

# Seeds of Success

A Toolkit for Growing School Food Gardens



Written and Published by the Educators of



## KidsGardening.org

Since 1982, KidsGardening has led the youth gardening movement. As a national nonprofit, we create opportunities for kids to learn, grow, and play through gardening, engaging their natural curiosity and wonder by providing inspiration, community, and original educational resources.

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*10 Terrific Vegetables and Everything You Need to Grow Them.*

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*GrowLab®: A Complete Guide to Gardening in the Classroom.*

Eve Pranis and Jack Hale. 1988.

*Growing Ventures: Starting a School Garden Business.*

Eve Pranis and Amy Gifford. 2003.

*Schoolyard Mosaics: Designing Gardens and Habitats.*

Eve Pranis and Amy Gifford. 2002.

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# CHAPTER 1

## Introduction to School Food Gardens

School food gardens naturally inspire inquiry, exploration, and innovation as students participate in real-world, hands-on experiences to dive into learning about science, health and nutrition, and food origins and systems — choose any topic and you're likely to find a way to teach about in a garden setting!

While the phrase “food garden” may call to mind tidy rows of vegetables, the reality is that school food gardens run the gamut, from windowsill plantings to raised-bed gardens to small-scale urban farms. You'll find them in classrooms and courtyards, and on playgrounds and rooftops. The possibilities are as plentiful as the benefits they provide to youth gardeners. Gardening educators, families, and community volunteers are quick to acknowledge that food gardens are a powerful, effective, and flexible teaching tool that has a positive impact on the physical, mental, social, and emotional growth of participating youth.

The *Seeds of Success Toolkit* compiles a wealth of knowledge gathered from school gardeners across the country to provide you with the information and inspiration you need to initiate and sustain a successful school food garden. We offer the who, what, where, why, when, and how behind developing a youth garden program so that you can feel confident in your planning and implementation.

This introductory chapter is designed to provide you with an overview of youth and school food garden programs and offers answers to the questions:

- Why garden with kids?
- What is a youth garden? What is a youth garden program?
- Where can you plant a school food garden?



### Getting Started: Why Garden with Kids?

Begin planning your school food garden program by taking the time to identify the why behind your efforts and explore all the options. A garden program is an ongoing investment of time and resources, not a one-time project, so careful planning and consideration are critical for success. Defining your motivation and understanding the range of possibilities for implementation not



only help you chart your course, they also allow you to easily make adaptations when challenges arise.

Gardens offer youth a calming, safe, dynamic space that also serves as a living science and food lab and allows them to explore, imagine, create, and connect. Youth garden programs provide opportunities for hands-on learning that is rich with “teachable moments” and real-life problem-solving. Gardening offers opportunities for:

- Multidisciplinary, active learning
- Physical activity
- Improved nutrition through increased consumption of fruits and vegetables
- Learning about food systems
- Nurturing environmental awareness and stewardship
- Personal growth
- Supporting mental and emotional health
- Community improvement
- Social awareness
- Horticultural therapy
- Fun!

**Multidisciplinary, active learning.** As gardeners, kids play the part of observers, questioners, doers, and problem solvers. The garden can add life and depth to studies by inspiring students to participate in their own education. By actively doing, investigating, and inquiring, students build understanding in a meaningful context. Beyond offering an investigative approach to learning key science concepts, the garden provides a natural context for explorations across the curriculum, including

language arts, mathematics, cultural studies, history, the arts, and more. The garden can serve as a centerpiece for these studies or can be used to enhance them.

*KidsGardening.org related resource:*  
[Connecting the Garden to the Classroom](#)

**Physical activity.** Digging, planting, and weeding the garden are energizing physical activities.

**Improved nutrition.** When kids raise fruit and vegetable plants, they are motivated to try new foods, which can lead to healthier eating choices. Gardens can also increase access to fresh fruits and vegetables at home and at school.

*KidsGardening.org related resources:*  
[Grow a Rainbow](#)  
[Teaching Nutrition in the Garden](#)

**Food system knowledge.** Most kids (and adults too!) no longer have a direct connection to the production, processing, and delivery of their food. Gardens provide firsthand experience that allows them to better understand what goes into getting food to their table.

*KidsGardening.org related resource:*  
[Sustainable Gardening Ideas from Around the Globe](#)

**Environmental awareness and stewardship.** In the garden, kids interact one-on-one with nature. Through these interactions, they learn that plants need air, water, light, and nutrients, and when kids provide these essentials, they become responsible caretakers. They also explore the



web of interactions among the living and non-living players that sustain life. By doing so, they develop a greater understanding of and appreciation for the natural world.

*KidsGardening.org related resource:*  
[Wildlife Inventory](#)



**Personal growth.** Students learn so much through planting a seed, watching it sprout, and caring for it as it matures. One look at the face of a child who has harvested a carrot from the earth, and you know the value of this experience. Gardening builds confidence, self-esteem, and pride as the kids reap the rewards of their hard work and patience. Additionally, working as a team towards a common goal develops communication and leadership skills and opportunities to learn peaceful ways to resolve conflicts.

*KidsGardening.org related resource:*  
[Nurturing Resilience in Gardens — and Kids](#)

**Mental and emotional health.** A garden can be a space for social-emotional learning and mental health-promoting activities. Research has shown benefits of time in gardens and nature includes a decrease in stress and anxiety as well as increased feelings of calm and relaxation. Garden activities can allow youth to express feelings, thoughts, and ideas. They can also offer opportunities to self-regulate and learn patience, compassion, and empathy.

*KidsGardening.org related resource:*  
[How Youth Gardens Can Support Social Emotional Learning](#)

**Community improvement.** Youth gardens help beautify the environment, allow young people to take action to improve their surroundings, and inspire cross-generational connections. School food gardens specifically can also provide youth with opportunities to contribute to local food supplies. Providing nourishing food for friends, family members, and neighbors can be a powerful experience for young people. Members of the community often respond with increased local pride and support for the gardening efforts.

**Social awareness.** The garden sets the stage for discussing, investigating, and responding to local and global food and hunger issues. Young people can learn about food production, food distribution, agricultural technology, and land resources. They may even choose to become part of the solution and address some of these problems locally.

*KidsGardening.org related resource:*  
[Celebrating Diversity in the Garden](#)

**Horticultural therapy.** Trained horticultural therapists can use the garden to craft

treatment activities to achieve physical, mental, and emotional therapeutic goals.

*KidsGardening.org related resource:*

[Designing a Healing Garden](#)

**Fun!** Above all, gardening is fun! It is a skill that, once acquired, can turn into a rewarding, lifelong hobby. Spending time outside, exploring in the soil, watching seeds grow, and harvesting the garden's bounty can be enjoyable and memorable ways for kids to spend their time.

*KidsGardening.org related resource:*

[Self-Expression in the Garden](#)

## Youth and School Food Gardens Defined

A **youth garden** is a garden space that is specifically designed for – and often by – young people to help them learn about plants, connect to nature, and be involved in the gardening process from planting to harvest. The youth garden is the foundation of a **youth garden program**, which can be defined as a coordinated series of activities that engage youth in the growing of plants to achieve specific goals.

A **school food garden and school food garden program** share the above definitions with a defined focus on growing edible plants and providing food-related activities and experiences.

As you might expect, with such broad definitions both youth gardens and garden programs can vary widely in size and scope. Successful gardens and programs are tailored to meet the needs of their target audience and to maximize the space and resources available.

For example:

- A garden space can be a compact area with a collection of containers or it can span several acres.
- Some programs meet monthly or weekly, while others provide youth time in the garden every day.
- Some are active year-round, while others are active only during the growing season.
- Some programs focus on growing food crops only, while others also incorporate habitat gardens to support pollinators and benefit wildlife.

There is no ideal or model youth garden program, and every situation is unique! Strive to create a program that best meets your needs and goals given the reality of your site and available resources.

## Types of Youth Gardens

Here are some examples of common youth garden program structures that can be employed in school settings:

- Classroom Gardens
- Garden Clubs
- Summer Camp Garden Programs
- Community Gardens
- Youth Garden Clubs
- Service Learning Projects
- Entrepreneurial Programs
- Work Training Programs
- Horticultural Therapy Programs





## Classroom Gardens

Classroom gardens are closely tied to the curriculum, ensuring that instructional time can be used for garden lessons. They require careful coordination between teachers, administrators, and volunteers and may include both outdoor and indoor garden activities. Classroom garden programs offer educators a valuable tool to incorporate inquiry-based, hands-on learning, and can be used to enhance the teaching of just about any subject.

Connecting the garden to required curriculum standards is especially important for school garden programs because ultimately the mission of the school is to help students master these standards. Fortunately, as living laboratories, school gardens provide a natural context for explorations across the curriculum, allowing for creative approaches to addressing many national, state, and locally mandated standards. By actively participating, investigating, and inquiring, youth are able to build understanding in a meaningful context. Health, career, and life skills classes are also natural fits for a school food garden.

### To make these links:

- 1 Consider which aspects of the curriculum might benefit from hands-on, minds-on, garden-based experiences.
- 2 Review the standards and curriculum goals and make a list or map of the areas that could be covered.
- 3 Create a list of garden tasks, projects, and goals, and look for overlap with the students' outcomes detailed in the standards.
- 4 Develop activities or locate existing activities that fit your curriculum goals.



Below, find ideas for connecting the garden to different subjects:

### Connecting the Garden to the Academic Curriculum

**Science.** A garden provides ample opportunities for making science inviting and relevant to students' lives by inspiring active exploration and problem-solving. The garden encourages inquiry as students use their senses, reasoning, communication skills, and existing knowledge to explore questions. These experiences can help improve students' attitudes toward science. Key science concepts that can be explored in the garden include organisms, life cycles, basic needs, structure and function, diversity, plant anatomy, adaptations, food webs, decomposition, interdependence, ecological principles, pollination, and diversity of life.

**Language Arts.** The garden provides an inspirational setting for students to exercise imagination and language skills. Documenting the gardening process through journal writing

and newsletters involves creative thinking. Language skills develop as students learn to identify plants using field guides, create signs, read related children's literature, record experiments and results, or create a cookbook.

**Math.** Math becomes practical and relevant when students implement the concepts they have learned in the classroom in a real-life garden setting. Planning, designing, and planting a garden require mathematical problem-solving and practice. Math skills used include addition, subtraction, multiplication, counting, measuring, and plotting. Students can also create and maintain garden-related businesses, such as plant sales or farmers' markets, and can assist in the financial management.

**Social Studies and History.** The garden can provide a hook for exploring cultures and engaging students in appreciating traditions and diversity through examining people-plant relationships. The garden is the perfect place to learn about Indigenous and Native American practices. For example, a Three Sisters Garden, filled with beans, corn, and squash, shows how plants rely upon each other, provide support, and work together to yield a more bountiful harvest. Through the garden, youth can also gain insight into different time periods (Middle Ages or Victorian Era, for example) by examining the culinary, religious, medicinal, and cultural significance of plants throughout history. Food gardens can serve as a rich tool for students to share and learn more about their own and their peers' cultural roots.

**Culinary Arts.** A school garden is a natural fit with a health and wellness curriculum, functioning as an incredible platform to cultivate an understanding and appreciation

for nutrition and cooking, both essential life skills. A school garden is a personalized grocery store, filled with fresh foods ready for youth to pick and prepare. Giving students the opportunity to not only grow their own food, but to also harvest, prepare, and taste it, creates excitement about and investment in healthy food options.

*KidsGardening.org related resource:*

[Indoor Gardening](#)

## Garden Clubs

With heavy demands on in-school instructional time, you may need to look beyond the traditional school day to find time to get youth into the garden. Before school, afterschool and lunchtime programs and clubs are great spaces for additional focused study of and interaction with school gardens. Unlike classrooms beholden to the pressure of learning standards, extracurricular programs have the freedom to tackle projects teachers may struggle to incorporate into their daily schedule. Such flexibility allows for truly organic development and implementation of programming that can vary with the seasons, emphasizing garden maintenance and outdoor exploration during the growing months, and food preparation/preservation and food systems work when weather confines programming to an indoor arena.

## Summer Camp Garden Programs

A summer camp is also a wonderful way to provide support to a school garden when classes are not in session. In cooler climates, summer is the prime growing season and summer programs can be used to help maintain gardens that were started in the spring. Most summer programs are less



structured than school-year programs, giving youth gardeners more time to explore and observe. Lessons and activities are often informal and much of the garden time is spent on the actual care of the garden and fun things like cooking and art. Summer garden programs may build their own garden space or partner with an existing school garden program and provide maintenance while students and teachers are on summer vacation.

**“Respect for nature has translated to respect for oneself. Caring for garden plots in cooperative teams of two has led to partners caring for each other’s welfare — as well as the vegetable plants! The divergent concepts of teamwork and self-reliance have become real and consequential to these students. Their willingness to taste fruits and vegetables previously unknown or disliked has grown a dramatic 95%.”**



**—JOE BLANTON  
JANOWSKI ELEMENTARY, TX**

Many school districts host summer meals programs, and these programs can be great partners with summer garden camps, such as by using freshly harvested garden produce and supporting cooking- and nutrition-related activities.

## Community Gardens

Many community gardens dedicate a portion of their grounds to youth gardeners. With the leadership of dedicated volunteers, youth can

participate in an organized fashion through regular garden work days and planned activities, or a space can just be left open for self-directed investigations and play while their families are there working in their own plots. Schools can partner with local community gardens in a number of ways to offer opportunities to their students. For example, if close in location, a community garden may offer space for educators to use on a regular basis. If not nearby, they may offer field trips to the garden and/or special programs they can bring to the school to share. Community gardens may also be willing to donate produce to the school for tasting activities or other events.

A community garden often sets the stage for discussing, investigating, and responding to local and global food, hunger, and health issues. Youth can learn about food production and food distribution, examine food cultures, including the social and economic forces that shape them, and begin to think critically about food justice and equity. They may even choose to become part of the solution and address some of these problems locally by donating garden produce to local food banks or taking produce home. The garden activities can serve as a springboard to build community and social awareness, launching the next generation of food and health advocates.

*KidsGardening.org related resource:*

[Starting a Community Garden on School Grounds](#)

## Youth Garden Clubs

Youth garden clubs can be started at schools, community gardens, community centers (libraries, YMCA’s, Boys and Girls Clubs, etc.),



or even in home gardens. A youth garden club can be informally organized with the help of an adult volunteer or can offer a more structured organization by participating in an existing garden program, such as The Junior Master Gardener Program. Many youth garden clubs are focused on community service, and their activities contribute to beautification efforts or the production of food to increase the local food supply rather than focusing strictly on academic topics.

## Service Learning Projects

Gardens are powerful centralizing themes for service learning projects, which invite youth to identify issues in their communities and brainstorm creative solutions. These projects promote student leadership and encourage social awareness, while simultaneously meeting real needs and inspiring change. Service learning projects can be offered during the school day or as an extracurricular activity.

Perhaps youth are passionate about teaching members in their community how to cook meals from whole ingredients or take care of a garden. Or they see a lack of social spaces in their community and seek to create a garden where people can spend time with their families. Perhaps they notice that local stores carry a very limited selection of fruits and vegetables and believe that by sharing produce from their school garden they could increase access to fresh foods. Whatever the project or focus, using a service learning model can provide the framework for students to do something they are passionate about for their community. Here are some ideas for service learning projects:

- Organize a group of peers to volunteer at a local food shelf on a weekly basis.

- Create a mentorship program with a local nursing home.
- Host a series of culinary workshops using garden produce.
- Plan a free community dinner featuring student grown produce.
- Create a pay-what-you-can farm stand.
- Plant a native plant garden for local wildlife and pollinators.
- Adopt a spot in the neighborhood to foster beautification efforts.

Creating a strong community connection increases the number of people invested in your program. This not only helps spread out the work of the garden, but also may help you find the resources needed to sustain your program over time.

*KidsGardening.org related resource:*  
[Service Learning: Helping Kids and Communities Grow](#)

## Entrepreneurial Programs

Garden activities can yield products that consumers are willing to purchase. Taking advantage of this benefit, youth garden programs can focus on the creation and operation of a business. From upper elementary school to high school, gardens provide versatile platforms for entrepreneurial projects, which in turn allow youth to step into leadership roles and gain valuable job experience. Whether youth participate in a formally coordinated internship program or pilot a creative business model as part of a more informal project, they can gain a plethora of work-readiness skills through garden-inspired businesses. This provides kids not only with gardening know-





how and real-world business experience, but also the means to raise funds for their school or community. Potential products include fresh fruits, vegetables, herbs, and flowers through a venue such as a Farmer's Market, or value-added items such as herbal soaps, jars of salsa, or cut flower arrangements.

There are many ways to organize a youth garden business. Funds collected can be shuttled back into the garden program to help maintain and sustain the gardens. Or the funds can be used to pay the participating youth, giving them a true sense of ownership in the business. This decision will likely be informed by your motivations for starting a business. For example,

- Do you want to fundraise for your garden program in a creative and engaging way? Consider having students volunteer their time and allocate any profits to a garden fund.
- Do you want to give youth a more formal work-and-learn experience? Consider ways to fund this type of program and how to pay your student employees.

No matter how you organize your youth garden business, the result is the same – youth get hands-on experience and learn important life skills.

## Work Training Program

Youth garden programs teach valuable job skills that can ultimately help youth find employment in the horticulture industry. There's a large job market and high potential for self-employment in areas such as the production of nursery crops, landscape design and maintenance, and the production and sale of fruits and vegetables. Work training programs are common at schools and through

community centers, such as botanical gardens and community colleges.

## Horticulture Therapy Programs

The therapeutic benefits of spending time in a garden are well-documented. With the help of trained horticultural therapists, as well as special educators, occupational therapists, and physical therapists, the garden and garden programs are great learning spaces for youth with disabilities.

This list is intended as inspiration as you brainstorm ways to incorporate a garden program into your school or community's culture. Keep an open mind and don't feel limited by these suggestions. Whether you have 30 minutes a week and a handful of planters or 30 hours a week and 5 acres of land, you can design an effective garden program to positively impact the youth in your life.

## In Summary

The benefits of youth gardens, and especially school food gardens, are diverse and plentiful. Your youth garden program should be tailored to meet the needs of your target audience while maximizing the use of the available space and resources. In the next chapter, we outline the steps to launching a successful kids' gardening program.



# CHAPTER 2

## Steps to Starting a School Food Garden Program

The key to a successful garden is to ensure it is part of a well-planned youth garden program. Before you begin designing and planting, determine how the garden will be used by educators for instruction and how it will be used by your young gardeners to explore and learn. Establishing a sustainable program also requires building a framework of supporters and plans for long-term funding and maintenance.

The following steps provide the structure and support needed to create a successful and sustainable program:

- 1 Develop a Support Network
- 2 Craft Goals to Guide Design of Your Garden and Garden Program
- 3 Identify Needs
- 4 Obtain Supplies and Recruit Volunteers
- 5 Plan and Manage Installation
- 6 Organize Maintenance of the Garden
- 7 Sustain Enthusiasm and Support for the Garden Program

Although youth gardens evolve along many different paths, and flexibility is another key to longevity, our experience shows that following these steps will get you off to a strong start.

Although presented in a linear fashion, these steps may be done concurrently and may

need to be repeated. For instance, identifying the needs of your audience is not a one-time event. You will want to continually review their needs and adapt as new needs arise, especially if you expand your program to include additional youth. You'll also need to continuously add to your support network since school garden programs often lose volunteers each year as students (and their supporting families) move on to new schools or graduate, and educators retire.

In this chapter we provide you with an overview of each step. At the end of this chapter are worksheets for each step to help guide you through the planning process. By the end of this chapter you should be able to answer the questions:

- Who should we involve in our school food garden?
- How do we plan a sustainable school food garden program?

*KidsGardening.org related resource:*

[Starting a School Garden Program: Overview](#)

### Develop a Support Network

Think of your support network as the root system of your school garden program. Just as strong roots are critical to the health of a plant, a strong support network is vital for the health and longevity of your program. Start with your organization's leaders. Support from your



school's key administrators is essential for a successful garden initiative so you'll want to be prepared to make your case. Practice sharing your message and rationale for developing a kids' gardening program so you can help them understand its importance and the many benefits it will offer. By involving administrators early on, you increase their investment in the project, and they are more likely to feel a sense of ownership over the planning process and ultimately the garden itself.

**"I LOVE vegetables!"**

**"This is the most fun I ever had!" "I can't wait to eat the kale!" Children gave up recess time to work in the garden—watering, weeding, and admiring their garden. The students devoured the fresh spinach and chard we harvested this spring, and even wanted more fresh garlic to add to the salad dressing they prepared. It was astonishing to see 9 and 10 year-olds asking for seconds and thirds of salad!"**



**— MAGGIE CONNOLLY  
F.P.G. CHILD CARE PROGRAM, NC**

Once you have secured approval from the top, broaden your network and involve as many community members as possible. The size of your support network should match the size and scope of your planned garden and garden program. The more people involved, the more likely it is that your program will be successful.

A structured brainstorming session open to the community is one way to reach out to

potential supporters. Invite administrators, educators, caregivers/parents, youth/ students, school nurses, food service personnel, school or facility staff (including custodians), current volunteers, neighbors of the potential garden site and other perspective community volunteers (pre-service teachers, Farm to School educators, Master Gardeners, garden club members, green industry employees, etc.). You may want to present your idea at pre-established gatherings such as faculty, school board, or Parent-Teacher Organization meetings. When planning a school food garden in particular, consider digging into community connections related to health, nutrition, and food systems. Examples include medical practitioners, hospitals, community health organizations, local farmers and farmers markets, and grocery store representatives.

In addition to gathering feedback and ideas, use this first meeting to help you identify people to serve on a garden planning or steering committee. This group should be composed of diverse, yet focused, individuals who are willing to meet regularly and share in the responsibility of getting the garden started by outlining and meeting the visions, goals, and needs of the program. Specifically, the committee will be responsible for compiling the project objectives, finalizing the project plan, preparing the budget, identifying donors, and fundraising.

Throughout the planning process, be sure to involve your future youth gardeners. Educators across the country have discovered that when students are involved in all stages of the process, they are more invested in the project's success and inspired to care for and respect their schoolyard oases. By valuing the opinions of your target audience



and encouraging them to make decisions, you will cultivate motivated, confident, and collaborative learners.

After the garden is installed, your planning committee should evolve into an active garden committee to sustain the program and share the work of maintenance. The members of this garden committee may include some of the same folks as your planning committee, but some initial members may want to step down so you will most likely need to find a few new recruits. Effective garden committees include at least three or four members so that responsibilities don't fall entirely on the shoulders of one champion. Regular meetings and clearly expressed expectations for participation are key for building a successful leadership team. Committed leaders are well organized and capable of encouraging kids, parents, teachers, and community volunteers to participate. Create a constant rotation of members to make sure you do not overwhelm those involved.

As valuable as your garden leadership team will be, remember that your support network should be much broader than your garden committee. Finding ways to engage and communicate with your supporters is no small task, but you garner many benefits from having a solid support network including:

- decreased likelihood of vandalism because more people have a stake in the success of the program.
- ample connections to potential volunteers and donors of labor, money, and products.
- encouragement of cross-generational mentoring and friendships among students, teachers, and a diversity of community members.

- infusion of needed expertise and fresh ideas to the project.

Use the **“Develop a Support Network”** worksheet at the end of this chapter to help you gather names and contact information.

## Craft Goals to Guide Design of the Garden and Garden Program

It is hard to chart a path without knowing where you want to end up. The next step is to answer the “what” – what do you want your school food garden and garden program to accomplish? Although it is tempting to start drawing up landscape plans once a gardening committee is organized, take the time to determine both how you want to use the completed garden and ultimately what impact you want garden participation to have on the youth involved.

Define your goals and objectives, write them down, and review them regularly to keep your planning on track. Start by answering these questions:

- Do you want the garden to improve the nutritional attitudes and eating behaviors of the youth?
- Do you want to have enough harvest to offer tasting samples to all students?
- Do you want to grow enough food for cooking classes and/or to allow students to take some home?
- Do you plan to grow fruits and vegetables that rely on pollinators, so you'll need to incorporate flowers and native plants into your plan?





- Would you like to start your own school farmers' market?
- Do you want the garden to be integrated into your curriculum or do you want to use it for extracurricular activities?
- Do you want your garden to raise funds or grow produce to donate to the local community food bank?

A purposeful garden program will be a worthwhile and long-lasting garden program.

## Select a Garden Site

Once your garden program is clearly defined you are ready to work identify a location for your garden and begin the design. The ideal location is one that is convenient to visit, has easy access to a water source, and gets adequate sunlight. (Most fruit, vegetable, and herb plants need at least 6 to 8 hours of full sun each day.) Screen potential sites to ensure that the soil does not contain any hazardous chemicals or substances, such as lead; most county extension offices can help you test your soil.

Although having your garden and educational programs at the same site is ideal, there are other creative options. If your outdoor space is limited, consider an indoor garden program using light gardens or sunny windowsills. If your site does not have an appropriate space, don't give up on your goal of having a youth garden program; rather, search your community for an alternative space that will work.

Beyond a school, some potential locations for youth gardens include:



- community gardens
- city parks
- libraries
- churches
- vacant lots
- rooftops
- nature centers
- museums
- retirement centers
- residential institutions
- housing developments

If your potential garden site is not located on your property or the property of your school or organization, your first step is to get permission to use it. Ask if the owner has plans for the site, such as the construction of a building, and if so, the timeframe. Inquire

about a long-term arrangement to use the space. Even if a short-term arrangement to use the space is your own option, knowing this up front will help you plan and determine what types of materials to grow. Explore insurance needs and coverage.

Growing edibles involves additional safety and environmental considerations:

- The soil must be free of contaminants (for in-ground beds) or you must have a source of high-quality soil for raised beds or container gardens.
- The area should also be protected from pests and animals, such as rats, that may spread diseases.



- There must be an easily accessible source of potable (safe-for-drinking) water.

## Explore Design Options

After a location is selected you can choose the type of garden you want to plant. There are many different garden options depending on the space and time available to you, including in-ground, raised bed, container, and indoor gardens.

With so many options, the design step can be overwhelming. To help maintain your focus, remember – a youth garden should be fun and functional. Keep it simple! Start SMALL! Plan big, but start small. A large garden project can exhaust the enthusiasm of your students and volunteers. Let them get excited about the joy of a bountiful, FUN, small garden, then expand as your confidence and experience increases.

Following these suggestions will help you create a useful and successful design. Since garden design is an important part of the planning process and a big contributor to the success of your program, extensive design details are presented in Chapter 4.

Use the “**Develop Garden Goals**” worksheet at the end of this chapter to help guide you as you work with your support network and planning committee to identify program goals and objectives.

## Identify Needs

With your plans in hand, you are ready to ask yourself what you need to accomplish these goals by identifying the supplies you will need to make your garden a reality. In addition to



listing the obvious gardening tools, soil, and plants, this is also a good time to also think about the volunteers and the educational materials/resources you will need to support your garden program goals.

## Basic Garden Tools and Materials

Every garden project will require the use of some tools, of course. How many and what types of tools you'll need depends on the scale of your project and how many kids will be working in the garden at one time. Although tools will be shared, it is best if you can be prepared with enough supplies to keep everyone busy. There is nothing more frustrating for young gardeners than to watch others garden when they are anxious to dig in.

When selecting tools, look for durable, well-made, properly sized products. Avoid cheap plastic tools that were crafted to be toys because they break easily. Consider purchasing kid-sized tools for your students, especially for preschool and elementary school gardens. Make sure to have supplies like clean baskets/containers and clippers available for safely harvesting fruits and vegetables. See sidebar at left for a list of essential tools and materials. As your program grows you may need additional items such as a storage bin or shed, trellis or other support structures, benches or picnic tables, and a compost bin. If you are installing indoor gardens, you will need additional supplies such as grow lights, pots, and soilless potting mix.

## Volunteers

Before you recruit volunteers, it can be very helpful to define the jobs you will need your volunteers to fulfill. Most garden programs



can use both one-time volunteers for the garden installation and special events, along with ongoing volunteers who help with chores such as daily weeding and watering. Drafting volunteer job descriptions can be a great tool to help you with your recruiting efforts. People are much more likely to agree to help if they know what is expected of them and they clearly understand what they are committing to in advance.

## Educational Program Materials

Just as you need to consider the goals of both the garden and the garden program, you will also need a second list of resources needed to conduct your garden educational programming. KidsGardening.org has a wealth of materials available to help with the implementation of food-related garden lessons and activities. Visit The Kids Garden Community to search for free online activities and lesson plans from other resources, and to get recommendations from fellow garden educators.

### Common garden tools needed:

- Hand trowels – for digging planting holes and removing deep-rooted weeds
- 3-pronged hand cultivators – for weeding and cultivating soil in small areas
- Shovel – for turning soil, building beds, digging planting holes
- Hoe – for weeding, making planting furrows
- Rake – for smoothing soil
- Hose – long enough to reach easily from spigot to far end of garden, with a wand or nozzle to direct water flow
- Watering can- small enough for kids to carry when full
- Buckets – 3- or 5-gallon plastic buckets for moving soil, collecting weeds, storing tools, and/or serving as temporary seating
- Containers and clippers for harvesting – Note: keep harvesting equipment clean for safe handling
- Garden cart or wheelbarrow – for moving compost, plants, mulch, etc. Depending on storage options, this is an item you may want to borrow rather than own.

### Common garden materials needed:

- Soil – invest in high-quality soil to support healthy plants and decrease pest and disease problems
- Compost – to build soil fertility and quality
- Garden stakes and row markers – to keep track of where and what you plant
- String and tape measure – for measuring space between rows, beds, seeds, etc.
- Mulch material – to cover beds and pathways
- Fertilizer – to maximize plant health and crop yields
- Plants

Once you have fully explored your needs, create a written wish list that includes your tools/materials, volunteer needs, and program supplies. Estimate the costs for the entire project and prepare a realistic budget. Remember to include expenses for site development and improvement, operation, curriculum, and miscellaneous items.

You can use the **“Identify Needs”** checklist at the end of this chapter to help you gather the list of supplies you will need to build your garden program.

## Obtain Supplies and Recruit Volunteers

Wish list in hand, your next step is to gather supplies and recruit volunteers. Before you begin asking for donations of money and supplies, make sure you have a means for processing these donations. For monetary donations, you may want to work within an established checking account such as through a PTO or your school’s or nonprofit’s business office. Another option is to create a new account just for the garden. If you choose to open a special garden account, you will need to create a record-keeping system for revenues and expenses and establish who has the authority to spend money from the account. Either way, make sure to know the tax status of your organization and the name donors should use when making out checks. See the Funding Your Garden section in Chapter 4 for more tips on gathering supplies and support.

Similarly, you should be prepared to accept and utilize volunteers before you begin recruitment. Make sure you have a way for





them to contact you, and be ready to provide them with information about the garden, including dates for training and implementation. Once you pique their interest, you want to follow closely behind with action items.

## Recruiting Volunteers

Volunteers contribute a wealth of experience and enthusiasm to a kids' gardening program. They also bring an abundance of skills and fresh ideas. Most importantly, volunteers provide support to the project leaders. This increases the adult-to-child ratio and makes the program much more likely to succeed since it doesn't rely on the efforts of only a few people.

Where can you look to find volunteers? Most organizations and schools already have a small group of really active volunteers, so you want to begin by recruiting from the folks that are already committed to your audience. Additional target groups to recruit from include:

- parents/caregivers
- grandparents/extended family members
- school neighbors
- teachers/retired teachers
- Extension Master Gardeners
- community service organizations (such as Rotary Club and Boy Scouts and Girl Scouts)
- students and faculty in the education and horticulture departments at local colleges or universities
- garden club members
- senior centers
- agriculture industry employees such as farmers or landscapers

Before you reach out to potential volunteers, check with your school or organization to determine their volunteer policy. Many organizations require volunteers to complete a background check prior to working with youth. Comply with all regulations and inform your potential volunteers about the process during recruitment.

Here are some tips for getting volunteers involved and keeping them interested:

- 1 People like to be asked in person. Requests for volunteers in group emails, a newsletter, or local newspaper will make people aware of your garden's needs but may result in only a few responses. Follow up with phone calls, personal email communications, and announcements during events or regularly scheduled meetings.
- 2 People like to feel appreciated. Here are some ways to show enthusiasm for volunteerism throughout the garden season:
  - Always provide an informal thank you every time someone volunteers.
  - Follow up events with volunteer participation by sending individual written thank you notes. Ones written by children are always a big hit.
  - Recognize volunteers through newsletter articles or photos.
  - At the end of the garden season, recognize volunteers more formally with a small gift or a volunteer appreciation awards ceremony.



- 3 People have different reasons for volunteering. Communicate with volunteers to find out why they have agreed to participate in your garden project. Some may simply have kids in the program; others may want to be more involved in their communities, meet new people, or make a difference in children's lives. To keep volunteers interested and motivated, it is important to understand and meet their needs as much as possible while still meeting yours.
- 4 People like to feel capable and competent. Make sure volunteers know how to do what you are asking them to do. If they don't, have a training session, either one-on-one or as a group. This will guarantee success and make the experience more gratifying.

As you recruit and manage volunteers, it is helpful to remember that although you do not provide a monetary payment to a volunteer, volunteers are not free. You pay them by offering them organized, high-quality volunteer experiences, respecting their time, and appreciating their service.

Use the “**Sample Garden Program Volunteer Job Description**” worksheet at the end of this chapter to help you define volunteer needs and recruit potential volunteers.

## Plan and Manage Installation

After creating a solid foundation for your garden and garden program and gathering the resources you need to make it a success, you will finally reach the step of installing your garden.

Although planting and maintaining a garden will be an ongoing activity, your initial installation often involves a larger community effort. A special planting day event provides a wonderful opportunity to recognize the contributions of sponsors and volunteers who helped in the planning process, attract the attention of the media and government officials while promoting the garden to the community, and, last but not least, actually get the plants in the ground. Although hosting an event can seem a little overwhelming, if properly planned, the planting day can contribute to the sustainability and long-term goals of your garden program. Here are some elements you may want to think about including at your initial garden installation event:

- 1 **A short presentation.** Provide a brief background of the effort, words of thanks to donors and volunteers, and recognition of special attendees. Keep it short. Young and old gardeners alike will be ready to dig in.
- 2 **Planting.** Although it takes some creativity to accomplish, the best planting day events provide opportunities for everyone in attendance to get their hands in the soil. Offer structure and proper instruction so that you don't spend the next few weeks fixing work done improperly on planting day.
- 3 **Chronicling the event.** Whether or not the local media can attend, take plenty of pictures and video. Post on your website and create press releases.
- 4 **Refreshments.** Providing snacks and drinks contributes to a jovial atmosphere and provides time for networking. Fresh fruits and vegetables are the best choice, of course!



- ⑤ **A party favor (optional).** Devise a small, youth-made gift for attendees to take home, such as a seed ball or pressed flower bookmark, and attach it to a brochure that recognizes sponsors and details needs of the program. In addition to bringing smiles to guests, they're also a great way to keep the garden in their thoughts.

Creating a dedicated celebration to mark the transition of your garden from a dream to a reality is exciting for everyone involved, especially the young gardeners. It helps attendees feel connected to the program and increases their investment in seeing it succeed. The event can serve as a springboard for attracting additional sponsors and volunteers.

You can use the **“Planting Day Event Checklist”** at the end of this chapter to help keep you on track while planning your garden installation event.

The fun is just beginning once the garden installation is complete! Chapters 4 through 6 offer extensive details about planting and maintaining your garden.

## Sustain Enthusiasm and Support for the Garden Program

School food gardens are a significant investment of time, energy, and resources, so you want them to last beyond one growing season! Continually moving through all the steps in this chapter will help you create a strong garden program with the organizational structure, supplies, and the human-power needed to sustain it over time. Here are some additional tips for a sustainable program:

## Garden Installation Day

**KidsGardening** has been involved in many garden installation days over the years. Here are some tips for a successful planting day:

- **Start planning early.** Planning a successful event does not happen overnight. Choose the date carefully to avoid competing with other major events in the community. Make sure the date is open for local government officials, administrators, and other honorary attendees you hope will attend.
- **Get the word out.** Send invitations; use social media, newsletters, newspapers, radio stations; and post flyers. These communications can serve double duty and include appeals for needed donations and support.
- **Be persistent, especially with local government officials and media.** Follow up written invitations with personal phone calls. Even better, have youth and parents (a.k.a. voters) contact them.
- **Properly recognize partners and volunteers.** During planting day events, put the spotlight on donors and volunteers. This can be done with posted signage, printed brochures, or through your presentation.





**Use your garden regularly and purposefully.** If youth only visit the garden for planting day and harvest day, they will not feel connected to the program and will not reap the true benefits of a food garden program. Students need to be able to visit their garden often, ideally daily, and participate in related lessons and/or activities frequently to maximize the impact of the program on their lives. Providing tasting or cooking opportunities using the garden harvest is also an important element to include in all food garden programs.

**Re-evaluate goals and needs annually.** Take time either at the beginning or end of the garden season to closely evaluate the goals and needs of your program. Are you meeting your goals? Are the existing goals still relevant? Brainstorm ways to improve the program, and either craft new goals and related needs or refocus the existing ones to meet new challenges.

**Communicate with your support network.** Maintain a mailing list or e-mail list of caregivers, teachers, administrators, neighbors, directors, garden volunteers, community leaders, local nonprofit

organizations, city and town officials, businesspeople, and legislators who can provide support for your garden. Keep the members of this list informed about the garden program and ask them for help when needed.

**Recruit new committee members and volunteers.** Continually attract new supporters. It is easy to get bogged down in doing things the way they have always been done, but new volunteers bring fresh ideas and excitement. Regularly adding volunteers to help get the work done also helps prevent burnout by spreading out responsibilities among more people.

**Create a garden calendar.** Develop a detailed calendar of activities, garden committee meetings, fundraising efforts, work projects, and special events for the entire year. Include a schedule for planting and maintenance. It is easy to get caught up in the activities of the season, and you want to make sure to get plants in the ground in time for a bountiful harvest. An organized garden program is a successful one.

**Add a new feature each year.** As much fun as it is to be involved in a successful existing program, people like the excitement that comes with doing something new and unique. Add a new feature or a new activity each year to help youth and supporters feel like they are making a significant contribution to the school garden. You can add new equipment like a weather station, plant a new crop, or add a new outreach program or special event. Large or small, adding something new bolsters feelings of pride and ownership.

**Document your garden.** Take pictures, collect youth journals, create a notebook/



scrapbook or Google Drive folder that includes news articles, letters of support, and an archive of all your plantings for the future. Saving this information not only provides a guide for the future, it also helps you measure your impact.

**Share your efforts.** Create a website, brochure, or project folder that shares the documentation you have collected and provides interested supporters with information on how they can contribute. Write articles for the school newsletter or local paper, post to a blog, share updates via Google Groups— these are just a few ideas for sharing the success of your program. Promote the garden whenever you can to attract new supporters and increase the pride participants feel in the program.

**Establish measures for success.** Based on your goals, determine measurable signs that you are achieving them. You can weigh and track the amount of produce harvested; conduct surveys of students, teachers, or parents; collect data such as test scores and food diaries, or track attendance or behavior issues. This information will help build support for your program and is useful when applying for grants.

**Thank everyone involved.** This includes educators, volunteers, staff, and students – anyone who helps in the garden. Thank them informally with frequent words of appreciation and formally by writing thank you letters, giving gifts of the fruit of your labors, or recognizing them at a harvest banquet.

**Enjoy!** A garden program that seems to be focused on weed pulling will quickly lose the interest of youth and volunteers. Make sure



kids have ample time to simply observe and explore in the garden, not just do “chores.” Also, plan time for fun activities like harvest parties and scavenger hunts, or host crafts days to make garden accessories like stepping stones or homemade plant labels.

See the **“Sample Year-End Report Form and Surveys”** for ideas on how you can chronicle and measure your garden program’s impact and help you in planning for the next garden season.

## In Summary

Carefully planning your garden and garden program is key to creating a strong foundation for a successful and sustainable school food garden program. As enticing as it is to just start digging in, time spent planning will result in significant benefits over the long term.



# Develop a Support Network

## WORKSHEET

Use this worksheet to compile the contact information for potential members of your school food garden support network, including possible planning and garden committee members.

Key administrators to contact (i.e., principal, executive director, vice principal, school board members, and school district staff):

Title	Name	Email	Phone Number

Educators who may be interested in the garden program:

Name	Title/Grade	Email	Phone Number

Support Staff who may be interested in the garden (i.e., cafeteria staff, librarian, nurse, custodians)

Name	Title	Email	Phone Number



Caregivers who may be interested in helping with the garden:

Name	Child's Name & Grade	Email	Phone Number

Potential Community Volunteers (i.e., neighbors, Master Gardeners, garden clubs, local nurseries or landscape company employees, farmers, health care workers):

Name	Connection to the Garden	Email	Phone Number

Students interested in helping with the garden:

Name	Grade	Contact Information

Local media to contact to spread the word about the garden:

Name	Media Outlet	Email	Phone Number

# Develop Garden Goals

## WORKSHEET

Brainstorm with your garden planning committee and support network to answer the following questions to help you define your garden goals:

Who will participate in the garden?

What do we hope participants will learn through the garden experience?

How will the garden fit into our existing activities and/or curriculum?

Where can we plant the garden?

When will we garden?

How much time will each participant realistically be able to spend in the garden?

How much money do we think we can potentially raise for installation? For garden maintenance?





# Identify Needs

## WORKSHEET

Here is a checklist of tools and resources commonly needed for a sustainable youth garden program:

TOOLS AND EQUIPMENT			
Item Description	Quantity Needed	Cost	Donated/Purchased
Hand trowels			
3-pronged hand cultivators			
Shovel			
Hoe			
Rake			
Water hose			
Watering can			
Buckets			
String and tape measure			
Garden stakes and row markers			
Garden cart or wheelbarrow			

MATERIALS			
Item Description	Quantity Needed	Cost	Donated/Purchased
Soil			
Compost			
Mulch			
Fertilizer			

**PLANTS**

Plant Name	Seed or Transplant	Quantity Needed	Cost	Donated/Purchased

**EDUCATIONAL SUPPORT MATERIALS**

Book or Website Name	Author	Website Link	Cost	Downloaded/Donated/Purchased



# Sample Garden Program Volunteer Job Description

## WORKSHEET

Title:

Duties:

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Location:

Time Required:

Schedule:

Skills Needed:

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Training Available:

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Reports to:

School Volunteer Policy:



# Sample Garden Program Volunteer Job Description

**Title:** Work Day Volunteer

**Duties:**

- Provide general maintenance of garden including weeding, watering, and planting.
- Help with special projects.

**Location:** School garden

**Time Required:** 3 hours once a month

**Schedule:** The second Saturday of the month March-October

**Skills Needed:**

- Willingness to get dirty

**Training Available:**

- Garden volunteer orientation

**Reports to:** Garden Coordinator

**School Volunteer Policy:** All volunteers must complete background checks.





# Planting Day Event Checklist

## WORKSHEET

Date Selected:

Time:

Event Coordinators:

Special invitations sent to:

Media contacted:

Volunteers attending:

Agenda for the event:

Supplies needed:

Snacks and drinks:



# Sample Year-End Report Form and Surveys

## SAMPLE GARDEN YEAR-END REPORT FORM

Name of Garden Coordinator:

Contact information for Garden Coordinator:

Number of students who participated in the program:

How many hours per week on average was each student involved in gardening activities:

Estimated number of students who benefited indirectly from the garden program:

Planting date (s):

Plant list:

Volunteers who participated in the garden program this year:

Grants and awards received for the garden program this year:

Donations received for the garden program this year:



How much money was spent on the garden program this year?

Obstacles to the garden program this year:

Successes of the garden program this year:

Suggestions for future gardens and programming:



# Sample Year-End Report Form and Surveys

## SAMPLE GARDEN YEAR-END SURVEY FOR STUDENT GARDENERS

List 3 things you learned about growing a garden this year:

- 1.
- 2.
- 3.

Did you eat any of the fruits and vegetables from the garden?

After helping with the garden, do you:

- like fruits and vegetables more
- like fruits and vegetables the same
- not like fruits and vegetables

After helping with the garden do you think you:

- eat more fruits and vegetables
- eat the same number of fruits and vegetables
- eat fewer fruits and vegetables

My favorite thing about our garden is:

My favorite garden activity from this year was:

Please list any ideas you have for next year's garden:





# Sample Year-End Report Form and Surveys

## SAMPLE GARDEN YEAR-END SURVEY FOR EDUCATORS AND VOLUNTEERS

1. What subjects did you teach through the garden program:

- Science
- English
- Math
- History
- Social Studies
- Health and Nutrition
- Art
- Physical Education
- Technology
- Other, list:

2. What curriculum books or activity guides did you use?

3. Did you connect your garden lessons to your required curriculum?

4. What non-academic topics were taught through the garden program:

- Community Service
- Leadership Training
- Character Development
- Intra/Interpersonal Relations
- Team Building
- Intergenerational Connections/Mentor Programs
- Other, list:

5. What percentage of your time in the garden was spent on the following types of instructional techniques:

- % Lecture
- % Independent Learning
- % Student-led Investigations/Hands-on Activities
- % Educator-led Investigations/Hands-on Activities
- % Collaborative Project Work



6. Did you witness improvements in any of the following characteristics:

- Improvements in scholastic achievement
- Improvements in attitude towards school
- Improvements in environmental attitudes
- Improvements in nutritional attitudes
- Improvements in social skills
- Improvements in self-confidence
- Improvements in community spirit
- Improvements in leadership skills
- Improvements in volunteerism
- Improvement in motor skills
- Other, list:

7. What evidence do you have of garden program effectiveness:

- Positive comments from students
- Positive comments from family members
- Positive comments from administrators
- Positive comments from volunteers or community members
- Positive survey results
- Improvement in test scores
- Decrease in disciplinary actions
- Improvement in attendance rates
- Other, list:

8. Did your students have the chance to eat fruits or vegetables from the garden?

9. Did you notice any changes in their attitudes toward fruits and vegetables?

- Significant Positive Change
- Moderate Positive Change
- No Change
- Moderate Negative Change
- Significant Negative Change



10. Did you notice any changes in their consumption of fruits and vegetables

\_\_\_ High increase

\_\_\_ Moderate increase

\_\_\_ Low increase

\_\_\_ No change

\_\_\_ Decrease

11. Please share any additional thoughts you have about the impact of the garden program. Include student quotes or stories if available.

12. What parts of the garden program do you want to see continued for next year?

13. Please list any suggestions or ideas for improvement you have for next garden season:



# CHAPTER 3

## Funding Your School Food Garden

Funding is one of the most commonly cited challenges for both new and established school food garden programs. While the prospect of raising funds to start up or sustain a school garden may seem daunting, there are many ways to acquire materials and funds to help you meet your needs. Fundraising can also provide opportunities for learning and help develop a sense of ownership and commitment to the garden on the part of students, caregivers, and volunteers. Successful kids' gardening programs frequently incorporate several strategies rather than relying on one source of funding to cover all expenses.



In this chapter you'll find ideas and tips for funding your school food garden. By the end of this chapter you should be able to answer the questions:

- What do I need to do before beginning my funding search?
- What are some common sources for funding and donations to support my school food garden?

### Before You Begin

Estimate the supply needs and costs for the entire project. By preparing a realistic budget you'll have a good fundraising target. Remember to include expenses for site development and improvement, routine maintenance, curriculum materials, and miscellaneous items.

Create policies and procedures for handling money and donations. Consider setting up an account for your project with the PTO or school business office to facilitate the process. If your program cannot fall under the supervision of an existing organizational structure, you may need to establish a new garden committee with executive positions and bylaws to provide you with the oversight needed to handle funds and allow you to open a checking account. Whether you fall under an existing organization or a new one, create a record-keeping system for revenues and expenses and establish who has the authority to collect and spend money.





## Common Fundraising Strategies

Here are some ways to obtain supplies and materials:

### Request Donations

Seek product and monetary donations from your support network and the community through a direct appeal. Although asking in person is best, you may also request donations by letter, email, or by posting requests through communication outlets such as bulletin boards (physical or electronic), websites, newsletters, newspapers, or Facebook. When asking for donations, be very specific about your needs. Remember that individuals and businesses receive requests for donations all the time, so be professional, organized, and detailed. Be prepared to provide information to support the size of your requests for cash or materials. It is helpful to have an official letter or a program folder that provides details about your program to share with potential donors. Your existing support network has the strongest investment and understanding of your program needs, so they are often your biggest financial supporters too.

Your support network may have limited resources; however, there are many other ways to raise funds, such as these ideas we collected from school garden educators around the country:

### Apply for Grants

There are many grants from both local and national foundations and other organizations that support initiatives in school and youth gardens (and specifically food or edible

garden programs), community development, and environmental education. You can begin your search by joining the free Kids Garden Community which has an [up-to-date list of grant opportunities](#) provided by KidsGardening and other garden-related national grant and award opportunities. When seeking this type of funding, remember that most grant programs are very competitive, and the number of applications is always far greater than the number of grants available. Check out KidsGardening's [Grant Writing Tips handout](#) to learn what makes a strong grant application. Do not be discouraged if some of your applications are not successful; just keep trying.

**“Plain and simple, the kid’s love to dig in the dirt and learn while doing it. Any gardening activity and other nature-based inquiry gets the students excited about learning and piques their curiosity.”**



— PATRICK MURPHY

SALISH KOOTENAI COLLEGE CHILDCARE CENTER, MT

### Crowdfund

Crowdfunding is a term broadly used to describe fundraising efforts focused on raising smaller amounts of money from large numbers of people, frequently through online and social media efforts. It allows you reach beyond your immediate support network. Many online platforms offer help with crowdfunding, such as GoFundMe and



Crowdrise. SeedMoney is a crowdfunding platform focused on raising funds for food gardens. Unlike other platforms, SeedMoney doesn't charge a service fee, and they also offer challenge grants. Another helpful service is Donors Choose, which provides opportunities for educators to use crowdfunding to obtain donations of materials rather than money.

### **Sell Garden-Related Items**

Offer items and services for sale, such as seeds, transplants, indoor plants, dried herbs and flowers, sachets, potpourri, fresh produce, zucchini bread, cut flowers, and certificates for an hour of weeding.

### **Host a Silent Auction or Raffle**

These fundraising opportunities highlight community partnerships by securing promotional donations from local businesses and individuals who may not have garden-related items to donate, but who can contribute products or talents which can then be turned into support for the garden program. Auctions and raffles can be combined with a dinner or special event.

### **Hold a Spring Garden Sale**

Sell plants started by the students or donated by local gardeners and nurseries.

### **Request Funds from Internal Funding Sources**

Request an annual allocation from your organization's budget and, if you are at a school, from PTO/PTA funds. If your garden is a vital part of the organization's infrastructure; is actively championed by staff, educators, volunteers, caregivers, and kids; and features

permanent structures, such as raised beds, fences, and sheds, you will have a clear case to be eligible to receive such funding. If fundraising for a school garden, emphasize the connection between the garden and curriculum and how the garden program will address local, state, and national standards and frameworks.

### **Create a Sponsor Program**

Offers corporate donors specific recognition benefits. These may include acknowledgment of their contribution with a sign or banner at your garden or through your newsletter or on your website.

For more ideas, check out the Growing School Food Gardens webinar on [Funding Your School Garden Program](#).

### **Fundraising Follow-Ups**

Don't underestimate the power of keeping the community informed about your project for securing ongoing donations, involvement, and funds. Here are some tips for reaching out:

**Calendar** – Develop a detailed calendar of activities, committee meetings, fundraising efforts, work projects, and special events for the entire year and use that in your public relations efforts.

**Publicity** – Develop a plan for publicizing your garden to a broad audience. Compile a media list with contact information for local newspapers and radio and TV stations. Talk with reporters, send press releases, and invite the media to special events.

**Promotion** – Create a brochure, folder, or website that describes your project

and provides interested supporters with information on how they can contribute.

**Documentation** – Have students create a scrapbook that includes news articles, color photos of kids working in the garden, letters of support, and dreams for the future. Display this scrapbook at public gatherings, school open houses, library exhibits, and county fairs.

**Mailing list** – Start building a mailing list or email list of businesspeople, parents, teachers, administrators, garden volunteers, community leaders, local nonprofit organizations, city and town officials, and legislators who support arts, education, nutrition, and environmental programs for kids. Keep the members of this list informed about the gardening program and ask them for help when needed.

**Newsletter** – Publish a print or email newsletter about your program. Include a

section listing and thanking sponsors and contributors. Make your goals, mission, and wish list known to readers.

**Network** – Cultivate community partnerships with local garden clubs, 4-H clubs, Master Gardeners, scouting groups, service organizations, businesses, and conservation organizations.

## In Summary

A bit of creativity and ingenuity can go a long way in raising funds for your school food garden program. Begin by drawing on your immediate support network, but then cast your net broadly into your community. Don't be afraid to ask others to help meet your needs. Keep in mind that providing support for impactful programs can be a source of joy and pride for donors.





# CHAPTER 4

## School Food Garden Planning and Design

Establishing a strong school food garden program is an important part of creating a sustainable youth garden, but certainly not the only component needed for success. Your garden design is another crucial step in the planning process. A well-designed garden maximizes the space available and creates the optimal conditions for your plants to thrive. In contrast, selecting a design or plant materials that are not appropriate for your location will create unnecessary challenges that can negatively impact your garden program.

### **We can't say it often enough: When designing a new youth garden, start small!**

It's easy to get carried away by the excitement of starting a garden; however, maintaining a large growing space can be overwhelming for both you and your young gardeners. Your initial design may include an extensive garden space, but break the installation of the garden into smaller, manageable stages by setting short- and long-term goals. Ask, What is reasonable to accomplish this year, given our funds, equipment, time, and people power? In three years? In five years? Prioritize your goals and then write down what you hope to accomplish each year so you'll have targets to aim for.

In this chapter we provide an overview of the design process for an outdoor garden and answer the questions:

- What is the best location for your garden?

- What components should be included in the garden design?
- What are some common themes for youth gardens?

### **Assess Your Site**

In the first step of the design process, you'll assess potential garden locations with respect to your goals and the basic needs of the plants you'll be growing. This is a great opportunity to engage your youth gardeners and put their sleuthing skills to use by conducting a site analysis.

Begin by analyzing your entire site. As you look for potential garden locations, note what areas have access to water and 6-8 hours of direct sunlight. Also, since youth will be using the garden, look for locations that are easy to access and not far away from the school. Once you identify one or more locations, complete a site analysis for each. A site analysis includes:

- an inventory of existing features
- a summary of site conditions

Your analysis should also include a preliminary list of needs both for the garden and for your garden program.

If your list of potential sites is lengthy, consider breaking into teams to complete the work and then share the results for discussion.







the day, potentially affecting the growing conditions of your plants.

## Summarize Site Conditions

Observe your site at different times of the day so you can record differences in light availability. If possible, visit your site after a rain, so you can determine how well the water drains and where it goes. Use the following questions as prompts:

## Inventory Existing Features

Take a field trip out to your potential garden space (or spaces). Start by sketching the space from a bird's eye view by outlining the perimeter and all the existing features (e.g., shrubs, sidewalks, structures, fences) on a piece of blank paper. Use a large tape measure to take accurate measurements of the site perimeter and each existing feature noted on your sketch. Record the information in the appropriate places on the site sketch.

Measure and make note of:

- Existing plants. Identify by name, if possible, along with their approximate size (height and width).
  - Features you may not be able to see, including underground electric, sewer, and water lines. You don't want to dig into or otherwise interfere with these lines! If you do not know this information already, contact school maintenance staff or utility companies for assistance.
  - Location of and distance to a water source.
  - Cardinal directions. Since the sun rises in the east and sets in the west, buildings, plants, and other features will create shade and shadows depending on the time of
- How do people use the space now? If the proposed garden space is near a play area or high-traffic zone, will people be apt to walk/run through the garden?
  - How will people access the garden? Is it near a path? Is it accessible to those with disabilities?
  - Does the soil appear to drain well? Are there areas of poor drainage (e.g. can you see standing water after it rains)?
  - Does the soil contain any contaminants, such as lead? If you are unsure, contact your state's soil laboratory or county extension office to learn how to conduct a soil test.
  - Does the soil look healthy? One way to assess soil health is to look at how well existing vegetation is growing.
  - From what direction does the wind usually blow? Is there a steady wind across the site?
  - Does the ground have any unusual dips? Determine the slope of the land. Would you need to take measures to prevent erosion?
  - What surrounds the space? Are there any views you would need to block, such as a busy road or dumpster? Is the space safe and secure or would you need a fence to protect gardeners from traffic or the garden from vandalism?

- Are there any trees or buildings that will shade the garden? If so, at what time and for how long?
- Are there any animal pests that may be of concern for the garden?

## Brainstorming a List of Needs for the Garden

All plants need is light, water, and nutrients; however, plants require different amounts of these. During your initial garden program goal-setting process, you may have determined what type of plants you would like to grow. If so, then make a list of the conditions those plants require and compare that list to the conditions you observe at the potential sites. If you have not yet determined what you want to grow, use the information you collect about the conditions at each site to help guide your plant choice. Here are some ways to evaluate the light, water, and soil at each potential site:

### Light

Since the school food garden is focused on growing vegetables and fruits, try to choose a site that gets full sun – at least six to eight hours of direct sun a day. But if your only growing spot has less than this, don't despair! While fruiting vegetables such as tomatoes, peppers, and squash require full sun, root crops like carrots and beets will get by with four to six hours of direct sun, and leafy crops like spinach and lettuce will still give you a reasonable harvest with just 3 to 4 hours of direct sun per day. Some herbs, like mint and cilantro, can grow in shady spaces! Have students check your potential garden site at different times during the day (and, if possible, at different times of year) to see

how much sun it receives. If you are doing an assessment in winter, remember to factor in shade that will be cast by trees in leaf. Keep in mind that shady areas make good gathering places for activities and lessons, and for resting.

### Water

Access to water is essential for gardening, and the closer water is to the garden, the better. Bucket brigades can work in the early stages, but eventually water needs a direct route to the garden via spigots or hoses. Make sure you have a potable (drinking water-safe) water source to irrigate your edible garden. Water provided by your municipality is usually a safe source. If the water you're using comes from a private well or untreated surface water source such as a pond or river, have it tested regularly for bacteria and other types of contamination. Your local health department can provide you with information on water testing.



Some gardeners use rain barrels to collect runoff from roof tops. Water collected in rain barrels is not considered potable and may contain harmful bacteria and other contaminants, especially if it is water collected as runoff from rooftops. The safest course is to use rain barrel water only for irrigating non-edible crops.

## Soil and Nutrients

Most plants obtain their nutrients through the soil. While it may seem like a simple substance, soil is an amazing and complex ecosystem that is one of our planet's most valuable natural resources. It's a mix of inorganic minerals, water, air, organic matter from dead and decaying plants and animals, and an incredible array of living organisms, ranging in size from microscopic bacteria and fungi to earthworms, moles, and shrews. The topmost layer of this vital blanket, called topsoil, is the most productive one. It's the layer with the most biological activity and where most plant roots are found. A site with six to 12 inches of topsoil is ideal, but often difficult to find.

Two important characteristics of soil are its texture and its structure. Texture refers to the kinds of particles that make up the soil. Structure refers to the way these particles are held together into larger particles, or aggregates. Soil with a crumb-like, granular structure allows for the best drainage and aeration.

By identifying your soil texture and conducting soil tests, you'll be better equipped to improve it. Here's how:

**1 Identify soil texture.** Soil is a mixture of mineral particles, organic matter, living

organisms, air, and water. The mineral portion is made up of particles of sand, silt, and clay. Sand particles are the largest; silt particles are smaller than sand, and clay particles are the smallest of all. (If you think of a sand particle as being the size of a basketball, a silt particle would be the size of a golf ball, and a clay particle only the size of the head of a pin!) The relative amounts of these different size particles determine a soil's texture. Soil that has a lot of sand (large particles) has large pore spaces between particles and drains quickly (sometimes too quickly for plants growing in it) and is often low in nutrients; however, it warms up quickly in spring and is easy to work. Soil that has a lot of small clay particles has smaller pore spaces between particles and drains slowly; it may stay too wet for healthy plant growth and roots may suffer from a lack of oxygen. It warms up slow in spring and is difficult to work. However, it also has the capacity to hold on to lots of nutrients. The properties of soil with lots of medium-sized silt particles fall somewhere in between.

**2 Identify soil structure.** A soil's structure refers to how well the soil particles are held together in small clumps, called aggregates. Soil with good structure has a crumbly look and feel (think moist chocolate cake). Soil with poor structure is powdery (think chocolate cake mix).

For many common garden plants — including most of the vegetables we grow — the ideal soil is loam. Technically speaking, loam is defined as a soil containing a balance of different-sized mineral particles (approximately 40 percent sand, 40 percent silt, and 20 percent clay). Loam soil offers both good drainage and water-holding capacity. The term



loam (or loam soil) is also commonly used to describe soil that has good structure and is rich in organic matter, characteristics that are also beneficial to plants.

**“We’ve learned that hands-on activities really make a difference! They involve reticent children and allow those who don’t usually star in the classroom to shine. They expend energy, see a difference, gain a sense of pride, and are then able to return to the classroom and maintain the control that is so often elusive.”**



— VANESSA WALLACE  
SEBAGO KIDS GROWING GARDENS  
SEBAGO ELEMENTARY SCHOOL, ME

Check your potential garden space to see if there are puddles after a hard rain, which may indicate a high percentage of clay. If the soil is generally dry and drains quickly after a rain, it contains more sand.

Don’t worry if your soil is less than ideal. Adding organic matter such as compost will improve its structure and fertility, helping sandy soils hold on to water and nutrients and clay soils improve their drainage and aeration. As soil microbes digest organic matter, they make the nutrients it contains available to plants. The microbes also release the “glue” that helps create the aggregates that create good soil structure.

**③ Determine pH and mineral composition of the soil.** A soil test will tell you whether

you need to add amendments to adjust the soil pH before planting. The pH scale runs from 1 (most acidic) to 14 (most basic), with 7 as the neutral middle point. Nutrients are most available to most plants at soil pH levels between 6 and 7. If your soil pH is too low (too acidic) you can add ground limestone to the soil to raise the pH. If your soil is too high (too basic or alkaline), you can add sulfur to lower the pH. The size of the garden and the results of the pH test determine the quantity of these amendments you will need to spread to alter the pH appropriately. A soil test will also measure the levels of key nutrients such as phosphorus and potassium. Knowing the current level of nutrients helps you apply the correct amount of fertilizer for healthy crops and avoid over-fertilizing. Most soil tests results include recommendations for the types and amounts of fertilizer needed to correct any nutrient imbalances. Also, be sure to test your soil for lead and other contaminants (see below). Contact your local Extension Service for information on soil testing, the cost of which is usually quite reasonable.

**④ Determine soil safety by learning the history of your site, if possible.** This can give you clues to possible hazards, whether it’s industrial contaminants, lead from paint, or the likelihood of flooding. Also, assess the garden site’s surroundings and take into consideration what might be carried into the garden along with runoff from areas nearby, such as parking lots or agricultural fields or pastures. Place gardens away from roadsides, older painted structures, garbage dumps, and industrial zones.

No matter where your garden is located, it’s always wise to start out with a soil test that



includes testing for contaminants such as lead and other heavy metals. Although this type of contamination is often associated with urban soils, it's also possible for suburban and rural area soils to be contaminated from lead paint residues, pesticides, or car exhaust from the days of leaded gasoline.

The main route of exposure to lead in the garden is through inadvertent direct ingestion of the contaminated soil, as well as dust that gardeners and plants come into contact with in the garden. While plants grown on soil high in lead may take up some through their roots and store it in their leaves and fruits, most of the risk comes from ingesting the lead-contaminated soil or dust deposits on the plants, rather than from actual uptake of lead by the plants themselves. Similarly, contaminated soil can be ingested via dirt and dust on hands, a significant concern especially when children are working in the garden.

While it's typically considered safe to eat fruits and vegetables grown in soils with lead levels up to 300 ppm, a level found in many urban soils, this standard applies only where soil exposure to children is not a concern. Where soil ingestion can occur, as with children who may touch their mouths or food with dirty hands, soil with lead levels greater than 100 ppm should not be used for edible gardening.

If the soil test determines areas your site has lead levels above 100 ppm, be sure to seek out expert advice from your local Cooperative Extension Service or Health Department on the safest strategies before beginning to garden. Do NOT grow edibles in the ground. You may still be able to garden safely by laying heavy-duty landscape fabric over the ground and pathways and mulching

thickly to keep kids from easily coming into contact with the soil. Then construct raised beds at least 18 inches tall and fill them with fresh, uncontaminated soil. Supervise young children to ensure they do not eat dirt or unwashed vegetables and make sure everyone washes hands immediately after gardening and before meals.

Even if your site is technically deemed "safe" but has somewhat elevated lead levels, it's a good idea for school gardeners to take measures to reduce exposure to soil-borne lead, such as:

- Add plenty of organic matter to the soil (helps to lessen plant uptake of lead).
- Maintain soil pH around 6.5 (helps to lessen plant uptake of lead).
- Supervise young children to ensure they do not eat dirt or unwashed vegetables.
- Make sure everyone working in the garden washes their hands immediately after gardening and before meals.
- Grow fruiting crops, such as tomatoes, peppers, beans, and okra, rather than root crops and leafy vegetables or herbs. Studies have shown that lead does not readily accumulate in the fruiting parts of vegetable and fruit crops, but accumulates more in leafy vegetables like lettuce and root crops like carrots.
- Peel root crops and remove the outer leaves of leafy crops before eating.
- Clean produce thoroughly before eating or storing to remove as much contaminated dust and dirt as possible.

*KidsGardening.org related resource:*  
[Digging into Soil](#)





Taking the time to thoroughly observe and understand the light available, access to water, and soil composition of your potential garden space will set your garden program up for success.

## Brainstorm a List of Needs for the Garden Program

In addition to considering the needs of garden plants, consider the needs of your garden program as you plan your space. Common needs include:

- Convenient distance to instructional space. Is the garden close enough for youth gardeners to visit on a regular basis? You will not want to spend a majority of your garden time in transit.
- Room for group activities and gatherings. Is there enough room to conduct lessons and activities in the garden? Can youth sit comfortably to work on projects? Will shade be needed for hot days?
- Adequate gardening space for hands-on engagement of all gardeners. How many youth will be working in the garden at one time? Is there enough room in the garden so that all your gardeners can be actively engaged in the process? Will all classes or groups involved be able to carry out their desired programming? Can the youth easily garden in the space with their smaller hands and shorter arm span?
- Enough of a harvest to meet goals. Many programs hope to grow enough food for youth to be able to enjoy the harvest. Is the garden space large enough to produce enough fruits and vegetables to meet that goal? Note that most schools do not have the space and time to maintain a



garden large enough to significantly meet the needs of their school meal service. Growing enough fruits and vegetables to allow for regular taste tests by students is a good goal, especially when getting started.

## Create a Base Map

Once your site analysis is complete, you will probably find that you have copious notes, along with a cluttered drawing of your garden space. The next step in the design process is to take the information you collected and turn your initial drawing of the potential garden space into a base map.

When you return to your classroom or indoor gathering area, provide your youth

gardeners with graph paper and have them create a scaled map from their measurements. Choose a simple scale like 1/8 or 1/4 inch for each foot so they can use a regular ruler and graph paper. Creating a scaled map can be difficult for younger children and is more age-appropriate for middle or high school students, so if you are working with elementary-aged students, you may want to lead the drafting of one group map. On this map, include all the permanent structures and features (including plants) that you plan to keep.

Next, use tracing paper to organize the other information collected. Place the tracing paper over your base map and add notes about the site conditions like drainage, light availability, etc. You can then add and remove layers to remind yourselves of the existing conditions as needed during the design process. In addition to these maps, also summarize your needs list, observations, and other notes on one piece of paper for easy reference. Remember to keep your original sketch and notes just in case you need to refer to them.

If you have been investigating multiple sites as potential garden spaces, you may want to use your base maps to select your final location. Discuss the benefits and challenges of each space. Bring key administrators and the garden planning committee into the discussion if they have not been involved in the data collection process. As a group, determine which location will best meet your needs. If the best choice is not obvious at this point, then proceed to the next step, which includes more brainstorming, and then review again.

*(See Sample Base Map on next page.)*

## Brainstorm and Create Bubble Diagrams

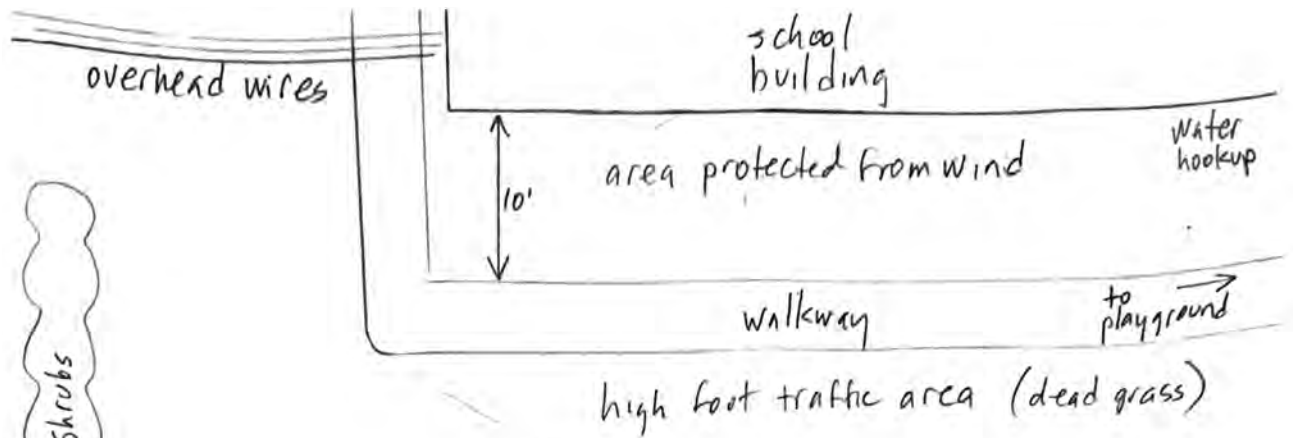
Once you have a base map, it's time to brainstorm. Many landscape designers brainstorm by using bubble diagrams. Bubble diagrams are quick maps that define open spaces using roughly drawn circles and squares rather than trying to determine specific sizes for the different areas. The advantage is that you can draw bubbles quickly, experimenting with different configurations and using different colors for clarity.

Start simply by once again laying a piece of tracing paper over your base map. Next, draw big "bubbles" on top of the base map to show the different garden zones being proposed. For example, your food production area may be a large bubble in the sunny zone, while a sitting area for instruction might occupy a more linear space along the building where there is shade from existing trees. Keep refining this concept to include more detail, like paths and places to sit.

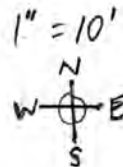
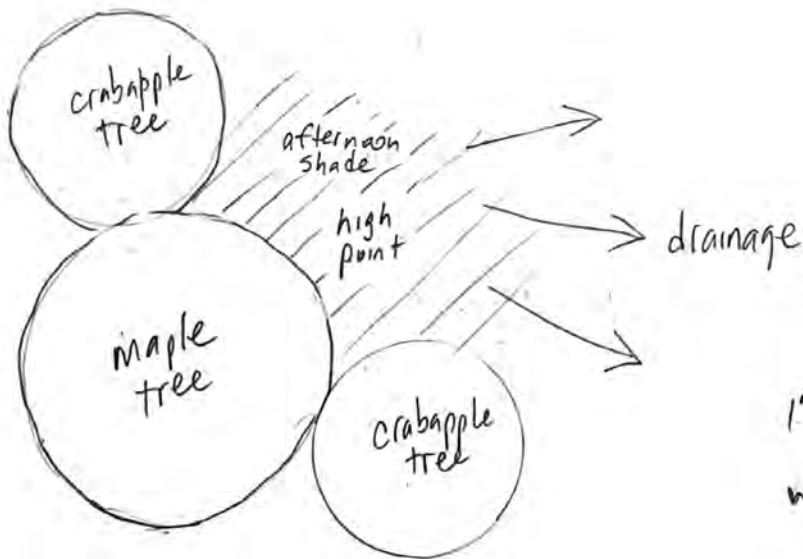
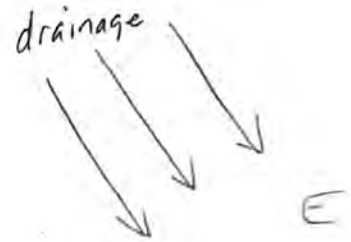
An alternative approach to using tracing paper is to make copies of the base map and draw directly on the copies. To engage youth, you may ask them to work individually or in small groups to come up with design ideas. You can then discuss the different plans as a group and develop a final version using their favorite ideas from many plans.

Here are some things to keep in mind as you brainstorm.

# Sample Base Map



lawn





## Be Creative with Garden Bed Structure and Design

There are many options to choose from depending on your needs and the resources you have available, including:

- **In-ground gardens.** A traditional outdoor garden is planted in the ground. If soil quality is high, this can be your most cost-efficient option. A level site is easiest to garden on, but a sloped area can also be suitable if you build terraces. And there's no rule that your garden must be one big rectangle planted in straight rows. Garden beds can be designed in all sizes and shapes, vegetables can be mixed with flowers, and fruit trees and bushes can enhance the landscape. It's best to keep individual beds no wider than 3-4 feet across to make it easy for students to reach plants without having to step into the beds. The beds themselves can be arranged in any configuration that meets your needs and design goals. For example, you might arrange your beds in a circle or

other geometric design around a central meeting area, or scatter beds of different sizes and shapes in a more naturalistic way throughout the garden site.

- **Raised-bed gardens.** Another common design uses raised beds. These are framed structures filled with soil, typically 9 to 12 inches deep (when set on soil) to 2 or more feet deep (when set on paved surfaces). They may be made of rot-resistant wood like cedar, concrete blocks, or recycled plastic planking.

Although they require more initial investment than a traditional in-ground garden, the benefits of raised beds pay off in the long run. If your soil is on the heavy side, raised beds will improve drainage and help the soil dry out faster in the spring; they're easier to cultivate; they can minimize problems related to toxins in the soil, such as lead; there are fewer weed and drainage problems; and the raised soil and plants are protected from crushing footsteps. Plus, design is flexible – you can build them to be accessible to disabled gardeners and to fit the space available, whatever the shape or size.

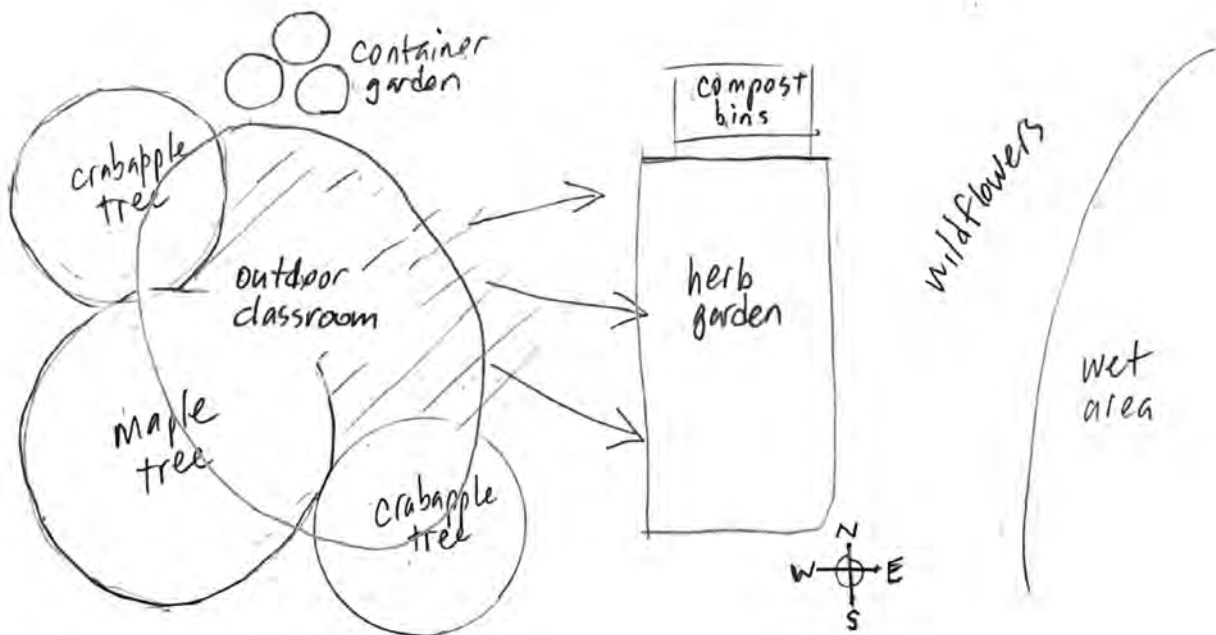
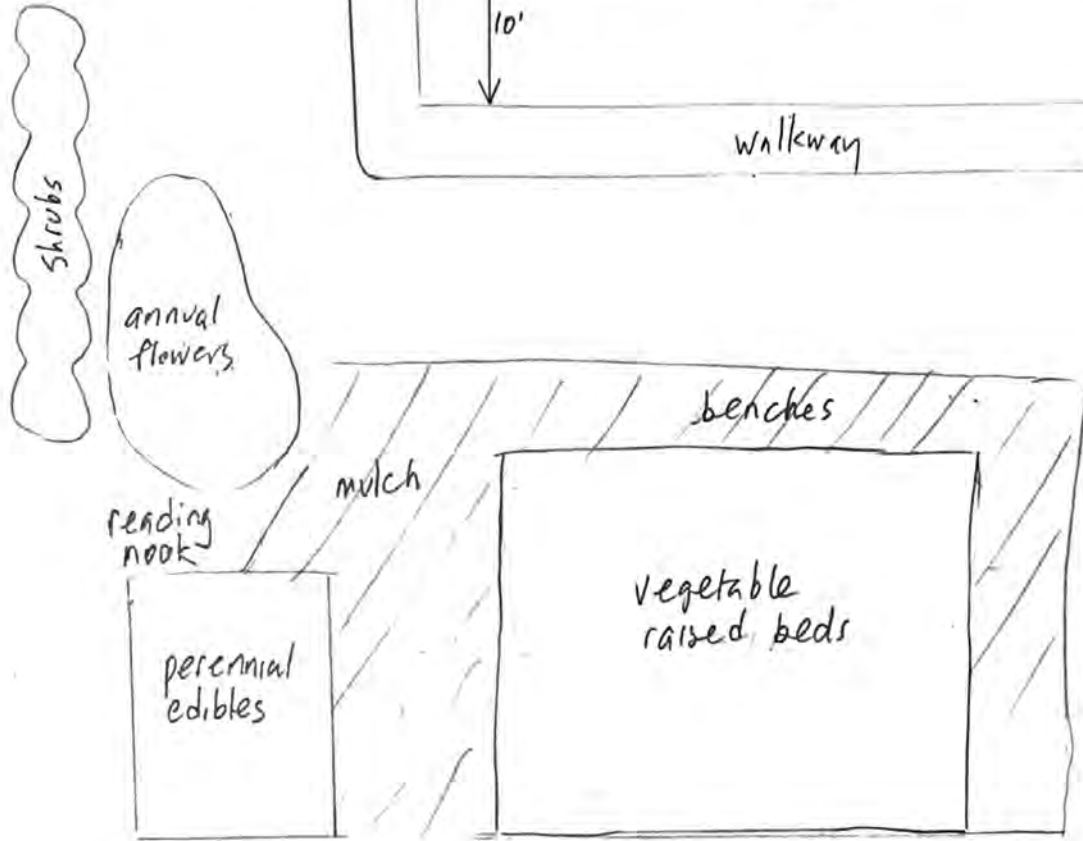
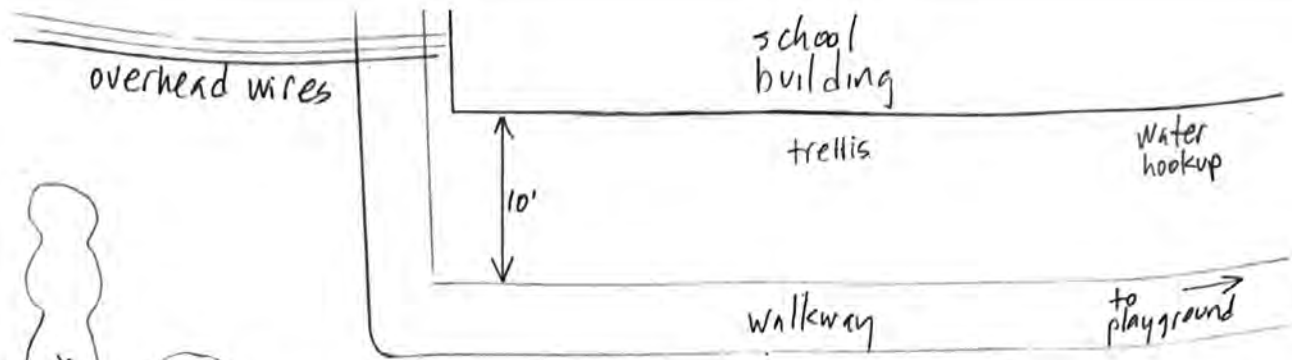
*KidsGardening.org related resource:*

[Raised Beds 101](#)

- **Containers.** You can also grow a garden in containers. Typically, garden containers are pots or troughs made of clay, plastic, or wood, but plants aren't fussy – they'll grow in anything that holds soil and has drainage holes. Experiment with whatever is at hand, from discarded 5-gallon buckets to an old bathtub! Window boxes and hanging baskets are great if you have little or no ground space. By adding handles, wheels,



# Sample Bubble Diagram





or placing containers on wheeled platforms you can make your garden mobile. This will allow you to move plants around the space to where they'll grow best as conditions change (e.g., the angle of the sun shifts slightly each day over the course of the summer). If the threat of vandalism is extreme, you can move containers to sheltered or locked areas.

*KidsGardening.org related resource:*  
[Container Gardening for Kids](#)

## Plan for Garden Access

Think about how students will move safely from the classroom out to the garden site and how they will move about within the garden itself. For example, you may want to plan for extra wide pathways to accommodate students working in groups or those with limited mobility, or design a spot for sitting large enough for the entire class to gather for discussions. Also, give consideration to pathway surfaces, keeping in mind the kinds of traffic they'll receive and how weather conditions will affect them. Plan to make the main paths of your garden 4 to 5 feet wide to easily accommodate wheelchairs, garden carts, and groups of children moving through the garden. If space is tight, secondary paths can be as narrow as 30 inches. Keep paths weed- and mud-free by covering them with cardboard, landscape fabric, or layers of newspapers overlaid with a layer of mulch, such as shredded bark or straw. For permanent paths, you can lay bricks, pavers, or crushed stone, or you can plant the paths with grass seed (or keep the original sod in place) and mow regularly.

*KidsGardening.org related resource:*  
[Accessible Garden Paths](#)



## Design a Gathering Place

In a shaded part of the garden, plan for a picnic table, bench, or even a group of cut logs or hay bales to sit on. This can be a place for cleaning and sorting vegetables, conducting outdoor lessons, doing arts and crafts, writing in journals, or just getting relief from the sun. If your site doesn't offer natural shade from a tall tree, build a structure with a roof or awning of some sort. Some garden programs are able to expand their gardening space to include an outdoor kitchen area to make food preparation and tasting experiences even more convenient.

## Include Storage Options

Plan for adequate, secure, and accessible tool and equipment storage. Will you include a shed in the garden space to provide on-site storage? If tools and equipment must be stored away from the garden site, consider investing in a garden cart to move them easily. Also plan for how materials such as lumber for raised beds or bulk mulch can be delivered to

the garden site if needed. Locating the garden so that it can be accessed by vehicles when needed will be most convenient, but that may not always be an option.

## Allow Space for Composting

If you designate a place for a compost pile or bin, students can convert garden waste (and perhaps cafeteria waste) into a rich, soil-building ingredients and witness the wonder of decomposition. You can create a free-standing pile, build an enclosure from materials such as lumber, chicken wire, or snow fencing, or use a manufactured composter. If you have more than one pile, you can have some compost “cooking” while you add new ingredients to another batch. While it’s convenient to place compost bins near the garden, be sure to locate them where runoff from the bins will not drain into areas where edible plants are growing. If this is difficult to do on your site, consider using a completely enclosed, tumbler-type composter.

*KidsGardening.org related resource:*  
[Gardening Basics: Composting](#)

## Plan to Keep Unwanted Visitors Out

Consider garden security, whether from vandalism or four-legged marauders like deer. Do your best to keep both wild and domestic animals out of your garden site, as the waste they leave behind can be a source of harmful pathogens. How you accomplish this will depend on what is roaming around your neighborhood. A tall fence is most effective at keeping deer out; a lower wire mesh fence will exclude rabbits and woodchucks but needs to extend underground about 6 inches to prevent them from tunneling under. Most kinds of fencing will exclude dogs,

but it’s much more difficult to keep free-roaming cats out. If cats are a big problem, repellents applied regularly along a fence line may be helpful. Don’t locate bird feeders or birdhouses within the garden area.

*KidsGardening.org related resource:*  
[Dealing with Garden Pests and Diseases](#)

After you have completed your bubble diagrams and brainstorming, you should be able to make your final selection of a garden site. Be sure to get administrative approval if needed before moving on to the next step, the creation of a final design.

## Create Your Final Design

The final step in the design process is to define the spaces that are currently represented by quickly drawn bubbles into specific sizes and shapes. During this step, you will need to decide on the types of garden beds (in-ground, raised beds, or containers) and pathways (hard or soft surfaces) you plan to construct. The materials you plan to use will impact the sizes and shapes available to you. Also, decide on other permanent structures you want to include, such as benches, tables, tool sheds, and compost bins. Even if you cannot afford to add all of these with the initial garden installation, you will want to include them in the final design for future expansion.

If you have not already done so, this is also the time to make a final determination about the first plants you want to grow. Even if you’re focus is on growing edibles, add a selection of flowering plants to attract pollinators. Many youth gardens find it helpful to plan their gardens around a theme that then guides their plant selection. As your garden program







becomes more established, you might adjust the plant types growing in your garden based on student interest, grant funding, and school priorities.

*KidsGardening.org* related resource:  
[Planting for Pollinators](#)

View the sidebar on the next page for some common youth garden themes to help you brainstorm ideas.

Creating a final design can seem like a daunting task to first-time gardeners. You may be able to call on the expertise of one of your garden planning committee members or an experienced gardener from your larger support network to draft your final design. If you are not feeling confident in creating a garden design and want help from someone more experienced, consider reaching out to local landscape designers to ask if they are willing to donate their time to help you through the process. They may be willing to serve in

a consultant capacity and double-check on your choices, or perhaps have even greater involvement throughout the whole process. If you have a site with complex slope or drainage issues, a professional landscaper or landscape designer can provide valuable assistance. However, don't feel like you need the help of a professional landscape design to plan a successful youth garden program! With a careful site analysis and graph paper, plus a little research, you can plan a functional and successful youth garden.

## In Summary

The garden design process is an important part of planning a sustainable school food garden program. Taking the time to match your goals and program needs with your garden plans will ensure that the installed garden will be useful and well-integrated into your school or organization's culture. Dream big, but start small! Implement your garden in stages as support and resources grow.

## Edible Theme Garden Ideas

**Recipe Gardens.** Grow plants that provide essential ingredients for a recipe. For example, a Pizza Garden would include garlic, basil, oregano, tomatoes, bell peppers, onions, and other veggies that make good pizza toppings. The garden can even be shaped like a pizza composed of wedge-shaped patches. End the growing season with a pizza party! A Salsa Garden would include tomatoes, sweet and hot peppers, garlic, onions, oregano, and cilantro. Celebrate the harvest by making salsa to share at a party for the school community.

**Herb Garden.** Herbs hold an enduring place in history and folklore because of their many uses in cooking, teas, medicine, and fragrances. Kids can uncover how various herbs, such as dill and mint, have been used historically and then explore the many opportunities for making crafts, herbal soaps, and herbal vinegar.

**Multicultural Garden.** Kids can explore other cultures by growing plants from around the world. For example, an Asian garden might feature soybeans, Chinese cabbage, Chinese greens, and ginger.

**Three Sisters Garden.** Kids can explore the stories and customs associated with the native crops of the Americas. One of the best-known Native American gardening techniques is the interplanting of corn, beans, and squash – a trio known as the “Three Sisters.” This garden provides many opportunities for trying new foods and recipes.

**Alphabet Garden.** Include fruit and vegetable plants whose names begin with each letter of the alphabet, from apples to zucchini. Consider Latin names as well as common names when choosing plants. Divide the garden into 26 blocks, each planted with a different kind of plant and labeled with a creative sign.

**Storybook Garden.** Growing plants from the gardens of popular children’s books, such as Peter Rabbit (carrot), Tops and Bottoms (radishes, beets, corn, and lettuce), and Jack-and-the-Beanstalk (bean), can breathe life into these stories.

**Rainbow Garden.** Grow a rainbow by planting fruits and vegetables representing all colors. Your garden can serve as a tool to teach young gardeners the importance of eating a rainbow every day! Rainbow gardens can also be used to promote inclusivity and create a safe space for LGBTQ+ students interested in gardening.

**Pollinator Garden Space.** Don’t forget the pollinators. Without pollinators such as honey bees and native bees we wouldn’t be able to enjoy many of the foods we eat. Alarmingly, populations of many pollinators are in sharp decline due to pesticide use, disease and parasite problems, and loss of food and nesting habitat. You and your students can help by planting a pollinator-friendly garden space in your edible garden to help increase your harvest and teach kids about why they are so important.





# CHAPTER 5

## Preparing for Gardening

With planning in place, you are ready to focus on the “hows” of the garden. At KidsGardening we recognize that many educators who want to start gardens are beginner gardeners themselves. Keeping that in mind, the next three chapters are devoted to providing you with gardening basics, delivered succinctly, and with the goal of helping you have the most success in your gardening endeavors as possible. We have included answers to some of our audience’s most frequently asked gardening questions, along with special tips we’ve gathered over the years.

In this chapter you will find answers to the questions:

- How do we prepare the soil for planting?
- How do we choose what to grow?
- When should we plant?

### Preparing a New Garden Bed

What is the secret to a bountiful garden? Excellent soil. In addition to anchoring roots, soil provides life-sustaining water and nutrients. Plants in poor soils will struggle to grow, even if optimal water and light are available. In contrast, plants in good soils will grow stronger and experience fewer problems with insects and diseases. For more information on soil preparation and testing, see Chapter 4 on Garden Planning and Design.

### Preparing Soil for New In-Ground Garden Beds

Here are the basic steps for preparing a new in-ground garden bed that is currently covered in sod.

#### Step 1: Mark the Bed’s Perimeter

Stakes and string work well to mark off areas with straight sides. For curved beds, use a garden hose to lay out the bed’s perimeter or sprinkle some ground limestone on the sod to mark the area to be planted. Test soil as mentioned in Chapter 4: Garden Planning and Design.

#### Step 2: Deal with the Sod/Weeds

You’ll need to kill or remove the existing plant growth — usually grass and/or weeds. Here are three options: smothering sod, removing it, or rototilling.

**A. Smother the sod** (should be done at least one season before planting). With some advance planning, you can avoid a lot of hard labor by covering the sod to smother it. Excluding light will kill the grass; it will then decompose in place. This method is ideal because it preserves the soil structure and prevents harm to beneficial soil life. Note, however, that smothering sod may not work well for all types of grasses and weeds.

Start the process the summer or fall before you plan to plant. First, do a soil test so you know if you need to add any amendments.





Begin by mowing the grass as short as possible. If your soil test recommends amendments to adjust pH or nutrients, spread them over the mown grass. Next, spread a 2-inch-thick layer of compost over your future garden area. Cover the compost completely with 6 to 8 thicknesses of newspaper, wetting them down as you go. Finally, cover the newspaper with a thick layer of organic mulch such as weed-free straw, grass clippings, chopped leaves, or more compost. Water the area lightly, repeating periodically if the weather is dry.

By the following spring, the sod and newspaper will have decomposed, adding organic matter to the soil. Simply pull back the top layer of mulch when it's time to plant – there's no need to till the soil. Earthworms and other soil critters will have incorporated the organic matter and amendments into the soil.

**B. Remove the sod.** To prepare the bed and plant it in the same season, you'll need to remove the sod. If you are willing and able to do some pretty hard labor, you can skim off the sod by hand using a spade. Or you can use machines to make the job a little easier.

**Spade.** To remove sod by hand, use a sharp spade to cut down through the sod, dividing it into 1-foot by 3-foot sections. Then slide the blade of the spade into the soil at a shallow angle, beginning on one of the shorter sides. Your goal is to slice off the roots of the sod just an inch or two under the soil surface. Use the blade of the spade to lift and roll up each section of sod as it is cut free, placing the sections on a sturdy tarp or in a wheelbarrow or garden cart as you go. Drag or wheel these pieces of sod to an out-of-the-way



corner; stack them upside down and let them decompose to make compost. Removing the sod like this will also remove some of the topsoil as well, so replenish the bed with some compost and possibly additional topsoil before planting.

**Machine.** A power sod cutter makes much quicker work of sod removal than hand labor. This machine can be rented, if you are comfortable operating one and have the means to transport it, or you can hire a landscaping company to do the job. As with hand removal, some of the topsoil will come off with the sod, so be sure to add some compost to the bed and additional topsoil if needed.

Use a garden fork to loosen the top few inches of soil, and then mix in some compost and any needed soil amendments. Gently loosening the soil by hand is ideal because it protects the soil structure and ecosystem. However, this method may not be practical for large garden areas or areas where the soil is compacted. In these cases, you'll need to literally dig in by turning over the soil by hand or with a tiller.

**C. Rototill.** You can also deal with the sod by chopping it up with a rototiller. You can either rent one for DIY or hire a landscaper to do the job. You'll need a rear-tined machine with a fair amount of horsepower to cut through established sod, and you'll need to make several passes with the tiller. After each pass, walk through the bed and pick out chunks of sod, shaking them to remove as much soil as possible. Then pile the chunks in an out-of-the-way place and allow it to decompose to make compost.

While rototilling will leave more of the site's original topsoil and organic matter in place than stripping the sod, it's also likely to leave you with a bigger weed problem. Try to remove the roots of perennial weeds like quackgrass by hand before tilling, since each section of root chopped up by the tiller can result in a new plant. And no matter how diligent you are in removing chunks of sod, some grass roots will remain that will need to be pulled as they sprout.

Note that, although it fluffs up the soil for easier planting, tilling isn't ideal because it damages soil structure by breaking up the soil aggregates that benefit the soil ecosystem.

If you plan to strip the sod or rototill, try to do this soil preparation at least a month before you intend to plant to allow any remaining vegetation to break down and give annual weeds a chance to sprout. When these weeds are only about an inch tall, cultivate with a hoe to kill them before planting time. This will help to reduce the number of weeds sprouting in your garden after it's planted. Following your soil test recommendations, this is also the time to add lime to raise pH or sulfur to lower it, and fertilizer to correct any nutrient imbalances.

### Step 3: Prepare In-Ground Beds for Planting

When it's time to begin planting in the garden, rake the soil surface with a sturdy steel garden rake to break up any large clods of soil and create a smooth, level planting bed. (You can skip this step if you smothered the sod.) Make sure that the soil is dry enough to work: Squeeze a handful of soil. If it forms a tight ball that drips water or holds its shape when you open your hand, it's too wet. The soil ball should hold together slightly, but crumble easily when you touch it gently.

### Preparing Soil for New Raised Beds

One of the benefits of gardening in raised beds is that you can fill the beds with optimal soil. (Learn more about the benefits of raised beds in Chapter 4.) When planting raised beds, you will most likely fill them with topsoil from an outside source, such as a garden center or landscaping company. Depending on the amount of soil you need, you may choose to buy it bagged or in bulk by the cubic yard. Buying your soil in bulk will be the cheapest option, but bagged soil can be easier if you only need a small amount. Look for soil specifically formulated for the type of plants you plan to grow. You may find

**“The garden program really united students. It didn't matter that they came from different areas or that their skin color was different; everyone's hands were the same color — dirty!”**



— MELISSA VANEK

HOLCOMB FARM LEARNING CENTERS, CT



options specifically tailored for raised beds. It's usually best to combine your soil with compost. When using bagged soil consider using 75% topsoil and 25% compost. When using bulk soil consider using 50% topsoil and 50% compost.

Before purchasing bulk soil, get a sample and ask questions about the soil. Find out where it comes from and if any testing has been done to make sure it is free of contaminants. To be on the safe side when buying soil in bulk, do your own soil test once it's delivered. Always secure the best soil you can find for your raised beds. Some municipalities may be willing to donate compost or soil for your organization's garden; however, be sure to check out soil quality before accepting it, as you would for purchased soil. Good soil is an important and wise investment in a school garden program.

## Preparing Soil for Containers

Use a commercial potting mix rather than garden soil to fill your garden containers. Garden soil is generally too heavy and will not drain adequately when used for container plants, and it may contain plant disease-causing organisms and weed seeds. A potting mix may include some true soil but will also include materials like peat moss and compost to retain water, along with materials like vermiculite or perlite for good drainage and aeration. Potting mixes are generally pasteurized to kill disease-causing organisms and weed seeds, which is especially important when starting seeds. It is recommended that you use 100% potting soil for containers.

*KidsGardening.org related resource:*  
[Urban Gardening Benefits and Techniques](#)

## Annual Soil Preparation for Established Gardens

If you are planting annual plants (most common vegetable plants are annuals), preparing the soil for planting is a yearly activity. Each spring you will want to refresh existing garden beds to improve their structure and nutrient content. However, once your garden is established, it is not necessary to till or turn over the soil deeply each spring. Tilling and turning over the soil can be detrimental to the soil, disrupting its ecosystem of beneficial microorganisms, harming soil structure, and bringing dormant weed seeds to the surface.

It's a good practice to cover bare soil with a protective layer of mulch, like wood chips or straw, over the winter. Then, in spring you can gently rake the mulch to one side to add compost and/or scatter granular fertilizer over the soil if needed. Only dig into the soil as needed to plant your seedlings or seeds to minimize disruption to the soil structure and ecosystem. Finally, renew the layer of mulch to keep weeds under control.

If your existing garden beds are weedy, cultivating just the top few inches of soil may be sufficient to get the beds ready for planting without disrupting the deeper layers of soil. Once the weeds are removed, use a metal garden rake to level and smooth the soil to create a seedbed ready for planting seeds.

Some gardeners plant winter crops or winter cover crops, hardy plants that prevent soil erosion and weed growth. If you planted a winter cover crop, tilling is usually the easiest way to incorporate it into the soil in the spring. Do this a few weeks before you





plan to plant the bed to give the cover crop's organic matter time to decompose. If you want to minimize soil disturbance, you can cut the cover crop off at the soil surface, add the clippings to your compost pile, and work the remaining cover crop stubble into the top 3-6 inches of soil with a hand cultivator. Read more about cover crops in the Putting the Garden to Bed section in Chapter 6.

*KidsGardening.org related resource:*  
[Soil Fungi: A World of Wonder Beneath our Feet](#)

## Choosing What to Grow

With the foundation of your garden established with properly prepared soil, you can turn your focus to plant selection. There are so many delicious vegetables, fruits, and

herbs to choose from that deciding what to grow may be one of the hardest parts of gardening! If you're like many gardeners, as you flip through a seed catalog (or scroll through, as most are also online), everything your eye lands on looks enticing. You may be asking yourself questions such as,

- How do I decide among the many varieties of tomatoes?
- Which kinds of veggies will grow best in my part of the country?
- What veggies are kids most likely to enjoy?
- Which plants would best complement my educational goals and relate to areas of learning, such as history, and culture, literature, plant and soil biology, and nutrition?



Make sure to involve your young gardeners in the selection process – it will help cultivate a sense of ownership in the garden and help them get excited to get growing! Consider the following recommendations to help you select plants that will grow successfully and enhance your garden program.

## ① Choose plants that can grow successfully in your region.

When growing edible plants, pay attention to the descriptions provided in seed catalogs, on the back of seed packets, or on plant labels. Note the listed days to maturity (DTM) for each particular variety. This tells you approximately the time it will take from seed sowing to harvest or, in the case of crops that are usually planted as transplants like tomatoes or peppers, from transplanting to harvest. This information is helpful in deciding if your growing season is long enough for the crop to mature. For example, if you garden where the growing season is short, choosing tomato varieties that require fewer days to mature will increase your chances of harvesting a good crop before the weather turns cold. Knowing the DTM can also help you figure out if a crop planted in spring is likely to be ready before school lets out for the summer or when you need to start a crop for fall harvest so that it matures before frost.

## ② Decide if you want to start with seeds or transplants.

Whether you choose to grow plants from seed or from transplants (young plants) depends on the crop you're growing and where in the country you're gardening. Plants that take a long time from seed sowing to maturity – tomatoes, peppers, and eggplant, for example – are set out in the garden as transplants just about everywhere in the country in order

for them to produce a harvest while weather conditions are suitable. These are also, for the most part, plants that tolerate the root disturbance of transplanting.

For some faster-growing plants, such as lettuce, basil, and zinnias, you choose either option: start them early indoors and transplant the seedlings outside or sow the seeds directly out in the garden.

There are two ways to obtain transplants for the garden – buy them from a commercial grower or grow them yourself from seed planted early indoors. Growing your own transplants from seed will give you a wider range of varieties to choose from — many more than are typically available at local garden stores and greenhouses. Growing your own will also usually save you money. However, to produce strong, healthy plants you must be able to give them suitable conditions of light and temperature, and you need to commit to two to three months of daily care of the young plants.

Some plants don't tolerate transplanting well and their seeds are usually sown directly in the garden. Many vegetable crops fall into this category including root crops like beets and carrots, beans, peas, and corn.

Pumpkins, melons, cucumbers, and squash also resent transplanting and usually grow best when direct sown. But they can be started early indoors if they are grown in individual "plantable" (biodegradable) pots so their roots are not disturbed when they're transplanted.

*See Appendix A for details.*





### ③ Choose plants that can be properly cared for and harvested when kids are around.

Especially if you are gardening in a school setting, you need to be mindful of scheduled breaks. Growing in both indoor and outside settings can present some special challenges. Keeping these considerations in mind from the start will help to make your gardening projects a success.

#### **Indoor Gardens:**

When you're growing plants indoors, it's important to have a plan in place for caring for plants over breaks. Young seedlings, especially, need frequent watering, so if there is a break that's longer than a weekend, make arrangements for someone to check on and care for your baby plants.

#### **Outdoor Gardens:**

Depending on where in the country you are gardening, much of the outdoor growing season may fall outside of the regular school session. Here are some possible approaches to this challenge:

- Youth gardeners can start transplants indoors and transplant and sow suitable crops outdoors before the school year ends. (In warmer climates, a great summer crop to plant is sweet potatoes because students can plant the slips in May and June, and dig them up in the fall.) Over the summer, volunteers, such as students, caregivers, teachers, and community members, care for and harvest from the garden, perhaps donating produce to a local food pantry. When students return at the end of the summer, they can participate in caring for and harvesting from the garden until the growing season comes to a close.



Depending on your climate, there may be time for students returning in late summer to plant cool-season crops like spinach and lettuce for harvest later in the fall.

- If your school runs a summer session, those students might take over caring for and harvesting the garden. Or your school might consider pairing up with a nearby local organization that runs a summer youth program, such as a library, parks and recreation department, or day camp for summer garden care and learning.
- If your garden program is able to invest in season-extenders like cold frames or low tunnels, you can begin planting some crops earlier in the spring or keep them growing later into the fall and early winter months.
- Another approach is to focus on crops that can be planted and reach harvestable size while school is in session. The warmer your climate and the longer your growing season, the easier this option will be.



Cool-season crops that mature quickly, like spinach, lettuce, beets, and radishes, are all good choices for spring and fall gardens in many parts of the country.

#### **4 Consider sun versus shade.**

If you're selecting plants for an outdoor garden, keep the growing conditions in mind as you choose what to grow. The amount of sunlight required by different plants varies, so match plants to the sunlight you have available.

Although most vegetable crops do best in full sun (6-8 hours of direct sun a day), full sun is a must for fruiting vegetable crops like tomatoes and peppers. If your garden space gets only 4-6 hours of sunlight a day, root crops like carrots and beets will still thrive. If your garden only gets 3-4 hours of direct sun, herbs and leafy crops like lettuce are good choices.

#### **5 Select a diversity of plants.**

Planting just one or two types of plants can make your garden a target for pests and diseases and result in the loss of much of your harvest. Avoid this by planting a diverse selection of crops. Then, if one crop falls victim to a particular problem, most likely it will not wipe out the whole garden.

*KidsGardening.org related resource:*

[Plant Families for Pollinators](#)

#### **6 Make classroom connections.**

Connecting the plants grown in the garden to other areas of study can really enhance the learning process. For example, growing a Three Sisters garden of corn, beans, and squash offers opportunities to explore Native American customs, nutrition, and history. As students dig in, investigations into plant and soil biology will also flourish. Many children's

books can inspire thematic growing projects. Connecting garden plants with classroom literature captures students' interest, curiosity, and cross-cultural awareness. Students might grow and taste the same foods as the characters in the book they're reading. Plant and garden experiences can also inspire students to write their own tales, exercising their imaginations and language skills and revealing what they've learned in doing so.

### **Determining When to Plant**

Your final preparation task is to create a schedule for sowing seeds and planting transplants in the garden. Correct timing of both indoor seed sowing and outdoor seeding and transplanting is a crucial part of growing healthy plants. Start seeds too early indoors and your seedlings may be leggy and pot-bound by the time outdoor planting time arrives; too late and your harvest will be delayed. Plant warmth-loving seeds or transplants outside too early and cold soil and air temperatures may harm them. On the other hand, crops that do best in cooler weather may not thrive if they are planted late and end up maturing when the weather is hot.

Fortunately, it's not difficult to come up with a seed starting schedule that is appropriate for your area and the crops you plan to grow. Figuring out what to plant when starts with finding out the average date of the last spring frost in your area. Then you can count the number of weeks before or after this date to sow seeds of each crop for the greatest likelihood of success. The local office of your state Cooperative Extension Service or local Master Gardener program can also help you determine the average last spring frost date (and first fall frost date) for your area.



If you are starting seeds early indoors to produce transplants to go out in the garden, your goal is to have transplants reach the best size for transplanting at a time when the weather conditions are suitable for them to go outside. Timing is also important for seeds planted directly in the garden. For example, cold-tolerant spinach seeds can be planted as soon as the soil is dry enough to work in the spring, while warmth-loving sunflower or pumpkin seeds should go in the ground two weeks after the last frost date.

Thankfully, the timing (relative to the last spring frost date) for sowing seeds has been worked out for you by previous generations of gardeners. This information is available in plant catalogs or on the back of seed packets. For your reference, we have also included seed-starting information for some popular vegetables and herbs in Appendix A.

As you are creating a planting schedule, keep in mind that all gardening is local. The specific seeding, transplanting, and direct-

seeding dates for your garden will depend on where in the country you are. It will come as no surprise that the last spring frost date in Texas comes quite a bit earlier in the year than in Vermont! In the warmest parts of the country, you may be able to grow some crops outdoors year-round or it may get too hot to grow other crops in mid-summer.

Your best source of information on the growing conditions in your area is your state Cooperative Extension Service. Many of the state Extension Service websites have seed-starting calendars that make it easy to come up with a seed-starting and planting schedule for your classroom and garden.

You can get multiple harvests of some crops through succession planting. Depending on the crop you're growing, your climate, and the months when your garden program is active, you may be able to plant the same crop multiple times during the season, a technique called succession planting. Some fast-maturing crops like lettuce may be planted every few weeks to give a continuous harvest. Cool-season crops like cabbage, spinach, and many other greens may be planted in early spring for an early summer harvest, and again in mid- to late-summer for harvest during the fall months.

## In Summary

Preparing the soil and planning what and when to plant are important steps that will contribute to your school food garden's success. Letting kids contribute to each of these tasks will get them excited about their upcoming garden. Much of this planning and prep work can be done during the winter months when activity out in the garden is at a standstill.



# CHAPTER 6

## Planting and Maintaining the Garden

With plans in place and the garden prepared, it is finally time to discuss the planting and maintaining of the school food garden. What a great reward it is to see the happy faces of kids digging into the soil after all of the hard work involved with organizing the garden program. We offer some basic instructions for planting both seeds and transplants, followed by basic care techniques and pest control.

Continuing with the presentation of the “hows,” in this Chapter, we will answer the questions:

- How do we plant our garden?
- Once planted, how do we keep the garden growing well?

### Planting in the Garden

With youth and volunteers properly informed about safety procedures (see Chapter 7), they are ready to jump into planting. As part of the learning experience, you want to make sure they understand the reasoning behind where and when they are planting certain plants and then provide proper instruction and a demonstration of how to plant. By giving them this important background, you are giving them the tools to start their own gardens in the future. Here is a concise description of each step in the planting process:

**1 Decide where to plant each crop.** It's best to sketch out a planting plan before digging in. Check seed packets and plant tags to

determine plant spacing for each crop. Be sure to allow adequate space for your plants; crowded plants will not be as vigorous, healthy, or productive. Some plants, like squash and pumpkin, require more space than others, like carrots. Most vegetables do best in full sun, so place tall plants like corn on the north side of the garden to keep them from shading shorter plants. That said, you can also use this shade to your benefit, especially in hot summer climates. Plants that grow best in cooler weather, such as lettuce, appreciate a little shade during the summer months; for the biggest and tastiest harvest, plant them where they will get some light shade during the hottest parts of the summer.

**2 Determine when to plant.** Make sure the soil is ready to be worked before you do any work in your garden. Working the soil when it is too wet can lead to compaction and poor seed germination or seedling growth due to lack of oxygen for roots. To test if the soil is dry enough, pick up a handful and squeeze it in your fist. If the soil maintains its shape when you release your grasp but crumbles easily when touched, you can dig in. If the soil stays together in a tight ball or water seeps out, it is still too wet. Wait a few days and test it again. If the soil is so dry that it does not form a ball at all, water it thoroughly and wait a day before working in the garden. Once the soil is ready, rake the planting bed with a metal garden rake to make it flat and smooth.





**3 Follow instructions on how to plant.** You may plant your garden either by sowing seeds directly in the ground or by transplanting young plants (called transplants). Plants that need a long season to mature, such as tomatoes and peppers, are usually set out as young plants. Faster maturing plants or those that don't transplant well are usually started from seeds planted directly in the garden. See the sidebars for specific instructions for

sowing seeds directly in the garden and for planting transplants.

With your plants in the ground, the next step is to continue to monitor plant growth and appreciate the wonder as plants transform as they mature.

*KidsGardening.org related resource:*  
[Transplanting and Direct Seeding](#)

## Sowing Seeds in the Garden

Growing crops from seed can save a lot of money and add to the fun of gardening, but sowing seeds correctly takes some practice. Follow these steps to maximize your success:

- 1** To create a straight row, stretch a piece of string in a straight line from one end of the garden bed to the other. Pound stakes into the ground to hold the string in place.
- 2** Make a shallow indentation or trough in the soil alongside the string with a finger, trowel, or hoe. Seed packages provide recommendations for planting depth, but a general rule is to plant seeds twice as deep as they are long.
- 3** Place the seeds in the furrow. The seed package will recommend how far apart to space the seeds. Small seeds, like carrot seeds, are difficult to place individually. You can scatter small seeds by rubbing them between your fingers, trying for relatively uniform distribution, or you can mix the seeds with dry sand or dried coffee grounds and sprinkle the mixture into the furrows.

- 4** Cover the seeds with soil, and then gently press the soil surface so the seeds will be in good contact with the soil.
- 5** Write the plant name and the date seeds were planted on a row marker with a waterproof pen and place it in the soil at the end of the row.
- 6** Water the planting area gently so the seeds don't get knocked out of place or flooded by the force of the water. You can use a watering can with a rose or a hose with a water breaker. Roses and water breakers are attachments with small holes that create a gentle shower.
- 7** Before planting the next row, check the seed packet to find out how much space to leave between rows. Leave extra space if you plan to have a path. Repeat these steps until the entire garden is planted.
- 8** Water the entire garden thoroughly when planting is complete. Keep the soil evenly moist until the seeds germinate.





## Setting Transplants in the Garden

Although it's more expensive than starting from seed, planting young seedlings (called transplants) provides youth gardeners with instant results. Follow these steps when transplanting seedlings into the garden:

- 1 Water the seedlings in their containers a couple of hours before transplanting. You want the soil mix to be moist but not soggy.
- 2 Dig a hole in the soil with hands or a trowel where you want to place your plant. The hole should be larger than the seedling's root mass — including soil — and deep enough to bury the soil around the seedling just below the surface of the ground.
- 3 Remove the seedling from its container by pushing up on the bottom of the container and easing it out. If the plant won't budge from its container, spread your fingers around the stem of the plant and over the top of the soil surface. Then turn the plant and container upside down and rap the edge of the container sharply

against a hard surface, taking care not to bump the plant itself. The soil ball should slide out into the palm of your hand.

- 4 Supporting the seedling by its rootball (not its stem), place it in the hole, and fill the hole with soil. Gently press the soil down around the seedling once the hole is filled in.
- 5 Water the seedlings so the soil is moist but not saturated.
- 6 Write the plant name and the date seedlings were planted on a row marker with a pencil or waterproof pen and place it in the soil at the end of the row.
- 7 Check the plant label to determine how much space is needed between rows. Leave extra space if you plan to have a path. Repeat these steps until the entire garden is planted.
- 8 Water the entire garden thoroughly when planting is complete.

## Maintaining the Garden

Once your seedlings have been transplanted and your direct-sown seeds have germinated, the plants will need routine care to keep them thriving. Weeding, mulching, and fertilizing are key garden tasks you need to schedule to maintain your garden's health. Keeping weeds under control helps your

plants by reducing competition for resources. Spreading mulch, like wood chips or straw, lessens weed problems, helps conserve soil moisture, and prevents soil erosion. Applying fertilizer at recommended rates can help to produce robust plants and a bountiful harvest. Following is an overview of these basic garden tasks.



## Weeding

A weed is simply a plant growing where we don't want it to grow. Weeds are just plants doing exactly what they've evolved to do: take advantage of and colonize an available ecological niche – in this case, open soil in the garden. However, in the garden, weeds compete with our cultivated plants for light, moisture, and nutrients, so we need to keep them in check.

Weeding doesn't have to be a time-consuming chore if it is done regularly when weeds are still small in size and number. But before young gardeners begin weeding it's important to teach them to identify which plants are weeds so they can distinguish them from the seedlings they have planted and remove the correct plants.

Weeds can be removed by hand or with tools. You can use a hoe to cut off small weed seedlings or use a cultivating tool to turn them under the soil. It's crucial to get rid of weeds before they flower and go to seed, or they'll end up sowing a lot more weeds for you to pull next year. Also, try to completely remove the roots of perennial weeds, as many reproduce readily from sections of roots or underground stems that have been left behind.

## Mulching

Low-maintenance weed control begins with mulch. Mulch is any material used to cover the soil to prevent weed growth, slow water loss, and/or prevent erosion. Mulching is an important practice in any sustainable garden. Organic mulches, such as weed-free straw (make sure it is herbicide-free), salt hay, sheets of newspaper, grass clippings (from herbicide-free lawns), and chopped leaves,



**“The children are truly inspired. They love every task assigned in the garden whether planting or maintenance. The children have a true sense of accomplishment at seeing something grow from seed into something to eat or to simply enjoy. The garden has also created a sense of ownership in the children. We have seen leadership abilities emerge. Faculty and parents have been impressed by the level of commitment and responsibility shown by the students while working on projects for the Learning Garden.”**

**– CHRISTINE SOTELO  
ST. LAWRENCE O'TOOLE SCHOOL, CA**

also add organic matter to the soil as they decay and improve soil structure.

Organic mulches tend to keep the soil cool and are good for crops that prefer cool conditions, such as broccoli and peas. When using these kinds of mulch around warmth lovers like tomatoes and peppers, let the soil warm up for a few weeks after planting before spreading mulch.

Shredded bark and wood chips are also organic mulches, but they take longer to break down than non-woody mulch materials, so they are generally more suited to use in paths and around perennial plants (those with a life cycle longer than one year) and woody plants like trees and shrubs. Wood-based mulches are a good option for native plant and pollinator youth gardens.





How deep should the layer of organic mulch be? Although it varies with the material used, in general, a 2- to 4-inch-deep layer will do a good job keeping weeds down. Apply coarser materials like straw more thickly; finer materials like grass clippings more thinly. If you are using grass clippings, let them dry in the sun for a couple of days before spreading them in the garden to keep them from matting down. Be sure not to pile mulch up directly against the stems of plants; keep it an inch or two away from stems to minimize pest and disease problems.

Inorganic mulches, including sheets of plastic, landscape fabric, and stones or gravel, will not decay and can be useful in perennial beds and around trees and shrubs. Dark plastic mulch is often used around heat-loving crops, such as tomatoes and peppers, because it

absorbs heat from the sun to warm the plants' roots. If you decide to use plastic mulch, be sure to lay down drip irrigation or soaker hoses underneath it, as the plastic will not let rainwater through.

## Watering

All living things need water to live and thrive, making it one of our most valuable natural resources. Adopting efficient watering practices not only conserves water and boosts plant health, but it's also another way to empower kids to help protect precious resources through their work in the garden. Depending on where you live, rainfall may help water your garden for most of the year, but in dry climates and when plants are growing vigorously during summer months you may need to water frequently. Most gardens need to have a water source close by and a practical plan for getting water from spigot to soil.

Common methods of irrigation include:

**Hand watering.** This method is usually the cheapest in terms of equipment costs. By using proper techniques, it can also be an efficient use of water. As you use a hose or watering can to irrigate you can be selective, watering each plant or plot as it needs. You can monitor how far moisture penetrates into the soil and adjust your watering time as necessary. It's important to apply water directly to the soil beneath the plants and to avoid excessive runoff onto sidewalks and other paved surfaces.

If you choose to use watering cans, select models that are the right size for your gardeners to avoid spills and injury.

Remember that a gallon of water weighs 8 pounds, so watering cans get heavy quickly! Fortunately, watering cans are available in many different sizes. Or you can save money by using half-gallon or gallon milk and juice jugs with handles.

If you prefer using hoses, choose adjustable spray nozzles that allow you to stop the flow without having to turn off the spigot, and that offer a range of volume and pressure options. This will ensure that you have the appropriate pressure for various kinds of plantings and reduce water waste.

The downside of hand watering is the time and energy needed. A strong and reliable team of kids and volunteers is necessary to monitor the weather and water when needed, especially during vacation breaks.

**Sprinklers.** Sprinklers decrease the manpower needed for watering. You can purchase hose-end sprinklers or install a system of underground pipes with spray heads. Both types can be made even more efficient and flexible by attaching manual or automatic timers.

**Hose-end sprinklers** are the least expensive option and can be a good choice if you have lots of beds scattered around. Some produce a spray that moves in a circular motion, others cast a fan that can move back and forth, and still others resemble mini-tractors that “drive” through the garden guided by the hose! You can turn them off and on by hand or purchase a timer to do it for you. The first time you operate your sprinkler, observe the spray pattern to make sure

it’s applying water where you need it and not to paved surfaces.

**Built-in sprinklers** use underground pipes and spray heads. They tend to be more sophisticated to use and expensive to install, but they can be useful for permanent beds. There are many different types of spray heads, including pop-ups, rotors, and bubblers that allow you to choose the direction and pressure of water delivery. Most built-in sprinklers are controlled by automatic timers you can program to water at the most appropriate time of day, even if you’re away. A helpful feature available on some automatic timers is a moisture sensor that prevents sprinklers from activating during rain! It is important to check the system regularly to make sure broken sprinkler heads are not wasting water or delivering spray to paved areas, and that spray isn’t overlapping and overwatering some plants.

The main benefit of sprinklers is convenience, and this is what makes them the least efficient irrigation method. Once they’re on schedule, we often forget to monitor them and end up with dried up or drowned plants and wasted water. You also have very limited control over the spray, so some plants get water whether they need it or not. Much of water sprayed into the air is lost to evaporation and wind drift, and since you don’t have to be present to operate them, it might be weeks before you discover a broken sprinkler head that is wasting water or starving plants of moisture.

**Drip Irrigation.** Drip irrigation provides a happy medium between hand watering and sprinklers. Drip systems allow for more selective water





application and can provide the convenience of automatic watering. Drip irrigation equipment is more costly on the front end than hand watering, but less expensive than installing underground sprinkler systems. Water savings and convenience can give you a rapid return on your initial investment. There are two main types of drip irrigation: soaker hose and emitter.

**Soaker hoses** have small pores along their surface that leak water directly to the soil at a slow rate, allowing for increased absorption and less water waste. Soaker hoses are a good option for rows and beds of vegetables and annual plants.

**Emitter hoses** feature components that are calibrated to deliver a precise amount of water, such as 1/2 or 1 gallon per hour. There are a variety of types. One kind features pipes with built-in emitters. Others let you attach small-diameter, flexible tubes capped with emitters to a main feeder hose, allowing you to locate emitters right under individual plants or in pots. Emitter irrigation is a great system for watering beds with permanent plantings.

Both drip irrigation options deliver water more efficiently than sprinklers with less chance for water loss due to wind and runoff, and they can be attached to timers and moisture monitors to allow for increased flexibility in scheduling. By delivering water directly to the soil, they are more selective than a sprinkler, but not quite as targeted as hand watering.

For optimal operation, you may need to add a pressure regulator to reduce and equalize water flow through the system and a filter to prevent small particles in the water from clogging pores and emitters. In some areas, insects such as

ants may enter emitters in search of water and may cause clogs.

Here are some additional watering tips:

**When to water.** Irrigate during early morning hours. Much of the water applied in the heat of the day is lost through evaporation. Evening watering can contribute to disease problems because plant leaves stay wet longer. Watering during windy periods increases water loss.

**Where to apply water.** Since plants absorb moisture through their roots, it makes the most sense to apply water to the soil. Overhead watering is inefficient; also, wetting the foliage can lead to disease problems. (If your garden is in a dusty area, rinse leaves occasionally if dust builds up on foliage.)

**Watch the weather.** As best you can, adapt your watering schedule to weather and changing seasons. Although watering every Monday and Wednesday might be convenient for you, it may not be the right schedule for your plants and may waste water.

**How much to water.** It is better to water thoroughly a few times a week than to apply a little bit every day. You want to moisten the soil to a depth of 6 to 8 inches to encourage deep, strong root growth. For all but fast-growing, shallow-rooted plants, allow the soil to dry to a depth of 1 inch before watering again.

**Avoid runoff.** Avoid letting your irrigation water run off onto paved areas or down storm drains. If you notice runoff, apply water more slowly in cycles, taking small breaks between applications to allow the soil time to soak up moisture.





**Know your soil.** How fast your soil absorbs water will vary by soil type and the amount of organic matter in the soil. Clay soils are slow to absorb water but tend to hold moisture longer, so they need less frequent watering. Sandy soils are better able to absorb water, but they also drain quickly and do not hold water well, so they dry out faster. Adding compost and other organic matter to your soil will improve water penetration in clay soil and water retention in sandy soil.

## Fertilizing

Although plants make their own food (carbohydrates) from atmospheric carbon dioxide and water through the process of photosynthesis, they need to take in additional nutrients for healthy growth. Plants take up these nutrients mainly from the soil through their roots. Many of these nutrients are commonly available in the soil, but there may be some that are not available in the amount needed by the plant. Nutrients may also be present but unavailable to plants if the pH (acidity/alkalinity) of the soil isn't suitable for them. A soil test will tell you the pH of your soil and if it needs amending for the crops you're growing. (See Chapter 4 for more information on soil testing.) Gardeners can make up the difference by adding organic or synthetic fertilizers to the soil. Fertilizers contain one or more of the nutrients that are needed for the growth, repair, and proper functioning of plants, such as nitrogen, phosphorus, and potassium.

Any product sold as a fertilizer has a nutrient analysis on the label consisting of three numbers. These numbers tell you the percentage of the three major nutrients – nitrogen (N), phosphorus (P), and potassium

## Is Compost a Fertilizer?

Compost consists of the partially decomposed remains of plant materials. While it contains plant nutrients such as nitrogen, phosphorus, potassium, along with micronutrients, these are present in smaller and more variable amounts than in products sold as fertilizers. This doesn't mean, however, that compost (and other types of organic matter) doesn't nourish plants and provide big benefits to overall soil health.

As with organic fertilizers, compost releases its nutrients to plants gradually over time as soil organisms feed on the materials the compost is made from. Also, in the process of digesting the compost, soil microbes produce a sort of "glue" that helps soil particles stick together into aggregates. This gives the soil a crumb-like structure that allows air to move and water to soak in, creating conditions that support healthy root growth. Compost helps the soil hold onto nutrients, keeping them from leaching out of the reach of plant roots and making any fertilizers you add more effective. It improves the water-holding capacity of sandy soils and the drainage and aeration of clay soils.

Adding a 2 to 3 inch layer of compost to your garden in the spring and fall is a great way to promote healthy soil – soil that offers a full spectrum of nutrients, abounds with beneficial soil organisms, and provides plant roots with the air and water they need for good growth.



(K) – that the fertilizer contains. (“Complete” fertilizers contain all three of these nutrients.) For example, a fertilizer with a 5-10-10 nutrient analysis contains 5% nitrogen, 10% phosphorus, and 10% potassium. Other fertilizers may contain only one or two of these major nutrients. For example, bone meal contains N and P, but no K so its analysis is 4-12-0. In addition, some fertilizers contain micronutrients, such as boron, zinc, and iron, that are needed by plants in very small amounts; these may be listed on the label but are not included in the product’s

three-number analysis. The product label should also tell you how much to use for different kinds of plants. Keep in mind that too much fertilizer can be just as detrimental to plant growth as not enough. Always follow label instructions and apply correctly.

Adding appropriate amounts of fertilizer at the beginning of the garden season is part of good soil preparation, setting the stage for a thriving garden. However, some plants may benefit from an additional dose of nutrients over the course of the growing season.

## Organic vs Synthetic Fertilizers – What’s the Difference?

Both organic and synthetic (also called chemical) fertilizers provide plants with nutrients, but in different ways. Organic fertilizers are made from materials of plant or animal origin with little or no processing. Examples include liquid seaweed, fish emulsion, bone meal, blood meal, alfalfa meal, cottonseed meal, composted manure, and complete fertilizers made from a combination of materials. They may also contain naturally occurring minerals that have received minimal processing, such as rock phosphate and greensand. The nutrients in organic fertilizers are released gradually over time through the action of soil microorganisms, providing a long-lasting source of plant nutrition. This slow release, however, means their nutrients aren’t readily available when the soil is cool and microorganisms are not very active, for example in early spring. Organic fertilizers generally help support living organisms in the soil and may improve soil structure. Organic fertilizers also naturally contain a

variety of micronutrients, which are vital to plant health but are needed only in small amounts.

Chemical fertilizers are manufactured from chemically processed raw materials such as natural mineral deposits and even air (as a source of nitrogen) and come in granular, water-soluble, and liquid forms. Generally, synthetic fertilizers contain fewer kinds of nutrients than organic fertilizers, mainly nitrogen, phosphorus, and potassium, and these nutrients are more concentrated. They are also more readily available for uptake plants, as they don’t need the action of soil microorganism to convert them forms that plants can use. But because they are concentrated and soluble, it is easier to over-apply synthetic fertilizers, which can harm plants, and they do not help to nourish those important soil microbes or improve soil structure as organic materials do.



This is called side-dressing. Crops that will benefit from some additional fertilizer during the growing season, known to gardeners as “heavy feeders,” include cabbage, broccoli; tomatoes, eggplant, and peppers; cucumbers, squash, and melons; and sweet corn. Granular fertilizer can be scratched into the soil near the base of the plants, or you can apply a water-soluble fertilizer like fish emulsion to the soil around the plants. Monitoring growth and health of plants can often help you determine if additional nutrients are needed.

## Dealing with Pest and Diseases

It’s safe to say that, sooner or later, every garden will encounter a pest or disease problem. The specific problems that can occur will depend on the crops you’re growing and where in the country you’re gardening. Fortunately, there are some easy strategies to make pest and disease problems less likely to occur and less damaging when they do. Even so, there will likely be occasions when pests or diseases reach levels where some sort of control measures may be warranted. It’s a good idea to think ahead of time about the type of pest and disease controls you think will be appropriate in your youth garden and to have a plan in place for implementing them if the need arises.

### Get familiar with pests and diseases.

Familiarizing yourself with which pest and disease problems you’re likely to encounter is a good first step in coming up with a control plan. While many pests and diseases are widely distributed, some are most problematic only in certain areas. Knowing what to be on the lookout for makes figuring out what’s causing a problem much easier. There are

many sources for information on vegetable pests and diseases; one of the best is your state Extension Service. The information it provides on its website, in publications, and through local Master Gardener and other programming is targeted to the problems that are most likely to be troublesome in your part of the country.

Insects probably come to mind first when thinking about garden problems, and some are certainly major pests of vegetable crops. But it’s important to remember that not all insect visitors to your garden are bad guys. Some — lady beetles, for example — eat harmful pests. Others, such as honey bees and native bees, in their quest for nectar, transfer pollen from plant to plant, making possible the development – and harvest – of fruits such as zucchini and pumpkins. So, it’s important to learn to identify the “good bugs” — the insects who are working with you for garden success. Read on for information on ways to encourage beneficial insects and pollinators.

And not all pests are insects. Mites may appear similar to insects, but they are actually more closely related to spiders (if you peer at them through a hand lens you’ll see eight tiny legs, not six), while slugs and snails are mollusks.

Diseases are caused by a variety of tiny pathogens, including fungi, bacteria, viruses, and nematodes (microscopic, worm-like animals). However, not all diseases are infectious; some, like blossom end rot in tomatoes or sunscald on peppers, are the result of poor environmental or cultural conditions.



**Practice prevention.** As they say in sports, the best offense is a good defense. Here are ways you can keep pests and diseases from gaining a foothold in the first place. While some of these strategies require advanced planning, they will stack the deck in favor of a thriving garden and make your gardening experience much more rewarding and fun.

**Feed the soil.** Just as people who eat a nutritious diet and get adequate exercise and rest are less likely to get sick, robust plants are better able to fend off pests and diseases. Healthy soil is the foundation for healthy plants. Regularly add organic matter like compost to encourage thriving populations of the soil microbes and other beneficial critters needed for healthy soil.

**Practice good garden sanitation.** Clean up the garden well at the end of the growing season. Many pests and diseases carry over from one year to the next in plant debris in the garden. Don't compost any obviously infected or infested plant material. You can't depend on your compost piles to heat up enough to kill pests and diseases.

**Rotate the location of related plants in the garden from year to year.** This helps to thwart soil-borne pests and diseases. A 3-year rotation is best for most crops, but if this isn't practical in your space, just do the best you can.

**Monitor soil moisture.** Aim for soil that is not too wet and not too dry – just consistently, evenly moist. Try to avoid getting the tops of plants wet when you water, as wet foliage promotes the development of many diseases. Use soaker hoses or drip irrigation, or water early in the day so leaves dry quickly in the

sun. Don't work in the garden when leaves are wet from rain or dew to avoid spreading diseases from plant to plant.

**Space plants out so there is good air circulation around them.** Crowded plants trap humidity, encouraging diseases.

**Don't import problems.** Examine any transplants carefully (especially leaf undersides) before buying to make sure there are no unwanted stowaways, and only select vigorous, healthy-looking plants.

**Plant lots of flowers to attract beneficial insects.** Although the focus of your school food garden is on fruits and vegetables, let Mother Nature help with pest control by





encouraging the insect species that prey on pests, helping to keep a natural balance in the garden. Include flowers in the food garden to provide pollen and nectar to feed predatory and parasitic insect species at certain stages in their life cycle. Plants with blossoms consisting of umbrella-shaped clusters of small flowers, such as yarrow or dill, and daisy-like flowers, like golden marguerite and coneflowers, are especially attractive to many beneficials. A border of flowers around the vegetable garden is an excellent way to provide food and shelter for them. Learn to recognize all life cycle stages of the “good pests/bugs” so you don’t mistake them for troublemakers. Immature stages may look very different from adults.

**Choose disease-resistant varieties if possible.** These are varieties that have been bred to be less susceptible to some of the common diseases of a particular crop. Look for letters after the variety name indicating resistance, or check the plant catalog, seed packet, or tag for information. For example, tomato varieties with the letters V and F after their names are resistant to Verticillium and Fusarium wilts, two common tomato diseases.

**Keep weeds under control.** They not only compete with your crops for nutrients, light, and water; some weeds can host pests as well. The same pests that attack garden crops can also infest nearby weeds that are in the same botanical family. Spreading mulch is a great way to keep weeds down and help conserve soil moisture.

**Use barriers and traps.** Lightweight fabric row covers that let water and sunlight through are very effective in preventing certain pest

problems, such as leaf miners in spinach or caterpillars in broccoli. In non-fruiting crops that don’t need pollinating, you can even leave row covers in place all season long. Flowering crops such as cucumbers and squash can benefit from row covers to keep flea beetles and cucumber beetles away when plants are young and most vulnerable to damage. Once plants begin to flower, remove row covers to let bees reach flowers for pollination. Cutworm collars and mats around cabbage stems to prevent root maggot egg laying are other examples of effective barriers. Placing saucers of stale beer in the garden to lure slugs in to drown is a time-honored and effective trap.

**They’re Heeeeere!** Even with the best preventative measures, there’s bound to be a pest or disease outbreak in your garden sooner or later. If you take time now to decide what kinds of control measures you consider appropriate for your garden, you’ll be better prepared to deal with any problems that arise. Will you take a hands-off approach and let nature take its course? Will you limit controls to physical methods such as barriers, traps, and handpicking? Will you consider using pesticides or fungicides? Will you use only organically acceptable pesticide and fungicide controls? Who will be responsible for applying pesticides? There is no one right or wrong approach; it’s whatever works best in your particular setting.

Check your plants frequently for the first signs of insects and disease. It’s much easier to nip a small problem in the bud than to control a severe one. You may be able to stop a small aphid infestation by simply knocking the insects off plants with a strong stream of water from a hose. If you wait until your



plants are swarming with aphids, more drastic measures will be needed.

On the other hand, don't pull out intensive treatments when they're not needed. Before resorting to insecticide sprays, even "organic" ones, make sure that the number of pests and the damage they are causing warrant that level of control. Extermination of all pests isn't necessarily desirable. If you're enlisting the help of beneficial insects, they need to have some of the pests around to feed on or they'll move on to greener pastures. What's needed is a balance where there are enough pests to support beneficials, yet not so many that they are causing an unacceptable amount of damage to your crops.

Be sure to identify specifically what pest or disease you're observing in order to know what control measures, if any, are appropriate. Do some research to understand the life cycle of any pest or infectious disease and at which stages in the life cycle treatments are most effective. A list of some of the most common garden insect pests can be found in Appendix B. Keep in mind that some problems are caused by poor weather or growing conditions, not insects or disease organisms. Solving these problems involves changing the environmental conditions that led to them, where possible, not the use of pesticides.

Consider physical controls first. Larger insects like tomato hornworms and Japanese beetles are relatively easy to control by handpicking (if you're squeamish, just wear gloves!). Some kids love this garden job! Handpicking insects is easiest in the early morning or evening when cool temperatures make them sluggish. Dispose of them by dropping them into a bucket of soapy water (the soap breaks the



water surface tension so they can't escape). Picking off and disposing of infected leaves may control the spread of some diseases at their outset.

If a problem is severe and you decide use of a pesticide is warranted, keep these things in mind in order to use it safely and effectively.

**Choose pesticides carefully.** Lower-toxicity, often naturally derived insecticides are generally the most appropriate choices for youth garden use and have the least harmful effect on beneficial insects. These include insecticidal soap, horticultural oil, botanical insecticides like neem oil and pyrethrin, and microbial insecticides like *Bacillus thuringiensis* (Bt). Some of these products may be suitable for organic gardening; look for OMRI certification on the label to be sure. Different pesticides are effective against different pests; check the label to make sure you are using an appropriate product for the particular plant you're treating and the pest you want to control. Make sure that the pest or disease you are trying to control is vulnerable to an applied pesticide. For example, squash vine borers are caterpillars that tunnel into the vines. Once inside the stems, they are out of the reach of any externally applied insecticides.

**Read the label.** No matter what type of pesticide you use, including "organic" ones,



always read the label completely before you apply it, and follow all its instructions and precautions exactly. If you are gardening at a school or another public building, check with your administrator to find out if there are any regulations in place governing pesticide use. If you do get approval to treat your problem, make sure that the plant you are treating and the pest or disease you are trying to control are both listed on the label. Following the label ensures that you are applying the product in a manner that is safest for the applicator, the plant it is being applied to, and non-target organisms like bees, while most effectively controlling the pest or disease-causing organism.

**Fungicides are preventative.** Fungicides can prevent the spread of diseases caused by fungi to uninfected parts of the plant, but they will not cure existing infections. They must be applied at the first sign of infection or before infection occurs to be effective, and usually require repeat applications to keep plants protected. Fungicides will not control diseases caused by viruses, bacteria, or nematodes;

only non-chemical controls are appropriate for these organisms in a school setting. Organic fungicides containing beneficial bacteria are relatively new and effective options for controlling diseases.

**Be cautious with home remedies.** You can find all sorts of recipes for homemade pesticide treatments in garden books and online, and some of these may be effective. But some may also have the potential to harm plants. For example, there are many recipes for homemade soap sprays, but there is no way to know if the particular brand of soap might have something in it that can harm your plants or be less effective in controlling pests. Commercially prepared insecticidal soaps have been specifically formulated for and tested on plants, and you are more assured of getting the results you expect when you use them. If you do decide to try a homemade treatment, try it on a small number of plants first to see if it causes any plant injury before applying it on a larger scale.

Don't let all this all this talk of insect and disease problems discourage you! While you're likely to encounter pests and diseases in your garden at some point, often they will not cause major problems, especially if you have put at least some of the preventative measures discussed earlier in place. And usually only a few crops in any particular season will be affected. Even though bean beetles may be chomping on your beans, your tomatoes, lettuce, and cucumbers may be thriving! Remember that planting a diversity of crops is one way to minimize the impact of any pests and diseases that occur. If one kind of vegetable develops major issues every year in your garden, consider simply planting something else in its place. There are lots of



different veggies to choose from, and you may end up expanding your youth gardeners' food horizons by trying something new.

As we said before, there is no one correct approach to dealing with pest and disease problems in a youth garden. Taking a hands-off or low-input approach is just as valid as employing more intensive control strategies. No one is going to go hungry next winter if you decide to simply let those bean beetles feast on the green beans – and they can offer a great opportunity for youth to learn about an insect with complete metamorphosis in its life cycle!

One of the great things about a youth gardening program is that just about everything – even a pest infestation – can be a springboard to learning. The life cycles of many insects and fungi are nothing short of amazing. Learning about these kinds of organisms really comes to life when kids can go out into the garden and observe them in action, even if they are feeding on the tomatoes!

Observing interactions between predatory and parasitic organisms and their prey is a good way to introduce concepts like the food web and the interconnectedness of natural systems. Finding tomato hornworms covered with the rice grain-like cocoons of parasitic wasps – and learning why these parasitized caterpillars should be left in the garden to allow wasps to complete their life cycle – will vividly illustrate these concepts to students.

Identifying introduced pest species like Japanese beetles or brown marmorated stink bugs can be the starting point for a discussion on the impact of invasive species on an ecosystem. And learning that those brightly

colored caterpillars feeding on parsley, dill, or carrot leaves will turn into beautiful swallowtail butterflies helps kids understand that there are really no “bad bugs” in nature – in the complexity of a balanced ecosystem, all creatures have value and a role to play.

## Summer Maintenance

Summer break is a common maintenance challenge for youth gardens, especially for those located on school grounds. In many areas of the country, much of the growing season occurs outside of the regular school session. If your program takes a break during summer months when your garden season is at its peak, here are some tips to help you keep your garden thriving over the summer months, ready for more learning and fun when kids return in late summer or early fall:

**Enlist volunteers.** Recruit summer volunteers to care for and harvest from the garden. In addition to students, parents, and teachers, approach community members and service organizations like Scouts, 4-H, or church youth groups about donating time to care for the garden. Some volunteers may be willing to adopt a bed for the whole summer; others will be interested in helping on a more limited basis. If possible, have one volunteer serve as overall garden coordinator for the summer. Create and distribute a written schedule so that someone is checking on the garden on a regular basis. Email or phone call reminders will likely be needed. Also, make sure to provide adequate instructions and guidance if the volunteers are not familiar with the garden procedures.

**Schedule work days.** You might hold a work day one Saturday per month to knock





down weeds or complete other tasks such as making mid to late-summer plantings for fall harvest. Reward volunteers by letting them harvest and take home any ripe produce on the day of their service. You might also consider organizing volunteers to donate garden produce to a local food pantry or other community organization. Be sure to check with the organization first to make sure it is able to handle donations of fresh produce.

“I always say that the most important thing we are growing in the garden is our children.”

— KIMBERLY GEORGE  
CHICAGO YOUTH CENTERS  
ABC POLK BROS.



**Tap into summer youth programs.** If your school runs a summer session or hosts a summer camp program on school grounds, get in touch with teachers or summer camp counselors to see if they are interested in taking advantage of your outdoor garden classroom during the summer months in exchange for upkeep. Or you might consider pairing up with a nearby local organization that runs a summer youth program, such as a library, parks and recreation department, or day camp for periodic summer garden care and learning.

**Install irrigation.** Drip irrigation equipment is available at most home improvement stores for a reasonable price, and you can set it up to run on inexpensive timers. It might be worth your while to search for someone to donate an automatic irrigation system.

**Use mulch.** A layer of organic mulch reduces weed growth and maintains soil moisture, while adding organic matter to the soil as it breaks down with time. In vegetable beds use inexpensive organic mulch such as sheets of newspaper topped with straw. If you also have flower gardens on your school grounds, use a 2- to 3-inch-deep layer of more durable organic mulch, such as shredded bark in these beds.

**Harvest in the spring.** Another approach is to focus on crops that can be planted and reach harvestable size by late spring while school is still in session. The warmer your climate and the earlier your spring frost date, the easier this option will be. Cool-season crops that mature quickly, like spinach, lettuce, beets, and radishes, are all good choices for spring and early summer harvest in many parts of the country. Once your plants have been harvested, cover the bare soil with a thick layer of mulch to discourage weeds and prevent soil erosion. The mulch will gradually break down over the summer and winter, adding organic matter to enrich the soil for the following year's crops.

**Plant in late Summer for fall harvest.** It's also possible in many parts of the country to plant fast-maturing crops in late summer, as soon as students arrive back for the start of a new school year, for harvest in the fall. Or summer volunteers can start crops that need more growing time in mid to late summer; then returning students can take over the care and harvesting. The longer the growing season in your area and the later your fall frost date, the more options you'll have in terms of suitable crops. You can also extend your fall growing season with cold frames, row covers, or hoop houses to protect crops from the cold.

*KidsGardening.org* related resource:  
[Extend the Season with Plant Coverups](#)



**Build soil during the summer.** If you are not growing plants in your garden over the summer, plant a summer cover crop to suppress weeds and add organic matter to your soil. Fast-growing buckwheat is a good summer cover crop in most areas and is great for keeping weeds down. Cut the plants down about a week after they begin flowering so they don't set seeds. On a small scale, plants can be cut down with hedge shears. Cut the shoots down in layers from top to bottom so they are chopped into relatively small pieces as they're cut. You can then leave the chopped shoots on top of the soil as mulch. If you plan to plant vegetables for fall harvest, just pull the chopped shoots aside and dig holes for transplants. To prepare a seedbed for planting, turn the chopped shoots into the soil with a shovel; then let them decompose for a few weeks before planting seeds. Check with your local Extension Service to for more information on other summer cover crops that are well suited to your area.

## Cool-Season Gardening and Beyond

Spring and summer are the most popular gardening seasons in schools, but as your garden program matures and you begin to witness the impact it has on your youth gardeners, you may want to begin exploring ways to extend your garden season. Check out the *Cool-Season Vegetable Gardening Guide* in Appendix C for planting tips for a successful fall and/or early spring garden.

### Putting the Garden to Bed

Whether you choose to continue your garden over the fall months or just wrap things up after summer plants are harvested, by

cleaning up your garden properly you are laying the groundwork for a good spring garden season.

**Remove plant debris.** It's important to clean up food garden beds well at the end of the season, removing plant debris (including weeds) that might harbor pests and diseases that could re-emerge the next year. If this plant debris shows obvious signs of insects or disease, it's better to dispose of it rather than add it to your compost pile. Taking it to a municipal compost drop-off rather than putting it in the trash is fine. Unlike most home compost piles, materials in these large-scale composting operations usually reach temperatures high enough to kill off pest and disease organisms.

**Cover bare soil.** After you've cleared the garden, give the soil a winter blanket. Soil that is left bare over the winter is vulnerable to erosion from wind and water. Rain falling on bare soil can compact it, and rain and snow melt can leach nutrients in the soil out of the reach of plant roots. Covering soil with mulch or a cover crop will also reduce the number of weeds sprouting over the winter and spring.

**Mulch.** One way to protect the soil is to cover your garden beds with a thick layer of mulch for the winter. Fallen leaves are generally plentiful (and free) in autumn and work well, especially if they are chopped first to make them less likely to blow in the wind. An easy way to chop leaves is to run them over with a lawn mower and collect them in the mower's bag. But other materials, such as dried grass clippings and clean straw, will also work.



**Winter cover crop.** An even better method of winter soil protection is planting a cover crop. A good cover crop grows fast, blanketing the soil and competing with weeds. Cover crops also grab onto nutrients in the soil, keeping them from leaching away over the winter; then return them when the cover crop is tilled into the soil in spring. The decomposing cover crop plants add new nutrient wealth to the soil and create good “tilth” (physical condition of the soil). The types of winter cover crops that are suitable for planting in your school garden in late summer and early fall will depend on your region of the country. Check with your local Extension Service to find the ones that will do best in your area.

*KidsGardening.org* related resource:  
[Seven Ways to Nurture Healthy Soil in Fall](#)

## Gardening through the Winter

In most areas of the country, outdoor gardens will be dormant during the coldest winter months (although in climates with moderate winters some crops can be grown during winter). However, you can continue youth gardening activities indoors using sunny windows and grow lights. Check out the Indoor Gardening Guide in Appendix D for an introduction to indoor growing options or for more extensive resources, visit KidsGardening.org to find out more information about our publications *GrowLab Classroom Activities for Indoor Gardens* and *Grow Lights and GrowLab®: A Complete Guide to Gardening in the Classroom*.



## In Summary

The activities of planting and maintaining your school garden bring planning to life and allow young gardeners to enjoy the fruits of their labor. By taking the time to set up safety guidelines for planting (see Chapter 7) and adopting practices to ease garden maintenance and appropriately care for your space in each season, you are ensuring a rich and enjoyable experience for all.

# CHAPTER 7

## Garden Safety and Harvest

Garden program educators have found that young gardeners who participate in growing their own fruits and vegetables are more likely to try them and make these healthful foods a regular part of their diet. The ultimate goal of many youth gardening programs today is to have a positive impact on the next generation's nutritional attitudes and behaviors.

Educators have seen how growing and harvesting produce in a youth garden helps young gardeners develop a deep relationship with food. What better way to further solidify and celebrate that relationship than by giving students the opportunity to prepare and taste it themselves? We begin this Chapter with recommendations to make sure planting days are fun for all. Next, we offer safety tips for harvesting produce from your youth garden. Finally, we wrap up the chapter with practical ideas on how to implement cooking demonstrations and tasting activities.

Whether in the cafeteria or a classroom, during an afterschool program, or at a summer camp, providing youth with the opportunity to prepare a simple snack or meal, experience new flavors, and voice their opinions promotes personal growth and discovery. Kids' comfort zones and palates expand with each new food sampled. They also begin to develop a mastery of life-long culinary skills with every carrot chopped and recipe read. By creating an organizational

culture that supports the process of exploring new fresh foods, you can help lay the groundwork for the next generation of engaged and healthy eaters.

This chapter will answer the questions:

- What considerations should be made to maintain safety in the garden?
- What food safety practices do we need to follow to bring in a healthy harvest?
- How can we use the harvest from our garden to improve student nutritional attitudes and behaviors?

### Garden Safety

School and youth gardens are great environments for learning and fun. But to keep the garden experience positive and safe, you need to pay attention to some basic guidelines as you plan and later enjoy the garden with kids.

Make sure everyone who plans and works in the garden, including garden coordinators, teachers, adult volunteers, and students, is familiar with safe gardening practices. Before your first trip into the garden (don't attempt this talk while in the garden – the kids will be too excited to listen), hold a safety orientation for kids, as well as a separate informational meeting to let teachers and adult volunteers know not only what the expected practices will be, but also the reasons behind them.





When folks understand how these practices help to keep everyone safe, they are more likely to remember and comply with them.

Below we present some recommendations we have gathered over the years. Many of these are simple common sense, but it's easy to forget or let things slip at times. Children, especially, respond to routine. If fun in the garden always starts and ends with hand washing, they'll be less likely to think of it as a chore and more as a just a regular part of their garden experience. Posting a safety checklist on a garden bulletin board and holding age-appropriate activities for kids relating to garden safety throughout the growing season will help everyone stay on track and keep the school garden experience safe and fun!

The following safety tips will reduce the chances of injuries and illness and help everyone involved in your garden program bring in a healthy harvest.

### ① Prior to gardening:

- Select a safe site for your garden that is protected from potential hazards such as busy roadways or large bodies of water.
- Test the soil for contaminants such as lead.
- Make sure your water source is safe.

### ② Staying safe while gardening:

- Plan for adequate adult supervision at all times when youth are in the garden area.
- Record all allergies, including those to food and insects.
- Keep a first-aid kit in the garden area, and inventory first-aid supplies periodically.

- Provide plenty of potable drinking water to prevent kids from getting dehydrated.
- Students should wear closed-toe shoes to protect their feet from cuts and stings. Bare feet, sandals, or flip-flops should not be allowed.
- Students should wear hats and sunscreen while gardening.
- Supply appropriately sized gloves.
- Only healthy students should participate in gardening activities. Any students exhibiting symptoms of illness or with sores or cuts on exposed portions of the hands and arms should be excluded from garden lessons until their health improves.
- All students should wash their hands thoroughly before and after working in the garden.
- Students should not pick and eat unwashed fresh produce while working out in the garden.
- Be aware that exposure to the sap, leaves, and stems of certain plants can cause mild skin irritation or contact dermatitis in sensitive individuals.
- Students should be encouraged to walk on pathways when they are available.

### ③ Tool and equipment safety:

- Provide tools that are properly sized to the age group using them.
- Show students the safe use and handling of garden tools and equipment. Instruct them to hold tools with sharp edges pointed down and to walk, not run, when carrying them.



- Remind kids to keep tools below the waist when working in the garden.
- Set rakes, hoes, and shovels with their blades and tines facing down when not in use.
- Keep tools out of pathways.
- Make sure there is a secure place to store tools, fertilizers, and pesticides out of reach of students when the garden area is unattended.
- Provide sturdy hangers — at a height kids can reach — for storing tools. You can also place tools in a large garbage can with the handles facing up. If you have a toolshed, keep it clean and organized.
- Coil up hoses after watering.
- Repair or replace broken tools immediately.

Some general safety considerations to keep in mind:

**Use rain barrel water safely.** Water collected in rain barrels is not potable and may contain harmful bacteria and other contaminants, especially if it is water collected from rooftops. The safest course is to use rain barrel water only for irrigating non-edible crops like native and pollinator plants. If you decide to use water from rain barrels on edibles, have the water tested regularly and clean and sanitize the barrels frequently. And, of course, don't allow student to drink water from rain barrels or garden hoses!

**Use fertilizers and pesticides safely.** When using any fertilizers or pesticides, even “organic” ones, be sure to read the label completely before use, and follow all instructions and safety precautions. While

organic gardening practices are the safest for gardeners and the garden environment, organic pesticides and fertilizers may still present risks and warrant precautions when used. Also, be sure to assess the safety of any garden home remedies before trying them. Store all pesticides and fertilizers securely out of reach of children.

“This program has allowed students of all abilities the opportunity to learn and work in an outdoor - non pressure environment. Every one is equal in the garden.”

— JO ELLEN PENSINGER  
BUSHNELL-PRAIRIE CITY ELEMENTARY, IL



**Use manure with caution.** While animal manures are time-honored soil builders, they can also harbor pathogens that cause serious illness in humans. Fresh, raw manure is riskiest, and we advise against using it in school or youth gardens, even when plants are not present. Aged and composted manures, while safer, may still contain pathogenic organisms, so the safest course is to forgo their use as well, especially when gardening with young children. If you do decide to use composted manure, we recommend only using commercially composted manure products (not home-composted manure) from a reputable company whose label indicates that it has been treated to be pathogen-free. As an added precaution, consider applying commercially composted manures only in the fall after crops are harvested or at least 120

days before planting an edible crop. Dog, cat, pig, and human manure, even if composted, should never be used.

**Compost correctly.** While it's convenient to place compost bins near the garden, be sure to locate them where runoff from the bins will not drain into areas where edible plants are growing. If this is difficult to do on your site, consider using a completely enclosed, tumbler-type composter. Keep bins enclosed or bury food wastes in the center of the pile to avoid attracting animals like rats and raccoons to the pile. Don't add cafeteria waste that could contain meat scraps, dairy products, or other foods of animal origin to your compost bin.

We do not recommend adding any animal manures to your compost pile. While "hot" composting (where temperatures in all parts of the pile reach 130 degrees F or higher) will kill many pathogens, it can't be relied on to kill all the harmful bacteria that animal manures may harbor. Hot composting is a batch process that requires stockpiling materials and then building a pile with the correct proportion of green and brown materials to fuel rapid decomposition. Instead, many gardeners practice add-as-you-go "cold" composting – simply piling materials in any proportion as they accumulate and letting them breakdown slowly with time. These cold piles never reach temperatures that will reliably kill off pathogens.

### **Consider livestock additions carefully.**

Keeping animals such as chickens and goats along with a youth garden can add an engaging dimension to a garden program. But their addition requires careful planning

and strict attention to safe practices because of the potential for these animals to transmit serious diseases such as salmonella. The Centers for Disease Control and Prevention recommend that live poultry not be allowed in schools and daycare settings with children younger than 5 years of age because of this risk. Check with your state Health Department for more information on safe practices for integrating livestock into a school or youth garden setting.

## **Safe Harvest Practices**

Giving kids the opportunity to grow, harvest, and eat delicious and nutritious vegetables, fruits, and herbs fresh from the garden is what school or youth gardening programs are all about. To keep this experience positive and safe, you need to pay attention to some basic harvesting guidelines to help to reduce the possibility of food-borne illnesses. This shouldn't discourage you from allowing children to enjoy all the benefits that come from gardening and eating fresh food. The following suggestions are, with a little planning, generally easy to implement. They'll help everyone involved in your garden program bring in a healthy harvest!

### **Enlist Healthy Harvesters**

Make sure everyone harvesting edibles, both children and adults, is in good health. Anyone who's not feeling well or who has cuts or sores on their hands or arms should refrain from picking produce.

### **Harvest with Clean Hands**

Before picking edibles, all harvesters should wash their hands thoroughly with soap and clean, potable water; then rinse under running





water and dry with a single-use towel. A simple handwashing station can be set up if running water isn't available at your site. Alcohol-based sanitizers are not as good an option for hand cleaning because they are not effective against Norovirus, one of the most common food-borne pathogens. While handwashing is the safest course, if this isn't possible, have harvesters wear single-use, disposable gloves when harvesting. And, of course, washing hands after doing any work in the garden is always part of good garden hygiene.

### **Gather Produce in Clean Containers**

Gather your produce into clean, easily washable, food-grade containers. Recycled five-gallon containers that held foodstuffs are often readily available from your school food service and are easy to keep clean. If you use plastic bags to collect produce, make sure

they are food-grade and don't reuse them. Using potable water, regularly wash (in warm, soapy, water), rinse, dry, and then sanitize all reusable harvesting containers. Also, wash and sanitize any harvesting tools like scissors or knives.

A solution of  $\frac{1}{2}$  fluid ounce (1 tablespoon) of unscented household bleach per gallon of water (or  $\frac{3}{4}$  teaspoon bleach per quart of water) can be used as a sanitizing solution. Spray the sanitizing solution onto the cleaned surface; let stand for a least one minute; then air dry or wipe dry with a clean paper towel. As long as you don't exceed the recommended concentration of bleach, you don't need to rinse off the sanitizing solution. Kids can help with the washing of containers, but sanitizing is a task for adults. Store harvesting tools and containers where they will not get re-contaminated after they are cleaned.

### **Store Produce Safely**

Brush off soil or debris on edibles with a clean paper towel before bringing them into your food storage or preparation area. If you choose to wash edibles before storing, be sure to dry them thoroughly with clean paper towels before storing, as moisture will promote the growth of microbes on them. Or you can store unwashed produce in clean, food-grade plastic bags and wash it right before you are ready to prepare or eat it. Berries should always be stored unwashed, then washed right before eating.

Store produce that needs refrigeration at 40 degrees F or less. Fruits and vegetables that don't need refrigeration, like potatoes, tomatoes, onions, and peaches, should be stored in a clean, cool, dry spot.



## Wash Produce Correctly

Make sure that the water used for washing produce is potable (drinking water safe). It should also be no more than 10 degrees warmer or colder than the temperature of the produce. This is because if the water temperature is too different from the temperature of the produce itself, pathogens on the surface of fruits and some vegetables can be drawn into them through the stem or blossom end as the produce is washed. If you are washing produce still warm from the garden, use tepid or lukewarm water for washing; use cold water to wash produce that's been refrigerated. Wash all fruits and vegetables under running water, using a clean scrub brush on firm produce like melons, potatoes, and root vegetables.

## Get Everyone on Board for Food Safety

It's important that everyone who harvests in the garden, from garden coordinators to adult volunteers to students, be familiar with safe food harvesting procedures. An informational meeting at the beginning of the season can be a good way to let adult volunteers know not only what the expected procedures will be, but also the reasons behind them. When folks understand how these practices help to keep everyone safe from food-borne illnesses, they are more likely to remember and comply with them.

Planning ahead helps streamline safe harvesting practices, making it easier for everyone to carry them out. Post a safe harvest checklist on your garden bulletin board, send reminders about safe harvesting procedures in garden newsletters and emails, and hold some age-appropriate activities for kids relating to food safety so everyone can enjoy delicious and healthful garden eating.

## Cooking and Tasting Activities

Although growing fruits and vegetables provides an understanding of their origins and often sways youth to view them in a more positive light, having the opportunity to consume the harvest has a much greater impact on eating behaviors.

Food preparation and tasting activities using garden produce can be as simple or as complex as you want, depending on the materials and time you have available. Just remember, whether you choose to simply try freshly washed greens straight from the garden or prepare a full meal, the most important thing is to make sure you're following standard food safety guidelines in the kitchen just like you did during harvesting. Important food safety guidelines to remember are:

**Wash hands.** Just as important as at harvest time, this is rule #1! Teach kids how to wash their hands properly and make sure they do so before handling food. Wash hands with soap and warm water for as long as it takes to sing the alphabet song. Dry hands with a clean towel.

**Clean your equipment.** Before you start to prepare any food, clean all work surfaces (including the sink) with hot soapy water. You can clean vegetable scrub brushes in the dishwasher or by rinsing them in a dilute bleach solution. Also, be sure your utensils and dishes are clean. Always use one cutting board for vegetables and fruits, and a different one for raw meats and fish.

**Clean your produce.** As mentioned above you'll want to wash produce right before



eating it, rather than when you store it. Wash all fruits and vegetables under running water. Scrub them with your cleaned hands or vegetable scrub brush and dry with paper towels. Avoid using damaged produce. Pre-existing cuts in fruits and vegetables can provide an entry for pathogens.

## Simple Tasting Activities

The most basic eating experience is to do a hold taste test using only a single ingredient. Here are some ideas to help you plan and conduct a simple tasting event:

- Sample a single whole food item from your garden. Have youth describe as many characteristics of the food as possible, including appearance, flavor, texture, and aroma—make it a full sensory experience and dig deep into descriptive vocabulary!
- To add a little more complexity to the activity, try multiple varieties of a single vegetable. You might have young gardeners taste an array of tomato varieties, for example. Record their

preferences on a table, graph, or chart, and use comparative language to describe distinctions between varieties.

- Compare a raw vegetable straight from your garden with its pickled, roasted, sautéed, steamed, or grilled counterpart. Connect to science topics by researching food chemistry or compare the effects of different cooking techniques on taste and texture.
- Explore the differences between a vegetable fresh from your garden and one from a grocery store. Compare where and how they were grown. Investigate how far your store-bought item traveled to get from its point of origin to your classroom. Was it processed or packaged a specific way (canned, frozen, etc.)? Could these differences be responsible for any variations in taste, appearance, or smell?
- Have a themed taste test! Feature seasonal produce (pumpkin seeds in October for Halloween, potatoes around St. Patrick's Day) or vegetables associated with a specific country or historical era you are studying in class.



As you conduct your taste tests, remember that food tastings should be inclusionary, not exclusionary. Create a judgment-free atmosphere where all preferences are valid. Youth should not feel pressured to try or say they like something, nor should they be faulted for disliking something or deciding not to partake.

To encourage youth to go into the activity with an open mind, provide them with the language to respectfully discuss their food preferences. For example, rather than saying



“I hate it” or “This is gross!” encourage youth to say “No, thank you,” “This isn’t for me,” or simply “I don’t like it.” Also, introduce the concept of a “Try a Bite” (or “Try a Sip” if you happen to be making a smoothie, soup, etc.) as a way to encourage youth participation. After you take your one Try a Bite, you can choose to take more bites if you like it or say “no thanks” and be done with the taste test. Also encourage students not let their preferences influence others. FoodCorp staff use the fun phrase “Don’t Yuk My Yum” to encourage kids to be accepting when food preferences vary.

Make sure to provide time to share opinions and collect feedback after a tasting activity. You can do this informally or use more formal measures such as having youth draw tallies or place stickers or post-it notes in a specific category on the poster to cast their vote. Give them a spectrum of options that they can choose between to express their preferences such as:

- Loved It, Liked it, Tried it
- I liked it, It was OK, No Thanks
- Thumbs Up, Thumbs in the Middle, Thumbs Down



When youth vote, hand out **I VOTED** or **I TRIED IT** stickers.

After you’ve collected your younger gardeners’ input, give voice to their choice. Share the results of the taste test in an organizational newsletter (include a recipe) or

during announcements/homeroom the next day. Display the posterboard where results were tallied in the hallway or the lunchroom until the next taste test, then compare the results.

As a conclusion to the activity, remind youth that their taste buds might take time to adjust to a new flavor or food. Scientists say people need to try something as many as eight times before they grow to like it! Encourage students to try it again in the future and, if possible, arrange for another tasting event.

### Cafeteria Taste Tests

In school settings, taste tests can be offered in a classroom setting or you can try approaching your school’s cafeteria staff to see if they would be interested in hosting a school-wide taste-testing event. Remember that they will probably need significant lead time to make this happen. Whereas in a classroom you might do a spontaneous taste test or only plan for one a day or two in advance, cafeteria-based taste tests using garden produce require additional coordination with food service staff. If you are looking at increasing the size and scope of your taste test programs, it may be helpful to establish a garden leadership committee to specifically plan and implement the events.

Begin by approaching your school’s kitchen manager, who may then contact your district food service director to discuss the possibility of facilitating a taste test using garden produce. You will want to begin by discussing your school district’s regulations related to fresh foods. School districts often have different protocols and expectations when it comes to using locally or school-grown

produce. Understanding your food service department's food safety standards is key to making a garden-based taste test a reality.

Once you understand the process, explore your food service staff's capacity for preparation. Keep in mind that school kitchens are busy places and vary site by site. Some kitchens and school food programs are based on a heat-and-serve model and might not have the same equipment and capacity as a kitchen where the staff prepares food from scratch. Does your kitchen have the necessary equipment, as well as staff capacity and knowledge, to prepare a taste test item from the garden? Will they also have to buy additional supplies, such as tasting cups or plastic forks? What is the purpose of a taste test? To expose students to new fruits and veggies? To promote currently unpopular lunch items? To highlight the school's productive garden? The answers to these questions will likely dictate what you feature from your garden and even how the item is prepared. Depending on when this conversation happens, it might also influence what you decide to grow in your garden.

After your cafeteria staff is on board, next consider the best way to distribute a taste test item while causing the least amount of disruption to the normal schedule. Ask yourself what a typical lunch period looks like at your school. Would it be most streamlined to set up a special tasting table at the end of the hot food line so that students can grab a sample as they walk by? What about youth that bring lunch from home? Will you ask them to come up individually (by table? by grade?) or will you deliver a sample to them? Or perhaps it's best to set up your tasting table elsewhere,

in a location that runs less risk of becoming congested. Will you have enough for all grade levels? Or will you need to take turns? Will you need volunteers to assist in this endeavor or will food service staff, teachers, or garden educators be available to manage the event? Carefully planning to best accommodate staff and students will contribute greatly to the success of your event.

Promoting the event to drum up excitement will also improve your event and its overall impact. Since you are investing resources in a school-wide taste test you want your students to know what's happening and be excited about participating. For example, you can have students make signs for the hallways that feature the date of the taste test and information about what you'll be trying; include pictures, drawings, fun facts, and nutritional information. Alternatively, create a series of signs that only hint at what you'll be trying — each one another clue in a taste test mystery! Another option is to take to the airways and use morning announcements to spread the word. Make sure parents also know about any tasting events. Mark taste test days on a school calendar and disseminate information via a newsletter or school Facebook page.

Be sure to find out ahead of time if any youth have food allergies. Modify recipes to feature alternative ingredients; for example, you could make a smoothie using juice, oat milk, or soy milk instead of cow's milk. Offer alternate foods for students to sample if someone is allergic to the food planned for a single-ingredient taste test but be careful to avoid cross-contamination.





On the day of the taste test, be sure to remind students during morning announcements or homeroom what they'll be trying and what a taste test looks like.

## Cooking Activities

If time and resources allow, you can expand upon the tasting activities by hosting a cooking demonstration or allowing youth to prepare a recipe using your garden-fresh harvest. A successful cooking activity requires careful planning and preparation. You will need to borrow or purchase special tools to help with your preparation. You want to choose your recipe to match the skill and maturity level of your audience. Cooking activities will also vary greatly depending on the number of youth participating, the number of adults available to supervise and assist, and the space and supplies available. Here are a few tips for planning a successful cooking activity:

- Check your organization's fire codes before bringing any portable kitchen equipment, like electric frying pans, into a classroom. Additionally, be sure to find out if your school has any specific food policies, such as a ban on peanut products, or regulations pertaining to allowable cleaning products.
- The first time you lead a cooking activity be sure to explain what certain kitchen implements are and how to use them safely. For younger gardeners, emphasize that everything from a measuring cup to a zester is a tool, not a toy. Consider having a clear zero-tolerance policy for fooling around with knives, blenders, etc.
- If a single individual is running the cooking activity or when working with young children, it can be helpful to organize all your implements and ingredients on a single table that everyone can see. Call each child up one by one to complete a



single step in the recipe. While students are waiting to be called up, consider having them prepare another part of the recipe using a kid-safe tool, pass out serving plates and utensils, or complete a related worksheet, so that they stay engaged in the cooking activity. Not only does this give everyone the opportunity to participate in an orderly and manageable fashion, but everyone can also observe the full process.

- For older youth who have cooking experience, or when more than one adult is available to help conduct an activity focused on a multi-step recipe, you might try assigning each youth a specific job, such as chopping onions or prepping garlic. If possible, have them gather their own tools, complete their task, and clean up their area. Remember that certain food prep jobs will be highly sought after (e.g., anything involving a grater), and assigning responsibilities can go from a simple procedure to one that is emotionally charged. If you lead regular cooking activities, create a chart of jobs that kids can simply rotate through so everyone has a chance to experience the range of tasks.

If you have the budget to invest in additional ingredients (and enough kitchen equipment), consider dividing youth into small teams and having each group complete the same recipe independently. Depending on the yield of your recipe, you may want to halve or quarter it. As with the previous example, this strategy works best when you have multiple adults available to help and youth who have some experience with cooking projects.

No matter how you choose to conduct a food preparation activity, have students participate

## Basic Equipment Needed for Cooking Demonstrations

Below, are suggestions for a well-stocked food preparation kit:

- Cutting boards
- Graters (zesters)
- Mixing bowls of various sizes
- Lemon squeezer
- Measuring cups + spoons
- Garlic mincer
- Knives (crinkle cutters)
- Peelers
- Spoons
- Blender
- Spatula
- Electric griddle
- Whisk
- Pots and pans
- Tongs
- Paper towels

Store all your cooking supplies in a large plastic container and include a list of every item you have, so you'll know if anything is misplaced.

in the cleaning up process. Make sure any food scraps are thrown out (or better yet, composted!), surfaces are wiped down, and kitchen implements are cleaned and put away.



## Looking for Assistance in your Community

If you're still feeling unsure about independently facilitating a cooking or tasting activity or feel you don't have either the supplies or budget to make these activities a reality, reach out to the immediate and wider community for support. Approach parents and community volunteers, especially those who lend a hand in the garden, about coming in to help manage an activity.

You may also want to contact staff from your local Supplemental Nutrition Assistance Program Education (SNAP-ED). SNAP-ED is a national program individually hosted by state agencies and local implementing agencies. In addition to providing educational materials, they often employ Nutrition Educators to connect with schools that have moderate to high free-and-reduced lunch rates to facilitate taste tests and short nutritional lessons. Find one in your area and coordinate special monthly visits.

Talk to local restaurants and see if any kitchen staff might be willing to spend time with your gardeners. Keep in mind that professional chefs and restaurant cooks might need guidance on how to communicate with the age group of youth.

## Other Ways to Use the Harvest

Here are some other ideas for making the most of your food garden's bounty.

### School Meals

For school gardens, another idea for increasing your students' exposure to fresh fruits and vegetables is to integrate garden produce into the cafeteria lunch line and

salad bar. Depending on the size of your garden, you might produce enough food on a consistent basis to consider regularly integrating it into school meals. Or perhaps you can just plan one or two special harvest lunches. Keep in mind that most school gardens are used as educational gardens, not production gardens, because the garden size needed to produce enough food for the school meal service is significant. Featuring student-grown and harvested produce in the cafeteria is a wonderful way to get youth excited about vegetables.

**“One parent reported, ‘My daughter just loves the garden. Sometimes, it’s the only reason she comes to school.’”**

— GEMMA SAGE

ROOSEVELT SENIOR HIGH SCHOOL, DC



Planning this type of arrangement will require very close coordination with school and district food service staff. Keep in mind the extra labor (and therefore cost) required when it comes to preparing whole, fresh foods. Furthermore, in some kitchens, incorporating these fresh items might be hindered by lack of supplies/equipment and scratch cook training.

Be as realistic and specific about what you can provide (salad greens and cherry tomatoes on a weekly basis, carrots once month, etc.). Kitchens are busy places. Coordinating food deliveries and planning meals is a complicated business, so make sure you can provide the quantity of the product you promise on the day you promise.





Think ahead during these most bountiful months. The summer is a great time to process and preserve large harvests that might otherwise go to waste. You might be able to coordinate with the food service staff working at a summer meal site to package and freeze your school's berries (the future perfect topping on a yogurt parfait) or to puree and freeze summer squash (the makings a delicious soup).

Potentially, providing produce to your school's cafeteria can help support the garden financially too. The district may be able to purchase fruits and vegetables the way they would from any other vendor. This could become a way to sustain the garden program.

### **Take Food Home**

If food tasting and preparation during programming time is not possible, don't despair; it is always nice to compensate your hardworking gardeners with produce from the garden to take home. Young gardeners and their families both get to enjoy it. For

maximum benefit, make sure to send home prepping instructions and recipes as well.

### **CSA or School Farmers' Market**

By creating a CSA or hosting a school farmers market, students can provide their community with access to fresh fruits and vegetables, raise some funds, and increase learning as they engage in planning, planting, preparing, and selling their produce.

### **Donation/Food Distribution**

One final option for using your harvest is to donate produce to a food bank for distributing to the wider community. The more involved the students are in the planning process, the more empowered they will become about addressing community food issues. Let students help decide where produce should go — you can give them a range of options, or have them research opportunities independently. Either way, you can use your garden to teach students about bigger issues such as food justice and equity and discuss hunger and health issues in your community or surrounding communities.

### **In Summary**

While coordinating cooking and tasting events takes careful planning, giving young gardeners (and the wider school community) the opportunity to consume their harvest is an important component for any garden program that hopes to impact youth eating behaviors. The first step in this process is to ensure that all produce is harvested and processed safely. Once that is accomplished, there are many ways to facilitate tasting experiences. Explore how you can work within your organization to find the strategies that work best for your program.



# CHAPTER 8

## Conclusion

Edible school garden programs are vital components of robust farm to school initiatives. Serving both youth and educators, they build awareness of food production, grow an appreciation for local food systems, and integrate high-quality agricultural and nutritional learning experiences directly into the curriculum. We hope the *Seeds for Success Toolkit* will help you as you begin your journey into starting a new or sustaining an existing school food garden.

To dig deeper into some of the topics presented in this guide, KidsGardening offered a series of Growing School Food Gardens Webinars which can be viewed at: <https://www.crowdcast.io/kidsgardening>. Archived topics include:

- STEAM (science, technology, engineering, art, math) in the School Food Garden
- Teaching for Sustainability
- Culturally Inclusive Garden-based Learning
- Funding Your Garden

For additional support, you can connect with other educators and garden volunteers in the Kids Garden Community. The [Kids Garden Community](#) is a free online community supporting individuals, families, and organizations with the skills, tools, and connections to garden with kids and scale transformative programs. It is your place to ask questions, make connections, access

resources, learn from each other, and stay inspired. Together, we will create change for our kids, communities, and the planet. We hope that you will join us to:

- Connect with other educators teaching in school food gardens
- Get support from experienced peer garden educators
- Share your expertise growing a school garden
- Find vetted school food garden and farm to school resources to support your growing and teaching adventures.

Good luck with your school food garden journey! We look forward to connecting with you!



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# APPENDIX A

## INDOOR SEED STARTING AND TRANSPLANTING TABLE

Type of plant	Number of weeks before last spring frost date to start seeds indoors	Earliest date to transplant hardened-off seedlings outside relative to last spring frost date
Basil	5	1 week after
Broccoli	6-8	2 weeks before
Cabbage	8-10	4 weeks before
Cauliflower	6-8	2 weeks before
Cucumber	2-3	1-2 weeks after
Eggplant	6-8	2-3 weeks after
Kale	8-10	4 weeks before
Lettuce	7-8	3-4 weeks before
Melon	1-2	2 weeks after
Onion	10-12	4 weeks before
Parsley	10-12	2-3 weeks before
Pepper	6	2 weeks after
Pumpkin	1-2	2 weeks after
Squash	1-2	2 weeks after
Swiss Chard	6-8	2 weeks before
Tomato	6-8	1 week after



# APPENDIX A

## OUTDOOR DIRECT SEEDING TABLE

Type of plant	Earliest date to direct sow seeds relative to last spring frost date
Beans	On last frost date
Basil*	1 week after
Beets	2-4 weeks before
Carrots	2-3 weeks before
Cilantro	1-2 weeks before
Corn	On last frost date to 1 week after
Cucumber*	1-2 weeks after
Dill	1-2 weeks before
Lettuce*	3-4 weeks before
Melon*	2 weeks after
Peas	6 weeks before
Pumpkin*	2 weeks after
Radish	4-6 weeks before
Spinach	4-6 weeks before
Swiss Chard*	1-2 weeks before
Squash	2 weeks after

\*May also be started early indoors.





# APPENDIX B

## IDENTIFYING COMMON GARDEN PESTS

### APHIDS

1/16"-1/8"

**Favorite vegetables:** Cabbage, cucumbers, melons, peas, potatoes, tomatoes

**What to look for:** Tiny, soft-bodied, pear-shaped, insects may be pale green, yellow, reddish-purple, or black. They feed by sucking plant juices, stunting plants, and causing leaves to turn distorted and yellow. Aphids can also spread plant diseases.

### CUTWORMS

1/2"-2"

**Favorite vegetables:** Cabbage-family crops, tomatoes, beans, peppers

**What to look for:** Fat gray, black, or brown caterpillars that curl up when disturbed. They feed at night, cutting off young plants just under or above the soil surface.

### FLEA BEETLES

1/16"

**Favorite vegetables:** Many crops

**What to look for:** Tiny, active black beetles feed on leaves, leaving numerous, small (1/8-inch diameter) holes. When disturbed, they jump like fleas. Their feeding damage is especially harmful to young plants.

### JAPANESE BEETLES

3/8"

**Favorite vegetables:** Many crops

**What to look for:** The larvae are white grubs that live in the soil and feed on the roots of grasses. Metallic green-and-copper adult beetles emerge in early summer and feed on leaf tissue between the veins, leaving a lacy-looking leaf skeleton.

### STRIPED CUCUMBER BEETLES

Adults: 1/4"

**Favorite vegetables:** Vine crops, such as cucumbers, squash, melons, and pumpkins

**What to look for:** Adults are yellow with three black stripes on wings. Beetles feed on the leaves and stems of young plants and transmit the disease bacterial wilt as well as viruses as they feed.

### TOMATO HORNWORMS

3"-4"

**Favorite vegetables:** Tomatoes; less commonly potatoes, eggplant, peppers

**What to look for:** The larval or immature stage of the hawk moth (also called sphinx moth), these large, fat green caterpillars feed greedily on foliage as well as fruits, especially green ones. They have white bands along each side and a horn at the tail end of their bodies. Look for black droppings on leaves to locate these well-camouflaged pests. The grayish-brown, night-flying adult moths have a wingspan of up to 5 inches.



# APPENDIX C

## COOL-SEASON VEGETABLE GARDEN GUIDE

### Planning for Fall Harvests

Youth garden programs that want to enjoy a fall vegetable harvest need to think ahead during summer's heat to cooler times to come. A little planning and planting beginning in midsummer can pay big dividends when youth return at the end of the summer by allowing your garden harvest to continue into the fall or even winter months, depending on your climate and the protection you give your crops.

There are two broad categories of plants that can be planted in midsummer for a later harvest:

- 1 Those that can't tolerate any frost but mature quickly enough to be ready for picking before frost shuts them down, like bush beans and basil.
- 2 Those that tolerate some frost and will keep growing — sometimes even improving in quality — until cold temperatures hit in mid to late fall.

Beets, cilantro, kohlrabi, broccoli, spinach, carrots, chard, cabbage, Chinese cabbage, bok choy, radishes, turnips, lettuce, and hardy greens like arugula and mizuna are all cold-tolerant plants that will take light frost.

And some crops, such as kale and Brussels sprouts, actually taste sweeter when harvested late in the season after they have been touched by frost. In areas with mild winters, like southern California,

the Gulf Coast, and warm parts of the Southwest, you may even be able to grow cold-tolerant crops throughout the winter.

### Fall Planting Formula

To figure out when to start what in your climate, begin by finding out the average date of the first hard frost in your area. While tender crops like beans and basil will be killed by light frost (32 degrees F), many cool-season crops survive until hard frost, when temperatures dip to 28 degrees F or lower. Especially hardy kale, cabbage, collards, and Brussels sprouts can withstand hard frosts, but will usually be killed when temperatures get down to 20 degrees F or lower. To determine when these temperatures arrive in your area, check with your local Extension Service.

Next, find the days to maturity (DTM) for the particular crop and variety you plan to grow. You can find this information on the seed packet, plant tag, or in the seed catalog. (Check to see if the days to maturity are from direct seeding or transplanting. For most of the crops you'll be planting for fall harvest, the DTM will be from seed, except for cabbage, broccoli, and other cole crops, which will be from transplant. If the DTM are from transplant to harvest, add another 2-4 weeks if you are growing your own transplants from seed.)

When possible, choose varieties with the shortest DTM for fall harvests. Then add in a "fall factor" of 10 to 14 days. This takes into account the slower growth of plants as the



days get shorter and cooler in late summer and fall. Add to this the length of the average harvest period, usually 7 to 14 days.

When you arrive at the total (days to maturity + fall factor + harvest period), count back this number of days from the fall frost date to arrive at your planting date. If you plan to protect your crops with a cold frame, cloche, or low tunnel, you can plant 2 to 4 weeks later than you would for unprotected crops. If you garden where frost comes in early fall, you'll need to start planning for and planting fall crops earlier in the summer than gardeners in milder areas, who may wait to plant until late summer or early fall.

*Here is an example, using a hard frost date of October 25:*

Bloomsdale Long Standing Spinach (DTM 42 days from seeding)  
42 days (DTM) + 14 days (fall factor) + 14 days (harvest period) = 70 days  
October 25 minus 70 days = August 16 (date to plant seeds to harvest mature leaves)

Because plants like broccoli, cabbage, and Brussels sprouts take a long time to mature from seed, it's more practical for many gardeners to purchase transplants from a greenhouse or garden center to plant at the appropriate time for fall harvest, rather than growing the plants from seed themselves. A common quandary for many gardeners when planning for fall vegetable crops is where to put them when all the garden space is still taken up with summer-producing crops. While it won't work for everything, many crops can be started in flats or cell packs and transplanted into the garden as space opens up at the end of the season. Even plants that are traditionally direct-

sown, such as beets, can be successfully transplanted if care is taken to disturb their roots as little as possible.

## Crops for Fall Harvest

Although the best fall crops vary by region, here are a few suggestions for plants that grow well in most areas of the country:

**Salad greens:** Crops such as lettuce, spinach, arugula, endive, mache, and mesclun are great for fall harvest because they mature quickly, grow well when the weather is cool, and are less likely to bolt or go to seed than spring-planted crops. Both spinach and lettuce germinate poorly in warm soil (above 60 degrees) so if you are starting plants in late summer, cover beds with shade cloth after planting or start seeds indoors and transplant.

**Hardy greens:** Fall is a great time to grow these nutritious crops. Kale, collards, Swiss chard, mustard greens, and bok choy all thrive in cooler weather. A few frosts will even sweeten the taste of your kale. If you are growing these crops as "baby" greens, you can sow seeds just a few weeks before frost. Some varieties of kale, such as 'Siberian', are especially cold tolerant and can be harvested even after snow covers the ground.

**Cole crops:** Like kale, Brussels sprouts taste best after it's sweetened by a light frost. But they take a long time to mature, so be sure to get them on your planting schedule in early to mid-summer if you plan to grow from seed. Other cabbage family members that are suited to fall harvest include broccoli, cabbage, Chinese cabbage (napa), kohlrabi, and cauliflower.



**Root crops:** Beets, carrots, turnips, and radishes are all suitable for fall harvests. Root crops that mature in the cooler weather of fall will be sweet and mild. In the warmest areas, you can grow these crops right through the winter months.

**Peas:** These grow well in the cooler weather of fall, but can be damaged by frost, especially the developing pods. Try to time your fall pea sowing so plants mature a week or two before the fall frost date and be prepared to cover plants if an early frost threatens. Keep the seed bed well-watered to ensure good germination.

**Herbs:** Dill, cilantro, and chervil all grow well in cool fall weather and, unlike spring crops, are less likely to bolt or go to seed quickly. Make successive sowings of these crops every few weeks from midsummer up until about 6 weeks before your frost date. In mild winter areas, these herbs can be harvested through the winter months.

**Leeks and onions:** Sow seeds of scallions or bunching onions about 8 to 10 weeks before your fall frost date; then begin harvesting when plants reach about 6 inches tall. In mild winter parts of the country, leek seeds may be started in late summer or early fall for harvest in the winter and spring. In cold winter areas, leeks may be harvested in the fall, but because they take a long time to mature they are planted in spring.

## Extending the Growing Season

In addition to careful plant selection, you can also extend your season by finding ways to protect your plants by shielding them from cool temperatures using covers. While

there are many coverup options that can be purchased, with a little ingenuity and some basic tools you can also construct your own.

Engaging youth gardeners in using coverups, building them from available plans, or, better yet, creating their own setups, does as much for the youth as for the plants. As they muse about design solutions, they hone math and problem-solving skills. Even simple setups can be a springboard for monitoring air and soil temperatures and otherwise exploring the physics principles behind the greenhouse effect.

## Creating Plant Coverups: The Basics

Most plant cover-ups, such as cold frames, hoop houses, row covers, hot caps, and so on, whether commercial or homemade, work on the same general principle – they trap the sun’s heat and keep the air temperature around a plant higher than the ambient outside air temperature. This is due to the “greenhouse effect,” where the short wavelengths of sunlight pass through the covering material and are absorbed by the plants and soil inside. The longer infrared rays that re-radiate from these heated objects do not pass back out readily through the covering, trapping the heat inside.

Some coverups protect individual plants, while others may cover an entire row or bed of plants. Depending on your climate and gardening focus, you can use coverups to start or harden off seedlings for transplanting, boost plant growth, hasten fruit production, or protect plants from cold temperatures.

Whichever type of coverup your students create or use, it helps to know a few basics.





Although most plant cover-ups are designed to trap heat, too much heat can be harmful to plants. So it is important to have some way to vent your coverup to release excess heat, and to have your keen observers monitor temperatures. Even in the middle of winter, the temperature inside a cold frame can climb above 100 degrees when the sun is shining! Ventilation also helps prevent diseases encouraged by high humidity, such as damping off of seedlings.

Different materials have different abilities to insulate and therefore protect plants from cold temperatures. A plastic milk jug placed over spring seedlings may only offer a couple of extra degrees of protection, for instance, but a cold frame with insulated sides or a double layer of glass offers a much larger boost. The more airtight your covering is, the better protection it offers on cold nights, but the more it will heat up during the day.

It's also important to remember that some crops, such as cucumbers and squash, rely on bees for pollination, so when blossoms appear you'll want to remove any covering so bees can reach flowers.

Below are several approaches to extending the season by covering plants. But don't feel limited. Once youth understand the basic concepts, they can invent their own setups from recycled materials. Here are a few common coverup examples:

## Protecting Single Plants

One of the oldest strategies for boosting plant growth and protecting them from cold is covering them individually with a type of mini-greenhouse. French gardeners in the

19th century used glass domes or bell jars, called cloches, the French word for bells. Today, commercial versions of these individual coverings are made of lighter-weight materials and are easier to vent. These include umbrella- and lantern-shaped cloches, plastic "bells," and waxed paper "hot caps."

Rather than buying such devices, why not challenge your students to invent their own from recycled materials? Plastic gallon milk jugs with bottoms cut out can get garden seedlings off to a good start. (Removable lids or holes in the sides make great vents.) Tomato cages covered with plastic are an elegant solution for protecting larger plants. What else can your young designers come up with? As plants grow larger, be alert for heat-damage that can occur as leaves touch the sides.

## Covering Garden Beds

When you want to extend the season, or urge it onward, and have wide rows or beds, you have a few general options including:

### Using Floating Row Covers

You can lay floating row covers made from lightweight spun-bonded polyester or polypropylene fabric right on top of most plants, securing the edges with rocks or boards, or burying them in soil. These covers are available in a variety of thicknesses. All let water pass through. The lightest weight covers (under 0.5 oz./sq. yard) let the most light through but provide little heat retention and are used mainly to exclude insect pests during the growing season (be sure to completely seal edges at the soil to keep pests from sneaking under). Mid-weight covers (0.5 to 1.25 oz./sq. yd.) offer good frost protection in spring and fall while still letting a



reasonable amount of light through (they also exclude pests). Covers made of the heaviest weight fabric (over 1.75 oz./sq. yd.) are used for nighttime frost protection but need to be removed during the day because they let little light pass through.

### **Building a Low Growing Tunnel**

Perhaps a more interesting (and challenging) means of extending the season for beds and rows full of vegetables, flowers, and herbs is to create low tunnels. This typically entails placing semi-circular hoops over garden beds and covering them with plastic sheeting or garden fabric. Hoops can be made from sections of heavy-gauge galvanized wire or plastic or metal tubing that are bent into semi-circles. The hoops are placed at intervals over the garden bed with each end of the hoop inserted 6 to 8 inches into the soil or fastened to the frame of a raised bed. The covering is then stretched over and attached to this framework. Covering can be made from solid plastic sheeting (1.5 to 3 mil thick), pre-slitted plastic row covers or garden fabric (described above). Be aware that if you use solid plastic sheeting without ventilation holes or slits, you'll need to ventilate the tunnels during the day as the weather warms. To provide ventilation, you can pre-drill or slit aeration holes in the roll of solid plastic before unfurling it.

### **Here are instructions for creating a basic tunnel:**

Decide the length and width of your growing tunnel. For every 2 to 3 feet of length you'll need one section of 1/2-inch PVC pipe, black polyethylene pipe, or 9-gauge galvanized wire to form a "hoop" to support your covering. The length of each section of pipe or wire will

depend on the width of your beds and height of the plants you'll be covering. The height of the hoops should be at least 6 inches higher than the tallest plants you plan to grow in the tunnel. You'll also need enough row cover material for the length of your bed plus 4 to 8 feet on either end for ventilation and wide enough to cover the hoops with enough extra to secure the edges at soil level.

Bend the plastic or wire to form semi-circular hoops and push them into the ground or connect them to the sides of a raised bed at 2- to 3-foot intervals. (It is helpful to cut the ends at a diagonal.) If your ground is too hard to push the hoop ends in easily, you can pound in short stakes or lengths of rebar at 2- to 3-foot intervals and push the ends of the pipes over them. Or create a wooden perimeter frame with dowels spaced at the same intervals and push and secure the plastic hoops over them.

Unroll the plastic sheeting or row cover fabric over the hoops and bury the edges in the soil or anchor them securely with rocks or earth staples (available at garden supply and hardware stores). To keep the covers from flapping in strong winds, purchase or have your students create clothespin-like clips to secure the fabric to the hoops. To close the ends, gather up the covering, cinch it together with rope or a spring clamp, and secure it to the ground.

Gardeners can keep track of temperatures inside the tunnel and decide what they need to do to maintain an environment to help plants thrive. Depending on weather conditions, you may want to leave at least one end open for ventilation during the day but close it up at night if frost or cold temperatures threaten.



## Building Cold Frames

Cold frames are mini greenhouses that are close to the ground. They are typically used to start or harden off seedlings in containers or grow cool-weather crops, such as lettuce, directly in the soil in spring, fall, and winter (depending on the region). You can also use them to root cuttings of perennial flowers or shrubs, store root crops in the winter, or chill bulbs for forcing.

A standard cold frame is 3 feet deep and 4 to 6 feet wide rectangle made from hay bales (the simplest system), 1- to 2-inch lumber made from rot-resistant wood (such as cedar), concrete blocks, or lumber made of recycled plastic. The front is 10 to 12 inches high and the back is 18 inches high. (This slope is not necessary, but having a sloped lid helps catch more sunlight during cooler months.) A couple of inches usually extend below the ground level for extra insulation. It is covered by a lid made of glass, rigid plastic, Plexiglas, or 3-mil plastic sheets that is either hinged or can be slid open. Old window sashes can be recycled into cold frame tops. To prevent excessive heat build-up inside the cold frame, depending on weather conditions, you need to be able to vent the frame by propping the lid up, sliding the lid off partway, or using purchased thermostatically controlled arms that will open the lid when temperatures reach a specified level. Be sure to place a thermometer within the cold frame so your students will know when venting is needed. There are certainly many possible variations on this theme. An internet search can supply young minds with creative ideas or step-by-step plans.

If possible, place your cold frame with its lower side facing south in a spot that is somewhat sheltered from the wind. Consider placing it up against a wall or fence, or even using a wall as the back part of the structure. If you want to grow plants directly in soil in your cold frame, loosen the soil 4 to 8 inches deep and add compost.

One of the challenges will be to ensure that plants do not overheat on sunny days and that temperatures inside the frame don't drop too low on cold days or at night. In general, when outside temperature reaches 40 degrees, it's time to check the temperature within the frame and vent as needed. A good rule of thumb is to vent sufficiently to keep the temperature inside the frame no higher than 60 degrees F for cool season plants such as cabbage and 75 degrees for warmth lovers like tomatoes. You'll typically want to close the lid in late afternoon before the sun sets in order to trap heat in. If cold temperatures threaten, you can add additional insulation by covering the lid with a blanket, roofing paper, a tarp, or rigid foam sheets weighted down with rocks. Another way to hold in heat is to keep plastic milk jugs of water inside against the back or north side. If you paint them black, they'll absorb even more heat and release it at night.

If you want to use your cold frame to store root crops, such as carrots and beets so you can harvest them, unfrozen, into the winter months (the length of the storage season will depend on the severity of your climate), dig a hole a foot deep in the bed and line it with straw. Put in the vegetables and cover them with 12-18 inches of additional straw, then cover the frame with a tarp.



## Additional Season-Extending Strategies

Beyond the construction of coverups, you may also want to extend your season by:

- Putting mulch on your garden in the winter. Pull it off early in the spring so the soil warms up and dries out more quickly. (Raised beds also dry and warm quickly, enabling you to plant earlier.)
- Using black plastic or IRT (infrared transmitting) mulch to warm the soil prior to planting in the spring. Cut holes in the plastic for planting seeds or seedlings.
- Storing root crops, such as carrots, beets, and parsnips, right in the ground. Cover a

section of a bed with at least 12 inches of organic mulch (chopped leaves or straw), extending the mulch out about a foot and a half on either side of the planting. To harvest, pull off the mulch and dig them, unfrozen, into or even through the winter months, depending on your climate.



# APPENDIX D

## INDOOR GARDENING GUIDE

### Introduction

Don't let cold weather slow down your classroom's gardening efforts! Use winter months to cultivate your green using indoor gardens.

Many schools garden during the fall and spring; however, incorporating indoor plant activities as well allows you to reap the benefits of hands-on, interdisciplinary horticulture lessons year-round. Using grow lights or even just a sunny windowsill, your class can experiment with growing a wide range of plants, from common houseplants and blooming bulbs to edible crops like radishes and lettuce. Nothing is more exciting than the opportunity to watch nature in action indoors, when most of nature is hibernating outdoors.

### Growing Plants Indoors

Bring life to your winter classroom by filling it with vibrant plants and incorporating indoor gardening activities into your curriculum. Although not a natural environment, an indoor space that provides the right conditions allows many plants to thrive, providing opportunities for hands-on science experiments and exploration. Taking advantage of indoor growing opportunities is especially important for those of you experiencing long winters and short growing seasons during the school year.

### Indoor Garden Options

The simplest form of indoor gardening is to

place plants in front of windows that receive a decent amount of light. Windows that face south and west are best and they usually receive enough light to grow leaf and root vegetables (beets, carrots, lettuce, onions, and radishes) and herbs. East- and north-facing windows do not receive as much light, so they will limit your planting options to mostly houseplants; however, houseplants can be an exciting and rewarding crop. You will need to spend a few days monitoring your window space to determine how much light is naturally available for an indoor garden.

Grow lights (LED or fluorescent lights designed to hang low over growing areas) are a more effective way to produce indoor crops. You can purchase prefabricated grow light set-ups or you can make your own. With grow lights, you can control the amount of light your plants receive and can expand your crop options to fruit crops like tomatoes and strawberries.

### Preparing Indoor Growing Spaces

If you are creating a windowsill garden, your main preparation for installation will be to find a way to protect the windowsill or table from water damage. You can place your pots in individual plant saucers or in a large plastic tray to catch drainage.

If you are installing grow lights, use the directions included with the equipment or research an approved design. Make sure to follow all safety precautions and, if possible,



see if your school district has an electrician to review your construction.

## Indoor Garden Supplies

The main supplies you will need for your indoor garden include plants, growing medium, and containers.

### Plants

Plants may be started from seed, cuttings, or purchased as mature plants. Most classrooms begin their gardens by planting seeds because they are relatively inexpensive and their growth helps students to visualize the full lifecycle of a plant. It is often easy to find donations of seeds from local garden centers or seed companies because near the end of the summer many companies want to get rid of excess stock. Seed is dated when packaged and even though most garden centers and seed companies will not sell seed with older dates, as long as packets are kept in a cool and dry location, they will have high germination rates for many years.

If you want to grow annual plants to maturity in your indoor garden, make sure to select varieties that are compact and perform well in containers. The following charts (on pages 114-116) provide recommended vegetable, flower, and herb plants for growing under lights from the *GrowLab®: A Complete Guide to Gardening in the Classroom*.

### Growing Medium

The growing medium in which you raise your plants is important. It anchors the roots so the plants don't fall over and serves as a reservoir for the water, air, and nutrients taken up by the roots. The best medium to use is soilless potting mix, made from peat moss (or coco peat), vermiculite, and/or perlite (it does not

contain any true soil). Soilless potting mix is light enough to allow for good water drainage, root aeration, and root movement, yet heavy and spongy enough to provide anchorage and to hold onto adequate water and nutrients. Additionally, it is easy to transport and readily available in most garden stores. Another good feature is that most are sterilized so that they do not contain weed seeds, insects, or diseases that could flourish in the favorable conditions of an indoor garden. A final benefit is that it doesn't produce mud, so if it gets on clothing, it brushes off easily.

### Containers

There is a wide variety of containers available to grow indoor plants; just make sure they have drainage holes or add drainage holes at the bottom to avoid waterlogging the plant roots. Plastic pots are the most common containers because they are generally inexpensive, can be reused, and are lightweight. You can also use clay or peat pots, school milk cartons, plastic yogurt cups, shallow rectangular growers' flats, egg cartons, and plastic soda bottle bottoms.



## Flower Planting Chart

Crop	Varieties	Days to Germinate	Weeks to Maturity	Plants Per 6" Pot	Depth* (Inches)
Ageratum	Blue Mink Blue Danube	5-10	9	4-6	0
Alyssum	Easter Basket Mix Carpet of Snow	5-14	10-12	6-8	0
Coleus	Rainbow	10-14	—	4-6	0
Dianthus	Snowfire	10-14	9	4-6	1/8
Impatiens	Blitz Super Elfin	10-20	9	4-6	0
Marigold	Petite Mix Inca Gold	5-7	11	4-6	1/8
Morning Glory	Heavenly Blue	5-7	6-8	3-4	1/4
Nasturtium	Dwarf Jewel	7-14	8-10	1-2	1/2
Petunia	—	10	10-12	3-4	0
Snapdragon	Floral Carpet	10-15	10	3-4	1/8
Zinnia	Thumbelina	5-7	10	4-6	1/8

\* Some seeds require light to germinate or are too tiny to be buried under soil. A "0" in the "Depth" column indicates that you should plant these seeds on top of the soil, pressing down lightly on them with a smooth surface. Do not bury them.

## Herb Planting Chart

Herb	Type	Days to Germinate	Plants Per 6" Pot	Depth* (Inches)
Basil	annual	7-10	2-3	1/8
Catnip	perennial	5-14	3-4	1/8
Coriander/Cilantro	annual	10-12	3	1/2
Chives	perennial	5-14	20-30	1/4
Dill	annual	5-10	3-4	1/4
Marjoram	perennial	10-16	2-4	1/8
Spearmint	perennial	10-16	3-4	1/8
Oregano	perennial	7-14	2-4	1/8
Parsley	biennial	10-20	4-6	1/4-1/2
Sage	perennial	14-21	3-4	1/4
Summer Savory	annual	14-21	1-2	1/2
Thyme	perennial	20-30	4-6	1/8



Vegetable Planting Chart									
Herb	Varieties	Days to Germinate	Weeks to Maturity	Plants Per 6" Pot	Plants Per Smaller Pot	Depth (Inches)	Low Light	Yield (Approx.)	
Beans	Contender Bush Blue Lake	4-8	8-9	1-2	-	1 to 1-1/2	no	6-10 per plant	
Beets	Early Wonder Cylandra Mini-Ball Ruby Queen	5-12	9-12	4-5	2	1/2	yes	1 to 1-1/2 diameter roots	
Carrots	Little Finger Short 'n Sweet Baby Finger Nantes Thumbelina	8-16	10-11	4-6	-	1/2	yes	1/2 diameter, 2" roots	
Chinese Cabbage (nonheading)	Mei Quing Choi Joy Choi	5-8	9-12	1	-	1/2	yes	2 cuttings	
Collards	Vates	4-6	11	1-2	-	1/4-1/2	yes	2 cuttings	
Cucumbers	Lemon Salad Bush Suyo Fanfare	5-10	9	1	-	1/2-1	no	1-3 6" cukes per plant	
Eggplant	Little Fingers Bambino Ichiban Green Goddess	20+	12+	1	-	1/4-1/2	no	1-2 small fruits per plant	
Lettuce	Tom Thumb Black Seeded Simpson Salad Bowl Red Salad Bowl	4-8	7-8	4	1-2	1/4-1/2	yes	4 small plants	





Vegetable Planting Chart (continued)									
Herb	Varieties	Days to Germinate	Weeks to Maturity	Plants Per 6" Pot	Plants Per Smaller Pot	Depth (Inches)	Low Light	Yield (Approx.)	
Mustard Greens	Green Wave Tendergreen	4-10	6-8	1-2	1	1/4-1/2	yes	2 cuttings of 6" leaves	
Onion Tops	Southport Yellow Glove White Sweet Spanish	7-14	6-8	12+	6+	1/2	yes	continuous cuttings	
Parsley	Extra Curled Dwarf Italian (flat)	10-20*	8-10	4-6	1/2	1/4-1/2	yes	continuous cuttings	
Peanuts	Early Spanish	7-14	20+	1	-	1-1/2	no	3-6 per plant	
Peas	Green Arrow Laxton's Progress	5-10	8-10	1-2	-	2	no	4-6 pods per plant	
Peppers	Ace Sweet Red Cherry	8-14	9-12	1	-	1/4-1/2	no	2 small fruits per plant	
Radishes	Cherry Belle Early Scarlet Globe Easter Egg French Breakfast	3-5	4-5	6-8	3	1/4-1/2	yes	1/2"-1" diameter roots	
Strawberries	(Alpine)	20	12+	2	1	1/8	yes	4-8 tiny berries	
Swiss Chard	Fordhook Giant Bright Lights	7-14	8-10	1-2	-	1/4-1/2	yes	continuous cuttings	
Tomatoes	Tiny Tim Patio Hybrid Pixie Hybrid Red Robin	6-10	10-12+	1-2	-	1/4-1/2	yes	6-15 small fruits per plant	
Turnips	Purple White Top Globe Tokyo Cross	3-7	6-8	4	1-2	1/4-1/2	yes	1"-2" diameter roots	



Additional supplies you may need are plant labels (popsicle sticks work great), watering cans (plastic water bottles or milk jugs can be used), and fertilizer (liquid or slow release).

## Tips for Indoor Gardeners

There are a few things to keep in mind as you garden indoors:

- The indoor environment does not provide as much light as an outdoor garden. Grow plants with lower light requirements or provide additional lighting with grow lights. If you are moving plants from outdoor lighting to indoor lighting, they may go into a bit of shock at first and lose some leaves. Give plants time to adjust to the new light level before giving up on them.
  - The air in the indoor environment is often drier than outdoors. You may need to increase the humidity around your plants by covering them with clear plastic or misting the air around the plants on a regular basis.
  - Indoor plants will not need as much water as those in an outdoor location. Use your finger to check on soil moisture and only water when the soil is dry. Apply water directly to soil and allow excess water to drain. Discard excess water from plant saucers so that soil does not stay too wet.
  - Check plants for pests such as aphids and fungus on a regular basis. Remove plants with problems quickly to avoid spreading to others.
- When choosing a location, consider accessibility. Students will need room to water and monitor plants and custodians will need room to clean around your indoor garden. Make sure there is plenty of room so plants are not knocked onto the floor by accident.
  - As with any youth gardening enterprise – remember to HAVE FUN

## For More Information About Indoor Gardening:

One of our best indoor gardening resources is our comprehensive GrowLab® Program. Developed by KidsGardening and written and field-tested by educators across the country, the program includes two books: *GrowLab Activities for Growing Minds* and *GrowLab®: A Complete Guide to Gardening in the Classroom*. The *Activities for Growing Minds* brings plant-based explorations to life through 46 lesson plans and hundreds of extension activity ideas that spark students' curiosity about plants and invite them to think and act like scientists. The *Complete Guide* provides everything you and your students need to know about indoor gardening, from planning and planting an indoor garden to tackling pests and other challenges.



# ADDITIONAL RESOURCES

## FoodCorps Lessons

The FoodCorps Lessons include hands-on experiential activities to engage kids in learning about healthy food. This suite of 96 lessons is for grades K-5, and is organized through a learning progression by grade, season, and theme. The lessons are tied to national academic standards and were developed following Culturally Responsive Teaching, Place-Based Learning, and Social and Emotional Learning best practices and frameworks. Each lesson was developed with input from FoodCorps service members, community partners, and resource specialists, and each has been evaluated and updated to reflect recommendations from our community of food educators. This suite of lessons is intended to guide food and garden educators to spark inquiry and love for healthy food and should be adapted to reflect the needs, identity, and culture of the community in which they are taught.

<https://foodcorps.org/resources/foodcorps-lessons/>



## Garden to Cafeteria Toolkit

The Garden to Cafeteria Toolkit was developed by Slow Food USA in partnership with the Whole Kids Foundation to help school district food services safely bring school garden produce onto the lunch line. The toolkit builds off the successes and safety protocols of four school districts across the United States to provide templates and a step-by-step process to help District Food Services develop their own protocols. Recordings of an accompanying webinar series are available to view.

<https://www.wholekidsfoundation.org/garden-to-cafeteria-toolkit>

## Gardening and Cooking Program Curriculum from Berkeley Unified School District

Educators have woven years of experience implementing district-wide garden programming into a guide of hands-on lessons that connect to academics and real-world experiences, include all learners, spark curiosity, and offer opportunities for reflection. The full 752-page guide is available as a free download.

<https://www.berkeleyschools.net/gcp/>

## Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms

Getting Started was developed by the Center for Ecoliteracy in collaboration with Life Lab Science Program, a national leader in garden-based education. This book will help you with



everything from outdoor classroom design and site selection, to strategies for gardening with students, to creating community support that will sustain your school garden program. While there is no one recipe for a successful school garden, the tried-and-true techniques presented here are based on the 20 years of experience that Life Lab Science Program has had in helping teachers establish a school garden that's right for them.

<https://www.ecoliteracy.org/download/getting-started-school-gardens>

### **Got Dirt?**

A step-by-step toolkit on how to build and utilize a school garden. The toolkit also includes tips from garden experts and garden success stories from around Wisconsin. While some examples and resources are specific to growing in Wisconsin, this resource includes information that is applicable to schools in many regions. This resource is available in English and Spanish.

<https://wischoolgardens.org/our-featured-publications/>

### **Got Veggies?**

Got Veggies? is a garden-based nutrition education curriculum created with the goal of getting children to eat more fresh fruits and vegetables. Got Veggies? features seven full lesson plans that are aligned with Wisconsin's Model Academic Standards for Nutrition, Health, Science, and other related subjects. A series of shorter garden-based activities are also included, as well as fun recipes and helpful tips for cooking and eating in the garden. This curriculum provides an all-around great way to nurture students' interest in growing and eating fresh fruits and vegetables! While some examples and resources are

specific to growing in Wisconsin, this resource includes information that is applicable to schools in many regions. This resource is available in English and Spanish and has an ECE-specific version.

<https://wischoolgardens.org/our-featured-publications/>

### **Greenhouse Manual: An Introductory Guide for Educators**

The United States Botanic Garden, the National Center for Appropriate Technology, and City Blossoms developed this introductory manual for educators wanting to better use new or existing greenhouses for programming. The manual clearly and concisely lays out a basic understanding of greenhouses, how to integrate them into lessons, and how to effectively use greenhouses in classroom curricula and out-of-school activities. The manual includes lesson plans as well as basic information on the layout and operations of a greenhouse, growing plants (especially during the school year), growing from seed, seedling nutrition, identifying and treating disease and pest management in greenhouses, basic budgeting, and succession planting.

<https://www.usbg.gov/greenhousemanual>

### **School Gardens: Using Gardens to Grow Healthy Habits in Cafeterias, Classrooms, and Communities**

The U.S. Department of Agriculture (USDA) School Garden developed this fact sheet for farm to school stakeholders. It provides examples of school gardens that have taken root, and resources to continue growing. School gardens have been around for over 100 years, and school districts continue to use them today to establish healthy eating





habits, as educational tools in the classroom, and to promote community inclusion.

<https://www.fns.usda.gov/cfs/school-gardens>

## **School Garden Guide**

The School Garden Guide was created by the United States Botanic Garden, the Washington D.C. Office of the State Superintendent of Education, and City Blossoms to assist you with starting a new school garden, maintaining an existing school garden, and providing high-quality garden-based instruction. This guide is intended for a broad audience including teachers, school administrators, community-based organization staff, community members, and parents.

<https://www.usbg.gov/schoolgardenguide>

## **School Garden Support Organization's Promising Practices**

A community of school garden support organizations from around the country, SGSO network members have shared and compiled resources to support the growth and development of school garden programs at all stages. This website includes an extensive archive of educational webinars.

<https://www.sgsonetwork.org/promising-practices/>

## **South Carolina Garden Toolkit**

Created by members of the South Carolina Farm to School Program, this toolkit offers a comprehensive yet concise overview of how to establish a new school garden.

<https://scfarmtoschool.com/classroom/garden-toolkit/>

## **Teaching in Nature's Classroom: Principles of Garden-based Education**

In *Teaching in Nature's Classroom: Core Principles of Garden-Based Education*, Nathan Larson shares a philosophy of teaching in the garden. Rooted in years of experience and supported by research, Larson presents 15 guiding principles of garden-based education. These principles and best practices are illustrated through engaging stories from the field. The book also features a collection of vivid paintings by mural artist Becky Redelings and connections to the research literature provided by Alex Wells and Sam Dennis of the University of Wisconsin Environmental Design Lab. This resource is available in both English and Spanish.

<https://wischoolgardens.org/our-featured-publications/>

