

Keeping the Garden Growing

Growing and Maintaining the Garden with Students

Preparing the Soil for Planting

Bed preparation is one of the most important steps toward a thriving garden. Healthy, living soil will produce healthy plants less prone to pest and disease problems. Your primary goal in bed preparation is to loosen the soil so that roots, water, and air can easily penetrate it. Bed preparation also includes mixing in compost or other soil amendments.

Before you start breaking ground, check the soil moisture by squeezing a handful of soil into a ball in the palm of your hand. The soil should keep its shape when you open your hand but crumble when touched. If soil sticks to your shoes or tools, it is too wet to dig. Digging wet soil will damage the soil's structure and leave you with huge dirt clods instead of the crumbly texture ideal for gardening. If your soil is dry and dusty, water it thoroughly, and let the area sit for a few days to attain the moisture level described above.

If you tested your garden soil for nutrient content and texture (sand, silt, and clay content) when planning your garden, use this information to decide what, if any, amendments you will add. Adding organic matter can improve the fertility and texture of any soil and is especially helpful if your soil has a high clay or sand content. You can add organic matter in the form of compost, sterilized manure, mulches, or cover crops. As these materials break down in the soil, they slowly release a wealth of nutrients to your plants. When you harvest, you remove those nutrients, so it is important to add organic matter each time you plant.

If your site is small, and the soil is not too compacted, you can turn the soil using spading forks and shovels. This method gets more people involved and is less expensive and more energy efficient than using machines. But if your soil is compacted, it may be best to turn it initially by machine. Rototillers are a good solution for sites that are less than an acre. For larger sites, you might consider using a small tractor with plowing attachments.

Tips for working the soil with students

- When using tools, always review safety measures first, such as keeping metal parts of tools below the hips.
- Demonstrate how to accomplish the task at hand before having students get their tools.
- Break large tasks into small tasks, and give everyone a job.
- Consider using trowels instead of large tools to prepare the soil. This will allow everyone to participate simultaneously.
- Students can add a layer of compost to the soil by scooping handfuls from a pile or wheelbarrow and sprinkling them over the bed.

Planting with Students

Starting seeds indoors

Starting seeds indoors allows students to observe germination and provides a controlled environment for young plants. By starting plants indoors in spring, you can give your garden an early start while the weather is still cold. Start your seeds in any container that is 2–3 inches deep with drainage holes. Yogurt

containers, small milk cartons, and similar small containers work well. Old six-pack seedling containers are ideal, and students can bring them in, or nurseries can donate them. Fill your containers with seed-starting mix. You can purchase this at garden centers, or make your own by mixing equal parts horticultural sand, compost, and coco pith fiber.

Before planting, wet the soil mix so that it is as damp as a wrung-out sponge. Fill your containers, then lightly tap them on a surface to settle the soil. Fill in with more soil if this process reveals that they are not full enough.

A good rule of thumb is to plant seeds about two to three times as deep as they are wide. Check the *Vegetable Planting Guide* or seed packet for specific guidelines. After planting your seeds to the appropriate depth, water them with a gentle spray of water, let the water soak in, and repeat until water has penetrated to the depth of the seeds.

Tips for sowing seeds in containers with students

- ✓ Enlist your students to help collect and wash out containers such as empty yogurt containers, small milk cartons, etc.
- ✓ Choose the space carefully where students will be filling their containers with seed-starting mix. This works well outdoors where it is okay to spill soil; it can also work indoors if you cover the ground with a tarp, or teach students to carefully fill containers over the top of a wide-mouthed container of soil.
- ✓ Use large seeds, like beans and peas, with young children who are developing their fine motor skills.
- ✓ If watering indoors, you can use a spray bottle on a mister setting to avoid children overwatering.
- ✓ You can create fun containers such as root-view cups, wheat heads, or newspaper pots, all of which are described in Life Lab's *The Growing Classroom* (lifelab.org).

Sowing seeds directly in the garden

Some crops grow better when they are started directly in the garden. Root crops such as carrots, radishes, and beets don't transplant well; crops such

as corn, beans, peas, squash, melons, and cucumbers don't transplant well either. A seed packet will have information about whether the seed does best when started in a container or when direct sown. To direct sow a seed, prepare your garden soil. Then refer to the seed packet for instructions on how deep and far apart to plant your seeds.

After you have directly sown your seeds in the ground, it is important to keep them moist until they germinate. Water with a watering can or hose attachment that delivers a gentle sprinkle. You may have to make 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; 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 it daily.

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

Tips for sowing seeds directly with students

- ✓ For seeds that are to be planted less than an inch, help students dig a small furrow to the appropriate depth, space seeds down that furrow, and cover with soil.
- ✓ For seeds that are to be planted an inch deep or more, have students space seeds along the top of the soil and then "drill in" each seed using their fingers. They can measure their finger to find an inch (i.e., up to the second knuckle) and then drill each seed down to that depth.
- ✓ For spacing seeds, students can make and use a sowing string, which is a string with stakes on either end and colorful tape spaced evenly (e.g., every 4 inches). You can connect with math by asking students questions: *If I am supposed to plant these plants 12 inches apart, how can I use this string to space them accordingly?*

- ✓ Alternatively, for spacing seeds, you can bring out rulers, and have students measure the distance from one planting hole to the next by using rulers or using their “farmers’ measurements,” such as the width of their fist or the distance from their thumb to their pinkie on their open hand.

Transplanting Plants

When are your plants ready to transplant into the garden? When seeds that were started in containers have at least two sets of true leaves, and their root systems are established enough to hold soil around them, then they are ready to be transplanted or moved from their containers into the garden. You can transplant young plants from seeds you and your students started yourselves, or you can purchase young plants (also called seedlings or transplants) at a garden center to plant in your garden.

To transplant, dig a hole in your soil about the same size as the container your seedling is in. Then remove a plant from its container by turning the container on its side and squeezing the sides of the container gently to wriggle out the plant. Make sure not to remove the plant by pulling hard on its stem. Then place it in the hole you made in the soil, and fill it in to the same depth that they were in their containers. Refer to a planting guide or seed packet for spacing information.

After transplanting, water transplants with many passes using a gentle spray, letting the water seep in between passes or by trickling water directly around the transplant’s root zone. Use your finger to make sure there is moisture at the depth of the roots.

Protect your transplants from pests, like birds, by covering the young plants with upside down strawberry baskets, netting, or floating row cover (thin, lightweight fabric available at garden centers).

Tips for transplanting with students

- ✓ Have your students mark out the spacing of the transplants before planting them in the bed. First,

help them find the spacing information on a seed packet or plant reference guide. Then they can mark the spots to be planted ahead of time by using rulers or “farmers’ measurements” to measure the appropriate distances and then sticking trowels or plant markers into each spot where a plant should go.

- ✓ For younger students, wriggling the plant from the container can be tricky. Instead, have them dig the hole. Then you can place the plant in there, and the student can fill the hole in.
- ✓ Teach students to “tuck in” their transplants with a gentle pat on the surrounding soil or by using their thumbs and index fingers to create a triangle around the stem and give their plant a “triangle hug.”

Watering

Water is the most basic plant-growth requirement: without enough water, garden plants will ultimately die. Therefore, it is essential to work out a system to get water to your plants regularly.

Some school gardens are watered by hand, and you can see tips below for involving students in watering. The challenge with hand-watering, however, is the sheer amount of time required (with or without students). For this reason, many school gardens use drip irrigation. Drip irrigation refers to systems that slowly drip water onto the soil surface at roughly the same rate as it soaks into the ground. This method effectively meets most watering needs in garden settings. It is water-saving and time-efficient, and it allows for thorough irrigations for both seedbeds and mature plants. Systems are easily designed to keep water out of non-crop areas and to prevent future weed problems. Visit www.savingwater.org for information on effective irrigation or www.dripworks.com for irrigation supplies. Dripworks provides a 10 percent discount and a free irrigation system design service for school gardens!

Tips for watering with students

Watering is a garden activity that many students enjoy. Your students might not deliver all the water the

plants need consistently, but it is still a great idea to involve them in watering and caretaking sometimes. As with any gardening task, students are most engaged and learn the most when everyone has a job to do:

- ✓ Give each student their own “watering can,” which can be an empty, washed milk jug with holes poked in the lid; or a small yogurt container with holes poked in the bottom nestled into a second, solid yogurt container. When they arrive at the plant, they simply lift the cup with holes, and let it drip over the base of the plant.

Before sending students 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, especially when there are newly planted seeds in the soil. Teach them to make a pass with the water, wait for it to completely soak in, then make another pass, wait again, etc.
- ✓ You can check that you have watered to the level of the roots, rather than just the surface, by poking a finger down into the soil to root depth and feeling for moisture.

Mulching

Mulching is the practice of adding a layer of material to cover the soil, such as straw, leaves, or other organic materials. Mulching can benefit your garden by reducing weed growth and keeping moisture in the soil. When choosing a mulch, consider availability, possibility of weed seeds, and possibility of plant-discouraging qualities. Finding a local, abundant source of mulch saves money and resources. Collect leaves from a tree at your school to use as mulch, or ask parents to send their old newspapers or cardboard boxes to school. Straw is a great mulch and is inexpensive; one bale goes a long way.

Tips for mulching with students

- ✓ Mulching is an ideal task for a large group of students. Many small hands can easily do the work of tucking handfuls of straw around and between plants.

- ✓ You can teach students to fill in around plants with a thick layer of mulch, lightly pressing it down to create a compact layer, and tuck it neatly into the edges of the bed, as if they were tucking the plants in for bedtime!

Cover Cropping

Cover cropping is the practice of planting an area with a crop that covers the soil surface to prevent or reduce erosion, and then, once turned under the soil, improves soil structure and fertility. This is a way to enrich an area of the garden that is not currently being used for harvestable crops (e.g., a bed that will not be used for the summer). 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 erosion and nutrient leaching, and help minimize weed growth. Most cover crops are relatively easy to grow and can be interesting, low-maintenance annuals in the school garden. Cover crops can be chopped into the soil or can be removed and turned into compost, which can then be added back into the bed. Ideally cover crops are cut down before they set seed, so they don’t sow a new (undesired) crop. If you turn them under the soil, wait two to three weeks for the cover crops to break down before planting in the bed. For information about specific cover crops that work well in your area and when to plant them, contact your local Cooperative Extension office or garden center.

Tips for cover cropping with students

- ✓ Many legume (bean/pea) cover crops have large seeds that are easy for students to plant by “drilling” them into the ground with their fingers and then covering up the hole.
- ✓ Grass cover crops have small seeds that are fun to broadcast (or scatter) and then lightly rake into the soil.

Weed Management

One of the never-ending garden maintenance tasks is weeding. On the one hand, weeds are problematic in gardens because they compete with crop plants for sunlight, water, soil nutrients, and space. They can also serve as habitat for garden pests, or make the garden look untidy. On the other hand, sometimes weed species play a beneficial role in the garden. Weigh the potential benefits against problems they may be causing. They can improve the soil through root penetration and increased organic matter; they can provide a habitat for birds, worms, insects, and other animals; and some are edible or can be used as medicinal plants. Weeds are also useful for student investigations (e.g., students studying roots can pull up a variety of weeds and compare and contrast their root structures).

Weed Prevention Strategies

To prevent weed problems:

- Water only where you want to see plants growing. As much as possible, keep water off non-crop areas such as paths.
- 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; it's easier than removing big weeds later.
- Remove weeds before they go to seed or otherwise spread.
- If you have many weeds and few helpers, decide which weeds should be given highest priority and tackle those first.

Weed Elimination Methods

When choosing a method for weeding an area of the garden, consider which will work best with your weeds, your students or volunteers, and the current conditions in your garden, such as soil moisture and weather. You may want to use different methods in different areas of your garden.

- Hand pulling

- Digging (for big weeds with deep roots)
- Hoeing
- Mulching (with some species this works even once weeds are growing if you mulch thickly enough)
- Mowing or using a weed whip
- Solarizing (covering with clear plastic for several weeks during warm weather to let heat kill weeds)

Tips for Weeding with Students

- ✓ Before weeding with students, water the weedy areas well so that the weeds come up more easily. Students get frustrated if they can't pull the weeds out but feel great satisfaction if they can!
- ✓ Before weeding, clearly mark any plants to keep so they don't accidentally pull out your best crops.
- ✓ Have student count their weeds; make a weed chart.

Pest Management

Healthy plants have fewer pest problems. Keeping soil fertile and irrigating adequately will prevent many pest problems from occurring. Follow the guidelines below for ecologically sound pest control.

- **Look for disease- and pest-resistant varieties:** Many crop varieties are less susceptible to disease and pest problems. Information on resistance is often available in the variety descriptions in catalogs and on seed packets.
- **Choose appropriate crops 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, choosing perennials that have consecutive

flowering periods and limiting the use of insecticides that can kill beneficial species as well as pests. Adding a birdhouse or a water feature, such as a fountain or bath, can also help attract birds.

- **Practice crop rotation:** 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 a different crop each year in any one location, on a three-year cycle, you can avoid many disease problems.
- **Use physical barriers for pests:** Often the most damaging pests to our gardens are rabbits, squirrels, and gophers. When properly secured, row cover (available at garden centers) is an effective barrier to non-burrowing vertebrates. Gophers and other burrowing pests can be kept out of beds lined underground with gopher baskets or hardware cloth (wire 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 Students

- ✓ Hand-picking pests is a method that is rarely viable in commercial operations but effective when you have twenty students eager to help out. If you have chickens, you can feed snails and other pests to the chickens. Note that moving them to an area near the garden will not be effective because they will work their way back in.
- ✓ Involve students in using rolled up newspaper or boards to capture critters. A board on the ground will attract snails and slugs. Students will enjoy turning over a board to find creepy crawlies.
- ✓ Let students research and identify beneficial insects and pests. The more they learn, the less likely they will be to indiscriminately squish insects.

Sustaining Community Engagement in the Garden

As a FoodCorps service member, it can be really exciting to think about designing and installing a new garden. A little less flashy, but no less important, is the plan for maintaining that space once it's built. To avoid building

something that, over time, will become an abandoned, weedy patch, it is essential to think through what a garden will take to maintain at the outset.

Making a Garden Maintenance Plan

As a FoodCorps service member, you may only be at your school for a year or two, so it is essential that you only install elements that you have strong reason to believe will be cared for over time. The best way to achieve that goal is to make a garden maintenance plan together with other garden supporters at the outset. An overall plan for maintaining your garden might include the following:

- A schedule for class use of the garden (if it is a shared area)
- A volunteer work schedule
- A watering schedule
- A plan for weeding, fertilizing, and composting
- A supply-ordering system
- A summer maintenance program

Ideally, students will do much of the garden maintenance (weeding, watering, and composting) as part of their activities in the garden. For any remaining maintenance, you can make a task list that rotates among participating classes, parent volunteers, or other garden supporters.

Summer Garden Maintenance

Here's one tricky thing about school gardens: Summer is generally the most productive time in a garden but the quietest time in a school! Here are some ideas to keep your garden going during the summer so that in the fall it will be full of treats to harvest instead of weeds.

Prepare Your Garden for the Summer

Here are some things you can do before the end of the school year to encourage garden health and growth over the summer:

- Weed thoroughly!
- Install drip irrigation on a timer so that the garden gets watered over the summer.

- Plant crops that can thrive on a plant even after they've matured as well as crops with long days to harvest. This way your students can come back in the fall to tall sunflowers, popcorn, and winter squash, for example, instead of zucchinis the size of baseball bats.



Garden Guardians

You can ask families or neighbors sign up to “adopt” the garden for a week or two during the summer. Leave simple directions on where to water and weed, and encourage your Garden Guardians to harvest the veggies and flowers that are ready for picking. This will not only serve as a simple thank you but also encourage your plants to keep producing fruit and flowers. Make a schedule for the summer, complete with phone numbers of the weekly caretakers so that they can find substitutes if summer plans change. Host a brief training to show each volunteer what to do during their week.



Host a Summer Program in the Garden

If possible, sign up to lead a summer school group, Sprout Scouts Club, or summer camp, and incorporate maintaining the garden into your activities with students.

