



School Garden Manual

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This is a **brief** review of the methods we practice in our gardens. Throughout this manual we ask that you contact us for more information: 513.221.0981 or youtheducation@civiggardencenter.org. No question is off limits!

Visit our website at civiggardencenter.org/k-12-education to join our School Garden Network, view our [monthly calendar](#) and check out our [Teacher Resources](#).

We also facilitate a school garden educator training called [Growing Our Teachers](#) and are happy to visit your school garden and conduct a [garden lesson](#) with your students. Don't forget about our amazing [Green Learning Station](#).

Forming a Team

Growing a healthy school garden takes more than just seeds and soil. Sustainable school gardens are an integral part of the school community. They rely on the combined efforts of teachers, administrators, facility staff, students and parents. Establishing a strong team from the beginning will instill a sense of ownership in the project that will bolster support when times get tough. Gardens that are supported by only one or two individuals often fail. We have worked with schools whose gardens fell into disrepair and neglect because the passionate individual who spearheaded the effort moved on to a new place. We can't stress it enough: building a solid team should be your first priority and a constant part of your school garden project.

Identify Stakeholders

In addition to those in the school community, include local organizations. They can bolster your assets by donating goods, providing volunteers and advertising your gardening achievements. Hold regular meetings and form subcommittees to divide up the work load. While it may seem easier to make decisions with a small group, a sustainable project will have several groups involved. Visit our website for a resource on methods for [involving community partners](#) for your school garden.

Here are some questions to consider when putting together a garden committee:

Who is already involved and are they willing to participate in a garden committee? Who else may want to get involved?

- Particular teachers?
- Community members?
- Afterschool clubs?
- Nonprofits?
- Garden clubs?
- Active parents?
- Administrators?
- Local businesses?
- Neighborhood churches?
- Libraries?
- Universities and colleges?
- Master Gardeners?
- Recreation centers?
- Political figures?

Making a personal ask is much more effective than sending out a mass email or a flyer home with students. As members join and meetings start to happen, be patient. The views and interests of the group may take time to determine. As with any venture, taking time to prepare will result in a more robust project. Some gardens are prefaced by one or even two years of planning before the first seed hits the soil, and that's ok!

Create Mission & Vision Statements

Each garden is unique and should be a source of pride for the community. What makes your school community special? How can you incorporate those aspects into the school garden? Once you have discussed these questions with your team, form a mission statement. Having a clearly defined mission will help explain the garden to potential stakeholders and volunteers. The mission statement can capture the eventual outcomes that you hope to accomplish, but there should be a vision for how to get there. One of our key learnings over the last few years of doing school garden work is that the vision should match the goals and the resources available. For example, if there is only one teacher who is enthusiastic about this project, then form the vision to start with that teacher. It's important to make sure that there is an achievable pathway forward with tangible benchmarks to measure success and progress. The

tendency when starting out is to go big right away, but the best idea is to start small. You can always expand, but it can be discouraging to have a large garden that isn't getting adequate use.

When articulating your goals for the school garden consider the following: Who? What? How?

Who will be using the school garden?

- Students?
- Local families?
- Younger siblings?
- Is this going to be a project for a particular grade level or the entire school?
- After school clubs?
- Teachers?
- Garden clubs?
- Grandparents?

If it's intended for the classroom, then it's extremely important that the teachers are on board. Without teacher buy in the garden will just be a novelty and not a main part of the curriculum.

What is the main purpose of the garden?

- Common Core enrichment?
- Hands-on exploration?
- Artistic inspiration?
- Beautification?
- Practice lessons in economics?
- Standards-based education?
- Scientific inquiry?
- Memorial to remember a staff member or student?
- To teach about health and nutrition?
- Teach students about agricultural careers?

How can the garden reflect the local community?

- How will teachers be supported?
- How will supplies be secured?
- How is the garden going to be funded? (there are annual costs)

Define Roles & Responsibilities

With any garden project there is stuff to do. A school garden project, in particular, requires coordination of efforts to make the desired outcomes a reality. Now that you have a group of people involved and a sense of where you're going, you should better know the key areas that will require attention. Some common ones include the physical development of the garden, outreach and publicity, recruiting and training volunteers, developing curriculum, scheduling classes, garnering resources and funding, etc. It will be necessary to divide and conquer to make sure that all of these things happen. A helpful way to do this is to form subcommittees. Members will appreciate knowing exactly what is expected of them and how they can contribute to the work. Some example sub-committees are listed below. You will likely need to tweak these based on your particular situation. It is also worth mentioning that the committee structure below assumes that the garden is being created, developed and managed by adults, which is usually the case in an elementary school setting. However, in the high school setting, some of the roles below should be filled by students. Having a succession plan is especially important in that setting.

Coordinator

Elect a chairperson (or persons) who will be the main liaison for the garden in the larger community. If at all possible this person should be paid for their time. Having a paid coordinator adds a level of professionalism and importance to the project. The coordinator will organize meetings, create a calendar so items are completed on time, oversee larger events, provide needed resources to teachers and students, and ensure the garden is maintained. This person should understand the unique aspects of how

your school operates. This might include knowing how to get a permit for access to the building on work days, knowing when particular school committees meet, what the chain of command is for making decisions, etc. The coordinator will also make sure seeds are available and that planting happens, get soil delivered, beds built or repaired and organize work days.

Public Relations

Responsibilities of this subcommittee may include volunteer recruitment and awareness-raising, representing the garden at school and/or community events, keeping the PTO/PTA informed of the garden activities, creating fliers, emails, or other publicity materials, capturing photos of the garden, social media, responding to email, etc.

Curriculum Development

Tasks may include compiling and making available curriculum, conducting teacher trainings, and developing new educational features in the garden (such as signage, a weather station, etc.)

Financial Development

Funding will certainly be necessary. This group will focus on that. This may include making proposals to the local community council, writing grants, asking for donations from businesses, etc.

Garden Maintenance

Even with whole classes of students visiting the garden on a regular basis there will still be times when the garden needs extra attention. Enlist the help of local gardeners to keep the garden growing properly. There may be opportunities for intergenerational learning to occur as students and community gardeners interact.

Never stop recruiting for your garden team. Members will come and go and as new parents, students and businesses join your community they will appreciate an invitation to participate.

Designing a School Garden

Once you've determined who will be using the garden and the purpose for its creation you are free to move forward into the design phase. Gardens come in all shapes and sizes. Some of the most successful school gardens we've seen have been just one or two plots tended by a few classes and parent volunteers. Leave Martha Stewart and Better Homes and Gardens on the shelf and design with kids in mind! Now that we're forming the garden, we need to re-examine the Who and What of the school garden:

Who will be using the school garden?

- **Age considerations:** The age of the students will impact the size of the beds that you use. For younger children, narrower beds are ideal so they can reach into them without stepping on the soil. Age will also influence the types of elements that go into the garden. A purely production-oriented garden for young children, for example, would be inappropriate. They will need more variety and things to explore.

- Class size: A classroom of 30 students will require a sizeable garden. A seating area that can accommodate the class will be necessary, especially if there will be lessons happening in the garden.
- Amount of classes: The number of classes and/or students using the garden will influence how many beds you will need. There may be a difference between the number of classes that you hope will use the garden and the number that actually do. Remember, you can always start with just a few beds and expand.
- Accessibility: Ensure all students will have access to the garden with wide, smooth paths.

What is the main purpose of the garden?

- This relates to the purpose that your team has set out for the garden. Some common activities will include gardening (of course!), exploring and playing, making observations and journaling. The activities that you envision and the type of garden will determine the elements that will be included in your design.
- Don't forget to leave an area just for worm digging!

Assessing the Site

Selecting a site for the garden is a crucial step that follows from your goals. Ideally, there will be a site that will be suitable for a garden that meets your goals. If not, you may need to revise those goals to fit with the site that's available. In general, your garden should be easily accessible to students and teachers and safety should be the top priority. Different plants require different conditions. In-depth knowledge of your site will help your team when choosing plant species and troubleshooting any issues. Use the following checklist as you start to assess different sites around your schoolyard:

- ✓ Safety
- ✓ Size - is it adequate to meet your goals?
- ✓ Access to water - consider catchment surfaces like roofs as well as tap sources like spigots
- ✓ Access to the site - is it easy/close to get to? Easy to get materials to?
- ✓ Amount of sunlight & shade - should have at least 6 hours of full sun for edibles and pollinator plants
- ✓ Topography - is it relatively flat? Are there any low spots that will collect water?
- ✓ Security - does the site require protection from wildlife or passersby?
- ✓ Visibility from classroom/street
- ✓ Noise - is it close to the street, playground, other noise sources? Will this be an issue for teaching?
- ✓ Legal concerns - zoning restrictions, setbacks from the street, utilities that need to be avoided, etc.

Outdoor Classroom Elements

Creating an outdoor classroom is very similar to turning an indoor space into an ideal learning environment. Consider the need for hard surfaces for the students to write and sit. Consider where you will store tools, hoses, watering cans, extra soil, etc. Depending on what topics you'd like to teach in the

garden, keep in mind the option to include a weather station, reading area, hand washing station or other areas with specific uses on the selected site. Here are some of the basic elements to consider as you plan your outdoor classroom:

- ✓ Gathering space
- ✓ Tables and chairs (cooking, food prep, hand washing)
- ✓ Storage (for tools, lesson materials, etc.)
- ✓ Access for wheelchairs
- ✓ Shade for students
- ✓ Learning stations (weather, reading, etc.)
- ✓ Exploration areas (digging pit, butterfly garden, wetland, gourd tunnel, bean teepee, etc.)
- ✓ Planting areas
- ✓ Handwashing station
- ✓ Compost area

Even though this list seems large all of these elements are not necessary at once. Remember, be a seed; start small and grow! We are happy to help with a consultation at your school site. [Contact us](#) to set up an appointment!

Garden Themes

Adding a theme to your garden is a fun way to organize plantings and classroom activities. Gardens come in many different shapes, sizes and compositions. The goals determined by your team should be the driving force for the theme of your garden. The chosen location will also dictate which plants will thrive in the garden. The goals and the site will ideally be aligned, but sometimes there are constraints. For example, if one of your team goals is to teach students about fruit development but the only site you can secure for a garden is in shade most of the day then you will have little to no success in producing a crop of tomatoes, peppers, strawberries, etc. If you are constricted to a specific site you may have to get creative in what you plant and how you theme your garden. We're happy to help you assess your site and provide suggestions for successful plantings.

Here are a few themes to start your team brainstorming session:

- Edible Gardens (Salad, Salsa, Pizza, Herb, Cultural, Culinary, International, Three Sisters)
- Native Plants (Wildflowers, Butterfly Garden, Native Ecosystems, Rain Garden)
- Curricular Theme Gardens (Rainbow, Time, Alphabet, Storybook, Sensory, Historical)
- Service and Donation Gardens
- Memorial Garden
- Playscape

Plan for a garden you can integrate into every unit of your curriculum. The garden needs to be tended on a weekly basis (at least).

Making a Layout

Create a base map and allow students and other stakeholders to contribute to the design process.

Your analysis and assessment process should allow you to identify an appropriate location for the garden that you envisioned in your goals articulation. Do you have a site that is appropriate for the goals that you laid out? If so, wonderful! If not, there are two possible routes forward. Either you have to adjust the site to meet your goals (which can be a daunting and expensive process, depending on what is required) or you can change your goals to fit the site. On a limited budget, the latter is likely to be the most feasible route forward. Changing your goals to fit the site may involve scaling back on size expectations, choosing different plants, configuring beds differently, etc.

With resolution between your goals and the site that you have selected, it's time to do your design work. Be sure to utilize the assets in the team you've created. Consider people with experience in landscaping, architecture, construction, carpentry, etc. Don't forget to include the students in the design process, their creativity leads to big ideas! Even though you may not be able to include a waterslide and zip line, some of their notions for experimental beds, a compost corner and ensuring the garden is able to be accessed by elderly and differently abled persons can easily be included and will give them an increased sense of ownership in the project. While involving more people in the design can be challenging, the more people involved, the more invested stakeholders you will have.

Your design should flow naturally from the union of your goals and your analysis and assessment of the site. Have fun with this process, dream big and sketch several different ideas before deciding where to start. Gardens are changeable but the hardscape elements such as tool storage, water access and permanent structures can be a great place to start.

Drafting a Budget

When you have a design in place your team can start pricing items. Have fun with this process! Visit local plant nurseries, ask garden clubs for advice and compare prices at several stores before finalizing your budget. Just remember that plants have seasons of availability so you can't wait too long to purchase after shopping. If you are planning a big garden split the project into phases. A tiered approach will be helpful when approaching donors.

Securing Funding

School gardens benefit from lots of funding opportunities. Start with your team and see who is able to donate supplies and/or time. Visit our website for our resource on [grant writing basics](#) for your school garden. If you have the garden project divided into phases you can market that to donors asking them to sponsor the orchard or the pollinator garden instead of a blanket ask for an unspecified amount of money.

Implementation

Once you've chosen your site and determined your theme based on your team's goals, it's time to plan for construction. If you are writing a grant to fund the garden set the build date after the funds would be disbursed. Be sure to have everything you need, ask several team members to help make a list so nothing is forgotten.

Make your planting day public. Building a garden, especially a school garden, should be a team effort. Invite journalists, television reporters, community members, business owners, family members, students,

faculty and administrators to volunteer their time and resources to help establish the garden. Put up posters and signs at the school. Plan a few activities for the children and provide refreshments. Find a local gardening organization such as a garden club, landscape company or beautification committee to mentor the school garden. Having a few experts on hand to answer questions, identify weeds, provide organic solutions to pest problems and offer training will be a huge asset to your program.

The more people you have involved in this initial step the better, as they will have a sense of ownership in the project and want to see it succeed. Your theme will determine the type of construction. We suggest installing raised beds for edible plantings. Raised beds allow you to build an ideal soil composition (covered in the next section) and reduce the worry of contamination (soil testing can determine the amounts of heavy metals - [contact us](#) if you have concerns). We suggest building beds from two inch thick cedar boards that are no wider than four feet to allow students to reach into the middle of the bed without stepping inside. Younger students may benefit from even smaller beds. Cedar has a higher cost up front but is slow to rot and doesn't need to be treated for outdoor use.

Instead of tilling use several layers of newspaper or cardboard to smother the grass where you'll place the garden. After a few weeks roots won't have any problems breaking through the broken down paper and you'll reduce the amount of weeds that will emerge from the base of the raised beds. Reusing old containers, shoes, toys, etc. will incorporate a component of recycling for the students and add some whimsy to your garden.

Native plants will thrive when planted in conditions that mimic their natural habitat, and should be planted directly in the soil. Playscapes and rain gardens require some preparation to the site before planting and some additional research. Another important factor to consider will be the space between each planting area. Will there be grass between the beds? If so, the space between them should be enough for a lawn mower. Will students with special needs have the ability to access the garden? What accommodations will you need to construct to enable the garden to be a safe and welcome place for all?

Soil Health

Healthy soil is the key to healthy plants. Plants depend upon the composition of the soil to provide minerals and nutrients for growth. A soil test is an easy way to determine the composition of the soil while providing suggestions on ways the soil can be amended to enhance plant growth. Contact your county Soil and Water Conservation District for information on soil testing. Once you have the soil on the site tested, you have the information needed to make important choices regarding which plants you purchase and any amendments you make to the soil.

If you are building raised beds you will need to add soil to them before planting. Raised beds provide a wonderful opportunity to tailor the soil to the needs of the plants. We suggest the following soil ratio: two parts garden soil: one part peat moss: one part compost. Garden soil sold in bags at the hardware store has a tendency to become compacted. The peat moss will help aerate the soil and will retain moisture. Compost or aged manure will provide a source of nutrients.

Annual addition of compost will help your garden thrive. Cover crops and crop rotation (covered in the next section) are part of a sustainable gardening.

Composting

Your garden will inevitably produce “waste”. Each time you pull a weed, dig a hole, and eat a fruit there will be a small (or sometimes large) amount of organic material left over. Establishing a compost area is important not only to have a place to store garden waste, but also teach students about the cycle of decomposition and how to reduce the need for fertilizers by using natural methods.

There are entire books written about composting but the main idea behind the concept is quite simple: with the help of decomposers-plant material breaks down over time. Once that material is broken down, the nutrients in the cells are available for future generations of plants to use. We can tap into this natural cycle by storing our garden waste, waiting as it breaks down, and then applying it to planting areas. Think of the forest: each year the leaves drop and land on the ground where they are eaten away by small insects, bacteria, fungi, worms, etc. and as the spring rains pound them into tinier pieces still, their cells are broken down and become part of the soil structure. Plant roots absorb these nutrients and use them to build new cells, continuing the nutrient cycle.

Plant matter will break down faster if conditions are ideal for decomposition. Paying close attention to moisture content, air flow and what is placed in the compost pile will contribute to quicker results. Keeping the compost pile free of diseased plants and weed seeds will reduce the chance of having these issues recurring in your garden.

Here are a few guidelines for your compost pile: Items that are high in nitrogen are considered greens. This includes food scraps, coffee grounds, fresh weeds, and spent flowers. A healthy compost pile will have 1/3 greens balanced by 2/3 browns. Browns are items that are high in carbon. These include dried leaves, mulch, newspaper, paper towels and napkins. Do not add any meats, feces, dairy, or greasy foods to your compost pile. These items will cause odors and attract rodents.

Vermicomposting is the term used for indoor composting using worms and we would be happy to send you additional information if you're interested in starting a worm bin compost system at your school. [Contact us](#) for more information.

Planting

Knowing when to plant certain crops and how long they take to mature is an important tool when planning your school garden. Seed packets contain a wealth of information but local gardening groups are a great resource too. Check out our [monthly calendar](#) and our resource on [starting and saving seeds](#) on our website.

Using data collected over many years, The United States Department of Agriculture has developed a map called the [Plant Hardiness Zone Map](#). When purchasing plants, especially perennial trees and shrubs, the information on their tag will identify which zones they grow well in. To be on the safe side, purchase plants that can survive in one zone lower than your region, unless you plan on bringing them indoors to a greenhouse for the winter months.

If you are planting trees for an orchard or arboretum it is best to plant them in early fall. Other fall plantings include bulbs for daffodils, tulips and iris. Native plants vary with their best planting times, be

sure to ask for details where you purchase your plants. Visit our website for a resource on [creating a wildlife habitat](#).

If you are considering edible plants, there are three general planting times during the garden season. Some crops are cold hardy (can tolerate a light frost) and can be planted when the soil dries out a bit in March. These plants typically do not tolerate high heat and humidity and as the weather warms they can be replaced by more tender species. Here is a short list of our favorite edible plants for school gardens and their planting times. See our Edible Seed List on page 19 for more.

Mid-March Planting	Arugula, *Cabbage, Carrots, Chard, Cilantro, Kale, Lettuce, *Onions, Peas, Radish, Sorrel, Spinach
Mid-May Planting	Beans, Beets, Collards, Corn, Cucumber, Eggplant, Herbs, *Peppers, Pumpkin, *Tomatoes, Squash, Sunflowers, Sweet Potatoes, *Watermelon
Mid-August Planting	Arugula, *Cabbage, Carrots, Chard, Cilantro, Kale, Lettuce, *Onions, Peas, Radish, Sorrel, Spinach (Fall is also the best time to plant most perennials)

**If possible, it is best to start these crops indoors from seed 4-6 weeks before transplanting outside.*

Considering all of this information, your site may have some microclimates that can influence what plants will do well. A microclimate would be the corner of a building or a fenced in area. This space may be protected from the wind, remain in shade longer than the surrounding area, have a slightly different soil composition, etc. These unique conditions may allow plants to succeed or fail in a way that isn't predicted on a plant tag or seed packet. Gardens located in highly developed areas can be planted earlier in the spring due to the fact that the buildings surrounding the garden reflect light and heat, melting the snow and warming the soil at a faster rate than gardens located in the suburbs.

Be sure to experiment with different planting times in your garden and keep detailed records so you can maximize the season for growth! Before planting seeds outdoors we suggest making seed mats before planting to make the most of each seed in your kit. [This seed mat resource](#) shows how to make them with simple, everyday supplies. Visit our website for a resource on [winter gardening](#) to make the most of your garden season!

Summer Care

If you are not planning to tend the garden in the summer, there are a few options to consider. First, harvest any available produce and then pull out all remaining plants and plant a summer cover crop which will keep the soil from eroding during rainstorms and can enrich the soil, depending on which cover crop you choose. [Contact us](#) for help choosing a good cover crop! This cover crop will need to be pulled and either composted or turned into the soil before students can plant in the fall. Or you could cover the open soil with landscape fabric or thick sheets of plastic to reduce the chance of erosion while also providing a clear planting area in the fall. We do not recommend leaving your crops to grow wild during the summer. Native plants and perennials still need some attention and maintenance crews tend to demolish unsightly areas. Put up signs to communicate to the public what is happening. Signs such as *Prairie in Progress* or *Coming Soon: Butterfly Habitat* will help explain why the area doesn't look extremely

manicured. With all of the tasks that need to be done in the fall to prepare for the students, coming back to a messy garden isn't ideal. If you're interested in learning more about cover crops, give us a call and we'll discuss the best options for your site.

Winter gardening is also an option for schools to continue harvesting between planting dates. There are several ways for you to create a protected environment for cold hardy greens to thrive. [Contact us](#) for more details!

Gardening Styles & Crop Rotation

Your garden design may include several raised beds for edible plants, some in ground beds for native perennials and possibly some planter boxes or other containers for herbs. It is important to plan how these areas will be planted and to document what plants are placed in each area.

Modern farming methods plant in large monocultures. An example of a monoculture is a large field of corn or soybeans. The farmer is growing only one crop at a time in each area. Most gardeners opt for a polyculture method where they plant several crops in the same area, typically in rows or blocks. Both methods have their benefits and challenges. When planting a small area with an entire classroom it can be difficult to keep the seeds and plants organized and planting an entire bed of radishes will reduce some of the chaos and make it easier to identify weeds.

Proper plant spacing is important for crops to grow their best. The [Square Foot Gardening](#) method is used by many schools and provides opportunities to easily integrate math lessons into the garden. When planting seeds with students it is expected that too many will be planted too closely together. As seeds germinate you'll need to pluck some of the new sprouts to allow the others to grow. This is called thinning. Root crops such as beets, carrots and radishes need to be thinned in order to grow to full size. When you are ready to start thinning be sure to include time for eating! Baby plants are tender and delicious. They make a wonderful salad and teach students that the garden can produce food even when it is just getting started.

Crop rotation is practiced by all successful farmers and gardeners. Farmers rotate planting corn and soybeans. This rotation is vital to the health of the soil and the plants growing in it. Corn uses certain nutrients as it grows, specifically nitrogen. Soybeans are planted the following year because their roots interact with soil organisms to increase the amount of available nitrogen. Corn grown the following year will utilize this nitrogen and on the cycle goes. If corn was planted every year, the amount of nitrogen in the soil would become depleted and the corn would not grow as well. Another danger of planting your crops in the same area each year is in the form of pests and disease. If an insect comes to your garden and really enjoys eating the cucumbers, they will return to this area the following year, expecting another buffet. Moving your crops makes it a little harder for pests to locate them and allows the nutrients in the soil to be replenished.

Seed Starting & Saving

Many annuals, perennials, vegetables and woody plants can be started from seed indoors. If you haven't saved your own seed, purchase fresh organic seeds from a reliable source. We highly recommend collecting your own seeds. Check a propagation reference book to determine dormancy requirements,

whether the seeds need to be stratified or scarified. Many wildflower and woody plant seeds will need such a treatment. Saving seeds will show students that the life cycle of a plant doesn't start at the store!

Any collected or purchased seeds that you do not use the first year and wish to save should be stored in a cool dry place. Keep in mind the germination rate will decrease as the seeds age. To test viability before planting, place several seeds in a moistened paper towel, roll it loosely, and keep it moist in a warm place until the seeds sprout.

For beginning gardeners we recommend using plants that can be directly seeded into the garden. The majority of plants on page seven grow best if they are sown directly outdoors in the garden rather than grown indoors and transplanted. For experienced gardeners the information below covers basic indoor seed starting. If you do not have an outdoor space and are gardening indoors with soil or hydroponically you will meet challenges that are not discussed in detail here. Please [contact us](#) for more information regarding those methods.

Before planting seeds inside there are three things you must consider: container type, soil medium and light exposure. Whatever type of containers you choose should be clean. Used trays and pots should be washed with a mild bleach solution. The soil medium should be loose, well drained, fine textured and sterile. Choose organic when possible. Finally determine if you have adequate light to grow healthy seedlings. Without a dedicated grow light the seedlings may not develop into healthy plants.

Thoroughly dampen the soil before filling your container. Do not compress the mix after filling. The planting depth is usually 2-3 times the diameter of the seed. For small seeds it is easier to place the seed on top of the soil and sprinkle a thin layer of soil to cover the seed. Most seeds prefer a soil temperature between 65°F and 75°F to germinate so a heating pad can be used under your container. The soil should remain moist during the germination period, but not left in standing water. You can cover the soil with burlap to help retain moisture. Seedlings will need 12 to 14 hours of bright light per day. Keep grow lights no more than 4-6 inches from seedlings to keep them from growing leggy and raise the lights as the seedlings grow taller.

Keep in mind that most seed starting mixes provide no nutrients. After the first true leaves appear add compost tea or an organic fertilizer at very low doses to help your seedlings thrive.

The tender plants should be hardened off before transplanting outdoors. Hardening off is a process where young plants are placed outside in a sheltered area and gradually over about a two week period of time moved into the full sun.

When you plant a seedling in the garden be sure not to bury it too deeply. With the exception of tomatoes and a few other species, most plants will not tolerate wet soil around their stems. Plant the seedling with the garden soil level just below the level it was in the pot so you don't have any soil contact with the stem but all of the roots are covered. Visit our website for our resource on [starting and saving seeds](#) for your school garden.

Choosing Healthy Plants

If you are buying plants for the garden, be sure to inspect them carefully. You wouldn't buy produce from the grocery that is damaged, and you should be just as careful with any purchased plants. Some plants

sold in hardware stores and nurseries have issues that can become problems in your garden. First, check the roots. Take the plant out of the pot and look at the roots to make sure the plant is not root bound. A plant that is root bound has been growing too long in a pot that is too small and the roots will be growing in a circle around the bottom of the pot. Root bound plants have trouble becoming established in a garden and should be avoided. Second, look closely at the color of the stem and leaves. A healthy plant will have a good, even, green tone. Some plants are bred for their unique color variations, but most edible plants should be a consistent shade of green. Plants that have yellow streaks, brown or white spots, or are wilted and weak are not ideal for your garden. Finally, while looking at the leaves turn them over and inspect the undersides and stem for any pests. Bringing insects into your garden on purchased plants can cause big problems. Some pests are white and fuzzy, others are hard brown scales, and spider mites are very small but able to be spotted by careful observation. None of these are welcome in your garden. Some common pests and treatment options are covered in detail in the next section.

Maintenance

Most plants need at least 1 inch of water per week during the growing season. Short bursts of rain do not satisfy this requirement. The soil needs to be soaked to the root layer in order for the plants to benefit. Students love to water plants but what about the weekends, long breaks or summer time? There are options to consider such as irrigation systems on timers or the recruitment of volunteers to ensure your garden doesn't dry up. If your location doesn't have a water source close by consider adding gutters to your tool shed and placing a rain barrel under them to collect rainwater. While this water shouldn't be drunk by the students, it will be perfect for the garden and free of chemicals that are laced in city water. Shade structures can also be fitted with gutters and rain barrels. [Contact us](#) for more ideas!

Weeding & Mulching

A weed is just the name for a plant growing in the wrong place. A beautiful rose can become a weed if it is constantly trying to invade your tomato patch. Keeping weeds under control will reduce the competition for resources in your garden and the plants you want to succeed will have access to the water, sunlight and nutrients they need. Having students sort different weeds, record the quantities of each type and friendly competitions will make weeding more interesting. Adding a layer of mulch will reduce weed growth and make it easier to pull weeds that become established. We recommend using a thick layer of straw between your established plants to retain soil moisture and keep down weeds.

Managing Pests & Disease

Seeing critters in the garden can cause some folks alarm, but remember your goals. Are you trying to create a learning space for student discovery or are you focused on producing a certain amount of edibles? If you are striving for the former, don't let garden pests cause you too much worry. Students are enthralled by insects, worms, moths, etc. and these invaders can be a wonderful source of lesson material. If you are trying to produce a certain amount of food from your garden, then pests can be quite a problem and there are organic methods you can use to reduce their impact. Using organic methods is important, especially if you intend to eat the produce with the students. Not all garden bugs are bad; there are many garden helpers that you don't want to kill by using broad spectrum pesticides. If you are planting a native pollinator garden do not apply chemicals.

Here are a few simple remedies for common garden pests:

Slugs & Snails	Spread crushed eggshells or diatomaceous earth on top of your soil
Cutworms	Wrap toilet paper rolls in electrical tape, cut them down one side and wrap them around the stems of your plants, securing them about 1” into the soil
Mealybugs & Scale	Dilute dish soap (1 part soap to 4 parts water) in a spray bottle and spray the pests after the sun has set or in the early morning
Tomato Hornworms	Add a birdbath to your garden and keep a feeder close by to attract a natural predator
Ants	Sprinkle dry corn meal or coffee grounds on the mound
Aphids	Release ladybugs or plant marigolds near your affected plants
Rodents	Remove nesting sites, sprinkle plants with pepper or garlic spray
Deer	Spread human hair and/or urine

As a general rule, if one or two plants are seriously infested, remove them, put them into a trash bag that is tied tight and dispose of them in the trash. The same is true if a plant is showing signs of disease, such as spotting or a yellowing of the veins. Do not put infested or infected plants in the compost as it can contaminate the compost and your garden.

Companion Planting is a method of using plants that complement each other, repel certain pests and naturally add fertilizers to the soil. Companion planting is not a hard science and its use can be a fun experiment for the students. If you are interested in finding out more, visit our library or give us a call and we can discuss some recommendations for your garden.

Diseases often live in the soil and are spread when watering. Mulching, practicing crop rotation and researching observed plant issues can keep your garden in good shape but it is often impossible to totally remove a disease from infected soils. If you are struggling with issues caused by disease there are certain plants you can purchase that have been bred to resist particular virus and disease strains. Contact your county Master Gardener program or extension office if you see disease as a problem in your area.

Integrating Curriculum

The garden provides a unique opportunity to integrate many different subjects. Science, math, language arts, social studies, physical education, art, music and foreign languages all have connections to botanical themes that can be explored in the garden. Creativity and collaboration between teachers, students and environmental education organizations can help expand your lessons to include all of these subjects. Incorporating standards and academic assessments will add to the validity of your garden initiative. Recording observations, taking pre and post tests, engaging in research are all important aspects of school gardens. To avoid maintenance issues, arising from neglect, plan to garden with your students on a

weekly basis. There are wonderful published works and websites with garden based lessons. Visit our website for a resource on [aligning lessons to learning standards](#) for your school garden. If you are having trouble thinking of ideas for a certain theme or subject area, don't hesitate to [contact us](#) and we'll brainstorm with you! Be sure to use our [standards-based lessons](#) that are designed according to seasonal garden developments. View the calendars on pages 17 & 18 for more ideas!

Tips for Outdoor Learning

Engaging students in outdoor learning can be a challenge. Often, students are not used to structured activities in the school yard and instinctively turn on recess mode. In order to ease this transition, give students directions before heading outdoors and familiarize them with any tools and tasks. Repeat the instructions after heading outside. Set up stations so the students are in small groups and enlist the help of volunteers to keep the students focused. Over time, this routine will help the students complete outdoor lessons. Visit our website for our resource on [managing student behavior outdoors](#) for more ideas!

Always check for safety issues before bringing students outside. Walk the area to check for garbage or other dangerous items. Tell your administration and other faculty members that you are heading outdoors. Establish clear boundaries and consequences for behavioral issues. The students should understand that going outside is a privilege and they need to work together and listen during the experience.

Sending it Home

Extend student learning in the garden by sending home plants, seeds, produce, recipes and photos. Think of how proud they will be to reveal the radish they grew and enjoy it at the dinner table! Gardening can be a very powerful and therapeutic activity for over scheduled youth and their families. Encouraging the students to connect their school experience with their home life can spark conversations and support from unexpected places.

Program Assessment

Evaluating garden learning can be challenging. Pre and post assessments can show learning over time, as well as journal entries, and long term projects. When forming your goals and objectives consider how you will evaluate their success. What are the benchmarks you will look for? Consider inviting younger students and community members for tours or lessons so you can observe how the students pass on the knowledge they have learned. For example, when kindergartener Susie wants to plant peas with third grader Alex and Alex directs her to plant them close to the fence so they can have a place to climb that indicates a significant amount of learning: peas are vines that need support to grow! Does Alex show her how deep to plant the seeds? Do they water the seeds together? Put together a checklist of objectives and use it through the year to assess student development.

Keep records of your program to help you revise methods for future growing seasons. Take time to reflect at the end of each week on how well things went during lessons, note any issues with certain plant species, identify pests and record weather conditions. You may think you'll remember details like these when planning for next year but it is easy to forget! Your garden journal will be a welcome source of information for other teachers wanting to start school gardens. Have an annual meeting with the team to

discuss challenges and possible strategies for overcoming them. Bring your issues to community partners and ask for their advice.

Tips for Success

- ✓ Maintain a strong team & have a committee to share the responsibility (at least 5 members is recommended with representation from the following groups: administration, faculty, parents, students and community council)
- ✓ Start small and grow with success
- ✓ Don't feel the need to tackle the whole school from the outset; it can be helpful to identify a single grade, class, or club to begin with
- ✓ Have regular committee meetings and do your best to make them fun
- ✓ Include students as much as possible in the planning & implementation stages
- ✓ Publicize your efforts to the community (both in and outside the school)
- ✓ Keep records so you can assess what needs to be changed for future success
- ✓ Focus efforts towards your goals, mission, vision
- ✓ Seek community partners
- ✓ Keep your plantings simple; salad is always a winner
- ✓ Better to refrain from late spring planting than to return from summer vacation to a garden that is overgrown, dead or full of weeds
- ✓ Ask for help (call us at 513.221.0981 or email us at youtheducation@civiggardencenter.org)
- ✓ Have fun! Be flexible! Celebrate!

Site Analysis & Assessment Activity

Assessing the Site

- Size (Is it adequate to meet your goals?)
 - Access to water (catchment surfaces as well as tap sources)
 - Access to the site (Is it easy/close to get to? Easy to get materials to?)
 - Amount of sunlight & shade (should have at least 6 hours of full sun for veggies)
 - Topography (Is it relatively flat? Are there any low spots that will collect water?)
 - Security (Does the site require protection from wildlife or passersby?)
 - Visibility from classroom/street
 - Noise (Is it close to the street, playground, other noise sources? Will this be an issue for teaching?)
 - Legal concerns (zoning restrictions, setbacks from the street, utilities that need to be avoided, etc.)
 - Safety concerns
-
-
-

Outdoor Classroom Elements

- Gathering space
 - Tables and chairs (cooking, food prep, hand washing)
 - Storage (for tools, lesson materials, etc.)
 - Access for wheelchairs
 - Shade for students
 - Learning stations (weather, reading, etc.)
 - Play areas (digging pit, gourd tunnel, bean teepee, etc.)
 - Planting areas
 - Compost area
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Garden Themes

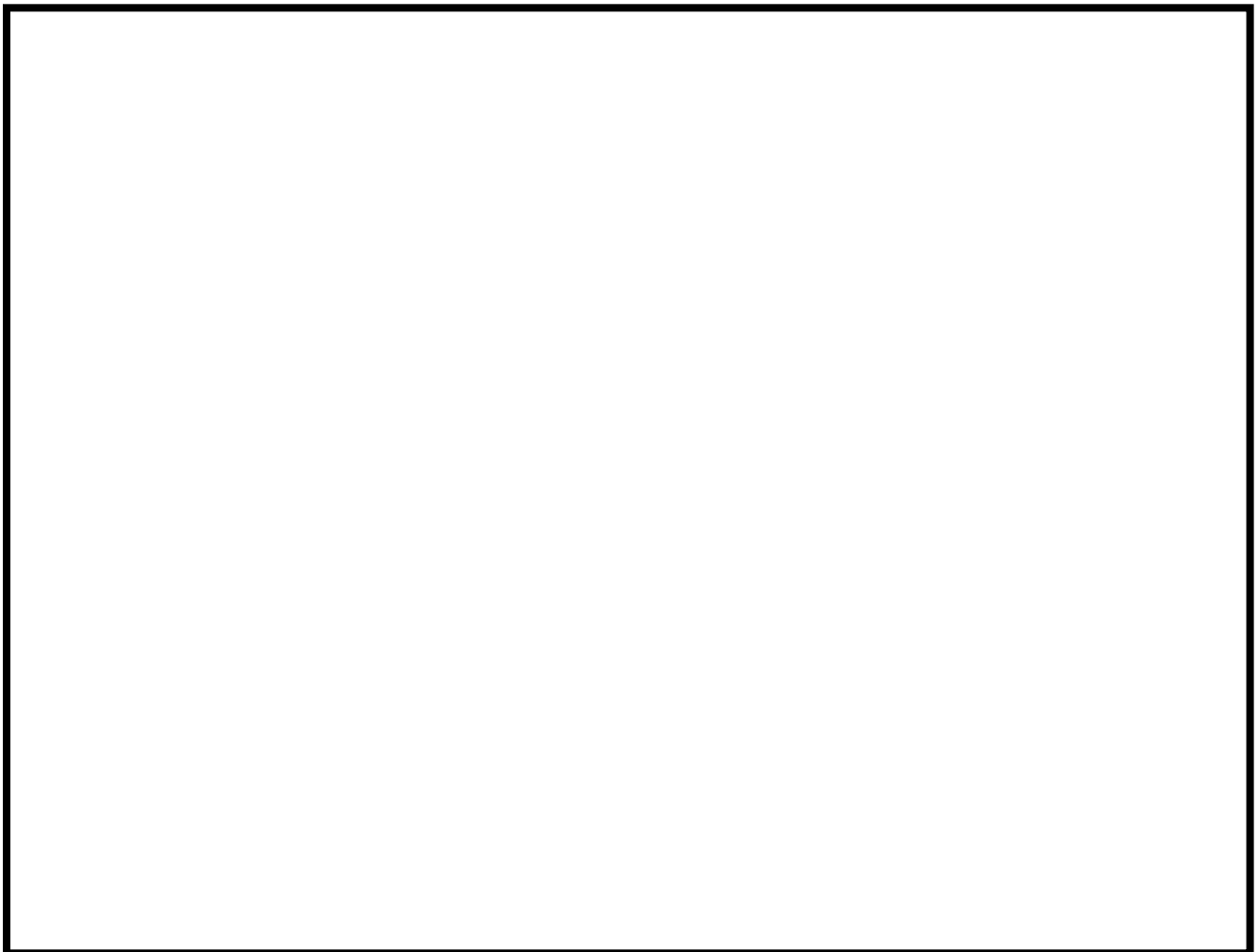
- Edible Gardens (Salad, Salsa, Pizza, Herb, Cultural, International, Three Sisters)
 - Native Plants (Wildflowers, Butterfly Garden, focus on Ohio Ecosystems, Rain Garden)
 - Curricular Theme Gardens (Rainbow, Time, Alphabet, Storybook, Sensory)
 - Service and Give-Away Gardens
 - Memorial Garden
 - Playscape
-
-
-

Making a Layout

Have fun with this process, dream big and sketch several different ideas before deciding where to start. Gardens are changeable but the hardscape elements such as tool storage and water access or other semi-permanent structures can be a great place to start.

The following elements will ensure you have year-round gardening options with a balance of high and low maintenance areas:

- Strawberry patch
- Perennial herb bed with chives, cilantro, lavender, lemon balm, licorice fennel, mint, and pineapple sage
- Sunflower planting area
- Spring bulb planting area
- Native pollinator garden
- Water source
- Shaded area for seating
- Compost area
- 3-4 areas for activity stations
- Raised beds for annual edible plantings that are fitted with row cover hardware











School Garden Calendar (Traditional Schedule)

Month	Garden Tasks	Curricular Activities
January	<ul style="list-style-type: none"> ➤ Plan ➤ Gather materials & enlist volunteers 	<ul style="list-style-type: none"> ➤ Research plants for spring planting ➤ Create garden maps with accurate dimensions
February	<ul style="list-style-type: none"> ➤ Make seed mats ➤ Prepare soil for planting 	<ul style="list-style-type: none"> ➤ Practice math skills with seed mats ➤ Perform indoor germination experiments
March	<ul style="list-style-type: none"> ➤ Add aged compost to garden beds ➤ Sow outdoor seed crop 	<ul style="list-style-type: none"> ➤ Record daily weather data (temp., rain, wind) ➤ Celebrate the spring equinox
April	<ul style="list-style-type: none"> ➤ Create a daily watering schedule ➤ Remove weeds 	<ul style="list-style-type: none"> ➤ Conduct soil shake test ➤ Carefully investigate worms
May	<ul style="list-style-type: none"> ➤ Harvest salad ➤ Plant cover crops & turn compost 	<ul style="list-style-type: none"> ➤ Observe roots & leaves ➤ Explore the function of stems
June		
July		
August	<ul style="list-style-type: none"> ➤ Make seed mats ➤ Prepare soil for planting 	<ul style="list-style-type: none"> ➤ Explore the life cycle of a plant ➤ Use gross motor movements to act it out
September	<ul style="list-style-type: none"> ➤ Add compost to raised beds ➤ Sow outdoor seed crop 	<ul style="list-style-type: none"> ➤ Explore flower diversity ➤ Observe pollinators
October	<ul style="list-style-type: none"> ➤ Create a daily watering schedule ➤ Remove weeds 	<ul style="list-style-type: none"> ➤ Explore cultural uses for foods ➤ Harvest seeds and design seed packets
November	<ul style="list-style-type: none"> ➤ Harvest salad ➤ Plant cover crops & turn compost 	<ul style="list-style-type: none"> ➤ Start a leaf collection ➤ Compile weather data into graphs
December	<ul style="list-style-type: none"> ➤ Reflect on experiences ➤ Inventory tools & materials 	<ul style="list-style-type: none"> ➤ Explore plant adaptations for surviving winter ➤ Make bird feeders

School Garden Calendar (Year-Round Schedule)

Month	Garden Tasks	Curricular Activities
January	<ul style="list-style-type: none"> ➤ Plan ➤ Gather materials 	<ul style="list-style-type: none"> ➤ Research plants for spring planting ➤ Make collages with garden magazines
February	<ul style="list-style-type: none"> ➤ Start seeds under lights ➤ Make seed mats 	<ul style="list-style-type: none"> ➤ Practice math skills with seed mats ➤ Sort seeds according to different characteristics
March	<ul style="list-style-type: none"> ➤ Tend to indoor seedlings ➤ Create a schedule for garden classes 	<ul style="list-style-type: none"> ➤ Record daily/weekly weather data ➤ Celebrate the equinox
April	<ul style="list-style-type: none"> ➤ “Harden off” seedlings ➤ Prepare soil for planting 	<ul style="list-style-type: none"> ➤ Conduct soil shake test ➤ Carefully investigate worms
May	<ul style="list-style-type: none"> ➤ Plant & mulch seedlings outdoors ➤ Build trellises & water regularly 	<ul style="list-style-type: none"> ➤ Observe roots & leaves ➤ Explore the function of stems
June	<ul style="list-style-type: none"> ➤ Weed unwanted plants ➤ “Thin” desired plants 	<ul style="list-style-type: none"> ➤ Explore the life cycle of a plant ➤ Use gross motor movements to act it out
July	<ul style="list-style-type: none"> ➤ Weed & water ➤ Assist in pollination 	<ul style="list-style-type: none"> ➤ Observe pollinators ➤ Explore flower diversity
August	<ul style="list-style-type: none"> ➤ Weed & water ➤ Plan a harvest party 	<ul style="list-style-type: none"> ➤ Explore decomposition by saving apple cores and adding them to the garden
September	<ul style="list-style-type: none"> ➤ Harvest produce ➤ Harvest seeds 	<ul style="list-style-type: none"> ➤ Explore shapes using fruits ➤ Conduct a taste test
October	<ul style="list-style-type: none"> ➤ Harvest produce ➤ Harvest seeds 	<ul style="list-style-type: none"> ➤ Explore cultural uses for foods ➤ Design seed packets
November	<ul style="list-style-type: none"> ➤ Clear beds & plant cover crop ➤ Add compost 	<ul style="list-style-type: none"> ➤ Start a leaf collection ➤ Compile weather data into graphs
December	<ul style="list-style-type: none"> ➤ Reflect on experiences ➤ Inventory tools & materials 	<ul style="list-style-type: none"> ➤ Explore plant adaptations for surviving winter ➤ Make bird feeders

School Garden Edible Seed List

	<p>Organic Arugula "Roquette"</p> <ul style="list-style-type: none"> ● Plant seeds 1/8" deep, expect germination in two weeks ● Harvest when the leaves are small and tender, cut them into small pieces for the salad (bold flavor; use sparingly) ● Leave the rest of the plant in the garden for a second harvest
	<p>Organic Di Ciccio Broccoli</p> <ul style="list-style-type: none"> ● Start spring seedlings 4-6 weeks before last frost. Plant in ground when 3" tall and bury stem 1" deep. ● Di Ciccio is an Italian heirloom broccoli dating from 1890. ● The plant produces several side shoots which can be harvested before harvesting the main head.
	<p>Organic Scarlet Nantes Carrot</p> <ul style="list-style-type: none"> ● Plant seeds 1/8" deep in fluffy well drained soil, expect germination in two weeks ● Once they germinate, thin the plants and give each plant 2 inches of space ● Harvest the 6" roots after eight weeks and add to your salad
	<p>Organic Chive Seed</p> <ul style="list-style-type: none"> ● Plant seeds 1/8" deep, expect germination in two weeks, harvest when the leaves are small and tender ● Leave the rest of the plant in the garden for a second harvest and to encourage blooms ● The cilantro seed is coriander, save a few to plant again next year and use as a seasoning
	<p>Organic Cilantro Santo Herb Seed</p> <ul style="list-style-type: none"> ● Plant seeds 1/8" deep, expect germination in two weeks, harvest when the leaves are small and tender ● Leave the rest of the plant in the garden for a second harvest ● The cilantro seed is coriander, save a few to plant again next year and use as a seasoning
	<p>Organic Vates Blue Curled Kale</p> <ul style="list-style-type: none"> ● Plant seeds 1/8" deep, expect germination in two weeks, harvest when the leaves are small and tender ● Cut them into small pieces for the salad ● Leave the rest of the plant in the garden over the winter for a second harvest in the spring
	<p>Organic Lettuce Seed Mix</p> <ul style="list-style-type: none"> ● Place seeds on top of the soil and sprinkle a light covering on top of them then gently pat the soil down ● Includes Rouge d'Hiver & Black Seeded Simpson Lettuce ● Harvest when the leaves are small and tender
	<p>Organic Sugar Daddy Pea</p> <ul style="list-style-type: none"> ● Plant seeds 1" deep, expect germination in three weeks, make sure these vines have thin wire or string to climb ● Remember to continually pick the ripe pods as to encourage a longer harvest ● Pods are ready to pick and eat when they are around 3" long, you can eat the entire pod



Organic Confetti Mix Radish Seeds

- Plant seeds ¼” deep, expect germination in two weeks-once it gets going it is a fast grower
- This colorful blend of white, red and bi colored radishes has a remarkable crisp flavor
- Pull them and cut them up for your salad once they are the size of a large marble
- The seed pods are also edible so leave a few in the ground to mature



Organic Green Sorrel

- Plant seeds ⅛” deep, expect germination in two weeks, harvest when the leaves are small and tender
- These leafy greens will add a tangy lemon flavor to your salad
- Sorrel can overwinter and grow as a perennial in your garden



Organic Bloomsdale Long Standing Spinach

- Plant seeds ¼” deep, expect germination in two weeks, harvest when the leaves are small and tender
- Plant every two weeks for a continual harvest
- Leave some plants to overwinter for an early spring harvest



Organic Rainbow Chard Seeds

- Plant seeds ½” deep, expect germination in one week, harvest when the leaves and stems are small and tender
- This chard produces amazing colors in shades of red, purple, pink, orange, yellow and white
- Pull off stems from the outside and let the plant keep growing from the middle

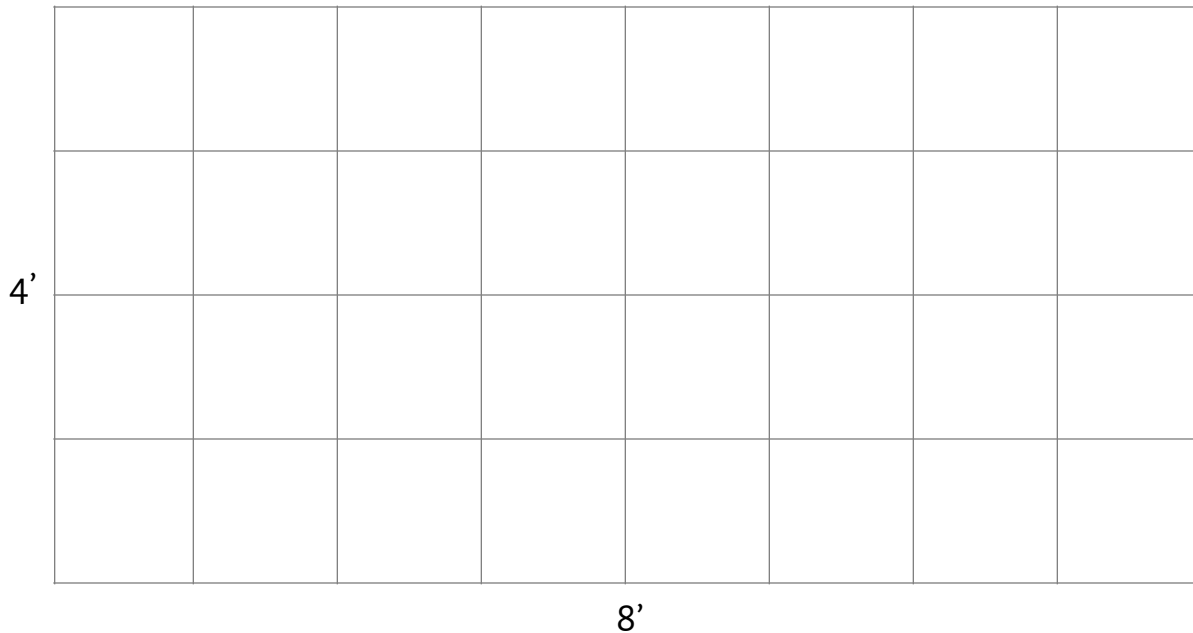
Planning Your Garden

These organic seeds can be purchased and more information about each seed variety can be found from True Leaf Market (<https://www.trueleafmarket.com/collections/vegetable-garden-seed>) and Johnny's Selected Seeds (JSS-<http://www.johnnyseeds.com/>).

This collection of seeds was selected to be planted outdoors in early spring or late fall. You can harvest a salad 60 days after planting. There are many ways to design your garden beds. Allow your students to make decisions and experiment!

Try the [Square Foot Gardening](#) method: think of your bed as a grid with 1' x 1' squares. Measure out the grid on your soil with baking flour or nailed string to guide your plantings. Create a map to keep track of what's growing.

Here is a blank 4'x8' garden grid you can use to help you plan out where and how much you want to plant of each seed.



Number of plants per square foot:

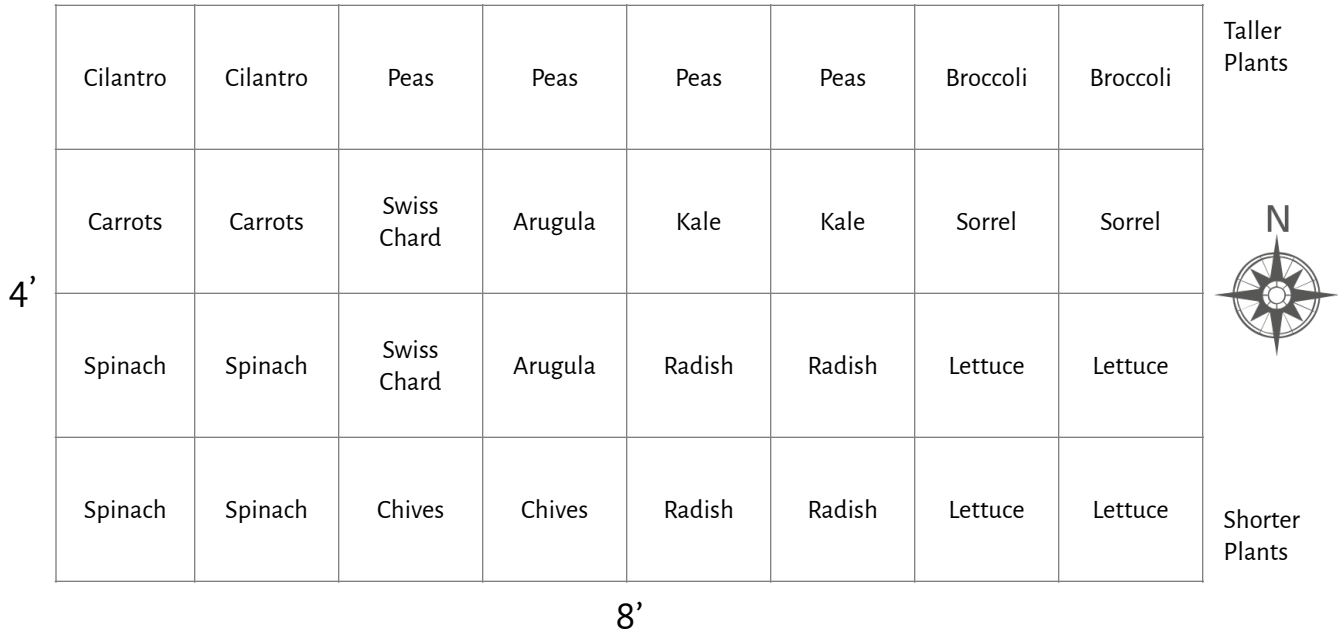
Arugula-4	Broccoli-1	Carrots-16	Chives-9
Cilantro-9	Kale-2	Lettuce-4	Peas-8
Radish-8	Sorrel-4	Spinach-9	Swiss Chard-4

Respect the seed:

We suggest making seed mats before planting to make the most of each seed in your kit. This seed mat resource explains how to make them with simple, everyday supplies.

Of course, you can arrange your garden any way that works for you. Here is a plan we drew up for one of our own beds this season. This plan takes plant height into account, and it separates similar plants into different parts of the bed so it will be clear when weeding. As the season progresses, please share your experience so we can use that information when planning for the next planting time.

Once you have planted the seeds will need to remain moist until they have sprouted. This may require watering several times a day on warm days. We highly suggest you add a layer of straw as a mulch to retain soil moisture. Growing in healthy soil with added compost is ideal.



Please don't hesitate to contact us with questions, we are here to help! Call 513.221.0981 or email youtheducation@civiggardencenter.org

Resources for Greater Cincinnati Gardens

Garden Planning Tools

- [Johnny's Harvest Date Calculator](#)
- [Soil Volume Calculator](#)
- [Rain Volume Calculator](#)

Grants

- Civic Garden Center [Grant Writing Basics](#)

Soil Testing

- [Hamilton County Soil and Water Conservation District](#)
- [City of Cincinnati Board of Health Childhood Lead Poisoning Prevention Program](#)

Curriculum

- Civic Garden Center [Garden Lessons](#)
- [Kids Gardening Compilation of Youth and School Garden Grants](#)

Soil, Compost & Mulch

- [H. Hafner & Sons](#) ask for the Terra-Mix Topsoil

Compost Bins & Worms

- [Hamilton County R3source](#)

Used Building Materials

- [Building Value](#)

Lumber & Hardware

- [Huber Lumber](#)

Rain Barrels

- [Civic Garden Center](#)

Seeds

- [True Leaf Market](#)
- [Johnny's Selected Seeds](#)

Plants

- [White Oak Gardens](#)
- [Pipkins Fruit & Vegetable Market](#)
- [Keystone Flora Native Plant Nursery](#)
- [Greenfield Plant Farm](#)
- [A.J. Rahn Greenhouses](#)
- [Funke's Greenhouses](#) (cash only)