rituals of proper food preparation and standardized harvesting methods will ensure a fun, meaningful harvest party.

Different crops have different harvesting requirements. Greens can be cut or pinched. Root crops and others that grow underground require some excavation and scrubbing. Students know they are free to pick and eat "at will" sugar-snap peas, snow peas, strawberries,

beans, cherry tomatoes, and edible flowers such as borage and spicy nasturtium. The crops mentioned in this section are hardy and require relatively little fuss. They are also crops that every school garden can experience at different times in the school year no matter what the local climate is.

EDIBLE CROPS BY HARVESTING METHOD

Cut	*Dig*	*Pick at will*
Lettuce	Potatoes	Peas
Spinach	Sunchokes	Beans
Chard	Beets	Carrots
Collards	Carrots	Edible flowers
Mustard	Garlic	Cherry tomatoes
Bunching onions	Onions	Berries
Chives	Leeks	
Herbs	Radishes	
Bok choi		
Arugula (rocket)		

Greens

As the parts of the plant that conduct photosynthesis, edible greens grow fast and copiously compared to the fruit, which takes time to ripen the seeds within. All dark, leafy greens (kale, chard, collards, lettuce, spinach) are packed with nutrients and are astoundingly easy to harvest. Students can snip leaves from the plants with a pair of child-sized scissors or gently tear them off. Some students prefer using scissors for harvesting greens and this ensures that a whole plant isn't pulled out by accident. As is mentioned earlier, lettuce can be planted thickly as a "cut and come again" crop, allowing for multiple harvests.

On harvest day, give each student a specific number of leaves to cut. This gives you control over how much of your crop is being used and how much you will have left for other classes. Depending on class size and the meal, you will vary the number of leaves per student. Usually ten leaves per student will make a generous salad. We have noticed that kindergartners tend to eat very little, whereas older students devour what they are served.

"Salad partyyy!" the class of third graders screamed when I appeared out of the garden shed wearing the orange apron that I always wore on harvest days. I carried two large bowls in my arms and descended the slight slope to the circle of straw bales where the students were waiting.

"What is salad?" I asked, "What crop?" Several hands shot up. I called on them all to reveal the answer in unison: "Lettuce!" they cheered.

A few weeks before, just after the school year started, this same group of third graders prepared one of our raised beds for planting. They added compost, evened out the surface, and drew back a thin layer of the rich, loamy earth to expose the planting area. We broadcast seeded many varieties of lettuce: black-seeded Simpson, Romaine, butter lettuce, red oak leaf, and other heirloom varieties.

Within a week we would begin to anticipate germination—the emergence of hundreds of tiny green mouse ear-like leaves; and now a few weeks later, it was time to celebrate with a salad party. The students each wielded a pair of scissors, ready to harvest.

"Each of you will harvest ten leaves of lettuce, and you know where to cut, right?" I asked. They did. They learned that if you cut the leaves above the crown this same plant would then continue to sprout new, young leaves for yet another harvest a few weeks later—a "cut and come again" crop. And that meant more salad parties.—RKP

(far left) A salad party.

(center) Cut and come again. *Photo by Brooke Hieserich*

(near left) Students with newly dug potatoes. *Photo by Jean Moshofsky-Butler*

Root crops and potatoes

Harvesting root crops such as radishes and carrots is as fun as finding buried treasure. Students can pull them directly out of the ground and there is certain to be discussion about who harvested the biggest root. Tools can be useful when excavating a bed of potatoes, or prying a reluctant carrot out of the soil; have trowels or a digging fork ready. Digging for potatoes, in particular, is one of the best gardening activities for any age group. Locating the firm rounds within the loamy soil is like finding gold. The transformation that takes place between the simple task of putting the potato in the ground and digging out the next generation of fresh new potatoes is miraculous.

Potatoes can be dug once the flowers or leaves of the plant have faded. Not much explanation is required for harvest; simply demonstrate how to carefully find the new potatoes without damaging them. (It is easy to accidentally slice them in half with a trowel.) Place a bucket of trowels next to the bed and have a bowl nearby to put the potatoes in once they have been unearthed. Scrub and rinse them in two buckets of clean, cold water.

The same harvesting method, using trowels if necessary, can be applied to sunchokes, the tubers of which remain buried in the soil after the leaves and flowers fade in the fall. Carrots, radishes, onions, leeks, and turnips will all also require some scrubbing after being pulled or pried from the earth.

Radishes, I thought, were the perfect crop for kindergarteners; they are easy to plant and they sprout extremely fast. The first year I taught in the garden I planted them with every class, it seemed. When the kindergartners harvested their first radish crop they held with pride the tight little red spheres that looked like candy. They washed and eagerly bit into their radishes. Immediately they loved them; I was so excited. Then a moment later the smiles turned to frowns and tongues started franticly pushing radish slaw out of their mouths and onto the ground. Too bitter, too spicy! All around the garden were little spits of radish. We cut back on our production from then on.—RKP

"At will" crops

You'll be hard pressed to find a single sugar snap pea on the vine in a school garden. Certain crops should be planted copiously for students to pick and nibble on at will. Strawberries, beans, snow peas, cherry tomatoes, and edible flowers such as borage and nasturtium are all fair game in the garden. Teach students to harvest carefully with two hands; one holding the vine or branch stable, the other pulling gently at the fruit.

Harvesting is the culmination of months of work in the garden, and is only surpassed by preparing and eating the harvest.

Rainbow chard makes a delicious snack.

Photo by Stephanie Ma.

THE FEAST

Eating from the garden is a powerful and memorable activity in the outdoor classroom. It directly engages the senses of sight, smell, taste, and touch. After a day of sitting at a desk, coming to the garden allows for very different kinds of learning. As mentioned, studies have shown that students exposed to fruits and vegetables through a school garden are much more likely to incorporate them into their eating habits later in life. Countless parents have reported that their once salad-hating child was now eating greens at home and was even schooling them on how to properly make vinaigrette dressing. Growing, caring for, and harvesting food give students a new perspective on vegetables and eating.

A note on proper hygiene and zero waste

Proper hygiene while eating from the garden is important. We recommend conducting some research into your local health codes. Meanwhile, for preparing and eating snacks in the garden, there are a few techniques for ensuring cleanliness. Before handling food always have a warm bucket of soapy water available for the students to wash their hands.

On harvest day, set out two separate buckets of clean water to wash greens and other vegetables. One bucket should be used for an initial scrub. Rinse everything again for good measure in the second bucket. A variety of brushes are useful for stubborn dirt. Occasionally, scrub these buckets down with a little soap and rinse well.

Wash any dishes, utensils, and cooking equipment such as pots and pans in a hot dishwasher after use. Otherwise have a dish-washing station set up for the end of class: one bin of warm soapy water, one for a rinse, and a last one with diluted bleach water to kill any pathogens. Please note that these are general guidelines and that you should research and develop appropriate hygiene standards for your particular school garden. Most outdoor picnics end with garbage cans overflowing with paper plates, plastic forks and knives, plastic cups, and napkins. School garden feasts are similar to a picnic but, instead of filling landfills with the debris of this style of event, school garden feasts are a ripe opportunity to instill a zero waste ethic.

Create a waste system in your garden that teaches students about where their "trash" ends up. One bin should be marked "compost" for all food scraps and other easily biodegradable items. The second should be marked "recyclables" for items such as plastic water bottles, cans, foil, and glass. The third should be marked "landfill" for items for which you have no alternative such as plastic wrap. For clarity, the bins might be different colors (green, blue, and black). Teach students how to properly dispose of items from their lunch or a garden snack. You'll be surprised at how little goes into the landfill bin when you are able to divert trash to either compost or recycling. Create a competition on how little each class sends to the landfill.

Compost any paper plates. If compost systems do not exist yet, invest in reusable plates and forks. Wash dishes, as described above, if a dishwasher is not available at your school. Buy supplies such as oil and vinegar in bulk and recycle empty bottles. Send nothing to the landfill if at all possible.

Set up

A large plastic container with a tight fitting lid in your garden shed labeled "Cooking" will be one of your best organizational tools. The container will have supplies such as paper or reusable plates, reusable forks, cutting boards, knives, a salad spinner, a wok, a small bucket, a portable stove, a few large bowls, tongs, a jar for making dressings in, a mortar and pestle for crushing garlic or nuts, and biodegradable/non-toxic dish soap. In an additional "Condiments" container, keep nonperishable supplies such as soy sauce or tamari, salt and pepper, vinegar, and spices of any sort. Keep perishables like Dijon mustard, olive oil, and lemons in the school refrigerator.

A broad, sturdy table that students can gather around is an ideal staging area. Parent volunteers are very useful on feast days to help set up, cut, clean up, etc. Place the appropriate supplies on the table: stove for heating if needed, bowls for harvested and washed vegetables,

salad spinner if appropriate, tongs, cutting boards and knives, plates and forks, and any other necessary ingredients.

COOKING

Some crops can be eaten right off the vine, some can be prepared and eaten raw (salads), while others require cooking (sautés). We offer a few examples of how to prepare a harvest from the school garden. Don't be afraid to experiment.

Off the vine; out of the ground

Carrots, strawberries, beans, snap and snow peas, cherry tomatoes, and edible flowers provide immediate snacks in the garden. Wash and eat! The connection between student and food created in that tasting is direct and indelible.

Salads

Salads of mixed lettuces as well as chopped salads of broccoli and carrots are the easiest meals to prepare with students; they require no heat. Whip up a vinaigrette dressing with olive oil, vinegar, herbs, salt and pepper, Dijon, and maybe some shallots or garlic from the garden. Students can help measure ingredients, harvest and chop herbs, and shake the dressing in a spare jar. Add this to your greens or chopped broccoli salad and you're ready to eat.

Salad parties created with the many varieties of lettuce deserve special note. They are easy to grow and prepare, and they are a great initiation to a lifetime affinity for vegetables and healthy eating habits. Fresh, crisp lettuce mixed in a bowl with calendula and nasturtium, herbs, and tasty vinaigrette makes for a quick and yummy snack.

Cooking over a stove in the garden

A quick stir-fry of onions, chard, and soy sauce is delicious added to cellophane rice noodles that have been soaking in warm water. A sauté of chard, collard greens, and pea shoots is accented nicely by a little honey and lemon. A great way to bulk up a meager harvest is to prepare pasta beforehand and add it to your sauté of greens. These meals can be thrown together in the wok and served immediately. A single-burner butane stove or a cast iron camp stove that connects to a propane tank works extremely well. Search online for either of these products. They typically cost between $60 and $90.

A sun oven (also called a solar oven) is another great piece of equipment to have in the garden—use it a to roast potatoes or bake cookies. There are designs to build your own available on the Internet, or you

Quick steps to prepare for a cooking day:

- ✓ *Identify parent volunteers.*
- ✓ *Check for adequate supplies such as plates and perishables.*
- ✓ *Set up hand-washing station.*
- ✓ *Set up dish-washing station.*
- ✓ *Set up produce-washing buckets.*
- ✓ *Set up stove and cooking area.*

Washing collards.

Using a stove in the garden.

can purchase one. Although they can be costly (prices range from $100 to $250), they are well worth the expense.

Put potatoes in the oven in the morning and allow them to cook most of the day until the class arrives in the afternoon. (Be sure that the oven reflectors follow the sun as the day goes on or the temperature will drop significantly.)

Once food has been prepared, have students serve each other. On the serving table you should have tongs, a pile of plates and forks, and perhaps a couple of sliced baguettes from a local bakery to supplement. Create a place for students to sit with one another and enjoy the meal or snack. Sit with them. Encourage discussion. Listen to reactions and comments. This is one of the calmer moments in the garden with students. Creating this environment during a meal reinforces the good habits of taking the time to eat, sit, and enjoy each other's company.

Planting and harvesting the crops to produce the feast are daunting steps to accomplish before taking the first bite. Strategic planning and preparation, good clear instruction, and trust in your students can make all of this remarkably easy and fun. Have your systems set up, teach your students rituals, and stick to them. At the end of the day, your students will go home practitioners of organic gardening, ambassadors of healthy eating, and champions of fresh, local food.