



“I can grow,”

Guide for Cultivating a Successful Youth Garden Program

© 2010 Ball Horticultural Company and W. Atlee Burpee Company

Burpee Home Gardens acknowledges the National Gardening Association for their participation in developing the “I Can Grow” guide.

www.burpee.com

www.burpeehomegardens.com

www.garden.org

Youth gardens grow so much more than plants. They grow children who are enthusiastic about eating fruits and vegetables, respectful of their environment, actively involved in making positive contributions to their community and hopeful about their future.

Gardening activities benefit mind, body and soul. They have the power to positively impact a child's social development in a number of ways, from offering a venue for inquiry-based, hands-on learning, to providing opportunities for youth to hone communication skills through teamwork. Garden programs teach, inspire, engage and nurture young gardeners.

In partnership with the National Gardening Association, Burpee has developed this guide to provide your school or community organization with the basics to start a successful youth garden program. Ultimately, together, we hope to foster the growth of the next generation of gardeners!

This year, Burpee is launching a national program called "I Can Grow," supporting a new, popular interest in vegetable gardening among younger and novice gardeners. The program reflects a growing interest in fresher, more nutritious food; supporting community needs; environmental responsibility; saving money; and finding personal satisfaction through home gardening.

A key component of "I Can Grow" is the installation of school and community gardens across the nation. This guide was developed to support a successful, educational gardening initiative.

We hope by the end of the guide you and your classroom of tomorrow's gardeners will be able to say, "I can grow!"



Table of Contents

In this guide you will find tips for starting, designing, planting, maintaining and sustaining an edible garden for youth, along with answers to some of the most frequently asked questions and a list of additional resources. The guide is organized into the following sections:

Seven Steps for Starting an Edible Garden for Youth 6

Five Tips for Maximizing Your Youth Garden Program..... 10

Garden Lesson and Activity Ideas 11

- Lessons and activities in the following subject areas: science; math; history and social studies; language arts; health and nutrition; art, music and drama
- Activity ideas for community gardens

Designing the Edible Garden 17

- Choosing a site
- Garden options
- Selecting plants: annuals, biennials, perennials
- Regional planting tips

Tips for Selecting Plants for an Urban Edible Garden 28

Preparing to Plant the Garden..... 29

- Mapping out the garden
- Preparing the soil
- Tools to collect
- Benefits/drawbacks to planting seeds directly into a garden
- Benefits/drawbacks to planting seeds indoors to transplant
- Benefits/drawbacks to planting purchased seedlings or plants

Planting Instructions 35

- Planting seeds directly in the garden
- Growing your own seedlings
- Transplanting purchased seedlings and plants

Maintaining the Garden..... 39

- Watering
- Thinning
- Fertilizing
- Mulching
- Weed control
- Promoting plant health
- Companion planting
- Low-impact pest control
- Harvesting
- Maintaining the garden over summer

Sustaining the Garden Program..... 47

- Build a strong garden committee
- Recruit new volunteers
- Communicate
- Maintain detailed records
- Engage the kids
- Connect with your community
- Promote the garden
- Host an annual planning event
- Expand and grow
- Schedule regular workdays
- Say thank you
- Remember to have fun

FAQs 52

- What can I do to prevent vandalism?
- What kind of safety measures do I need to take?
- Where can I find funding and materials to begin and sustain the garden?

Additional Resources..... 54

Seven Steps for Starting an Edible Garden for Youth



Edible gardens for youth come in all shapes and sizes – from flats of lettuce grown in indoor gardens for a year-end salad party, to large outdoor plots producing enough vegetables for a student-run farmer’s market. Your garden should be uniquely designed to meet your educational goals, the resources and space available, and the climate in your area.

Although the design and function of edible gardens varies greatly from school to school, and from community garden to community garden, the process of developing a successful program is the same for everyone. Follow these steps to create a sustainable youth garden program:

1. Building the Case

2. Gathering Support

3. Planning the Program

4. Designing the Garden

5. Searching for Resources

6. Planting and Maintaining the Garden

7. Sustaining the Garden Program

Step 1: Building the Case

To rally support from administrators, educators, support staff, parents, volunteers and funders, you need to build your case. *Why do you need an edible garden? How will it benefit the students at your school?*

Point to research-based evidence and anecdotes that illustrate how the hands-on nature of gardening can enrich the curriculum, improve students’ interest in learning and encourage them to eat well.

You may find it beneficial to communicate several of the positive factors educators have reported. Edible gardening programs:

- Provide opportunities for hands-on learning, inquiry, observation and experimentation.
- Motivate kids to eat and like fruits and vegetables.
- Build an understanding of where our food comes from and respect for the field of agriculture.
- Promote physical activity and quality outdoor experiences.
- Teach kids to nurture and care for other living things while also learning how to care for themselves.
- Increase student access to fruits and vegetables.

In addition to anecdotal evidence, you can draw from the findings of research studies which show that gardening programs:

- Increase interest in eating fruits and vegetables and improve attitude toward fruits and vegetables.¹
- Improve attitude toward vegetables and toward fruit and vegetable snacks.²
- Improve nutrition knowledge and vegetable preferences.³
- Increase children's knowledge about the benefits of eating fruit and vegetables and participants reported eating healthier snacks.⁴
- Increase fruit and vegetable consumption of adolescents.⁵

Step 2. Gathering Support

Next you need to ask, *"Who will we involve in our garden program?"* The answer is, *"Everyone!"* Cultivating people excited about the garden is as much a requirement for creating and sustaining your program as preparing the soil.

Start at the top. Obtain buy-in from administrators. Supportive administrators can provide valuable help in finding the time and resources needed for a successful garden project.

Recruit parents, staff and community volunteers for a garden team. Although nominating two or three individuals to lead the way as garden coordinators is helpful, many hands are needed to ensure a successful garden program. Creating a team or committee that is actively involved results in the best garden plan possible, and it broadens your reach into the community for resources, adds extra hands for installation, helps prevent volunteer burnout during maintenance and ensures long-term sustainability.

Forming subcommittees such as a curriculum subcommittee to work with teachers on lesson plans, an event subcommittee to assist in planning regular workdays and harvest parties, a fundraising subcommittee to help find donations and funds, and a communications subcommittee to help keep everyone informed, provides lots of opportunities for ownership and spreads out the responsibilities so that no one person feels overburdened by tasks. Some schools find that making garden coordinator(s) a permanent position of the parent-teacher organization also helps with long-term sustainability.

Don't forget to involve the students! Educators across the country report that when students are involved in all stages of the process, they are more invested in the project's success, and are inspired to care for and respect their gardens.

¹Pothukuchi, K. 2004. Hortaliza: A Youth "Nutrition Garden" in Southwest Detroit. *Children, Youth and Environments* 14(2):124-155.

²Lineberger, S. E., and J. M. Zajicek. 1999. School gardens: Can a hands-on teaching tool affect students' attitudes and behaviors regarding fruits and vegetables? *HortTechnology* 10(3):593-597.

³Morris, JL and Zidenberg-Cherr, S. 2002. Garden-based nutrition curriculum improves fourth-grade schoolchildren's knowledge of nutrition and preferences for some vegetables. *Journal of the American Dietetic Association* 102(1):91-93.

⁴Koch, S., T. M. Waliczek, and J.M. Zajicek. 2006. The Effect of Summer Garden Program on the Nutritional Knowledge, Attitudes and Behaviors of Children. *HortTechnology* 16(4): 620-625.

⁵McAleese, J.D., and L.L. Rankin. 2007. Garden-Based Nutrition Education Affects Fruit and Vegetable Consumption in Sixth-Grade Adolescents. *Journal of the American Dietetic Association*. 107(4): 662-665.

Step 3: Planning the Program

Garden lessons and activity ideas to help you plan your program can be found on page 11.

“What will our garden accomplish?” comes next. Although it is tempting to start drawing up landscape plans once a gardening committee is organized, it is important not to skip the step of determining how you will use the completed garden. Each program should have defined goals and objectives. To have the most impact, school gardens should be integrated into the existing curriculum, and youth-focused community garden programs should be designed to meet identified local needs (for example, increasing fresh fruit and vegetable availability in an area without a grocery store or improving the dietary habits of youth challenged by obesity). The garden should be seen as a tool to teach required standards or solve local problems, rather than an additional activity to squeeze into the day. A purposeful garden will be a worthwhile and long-lasting garden.

Step 4: Designing the Garden

Additional garden design information can be found on page 17.

Finally, it is time to design the garden. A very important tip: Dream big, but start small. A large project can exhaust the enthusiasm of your students and volunteers. Let them get excited about the success of a bountiful, enjoyable small garden, then expand as your confidence and experience increases.

You will begin the design process by evaluating the space and resources available to you and deciding what type of growing space best fits your needs – an indoor garden, container garden, raised-bed garden or in-ground garden. Once your location and garden structure are selected, you can draft a design and choose plant materials. As you move through the design, remember first and foremost: a youth garden should be fun and functional.

Step 5: Searching for Resources

Additional suggestions for beginning your resource search can be found in the Frequently Asked Questions (FAQs) section on page 52.

Get creative as you search for funding and materials to start and maintain your youth garden program. Money can come in the form of grants from your PTA, local businesses, small fundraisers, garden clubs, major corporations and gardening organizations. Tools can be borrowed (if purchasing is out of the question) from parents, your school district or other partners in education. You can also solicit tool donations or write grants to support purchasing tools.

Five Tips for Maximizing Your Youth Garden Program

- 1. Establish a strong garden committee.** Constantly seek out new members and distribute responsibilities.
- 2. Involve kids** in planning, planting, maintaining and sustaining the garden.
- 3. Engage your community** through ongoing and special events. Networking will result in new educational opportunities and help secure necessary resources.
- 4. Use the garden** to meet existing educational goals and identified needs.
- 5. Incorporate sustainable gardening techniques** during the design, installation and maintenance of the garden.

Step 6: Planting and Maintaining the Garden

It's time to get your hands dirty and work up a sweat! Although the installation varies greatly on your design, typically, this stage requires you to address:

- Weed and grass removal
- Soil preparation, including bringing in soil or amending existing soil
- Planting of seeds or plants
- How to facilitate basic maintenance, including watering, weeding, mulching and harvesting

It's vitally important to have a dedicated group of parent and community volunteers to help you with garden installation and maintenance. A small adult-to-child ratio ensures a safe experience that provides kids with the most opportunities to contribute.

Step 7: Sustaining the Garden Program

Why think about sustainability in the planning stages? Youth gardens are a significant investment of time, energy and resources, so you want them to last beyond one growing season. Consider long-term costs and volunteer recruitment before you put your first plant in the ground.

Summary

This may seem like a long process, but don't let it overwhelm you. Just remember: You don't need to know all the answers up front – you'll learn as you go, and your young gardeners will benefit greatly from your shared educational journey.

Additional planting instructions for preparing to plant a garden can be found on page 29, and maintenance tips are noted on page 39.

Suggestions for growing a sustainable gardening program can be found on page 47.

Garden Lesson and Activity Ideas



Lesson Ideas for School Gardens

Check online for more about these types of activities. A simple Web search should yield lots of great information.

Your young gardeners will learn a lot through the experience of planning, planting, maintaining and harvesting; however, in order to justify the time spent in the garden, your lessons should be designed to accomplish the goals and objectives of your required curriculum. Fortunately, the garden is a flexible teaching tool providing unlimited interdisciplinary opportunities. Here are some ideas for how to use your garden to teach core subject matter:

Science

The science curriculum is a natural fit for a garden. Growing plants provides a resource for observing life cycles and learning about ecosystems and the environment. Students practice and hone scientific process skills by observing, classifying, inferring, measuring, predicting, organizing and interpreting data; forming hypotheses; and identifying variables.

Botany

- Observe the life cycle of plants from seed to seed.
- Learn the different parts of a plant (seeds, cotyledons, roots, stems, leaves, flowers, fruits) through dissection activities.
- Plant seeds in a root view box to observe plant structures at each stage of the plant's life cycle.
- Explore photosynthesis, pollination and decomposition.
- Sort and classify plants according to their characteristics. Practice using dichotomous keys for identification.
- Conduct experiments to understand plant needs and conditions needed for germination and proper growth.

Earth and Physical Science

- Plant a terrarium to demonstrate the water cycle.
- Build a compost bin to demonstrate decomposition and recycling of nutrients.
- Create a weather station to measure and record conditions such as temperature, rainfall and wind speed.
- Explore your soil texture and composition, including organisms that call the soil home. Compare and contrast the properties of different types of soils (density, air spaces, living organisms, composition, texture, smell, appearance).
- Use litmus paper or test kits to test the pH of different soils. Investigate how plants respond to soils with different pH levels.
- Grow plants indoors under different types of lights and discuss different light wavelengths and how they impact plant growth.

Environmental Science

- Plant native species and learn about your local ecosystem and interdependence of all the plant and animal species.
- Simulate soil erosion in your classroom garden and discuss the importance of plant material to prevent loss of topsoil and runoff into streams.
- Investigate the impact of human actions on plants by conducting experiments such as watering plants with salt solutions of various strengths and observing differences in plant growth to demonstrate the effects of road salt on plant growth.
- Observe the growth patterns of native and exotic plants and discuss concerns related to invasive plants.

Math

The garden provides a plethora of opportunities to practice basic mathematical functions, such as calculations, comparisons, measurements and creation of varied representation of data (charts, graphs, etc.). The hands-on and practical applications presented by gardening activities can help to motivate students who are confused by textbook questions and examples. Here are a few math activity ideas:

- Measure and graph the growth rates of plants and make predictions regarding future growth. Use standard and metric measurements.
- Predict dates of germination and maturity based on information from seed catalogs. Plan backwards from a scheduled salad party date to determine when each crop should be planted.
- Use graph paper to make a map to scale of the area of your garden.
- Calculate amounts of fertilizer to use per quart or liter of water.
- Count the total number of flower buds, and the number of buds that actually produce fruit. Figure a percentage or fraction of the total that fruited.

History and Social Studies

Plants are an important part of world history. They have influenced human civilizations and economies since the beginning of time. As the bottom of all food chains and supplier of oxygen for our air, they will always be essential to our survival. Gardening activities can be used to teach about specific historical events and cultures, and also to introduce current events like the impact of biotechnology. Some gardening activity ideas include:

- Research and report on cultural/ethnic differences in food consumption and gardening practices.

- Visit local farms and interview farmers about choice of crops, growing practices, marketing and farm history.
- Collect newspaper or magazine clippings and discuss how advertising influences our food choices.
- Research the histories of your classroom garden plants. Discover where they originate, the impact they've had on our diets, and how today's varieties differ from the original plants.
- Study some of the political, ecological and economic reasons for hunger and what can be done locally and globally to eradicate it.

Language Arts

Reading and writing are two very important classroom basics, and mastery of these skills provides students with the power for success in this world. Relating language arts to the garden adds a hands-on learning element to this subject and provides opportunities for practical applications.

- Hone writing skills through daily garden journal entries.
- Practice research and reading comprehension skills while planning the garden and learning how to care for plants.
- Write, illustrate and publish a collection of garden stories and poems.
- Study new vocabulary that relates to plants and gardens.
- Write letters to local merchants explaining your gardening project and asking for donations of supplies.
- Publish a class newsletter about the garden and distribute it to other classrooms.
- Read daily newspapers and magazines, and bring in articles that relate to gardening, agriculture, hunger, nutrition, etc.

Health and Nutrition

Research is mounting documenting the health benefits of eating fruits and vegetables, and yet most children do not eat the recommended daily amount. Growing fruits and vegetables in the classroom improves students' attitudes toward these healthy foods and provides them with motivation to try them. The garden can be used as a hands-on tool to teach nutrition lessons, including the importance of fruits and vegetables and proper food preparation techniques. Specific activity ideas include:

- Compare the importance of nutrients in the health of humans and of plants.
- Study the nutritive value of the various crops in your garden.

- Identify the parts of the plant represented by common fruits and vegetables.
- Discuss the difference in nutritional value of various plant parts.
- Prepare vegetables in exciting new ways.
- Conduct a blindfolded taste test using classroom vegetables and supermarket vegetables.
- Experiment with food preservation techniques such as drying, freezing and canning.

Art, Music and Drama

Nature is the inspiration for many works of art, music and drama. Use your garden to inspire your budding artists. Activity ideas include:

- Create paintings and drawings of garden plants.
- Paint a class garden mural to hang in the hallway.
- Design labels to mark pots and flats.
- Make puppets and present a play about garden life, ecosystems, food concerns, etc.
- Dramatize the life cycles of garden vegetables.
- Pantomime various gardening tasks (transplanting, fertilizing, sowing seeds, pollinating, etc.).
- Learn a collection of songs that relate to food, gardens and the environment.
- Using a movie camera with single-frame capability, make a time-lapse film of a plant growing.

Activity Ideas for Community Gardens

Although the lesson ideas listed above can be used for any type of garden program, most youth-focused community garden programs emphasize the development of practical life skills rather than strict ties to the academic curriculum. Here are some activity ideas to consider when working in an informal education setting:

Set up a youth garden business. When students plan, launch and maintain a business of any size, they develop a host of important life skills, gain confidence and possibly even bring in some income. Through the process of starting and running a business, kids help identify target audiences; survey potential customers; design products; tackle production and sales challenges; promote their products; and track expenses, revenues and profits. Some examples of youth garden business ventures include:

- Vegetables, herbs and flowers (sold at a farmer's market/vegetable stand)

- Bedding plants (seedlings)
- Homemade plant pots
- Worm composting kits with directions
- Bagged compost
- Seeds saved from the school garden and sold in student-designed packets
- Herbs and herb crafts (for example, potpourri, vinegars, pillows, catnip mice)
- Wreaths made from herbs and flowers
- Dried flowers/pressed flower cards and placemats
- Homemade paper note cards
- Canned goods such as salsa, jam and pickles

Start a job-training program. The horticulture industry is full of job opportunities, from working at a botanical garden to owning your own landscape business. Teaching youth gardening basics through hands-on experience provides them with a foundation to build upon to enter this field.

Conduct cooking classes. Providing kids with access to fruits and vegetables is only half the battle. Showing them how to prepare them in tasty and nutritious ways provides them with the full skill set to maintain a healthy lifestyle. Look for age-appropriate recipes and cooking utensils.

Donate fruits and vegetables to local food pantries or senior centers. Growing food to donate to community members in need plants the seeds of generosity in your gardeners as they experience the joy of helping their neighbors.

Begin a neighborhood beautification project. Participating in beautification projects gives youth a chance to have a direct impact on their surroundings. Not only can they see the difference, they also receive loads of praise and positive feedback from family, friends and even strangers, adding fuel to their desire to contribute to the aesthetics of their community. Beautification project ideas include installing a garden at a public place like a local library, planting trees and shrubs in a local park, planting and maintaining hanging baskets or containers along the streets, and growing seedlings to distribute to neighbors.

Create an intergenerational mentor program. Positive interactions between different age groups are important for connecting the community. Adults and older students serve as positive role models for young children, and kids provide inspiration and motivation for adults as they share their contagious energy and enthusiasm for nature. By working together toward a common goal, individuals grow to trust, respect and learn from one another.



Designing the Edible Garden



Choosing a Site

When designing an edible garden for youth, identifying the best location available is an important task to optimize production. A successful edible garden needs adequate sunlight, reliable moisture and nutrients from fertile soil. Key consideration when choosing a location:

Light. In order to produce a good crop, most vegetables require at least six hours of full sun per day, and more is better. Check your potential garden sites at different times during the day to see how much sun they receive.

Water. Most edible crops are sensitive to inconsistent moisture levels, so you need to be prepared to supplement rainfall with additional water when necessary. Your garden should be in close proximity to a convenient water source or an irrigation line should be installed. You also want to avoid areas with poor drainage and too much water.

Soil. If the soil supports thick, healthy grass or weed growth, it probably has enough nutrients to get your garden started. There should be 6 to 12 inches of top soil (as opposed to gravel, stone or hardpan) on the site. Since you will be growing plants for consumption, make sure to test for lead.

In this section:

- *Choosing a Site*
- *Garden Options*
- *Selecting Plants*
- *Regional Planting Tips*

Your county Cooperative Extension office (find your local office at: <http://www.csrees.usda.gov/Extension/>) or public health department can help you test for lead in the soil. If lead is found, choose another site or garden in containers with potting mix.

Garden Options

There are many different growing techniques to choose from depending on the space you have available. Gardening options include:

Traditional in-ground beds. If you have space and acceptable soil, you can plant your garden directly in the ground. Before planting, you will most likely want to add additional organic matter and use a tiller to break up compacted soil, but overall this option requires the least inputs. When laying out your in-ground garden beds, remember to include plenty of wide pathways. This will prevent soil compaction in the beds, allow plenty of room for wheelbarrows and small group discussions in the garden, and reduce the amount of soil amendments and water you will need (no need to amend the pathway).

Raised beds. Raised beds are comprised of soil raised above ground level, usually framed by structures made of rot-resistant wood (like cedar), concrete blocks or recycled plastic planking. They can be built on top of soil (raised beds built over soil should be at least 8 inches in height) or paved surfaces (raised beds over pavement may need to be at least 2 feet in height). Although they require more initial investment of time and money than traditional in-ground gardens, the benefits of raised beds pay off in the long run: they're easier to cultivate; you don't have to worry about 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. As you design the beds, remember that students need to be able to reach plants growing in all sections, so

it is best if they are a maximum of 3 to 4 feet wide. Leave approximately 4 feet between beds to allow access for wheel chairs and wheelbarrows.

Container gardens. Container gardens are another option for growing edible plants in challenging growing conditions. Traditional garden containers are pots and troughs made of clay, plastic or wood, but plants aren't fussy – they'll grow in anything that holds soil and has drainage holes. You can experiment with whatever is at hand, from discarded five-gallon buckets to an old bathtub. Window boxes and hanging baskets are great if you have little or no ground space. Just make sure your containers have never been used to hold poisonous materials.

By adding handles or wheels, or placing containers on wheeled platforms, you can make your garden mobile and move plants to locations where they'll grow best as the season advances or conditions change (for example, as the angle of the sun shifts slightly each day). If threat of vandalism is extreme, you can move containers to a sheltered or locked area. Additionally, in urban areas where ground space is at a premium, containers can even be placed on roof tops.

Indoor grow lights. An indoor garden is a good option if room is not available outside or there are challenging weather conditions such as long winters and short growing seasons during the school year. The simplest form of indoor gardening is to place plants in front of windows; however, this is usually not enough light for edible plants to grow successfully. Grow lights designed to hang low over growing areas are a more effective way to produce indoor crops. You can purchase prefabricated systems or you can make your own. With grow lights, you can control the amount of light plants receive, allowing you to grow leaf and root crops like lettuce and radishes, along with plants needing higher light intensities to produce fruits like tomatoes and strawberries. When planting in indoor gardens, look for dwarf or short varieties to accommodate limited vertical space.

Selecting Plants

The next design step is to choose your plant materials. Look for varieties that grow well in your region, can be easily maintained, and if possible, are blooming, growing and fruiting at a time when kids are on site.

To help guide the selection process, you may want to choose a garden theme. Theme gardens motivate students and build excitement and interest in gardening. They also bring focus to plant selection and can support the curriculum. Some schools devote one or more beds to specific themes, while others create entire gardens or schoolyards around one theme.



Here are a few edible garden theme ideas to spark your imagination:

Pizza garden. Grow the ingredients to make a class pizza, including tomatoes, basil, oregano, peppers and onions. Get creative and add broccoli and carrots.

Rainbow garden. Research plants whose flowers or leaves show off the different colors of the rainbow: red, orange, yellow, green, blue and purple.

Salad garden. Grow the ingredients to make a tasty salad: lettuce, carrots, radishes, cucumbers, cherry tomatoes and edible-pod peas or green beans.

Salsa garden. Grow the ingredients to make a batch of your own salsa, including tomatoes, garlic, cilantro, bell peppers and onions. Consider adding corn or mild chili peppers.

Suggested Plant List

This list of edible plants that do well in youth gardens is divided into categories based on their growing seasons (annuals/biennials and perennials) and whether it is easiest to grow them from seed or to transplant seedlings. For those of you new to the gardening world, it's helpful to become familiar with a few plant terms to help you navigate through the myriad choices.

Annuals are plants that complete their life cycle from seed to seed during one growing season. In this list, we divide them into cool-season and warm-season annuals. Cool-season types, such as lettuce and spinach, grow best when daytime temperatures are 60 to 70°F. Warm-season annuals, including beans and corn, grow best when daytime temperatures are in the mid-70s through the 90s°F.

Biennials are plants that live for two growing seasons. During the first season they build up reserves that they use during the second season to blossom and produce seed, after which they die. Common biennial plants include carrots and onions. (Gardeners don't grow these two crops for flowers or seeds, but you may wish to let some specimens complete their life cycles just to illustrate the biennial cycle to children – just be aware that the roots will no longer be palatable.)

Perennials live for three or more years. Lifespans vary, with some lasting just a few years and others living for decades.



For planting ideas and nutrition information, check out Burpee's Rainbow Power Chart at: www.burpee.com/contentarticle.do?itemID=100013&KickerID=100121&KICKER

Annuals/Biennials

Cool-Season Plants to Grow from Seed

Beets are grown for their nutritious roots. To kids, harvesting root crops is like digging for buried treasure! Colors include red, orange, yellow, white, pink and striped. Leaves are also edible. Harvest roots while fairly young – they can become tough and fibrous when they grow too large. Beets can be eaten boiled, baked or pickled. Biennial.



Carrots are packed with health-promoting nutrients and taste great fresh from the garden. Varieties range in size from baby carrots to foot-long roots. Although orange carrots are most common, yellow, white and maroon varieties are available. All have attractive feathery leaves. Carrots are fairly easy to grow in well-drained, well-tilled soil. Keep soil evenly moist to ensure even germination of seed. Biennial.

Cilantro is an easy herb to grow and a staple in Mexican cuisine. One of those confusing plants with two common names, it is also known as coriander. When grown for its leaves, it is usually referred to as cilantro. When grown for its seeds, coriander is more common. It grows best in cooler spring and fall temperatures in Southern climates, but will survive through the summer in northern gardens. Annual.

Dill can grow up to 5 feet tall, with airy foliage and beautiful yellow flowers. This herb is used to flavor dill pickles, dressings, fish and dips. The flowers attract butterflies, and the leaves are a food source for swallowtail butterfly caterpillars. In hot climates, it grows best during the spring and fall months, but it thrives all summer in cooler climates. Annual.

Lettuce grows quickly and forms the foundation for fresh classroom salads. Dozens of varieties are available in many different colors (reds, purples and all shades of green). Heading lettuce forms a tight mass of leaves that you harvest all at once. Looseleaf lettuce can be harvested by the leaf throughout the growing season. An excellent crop for both spring and fall. Annual.

Radishes germinate in three to seven days and many varieties are ready for little hands to harvest in 30 to 45 days. Like beets and carrots, the roots are the prize, and they come in a wide variety of shapes (round to oblong), colors (including red, white, pink, purple and yellow) and sizes. Most are eaten raw to add a spicy flavor to salads. Annual.

Peas come in several different types from snow peas to field peas, some with edible pods and others dried and used for soups. Most have a vining habit and need support in order to yield a good crop. Try growing them on a trellis, fence or bamboo tepee. Peas are a good source of protein, minerals and vitamins, and they're great fun to pick. Annual.

Spinach leaves are packed with powerful nutrients such as vitamins A and C, iron and calcium. Spinach grows easily and

very quickly, and prefers the cool temperatures of spring and fall. You can start harvesting as soon as plants have five or six leaves. Annual.

Swiss chard is grown for edible petioles (leaf stalks) and leaves. The variety 'Bright Lights' is popular with kids because its stems and leaf veins come in a range of bright colors, including yellow, pink, red, orange, purple, white and green. Like spinach, it is high in vitamins and iron. Annual.

Cool-Season Plants Easier to Transplant from Seedlings

Broccoli, grown for its green immature flower buds, is a tasty treat that is also high in nutritional value. When you offer kids the opportunity to "eat flowers," they're sure to be intrigued! Broccoli can blossom prematurely (called bolting) in hot weather, so plant seedlings when the weather is cool to ensure a good harvest. Annual.

Brussels sprouts are related to cabbages, as you may guess from their appearance. They are a fun size for small children, especially when they grow alongside a cabbage for size comparison. Annual.

Cabbage forms an edible head of tightly clustered leaves. Available in a variety of sizes and colors (red, purple and white), cabbage can be eaten cooked or raw. Annual.

Cauliflower is grown for its tasty flower buds, which provide an excellent source of vitamin C. Although white varieties are most common, green, orange and purple heads also available. Annual.

Onions are a universal seasoning. Grow and taste both the edible bulbs and green tops. Plant onion seedlings or "sets" (small onion bulbs), available from garden centers and catalogs in the spring. They vary in skin color (white, brown, yellow, red or purple), flavor (from sweet to spicy) and shape. The tops grow quickly for student sampling. Biennial.

Parsley is high in vitamin A, and by weight has more vitamin C than an orange. The curly variety has a tight mounding growth that resembles a bed of soft moss, making it a nice "touch" plant. Parsley is also a food source for black swallowtail butterfly caterpillars. Biennial.

Warm-Season Plants To Grow from Seed

Bean seeds are large enough for kids to handle and plant easily, and they grow quickly, some maturing in as few as 45 days. Both bush and pole varieties come in a wide array of types and colors, including yellow, green and purple. Pole beans are great for creating child-friendly structures like tepees and tunnels. Kids can harvest snap, string or French beans for eating raw or cooked. Types meant for drying, such as pinto, kidney and black beans, stay on the vine until the pods become brown – they make an exciting package for curious kids to open, with shiny, colorful seeds inside. Annual.



Cantaloupes provide sweet, refreshing fruit and are a wonderful source of vitamins A and C. These vining plants require lots of room to spread (leave at least 5 feet between standard plants, and 3 feet between compact bush varieties). Children will enjoy monitoring the growth of these ball-shaped fruits. Annual.



Sweet Corn, with its tall stature, can offer a structural as well as edible element to a garden. Because it is pollinated by the wind, you need to plant it in blocks of several rows (at least 3 feet by 3 feet) or in tight “hills” of at least three stalks in order to get edible ears. After you harvest, leave the stalks in place and let kids play hide-and-seek in the patch, and use the stalks to make decorations. Annual.

Cucumbers can be eaten fresh, added to salads or turned into pickles. Like their cousin the cantaloupe, cucumbers grow on a vining plant. Let it sprawl across the ground, or if you’re short on space, train it up a trellis or choose compact bush varieties. Annual.

Peanuts are perky green plants with bright yellow flowers. They have a fascinating growth habit – after pollination, the flower stalk stretches down to touch the soil and fruits (peanuts) develop underground. Due to allergy concerns, be sure to check your school or group’s policy on peanuts. Annual.

Squash is a common name given to several species of plants. There are three main types of squash – summer, winter and pumpkin. Summer squash are harvested when tender and still immature. The most common varieties grown and consumed are straight or crookneck yellow varieties and green zucchinis. In contrast, most winter squashes are vine-type plants whose fruits are harvested when fully mature. They have a hard outer shell, take longer to mature than summer squash and are best harvested once the cool weather of fall sets in. Squash plants like to spread, so leave plenty of room when planting. Annual.

Watermelons are a summertime favorite and rewarding for kids to grow. Like cantaloupe, plant them in hills and give them lots of space (7 to 10 feet between hills). Annual.

Zucchini is a popular and usually prolific summer squash, producing tons of slender green fruits on bushy plants. Annual.

Warm-Season Plants Easier to Transplant from Seedlings

Basil, like other culinary herbs, is a stimulating sensory plant for children to smell and taste. Aside from traditional basil, there are also lemon, lime, anise and cinnamon-flavored types. Leaf colors and shapes also vary, from tiny, pale green leaves to deep purple ruffles. They also come in different sizes, but classic basil can reach 2 feet at maturity. Basil grows best in full sun. Basil plants also produce attractive flowers, although if you are harvesting leaves for cooking it is best to remove flower buds and encourage vegetative growth. Annual.

Eggplant is a common ingredient in stir-fries, salads, soups and stews. Although purple-skinned fruits are most common, there are green, red, white or striped types, as well as smaller-fruited varieties with either an elongated or round shape. Start your own seeds indoors eight weeks before your last expected frost date in the spring. Annual.

Rosemary is an evergreen woody shrub that produces pine-scented leaves used in cooking and potpourri. Flowers are white or blue, and you can choose varieties with upright growth or with trailing branches. It is also commonly used in cooking with breads, meats and vegetables. Perennial in USDA Hardiness Zones 8 to 10; annual elsewhere (bring it inside for the winter).

Peppers are available in a wide range of flavors from sweet bell peppers to spicy chili peppers. They come in a rainbow of colors and can even be used as ornamental plants. When growing peppers with young children, plant sweet peppers with low heat as a safety precaution.

Tomatoes are a garden staple. Fruit can range in size from small cherry tomatoes that pop into your mouth to large beefsteak tomatoes that slice to fill up a hamburger bun. They are sensitive to cold temperatures and extreme heat. Tomatoes stop setting fruit when night temperatures are higher than 70°F, so gardeners in the Deep South grow them as a spring and fall crop. Gardeners elsewhere in the United States grow them as a summer crop. Start your own seeds indoors six to eight weeks before planting time. Annual.

Perennials

You can plant most perennials throughout your growing season, although each variety may have an optimum planting date for your area. The most flexible planting time in most areas is in the spring after chance of frost has passed, but many will also thrive if planted in summer or fall. If you do plant them in the heat of summer, monitor water needs frequently. If you plant in fall, allow enough time for roots to become established before cold weather hits.

Blueberries not only provide fruit early to mid-summer, they are attractive low-maintenance shrubs with good fall color. Bush varieties range from 4 to 7 feet tall, and “wild” blueberries stay low to the ground. All require acidic soil, but they have few pests other than hungry birds.

Chives are normally grown for their flavorful leaves, which can bring a mild onion or garlic-like flavor to dishes like salads and baked potatoes. Chive flowers are also edible and come in white, lavender or purple.



Lemon Balm has attractive green foliage with a refreshing citrus flavor. Let children smell and taste the leaves, and add them to tea and fruit salads. Grows to 2 feet tall. Perennial in USDA Hardiness Zones 4 to 9.

Mints of all kinds are a sensory treat. The most common are peppermint and spearmint, but there are others to try, such as ginger mint and chocolate mint. Plants grow from 8 inches to 3 feet tall. All spread quickly by underground rhizomes, so if you don't want them to take over other plants, plant mint in a pot or a separate bed.

Oregano is a compact herb plant with attractive pink and purple flowers. The herb is a favorite in Greek, Italian and Mexican cooking. Plant it in full sun. Perennial in USDA Hardiness Zones 5 to 9.

Strawberries are usually the first fresh fruit of the growing season, making them favorite of children. Flowers are typically white, but there are some with pink blossoms. This is an excellent ground cover or border plant because of the long stems, called "runners," that trail and sprout new plants.

Thornless Blackberry shrubs have long canes that grow to heights of 5 to 10 feet tall. Fruit matures in mid to late summer, and make great picking for little hands!

Thornless Raspberry shrubs range from 4 to 6 feet tall. Summer and fall-bearing varieties are available. Children enjoy wearing the berries like thimbles on their fingertips before popping them in their mouths.

Regional Planting Tips

The following tips are divided into warm, moderate and cold climates with approximate links to the USDA Hardiness Zones. To find out what zone you are in, see the next page.

Warm Climates (USDA Hardiness Zones 8a to 11)

The warm climates in the South and West offer the most flexibility in selecting edible crops for school-year gardens. Spring and fall plantings can accommodate all of the cool-season annuals and depending on the zone, some warm-season annuals including beans, corn, cucumbers and tomatoes.

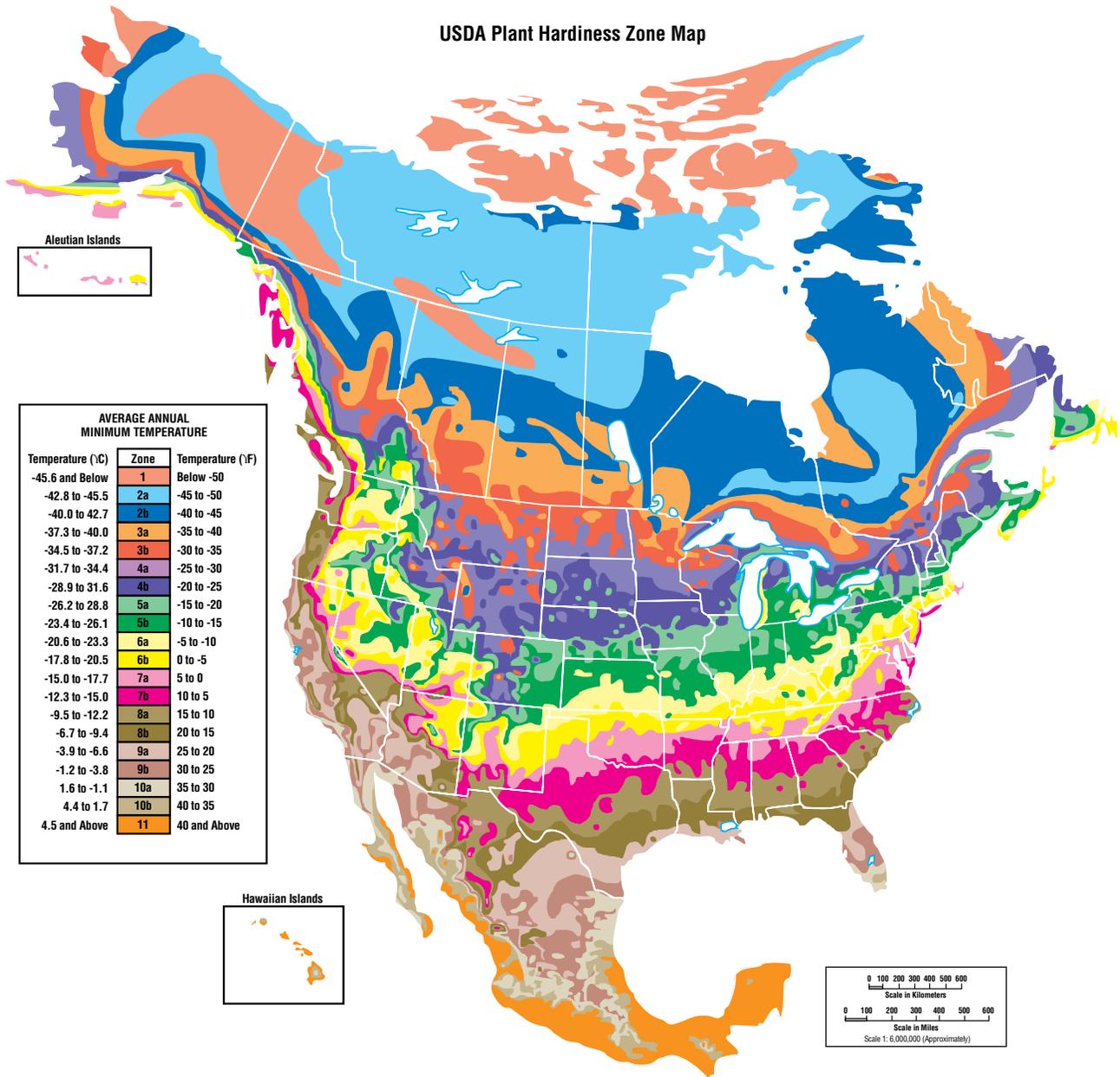
Moderate Climates (USDA Hardiness Zones 6a to 7b)

In moderate climates, school-year plantings are a little more limited. For optimum success, focus on root and leaf crops such as lettuce and radishes, which can be planted earliest in the spring, and last the latest into the fall. There are a number of techniques you can use to extend your growing season, including:



For more information on USDA Hardiness Zones, visit the United States National Arboretum's Web site (www.usna.usda.gov/Hardzone/ushzmap.html) or Plantmaps.com (www.plantmaps.com/usda_hardiness_zone_map.php).

USDA Plant Hardiness Zone Map



Movable containers. Planting vegetables in containers offers considerable flexibility. Movable containers let you reposition the pots so your plants get the most sun and are easy to protect with plastic tarps or sheets. If a hard frost threatens, you can move containers of vegetables you care about most to very protected locations, or even indoors.

Covering prized plants. You can use a number of readily available household materials to cover individual plants: plastic sheets, old blankets, towels and even baskets. When covering a large plant like a tomato, use stakes to erect a “tent” frame that keeps the covering material from touching the plant’s foliage. Cold temperatures can damage any leaves that come in direct contact with the material.

Another option is to purchase a floating row cover. This lightweight, white fabric is similar to cheesecloth, and lets in oxygen, water and sunshine, but keeps the air around plants above freezing, even when temperatures dip into the low 20s°F. It's a great material for protecting late fall crops or it can give you a jump on spring gardens. Floating row cover is available at garden centers, nurseries and some mail order catalogs.

Cold frames. A cold frame is essentially a miniature greenhouse that protects plants from chilling winds and low temperatures. Some cold frames are constructed with plastic or nylon sheeting held aloft on wire hoops or wooden frames; others are made from rigid polycarbonate or even glass. As the sun passes through the clear or translucent covering, it warms the air and ground inside the cold frame. Some of this warmth is retained overnight when the outside temperature drops. You can add to your cold frame's heat-storage capacity by placing dark-colored plastic jugs filled with water in the unit. The sun warms the water in the jugs during the day and the heat radiates out at night to help keep nearby plants warm.

If you have an old window and some planks or scrap lumber, you can build a simple cold frame. Nail the scrap wood together to form a four-sided base and top it with the storm window. Adjust the height of the sides according to the crops you want to grow in it. If you hinge the window to the wood frame at the back you can easily prop open the window on warm days to regulate heat. On cold nights, close the window and cover it with an old blanket. For a more refined structure, build the base so the front is lower than the back and the sides are angled between the two heights. Again, hinge the window to the wood frame at the back. An angled cold frame maximizes the sun your plants receive. Your completed cold frame will ideally be located on a south-facing slope backed by a building that will protect the frame from cold north and west winds.

Colder Climates (USDA Hardiness Zones 1 to 5b)

Indoor grow lights. In colder climates, indoor grow lights are an excellent option for spring planting activities. As previously mentioned on page 19, indoor lights can be used to grow a wide range of plants to maturity, or to grow seedlings to give you a jump-start once you can get outside.

Greenhouse. Another option, although a greater investment, is a greenhouse. Greenhouses can be as simple as a portable pop-up model with fabric or plastic walls, or as sophisticated as a year-round permanent greenhouse with insulated glazing.

Check out the School Greenhouse Guide available at www.kidsgardening.org/greenhouseguide/1.asp for more information and considerations when installing a greenhouse on school grounds.

Outdoor fall growing. Alternatively, there are a number of fall crops that will grow well outdoors in northern climates during the fall. Select cold-tolerant vegetables such as broccoli, cabbage, Brussels sprouts, carrots, beets, collards, kale, kohlrabi, mustard, onions, radishes, spinach, lettuce, turnips and Swiss chard. To extend a short season, use the techniques listed above for moderate climates, start seedlings to transplant, or plan a special planting day in August before school starts.

Summer growing partners. One last option for colder climates is to partner with a summer camp or summer school program. Classroom students will get to experience planting in the spring and harvesting in the fall, and the summer participants will enjoy the maintenance in the middle. Although seeing the cycle from beginning to end is preferred, there are many benefits to this type of team approach.

Tips for Selecting Plants for an Urban Edible Garden

1. Choose hardy plants. The urban environment is very different from nature. Plants are challenged by extreme temperatures, pollution from sidewalks and streets, less-than-optimal space for roots, and unusual water flow from paved surface runoff. Choose hardy plants that are resistant to things like car exhaust and de-icing chemicals. Plants that can tolerate variations in water availability, including occasional dry conditions and excessive moisture, are also preferable.

2. Grow dwarf varieties of plants to maximize your outdoor space. Dwarf varieties of fruit trees and shrubs such as apple, peach and blueberry make it possible to grow fruits even in small urban gardens. Their compact roots make them ideal for containers.

3. Use vertical space. If you have a fence or railing, or a wall that will support a trellis, grow up! Green the vertical surface with vines like peas and pole beans. These living fences soften the urban landscape, are effective screens and can increase the crop production area.

Additional information about ways to cover and protect plants can be found at:

Season Extenders: www.garden.org/ediblelandscaping/?page=october_extenders

Easy Cold Frames: www.garden.org/articles/articles.php?q=show&id=432

All About Cloches: www.garden.org/articles/articles.php?q=show&id=546&page=1

A Gardener's Guide to Frost: www.garden.org/articles/articles.php?q=show&id=403

For specific urban plant ideas, visit:

A Container Veggie Garden (www.garden.org/urbangardening/index.php?page=container-veg)

Kitchen Garden Plants (www.garden.org/urbangardening/index.php?page=kitchen-garden)

Contact your local Extension office. Many will have a list of recommended varieties for your area, like the list from the University of Illinois Extension (www.urbanext.illinois.edu/veggies/directory.html).

Preparing to Plant the Garden



Mapping Out the Garden

Involve students in laying out the garden. Make planning as exciting for kids as planting by engaging their imaginations and having them “plant” the garden on paper first. They will be more invested in their garden’s success if they are the creative force behind the concept, layout and plant choices. Plus, it provides excellent opportunities for applied mathematics.

Decide on the size and shapes of beds or containers and lay out the space available on graph paper. Remember to leave space for paths, too. Decide if you want a single group garden or plots for individual students or classes. By sharing the responsibility of caring for the garden, students learn to work together. Individual plots, on the other hand, can encourage personal responsibility and pride.

Let students get to work placing the plants on the map based on the spacing information from the seed packets. In addition to the horizontal space needed, make sure the kids think in 3-D to also consider height (locate tall plants at the north end of the garden so they don’t shade shorter plants).

Preparing the Soil

Any experienced gardener will tell you that the secret to a great garden lies in the soil. Soil gives plants a place to sink their roots for support and moisture, along with life-sustaining nutrients and minerals. Plants in poor soils will struggle to grow, even if optimal water and light are available. In contrast, plants in good soils will grow to their fullest potential and experience fewer problems with insects and disease.

What is soil? Soil is composed of minerals and organic matter. Sand, silt and clay are the mineral particles derived from rock broken down over thousands of years by climatic and environmental conditions (rain, glaciers, wind, rivers, animals, etc). The largest, coarsest mineral particles are **sand**. These particles are 2.00 to 0.05 mm in diameter and feel gritty in your fingers. **Silt** particles are 0.05 to 0.002 mm and feel similar to flour. **Clay** particles are extremely fine — smaller than 0.002 mm — feel sticky in your fingers when wet, and clump to the point that you can’t see an individual particle without a microscope. Organic matter is the decayed remains of once-living plants and animals.

In addition to these materials, a healthy soil environment is teeming with life, including microorganisms like bacteria and fungi (billions in a single teaspoon!) and larger animals such as worms and sowbugs. Many of these underground inhabitants feed on the remains of plants and animals, breaking down their tissues and adding to the organic matter of the soil. In the process, they create pore space and release nutrients that plants need, and the cycle begins again.

Good plant growth and development depends on the mineral and nutrient content of soil, as well as its structure. Soil structure refers to the arrangement of soil particles in relationship to each other. The proportion of these different-sized particles affects the pore space, which impacts the amount of air, water and nutrients available to plants, and how the soil “behaves.” In an optimal situation, about 50 percent of the volume of the soil would be pore space, with half of that filled with water and half filled with air. The other 50 percent would be sand, silt, clay and organic matter. Roots need air as much as they need water; plants can actually suffocate or drown if they are completely submerged in water for extended periods of time.



While there’s no such thing as a perfect soil, particular plants grow best in particular soils. In general, common garden plants prefer **loam** — soils with a balance of different-sized mineral particles (approximately 40 percent sand, 40 percent silt, and 20 percent clay) and ample organic matter and pore space, but some common plants grow better in sandy conditions, while others are well adapted to clay soils.

A key to getting the most out of your garden is to understand your soil’s composition and work to improve its structure and nutrient content. If your site is brand new, turn the soil a month or two before you intend to plant to break down the existing vegetation, and remove tenacious weeds by hand. Test the soil for nutrient levels and pH. This can be done by using a home test kit, or contact your local county Cooperative Extension office to find out where to send a soil sample for testing. A soil lab will send a report indicating pH and nutrient levels along with recommendations for correcting deficiencies.

Most garden plants prefer a pH between 6.0 and 7.0. After determining current levels, add lime to raise pH or sulfur to lower pH if necessary, and compost or fertilizer to boost nutrient levels. Adding organic matter like compost is essential to maintaining a healthy environment for plants. It improves the soil’s pore space, impacting its ability to hold moisture, air and minerals, and steadily releases its nutrients to plants. If your garden site is new, you can also add granular fertilizer. Till the soil again right before planting and rake it to create smooth, level planting areas.

If the soil is very wet, wait for it to drain before you till or else you will compact it and lose valuable pore space. To test for the right moisture level, 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.

Preparing your soil is an annual activity. As plants grow, nutrients are removed from the soil. When plants die in natural settings, worms, insects, mites and microbes break them down, returning nutrients to the soil. But in a garden, we remove the plant material and, as a result, we have to replenish nutrients each gardening season.

Tools to Collect

The motto “Use the right tool for the job” is as true for gardening as for any other project. When selecting tools, look for durable, well-made, properly sized products. Avoid plastic tools because they break easily. Consider purchasing kid-sized tools for your students.

Here’s a list of essentials.

- **Hoe** for weeding, building raised beds, making planting furrows
- **Rake** for building beds and smoothing soil
- **Shovel** for turning soil, building beds, digging planting holes
- **Hand trowels** for digging planting holes and deep-rooted weeds
- **Three-pronged hand cultivators** for weeding and cultivating soil in small areas
- **Hose** that is long enough to reach easily from spigot to far end of garden
- **Watering can** that is small enough for kids to carry when full
- **Garden cart or wheelbarrow** for moving compost, plants, mulch
- **Soil thermometer** to measure soil temperature to determine when to plant seeds

Some additional materials you may want to gather before planting:

- **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 spacing between rows, beds, seeds and so on
- **Mulch material**, which is a layer of material that you typically put on the soil to block weed growth and help maintain moisture
- **Fertilizer** to maximize plant health and crop yields



Plants

You can obtain the plants needed for your design as seeds, which you can then plant directly into the garden or plant indoors to later transplant as seedlings, or you can purchase seedlings or plants grown by commercial nursery operations. Here are some of the benefits and drawbacks for each method to help you determine what is best for your garden.

Planting Seeds Directly into the Garden

Benefits

Saves time. You only plant once if you sow seeds directly into your garden beds.

Saves money. Buying plants as seed is usually cheaper and if you plant them directly into the garden, then you do not have to obtain additional materials such as pots, soil or grow lights.

Avoids root disruption. Plant roots are able to establish firmly in the soil and avoid damage that may occur during transplanting.

Expands your options. Commercial growers limit their production of seedlings to a few select varieties; however, in addition to seeds available locally, you can expand your seed options by also ordering from print and online catalogs.

Drawbacks

Later planting time. For most plants, you will need to wait until the soil warms up in the spring before you can plant, which also delay your harvest.

Weather concerns. The average last frost date is just an average, so even with protection, a late frost could wipe out your young seedlings, which are more sensitive to extreme temperatures. Additionally, an exceptionally wet or dry period during germination and seedling establishment may challenge your young plants.

Disease potential. Some seeds and seedlings are more susceptible to fungal and bacterial disease found in the soil.

Challenging soil conditions. If you have compact or clay soils, growing from seed could be a challenge.

Planting Seeds Indoors to Transplant Outdoors

Benefits

Earlier planting time. By planting seeds indoors, you can start them six to eight weeks before frost and get a jump-start on the gardening season, resulting in an earlier harvest.

Protection from disease and weeds. You can purchase sterilized seed-starting potting mix to avoid problems with disease and competition from weed plants.

Control over moisture and temperature. You can control the moisture levels and temperature, two very important elements for seed germination.

Expands your options. As listed above, planting from seed allows you to choose from a greater diversity of varieties.

Drawbacks

Cost of supplies. When starting seeds inside, at minimum you must obtain soil and pots. For optimum seedling growth, it is also helpful to have grow lights.

Availability of proper space. Your classroom may not have a good space with adequate light and temperatures for growing seeds.

Some plants don't transplant well. Some plants just don't transplant and will have a hard time getting their roots established when moved. Root crops like carrots, radishes and beets are good examples of plants that should always be started directly outdoors.

Planting Purchased Seedlings or Plants

Benefits

No indoor growing space required. You get a jump-start on the season just like starting your own seedlings; however, you do not need indoor growing space and do not have to purchase grow lights or seed-starting supplies.

Saves time. As with planting seeds directly in the garden, you will only need to plant your seedlings once. You also avoid the work of watering and thinning seedlings that comes with direct seeding.

Avoid challenging seeds. Some plants such as many fruit plants and trees are hard to grow from seed or take a really long time to mature, so it is easier to leave that to the experts.

Right number of plants. Most seed packets come with many more seeds than you actually need to grow. With transplants, you only purchase the number of plants you need.

Drawbacks

Availability. You may be challenged to find plants in the varieties you hope to grow.

Cost. Transplants and plants are usually more expensive than purchasing seeds. However, make sure to consider the time and seed-starting supply savings when comparing purchasing options.

Planting Instructions



The following information provides general instructions for planting seeds both outdoors and indoors, and transplanting seedlings.

Additional plant-specific details are available online in the National Gardening Association's Food Gardening Guides (www.garden.org/foodguide/browse).

Planting Seeds Directly in the Garden

Check the back of the seed packet for recommended seed spacing and planting depth. These guidelines are suggested so that mature plants won't crowd each other and compete for resources. The packet also indicates the best planting time based on the average last frost date for your area.

Make holes or shallow trenches at the recommended depth, plant seeds and cover them with soil. If the soil is very sandy, plant seeds more deeply than recommended; if it is heavy clay, you can cover them with less soil. Place a label with the date and crop/variety name where it can easily be seen.

It's important to keep the soil constantly moist so the newly planted seeds will germinate. Water the bed gently so the seeds won't be washed from the soil. A thin layer of organic mulch (such as straw) over seeded beds can help reduce evaporation. Move mulch aside as seedlings emerge to expose them to sunlight. Thin seedlings if necessary, being careful not to disturb the roots of the plants you want to keep.

Growing Your Own Seedlings

The best time to start seedlings depends on the crop and your climate. Generally, you should start vegetables three to eight weeks before the typical last frost date for your area, or so that plants mature before excessive heat arrives.

You will need containers and potting mix for planting. Any container at least 3 inches deep will work for seed starting. Students can collect plastic yogurt containers, milk cartons and plastic milk jugs, and poke holes in the bottom for drainage. Commercial peat and plastic containers come in standardized sizes, and some are reusable. Use a soilless seed-starting mix available at local garden centers. These contain a blend of finely ground materials that provide adequate moisture retention and aeration. Many also include a small amount of fertilizer to help seedlings get off to a good start.

To plant, moisten seed-starting mix in a large container, using enough water so that when you squeeze a handful, the mix has the feel of a moist sponge. Fill each container and press it gently to make sure there are no air pockets. There should be about ½ inch of space between the lip of the container and the soil surface. Make small holes with a pencil eraser at the spacing recommended on the seed packet, and add a few seeds. Cover with soil.

Until seeds germinate, keep the soil moist by spraying it with a pump sprayer or mister, and leave in a warm location. You can cover the pots with clear plastic to preserve moisture. Indoors, most vegetable seeds germinate best at soil temperatures between 70 and 75°F, and air temperatures between 65 and 70°F.

Have students check the containers daily, and once the first seedling germinates, remove the plastic. After a few days, use scissors to thin the seedlings to one per planting hole.

Once they're up, seedlings need lots of light, or they'll grow tall and weak. Because light from a window is unreliable, we recommend using grow lights or fluorescent lights to grow seedlings indoors. Keep the tops of the seedlings within a few inches of the bulbs. Keep the lights on for 12 to 16 hours per day (use a timer to turn lights on and off). Check seedlings daily, and raise lights as they grow taller.

Consistent moisture is also very important, but be careful that soil doesn't get too wet, because excess moisture can lead to rot.

Begin fertilizing your seedlings when they have their second set of true leaves. The first leaves that emerge upon germination are seed leaves (also called cotyledons) and do not have veins as the true leaves do. Use a mild fertilizer for seedlings, following directions on the product label. Some seed-starting mixes contain fertilizer, but your seedlings may use it up before you are ready to transplant them. Always read the label on the bag for fertilizing guidelines. Be careful not to use a strong solution on seedlings, since excess nitrogen, in particular, can prompt weak growth, making the seedlings susceptible to pests such as aphids.

As plants increase in size, seedlings may become too crowded and need to be thinned again. If you have room and enough supplies, you can transplant individual seedlings to their own pots and thus minimize competition for light, water and fertilizer.

A week before transplanting seedlings from indoors into the garden, begin to acclimate them to the outdoors. This process is known as "hardening off." Place containers outside each day that week, gradually increasing the number of hours that they spend outside. Start by placing them in a partly shady spot sheltered from wind, and expose them to more sun and wind each day. By the end of the hardening-off period, they should be able to withstand full sun and stay outdoors overnight.

Transplanting Purchased Seedlings and Plants

Seedlings and plants grown by commercial growers should be ready to plant in your garden. Begin by watering them well to ease removal from the pot. Dig a hole for each transplant based on the spacing requirements of mature plants.

Place a handful of compost in the hole, then insert the seedling. If you use a granular fertilizer such as 10-10-10 at planting time, dig planting holes a bit deeper, add fertilizer as recommended on the product label, and cover it with a bit of soil before planting the seedling. Firm the soil around the root ball, water it, and mark the bed. If you use a liquid fertilizer, read the label for application instructions, as seedlings require a weaker solution than established plants.



If your plants do not contain labels with spacing requirements, check out the National Gardening Association's Plant Care Guides (www.garden.org/plantguide/). These guides offer in-depth planting instructions for the 100 most popular garden plants.

Maintaining the Garden



Many different tasks are involved in maintaining a garden. You and your students will be most successful if you scale the garden so that you can easily keep up with the work. Make a calendar of activities – planting, watering, weeding – to help you stay on track and plan curriculum connections.

Watering

Most garden books advise that plants need at least 1 inch of water per week in the form of rain or irrigation, but if the weather is very sunny and windy, they may need more. Plants sometimes wilt in the heat of the day even when there is plenty of moisture, so their appearance isn't always an indicator of need for water. If students put their fingers an inch down in the soil, they'll be able to feel if the soil is dry or moist, and water accordingly.

Encourage students to water the soil, not the plants, since the roots absorb most of the moisture a plant uses. Using sprinklers in a garden may save time, but if water stays on leaves for even a few hours, it can invite disease. Soaker hoses or drip irrigation systems are easy ways to get the water where it is needed; however, these materials can be expensive tools for school gardens.

A low-cost watering option is to poke holes in the bottom and sides of milk jugs, bury them in the soil near plants, and fill them water. They'll slowly leak moisture into the root zone, and you can refill them as needed.

Thinning

Even in a garden, not all seeds will sprout, so it's a good idea to plant more than you need. However, if more than enough seeds sprout, they will crowd each other and compete for light, moisture and nutrients. Few will grow large and healthy. Seed packets tell you to thin crops to a specified spacing when seedlings reach a certain size. To do this, choose the healthiest seedlings at that spacing, and pull out or cut off the less sturdy ones in between. Be careful to cause as little disturbance to remaining plants as possible.

Fertilizing

Supplementing soil with organic matter is the best way to ensure that plants have enough nutrients for growth. Microbe-rich humus, a stable form of well-decomposed organic matter, releases nutrients to plants. Since nutrients aren't always abundant enough in soil to support healthy plant growth, gardeners make up the difference by adding fertilizer. Fertilizers contain nutrients such as nitrogen, phosphorus, potassium and calcium for growth, repair and proper functioning of plants.



Fertilizers that provide nutrients and maintain soil health include compost, dried manure, liquid seaweed and fish emulsion, and bagged organic fertilizers made of natural materials, such as ground rock, bone meal, blood meal and alfalfa meal. Finally, there are granular, water-soluble and liquid fertilizers that provide nutrients for plant growth, but do not contribute to soil health.

Any product sold as a fertilizer has a nutrient analysis on the label. This set of numbers tells you what percentage of three major nutrients – nitrogen, phosphorus, and potassium – the fertilizer contains. The product label should also tell you how much to use for different crops, and how to dilute it if necessary.

Mulching

Organic mulches, including straw, newspaper, grass clippings and leaves, improve soil structure as they decay. They also tend to keep the soil cool and are good for crops that prefer cool conditions, such as broccoli and peas. Bark and wood chip mulches take longer to break down, so they are often used in paths and around perennials, trees and shrubs. Inorganic mulches, including plastic landscape fabric and stone, will not decay, and can be useful in perennial beds and around shrubs. Dark plastic mulch is often used for heat-loving crops such as tomatoes and peppers, because it absorbs heat from the sun to warm the plants' roots.

Weed control

A weed is any plant growing where you don't want it to grow. Low-maintenance weed control begins with mulch, which discourages weed seed germination. To remove sprouted weeds, you can use a hoe to scrape the tops off masses of small seedlings, or use a cultivating tool to loosen them from the soil. It's important to get rid of the weeds before they blossom and go to seed or they'll end up sowing a lot more weeds for you to pull next year. Also, try to remove weed roots, as many reproduce readily from sections of roots or underground stems that have been left behind.

Promoting plant health

All gardens are home to plant pests – slugs, insects, nematodes, fungi, bacteria and viruses – but their presence doesn't necessarily count as a threat to plants. Like healthy people, healthy plants are usually able to ward off or weather a time of stress or illness and continue to perform well. To promote plant health and vigor, follow the soil-building and garden maintenance practices we've discussed above. The list below suggests ways to minimize pest and disease build up in the garden.

These are the basic steps to follow to maintain a healthy garden:

- **Practice crop rotation.** Pests and diseases that affect certain crops (or families of crops) build up in the soil if the same crop is grown in a bed year after year. By planting a different crop in the bed each year on a three-year cycle, you can avoid many problems.
- **Discourage excess moisture on foliage.** Most fungal and bacterial diseases can infect plant surfaces only if there is moisture present. In regions where the growing season is humid, provide adequate space among plants so that air can circulate freely. Try to stay out of the garden when it's wet so you don't spread disease organisms.
- **Plant disease- and pest-resistant varieties.** Some varieties of crops are naturally less susceptible to problems, and plant breeders have developed many others. Look for resistance information in variety descriptions in catalogs and on seed packets.
- **Clean up your garden.** Disease and pests can remain on infected and dead plant material, making it easy for them to attack other plants. Remove infected plant leaves, keep weeds to a minimum, and clean up the garden at the end of the growing season.
- **Encourage beneficial organisms.** Make your garden inviting to pest predators such as ladybugs, wasps and birds. Flowers and herbs provide nectar to predatory insects, and a water source, such as a fountain or bath, will attract birds. Read more about attracting beneficial organisms in the section on companion planting below.
- **Identify problems.** Help children recognize the symptoms of plant stress, then consider a "problem" as an opportunity to investigate potential causes. Some crop losses or pest problems are responses to weather patterns, which are out of our control. Other problems may be due to factors such as poor timing for planting, road salt spray, nutrient imbalance or gardener error (for example, not providing the correct growing conditions). After carefully observing and researching the situation, consider whether it's best to simply observe the plants to see if the situation changes, or to take action.

Companion planting

Companion planting is another method to promote the overall health of your garden in a low-impact way. Arranging crops so they complement each other in some way is known as companion planting. Companion plants help with pest control in a number of ways, including by repelling pests, luring pests away from crops and by attracting beneficial insects and birds that prey on pests.

- **Repelling pests.** Gardeners have long held that some plants are repugnant to certain pests. Herbs such as tansy, mint, basil and thyme exude strong fragrances (from their essential oils) and are believed to repel insects or confound them by disguising the smell of neighboring plants. Garlic, onions and marigolds are also known to have repelling qualities.
- **Attracting beneficial insects.** Plants with tiny flowers, such as members of the carrot (umbel) and daisy (composite or aster) families, attract many beneficial insects, including small parasitic wasps, green lacewings and lady beetles. In addition to feeding on pollen and nectar, these insects also feast on pest insects such as aphids. Include plants such as anise, dill, caraway, fennel, yarrow, sweet cicely, zinnia, cosmos and marigolds in your vegetable garden to attract beneficial insects. If you want to keep the good guys coming, you'll need to grow a variety of plants with different bloom times.
- **Luring pests away.** Some plants are simply so attractive to pests that you can use them to lure garden intruders away from your precious vegetable crops. These attractants also referred to as "trap crops." Once the trap crops are infested with pests, you can pull them out and discard them, pests and all. Try nasturtiums for aphids, radishes or nasturtiums for flea beetles, dill and lovage for tomato hornworms, and eggplant for potato bugs.

As a general rule of thumb, pests tend to flourish in a simple environment with few plant species. Therefore, the greater the diversity and variety of plants in your garden, the greater the number of beneficial organisms attracted to keep the populations of pests in check.

Low-impact pest control

Sometimes, despite all your efforts, pests and disease will strike your garden. When children are involved, it's especially important to use environmentally benign methods of combating them. Some states and school districts, in fact, forbid the use of synthetic chemicals on or near school grounds. We suggest trying the first three pest control options listed below before trying sprays, since the latter have an impact on nonpest organisms such as bees and insect pest predators. Students may want to consider the pros and cons of various pest control methods before choosing one.

- **Handpicking.** Have students inspect plants and soil for pests in all life states (egg, larva, pupa, adult). Pick and crush pests, or collect them in a can of soapy water.
- **Barriers.** Floating row covers are made of lightweight fabric that you can place over plants to protect them from invading pests. The fabric allows light, moisture and air to pass through. If you cover a crop that requires insect pollination in order to bear fruit, you will have to remove the covers when the plants begin to blossom. Row covers also deter some animal pests, but fences are often the only way to keep large, persistent creatures out of the garden. Use netting to protect fruit crops from hungry birds. A collar of newspaper, stiff paper or boxboard circling seedling stalks and extending 2 inches above and below ground prevents cutworm damage.
- **Biological control.** This term encompasses living organisms that are pests' natural predators, parasites or diseases. For instance, ladybugs and lacewings are natural predators of aphids. Different strains of the bacteria Bt (*Bacillus thuringiensis*) infect cabbageworms and potato beetles. Most bio-control methods do not harm creatures other than pests, but some aren't so exclusive. For instance, the Bt strain that kills cabbageworms also infects the larvae of all other moths and caterpillars. To reduce the risk to non-pest organisms, follow the application directions exactly. You can encourage some beneficial creatures to visit your garden, or you can purchase them through catalogs.
- **Suggested sprays.** Always use caution when working with any spray, even those that are considered organic or low-toxicity. Be sure to follow application, storage and disposal directions on the product label. Some sprays can damage plants if they aren't applied properly. Before spraying an entire plant, try the spray on a sample leaf to make sure the plant can tolerate it.
- **Insecticidal soaps.** These kill or repel a wide variety of insects, including aphids, leafhoppers and spider mites, by dissolving their projective outer shell.
- **Horticultural oils.** These refined petroleum- or vegetable-oil based formulations can be sprayed anytime of year on most plants to cover and kill pest eggs and clinging insects such as scale.

If you have questions about any pesticide, call the manufacturer (the phone number will be on the label).

Harvesting

Safe handling practices of all food products is essential when working with youth. Use the following guidelines to promote food safety in your garden program:

- **Use clean tools and clean hands at harvest.** Make sure all equipment used to harvest and transport produce, including baskets or other containers, is sanitized. Ask gardeners to wash their hands before harvesting.
- **Wash your hands in the kitchen or classroom.** This is rule Number One! 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 diluted 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.
- **Avoid damaged produce.** Pre-existing cuts in fruits and vegetables can provide an entry for pathogens.
- **Clean your produce.** Wash all fruits and vegetables under running water. Scrub them with your cleaned hands or vegetable scrub brush, and dry with paper towels. Additional tips:

Wash produce right before eating it, rather than when you store it.

Wash whole fruits and vegetables with rinds or hulls (for example, watermelons, strawberries, winter squash) before slicing them or removing the hulls to avoid contaminating the edible portion as your knife slices through the outer layer.

Remove the outer leaves of vegetables such as lettuce, cabbage or cauliflower before washing them.

Refrigerate any cut-up leftovers for later consumption.

Maintaining the garden over summer

Maintaining a school garden during the summer amidst vacation plans is a common challenge. You want to enjoy the break and renew your spirits, but you don't want to see all the hard work from the school year transform from a beautiful garden into a jungle of weeds. Here are a few tips for summer maintenance:

- **Choose low-maintenance plants.** Focus on growing plants that will thrive on their own without much attention. Two characteristics to look for are drought tolerance and vigorous



foliage that will smother or outcompete weeds. Choices vary by region and the amount of rain or irrigation available to the garden. Check with your local Cooperative Extension office for a list of plants recommended for your area.

- **Use mulch.** A thick layer of mulch reduces weed growth, maintains soil moisture and enriches the soil as it decays. In vegetable and annual beds, use inexpensive organic mulch such as newspaper topped with straw. In perennial beds add a 2- to 3-inch layer of a more durable organic mulch, such as shredded bark or cocoa bean hulls.
- **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.
- **Recruit volunteers.** Enlist the help of parent volunteers or service organizations such as Future Farmers of America, 4-H, scouts and church youth groups. Create a schedule so that someone checks the garden on a regular basis. You can even hold a workday one Saturday per month to knock down weeds and/or other large tasks.
- **Host a summer camp.** Many schools offer summer school classes or kids' summer camps. Get in touch with teachers or summer camp counselors to see if they are interested in taking advantage of your outdoor classroom facilities during the summer months in exchange for upkeep.
- **Harvest in the spring.** Pick and use or distribute as much of your vegetable harvest as is ready. Pick flowers and press or dry them for art activities in the fall. Before you leave for the summer, remove all the plants and then do one of the following:

Cover your garden with a thick layer of mulch to discourage weeds and decrease water loss. The mulch will break down over the summer and provide organic matter and enrich the soil for next year's crops.

Solarize. Cover the garden with a sheet of clear plastic to use the sun's energy to heat the soil to kill weeds and soil-dwelling pests.

Plant a summer cover crop. A cover crop, sometimes called green manure, is a short-lived legume (e.g., beans) or grain (e.g., buckwheat) that you plant to prevent weeds, reduce soil erosion and boost organic matter. They also help maintain and/or increase the nitrogen content of the soil.

Sustaining the Garden Program



Creating excitement for a new youth gardening program is an easy endeavor. Everyone likes to be involved in “ground-breaking” experiences benefiting youth in the local community. Participants enjoy planning, with the opportunities to dream and share their thoughts and opinions. Planning is followed by installation and the great satisfaction of watching an empty plot transform into a beautiful outdoor learning laboratory. But maintaining everyone’s enthusiasm after installation can be a challenge. You can avoid this pitfall and sustain strong levels of support and enthusiasm by carefully nurturing the seeds of ownership. When students, parents, teachers and community members feel ownership in a garden project they are willing to dedicate time and invest resources in its growth.

Here are some ideas for how to build this spirit of ownership:

Build a strong garden committee.

Although it can sometimes feel like it’s easier to do all the work yourself, in the long run, growing a dedicated garden committee will increase your harvest tenfold. Youth gardens are sites of constant activity, and they present more work than a single person can keep up with. For sustainability, it’s essential to build a strong committee of members willing to shoulder their share of responsibility.

Recruit volunteers.

Always be on the lookout for new members to avoid volunteer burnout. Pledge to recruit three to five new members each season. Give them proper orientation/training and assign them jobs that make them feel like an important part of your team – don’t just send them out to weed all the time.

Communicate.

Communicate clearly and frequently with your garden team, including the students. Participants who stay informed about the plans and progress of the garden possess the strongest sense of ownership. In contrast, poor communication leads to frustration and a quick decrease in support. Make a list of the people you need to communicate with, evaluate the options and resources available to you (including time) and let that guide your communication plan. Make sure everyone is aware of how you plan to communicate with them and then stick with it. This is very important. Communicate!

Ideas for fostering good communication:

- Write a special garden newsletter or add a column to an existing newsletter.
- Maintain a Web page.
- Create an e-mail list.
- Start a phone tree.

Maintain detailed records.

Keeping detailed records about your garden program provides two main benefits: it helps show the impact your program has on youth gardeners and the community, and it becomes an archive and the foundation for future planning and sustainability. It's much easier to recruit a new volunteer coordinator if you approach them with a scrapbook of records they can use as a guide.

Some items to include:

- Pictures from start to finish, including photos of the garden at its peak
- Student drawings and excerpts from garden journals
- Plant lists and a map of the garden layout
- Harvest data
- Names of those who donated time (volunteers), funds and materials to garden efforts
- Detailed information about favorite lessons and activities
- Newspaper clippings, newsletter articles and other publicity
- Letters of support and feedback from students, parents, administrators and community members
- Information about awards and other recognition
- Packets of seeds collected from garden plants
- Pressed leaves and flowers
- Plans for the future!

Engage the kids.

Children are the impetus and energy behind every youth garden. Adult volunteers and educators work with youth gardening programs because they enjoy the fascination and excitement of the children involved. By ensuring that youth feel a strong sense of ownership, you also motivate and cultivate feelings of ownership in adult participants. To keep youth engaged, use inquiry-based learning techniques, and make sure kids have a say in what is grown and how the garden is used. Keep the garden accessible for exploration outside of class hours. Involve them in all aspects of the garden including planning, installation, maintenance and harvest. And don't spend all your time weeding!

For garden journal ideas, visit University of Illinois Extension's My First Garden Journal (www.urbanext.illinois.edu/firstgarden/fundamentals/journal.html), or Northern Gardening's Sample Journal (www.northerngardening.com/gardenjournal.pdf).

Connect with your community.

You probably enlisted the help of many organizations in the beginning stages of your youth garden project, including schools, garden centers, governmental agencies and nonprofit organizations, but have you kept in touch? Continue to network with existing community partners and reestablish ties with those you may not have heard from in a while. Perhaps a local garden center or garden club would like to adopt your garden as a special outreach effort.

In addition to building relationships with plant-related businesses and organizations, make it a priority to connect to organizations that don't, at first glance, seem to fit. School gardens, for example, can reach out and find ways to involve a local senior center, food bank or library. If your program is at a community garden, see if you can integrate your activities with what your young gardeners are learning in school.

Promote the garden.

Send updates to local print and broadcast media. Invite municipal officials and community members to events or ask them to just stop by and see the garden. This way, you cast a wider net of ownership, which in turn can boost donations and financial support for the garden, decrease vandalism and help you recruit additional active volunteers. Your garden is a youth program that everyone in the community should be proud of, so make sure they know about it!

Host an annual planning event.

At the beginning of each school year or growing season, plan a brainstorming meeting. Invite everyone you think might have an interest in your youth garden: students, parents, teachers, school administrators and custodians, and community members including neighbors and business owners.

New gardens probably attract the most interest, but each year you can brainstorm ideas for additions to the garden and/or new programs/projects for the garden. Although you'll need a smaller team to handle the details, a large brainstorming session builds a foundation of ownership. Even if the planning session participants do not continue to be actively involved, when they see the garden they will know they helped contribute to its creation.

Expand and grow.

Add a new element to your youth garden each year. It keeps your garden dynamic and gives the current year's participants opportunities to be part of the planning process. People love to be involved on the ground floor of a project. It gives them a special opportunity to contribute ideas and join in without feeling like an outsider. This doesn't mean starting over from scratch each year. Simply add to or improve the existing garden. Additions can be as small as adding a bench where students can sit and read, or as large as adding a new garden space.

Schedule regular workdays.

Holding regularly scheduled events such as workdays or open garden days helps establish a routine that gives participants a comfortable way to be involved. Because they know what to expect after attending the first event, they will approach future events with a sense of familiarity and belonging.

Say "Thank You!"

There is no right or wrong way when it comes to thanking your volunteers and garden supporters – just make it a regular activity. An end-of-year recognition ceremony or reception is a wonderful idea, but don't isolate your thanks to an annual event. Write thank-you notes, share your garden harvest by making fresh salsa or flower bouquets, and recognize people in newsletters and at meetings. Recognizing participants for their work acknowledges their importance to the garden. Use a variety of ways to show appreciation, including verbal praise, written notes and formal events.

Remember to have fun in the garden!

After all, the garden is there to be enjoyed! Remember to give everyone involved in the program plenty of opportunities to experience the magic of nature and whimsy of the garden.

FAQs

What can I do to prevent vandalism?

Vandalism can be a problem in any school garden, but it's more prominent in urban areas with a more dense population. Time and again, schools report that the best solution for preventing vandalism is to get vandals and/or potential vandals involved in the garden. They'll develop a sense of ownership and therefore concentrate their energies on protecting the space rather than destroying it.

Other suggestions include building strong relationships with neighbors who can watch over the garden when school is not in session. Posting signage can also deter vandals. If people understand the garden has a purpose and is being cared for by students, they may be less likely to harm the space.

What kind of safety measures do I need to take?

If possible, plant gardens a safe distance from roads, or provide secure fences to serve as barriers – both to keep kids in and keep those with bad intentions out. Since outdoor education settings can be a bit more hectic than classrooms, be sure that there's a good ratio of students to adults for adequate supervision.

Plants should also be considered from a safety standpoint. Avoid plantings that create blind hiding spaces and, depending on the age of the children, also avoid plants with poisonous parts.

If potentially hazardous litter items, such as glass and hypodermic needles, are a problem at your site, make sure that the area is constantly monitored and cleared by adults, such as a group of volunteer "garden angels." It also helps to keep the garden well tended year-round, even when school is not in session. If you let the weeds run wild, people will naturally feel more comfortable using it as a dumping site, while a well-kept garden inspires more responsible behavior from neighbors.

Where can I find funding and materials to begin and sustain the garden?

Develop a list of resources needed to implement your program. With this list in hand, the search for materials and funds can begin. The items on your list will help guide you to an appropriate source. If you are looking for specific supplies, search for donations from local businesses. If you are looking for money, grants and fundraisers may be a better option.

Donations. Seeking donations is a task that many people dread. Here is a list of tips to make sure your donation search is rewarding rather than frustrating:

- Begin with the parents of your youth. They are strongly invested in your program and may be able to donate the items you need, or they may possess community connections to fulfill your needs. Reach parents via parent volunteer meetings and school newsletters.
- Identify potential donors by matching your needs with their needs and products.
- Conduct background research on potential donors to see if they are open to requests for donations and if they have a specific procedure for requests.
- Remember, businesses need to sell their products and make a profit to survive. They receive daily requests for donations from many worthy causes. Be ready to tell them why they should invest in your program.
- When talking with potential donors, organize your thoughts and, if possible, provide written materials to leave with them. Pictures are a great asset. You are selling your program to them, so spend time preparing your sales pitch before you visit.
- Ask for and accept only the specific items you need.

- If you do not like to ask for donations, find someone on your committee who is more comfortable with the process. Donors pick up on hesitation and are more likely to say “no” to a person without enthusiasm and confidence.
- Accept a “no” gracefully and thank the person for their time. Down the road, they may change their mind or you may need to approach them about something more specific in the future.

Grants. There are a number of grants available that provide money and materials to help fund youth gardens. A great place to start searching for them is www.kidsgardening.org.

Grants generally require completion of an application. After a grant request is reviewed, your application will either be awarded or rejected. Grants come from a number of sources, including both public funds (local, state and federal government) and private funds from foundations (general, community, corporate, family), corporations and other local resources.

Here are a few tips for finding and applying for grants:

- Find grants with requirements that match your needs and situation.
- Do your homework. Find out about the programs the organization supported in the past as well as its current priorities.
- Submit a professional application, making sure to follow all instructions, answer questions thoroughly, keep text concise and meaningful, and provide as much detail as possible, including plans for sustainability.
- Ask someone to proofread your application before you submit it.
- Make sure the application is easy to understand. If you handed it to a stranger, would they be able to understand your goals and purpose?
- Submit the application before the deadline.

Fundraising. Incorporating garden projects to raise money not only provides funds for your garden, it also provides students with business experience. Here are a few fundraising ideas:

- Plant and sell vegetable, herb and/or flower seedlings.

- Create and sell craft projects from the garden such as potpourri, pressed flower stationary or dried flower arrangements.
- Sell cut flowers for special occasions.
- Save and package seeds to sell.
- Make an edible product like salsa or jelly.
- Sell tickets to a special garden tour, including tours of your own garden or add others in the area.

Follow-up activities. It is extremely important to follow up with your donors to show appreciation, update them on your progress, and create a sense of ownership in the program so hopefully they will want to donate again in the future. Many grants require submission of an annual report. Make sure you know and complete all the requirements.

Regardless of the requirements, when you receive a donation or grant (no matter how large or small) make sure that you send a thank you note written by you or by one of the youth involved in the program.

Some additional ideas for follow-up include:

- Send a regular newsletter out to all funders and sponsors.
- Send a holiday card with updates on progress, such as a “First Day of Spring” card.
- Host a garden party and invite all funders and sponsors to participate.
- Recognize sponsors in a school newsletter or newspaper article.
- Create small gifts from the garden to give, such as a basket of fresh vegetables or potpourri from dried flowers.

Links to grant and funding opportunities for youth gardens are posted each month in the National Gardening Association’s Kids Garden News posted at www.kidsgardening.org/kgn-current.html.

You can also search the Kidsgardening Resource Directory at: www.kidsgardening.org/resources/resource.asp.

Additional Resources

Gardening Web Sites

www.burpee.com In addition to a large selection of seeds, live plants and gardening supplies, the Burpee Web site also offers a collection of helpful gardening articles.

www.burpeehomegardens.com The Burpee Home Gardens Web site is an active resource designed to inspire confidence in novice gardeners. It features tips and tricks from planning and planting through harvest, a helpful blog, recipes and more.

www.garden.org This Web site from the National Gardening Association features biweekly regional reports and blogs, an extensive article database, how-to projects and videos, planting guides, weed and pest control libraries, horticultural news and much more.

Youth Garden Books

Nourishing Choices: Implementing Food Education in Classrooms, Cafeterias, and Schoolyards. Eve Pranis. 2008. National Gardening Association. South Burlington, VT. 88 pages. This book is a road map for developing a food education program and exciting children about healthful eating.

Schoolyard Mosaics: Designing Gardens and Habitats. Eve Pranis and Amy Gifford. 2002. National Gardening Association. South Burlington, VT. 56 pages. This book offers advice on involving students in the planning and design process, building community support, and integrating the project with your curriculum and learning goals, and also includes 11 garden plans from existing school gardens.

Steps to a Bountiful Kids' Garden. Amy L.S. Gifford, ed. 2001. National Gardening Association, Burlington, VT. 56 pages. This National Gardening Association publication is an information-packed how-to guide containing all you need to know to launch and sustain a school or community kids' gardening program. Also available translated into Spanish.

Growing Good Kids (www.jmgkids.us/index.cfm?did=11866§ionID=10398) Each year, the Junior Master Gardener Program and the

American Horticultural Society honor engaging, inspiring works of plant-, garden- and ecology-themed children's literature through the "Growing Good Kids – Excellence in Children's Literature Awards" program. This Web page provides a summary of all books selected for this award, including a list of classic garden books.

Youth Garden Web Sites

www.kidsgardening.org The Web site offers garden and plant-based lessons and curriculum, school garden success stories, gardening grants and online teachers' courses – everything you need to make the most of learning in the garden!

Gardens for Learning (www.csgn.org/page.php?id=36) From the California School Garden Network, Gardens for Learning provides detailed instructions about how to create and maintain a sustainable youth garden program. The book can be downloaded free as PDF files.

www.schoolgardenwizard.org An informative Web site for new and existing youth gardens from The Chicago Botanic Garden and the U.S. Botanic Garden.

My First Garden (www.urbanext.illinois.edu/firstgarden/) This Web site is designed to walk kids through the steps of planning a garden and includes a Teacher's Guide to help educators use the site with their class.

Youth Garden Curricula and Activity Guides

Botany on Your Plate. Katharine Barrett, Jennifer White and Christine Manoux. 2008. National Gardening Association. South Burlington, VT. 88 pages. This standards-based, life science curriculum inspires children to explore the fascinating realm of plants we eat, and weaves together nutritional health, mathematics, language arts and social studies with investigative science.

Early Sprouts. Karrie Kalich, Dottie Bauer and Deirdre McParlin. 2009. Red Leaf Press. St. Paul, MN. 208 pages. A research-based early childhood curriculum, this seed-to-table approach encourages young children to eat more vegetables by planting, harvesting and preparing their own organically grown produce.

Garden Adventures. Sarah Pounders. 2010. National Gardening Association. South Burlington, VT. 96 pages. Written for early childhood educators, this book features 16 thoughtful, hands-on activities centered on four key questions: What is a plant? Where do plants come from? How do we take care of plants? Why are plants important?

Gardening with Children. Monika Hannemann, Patricia Hulse, Brian Johnson, Barbara Kurland and Tracey Patterson. 2007. Brooklyn Botanic Garden. New York, NY. 120 pages. Written for kids but also useful for adults, this great book offers gardening basics and activity ideas.

Gardening Wizardry for Kids. L. Patricia Kite. 1995. Barron's Educational Series, Hauppauge, NY. 224 pages. This kid-friendly book includes histories and folklore of common fruits, vegetables and herbs, along with indoor growing projects and engaging investigations.

The Growing Classroom. LifeLab Science Program. 2007. National Gardening Association, South Burlington, VT. 464 pages. This teacher's manual features strategies for managing garden-based science instruction, including planning a garden laboratory, facilitating investigative lessons on ecology and nutrition, and involving the community.

Growing Food. Pamela Koch, Angela Calabrese Barton and Isobel R. Contento. 2007. Teachers College Columbia University and National Gardening Association. South Burlington, VT. 256 pages. With this curriculum, students learn science through the study of our fascinating food production system. Students learn about cycles in nature, flow of energy and food systems while engaging in hands-on investigations of photosynthesis, food webs, agriculture and more.

GrowLab: Activities for Growing Minds. Eve Pranis and Joy Cohen. 2009. National Gardening Association. South Burlington, VT. 307 pages. Designed to complement indoor gardening programs, this extensive curriculum uses inquiry-focused lessons to explore plant life cycles, examine plant diversity, and investigate the interdependence of plants, humans, and other living and nonliving things.

GrowLab: A Complete Guide to Gardening in the Classroom. Eve Pranis and Jack Hale. 2006. National Gardening Association. South Burlington, VT. 112 pages. Everything you and your students need to know about indoor gardening.

www.harvestofthemonth.com Harvest of the Month is a free online curriculum developed by the Network for a Healthy California, and is comprised of four key monthly elements: educator newsletters, family newsletters, menu slicks and press release templates. The materials are designed to give students hands-on opportunities to explore, taste and learn about the importance of eating fruits and vegetables and being active every day.

Junior Master Gardener Program Books. Texas Agricultural Extension Service, College Station, TX. This national children's gardening program enables kids in school or youth groups to become certified Junior Master Gardeners. Books feature both individual and group gardening and learning activities. Books include: *The Junior Master Gardener Handbook: Level 1*, *The Junior Master Gardener Teacher/Leader Guide: Level 1*, *JMG Level 2: Operation Thistle*, *Seeds of Despair*, *JMG Level 2: Operation W.A.T.E.R.*, *Dr. Thistle Goes Underground*, *Health and Nutrition from the Garden*, *Literature in the Garden*, and *Wildlife Gardener*.

Math in the Garden. Jennifer M. White, Katharine D. Barrett, Jaine Kopp, Christine Manoux, Katie Johnson and Yvette McCullough. 2006. National Gardening Association. South Burlington, VT. 160 pages. This engaging curriculum uses a mathematical lens to take children on an education-filled exploration of the garden.

Project Seasons. Deborah Parella. 1990. Shelburne Farms, Shelburne, VT. 318 pages. These investigative activities integrate science, agriculture and environmental themes to show how all things are interconnected. Explore plants, worms, soil, farm life, water cycles and more through the school-year seasons.

Roots, Shoots, Buckets & Boots. Sharon Lovejoy. 1999. Workman Publishing, NY. 160 pages. This book contains inspiring youth garden theme and activity ideas, along with a list of popular plants for kids.