

# arizona gardens for learning

creating and sustaining  
your school garden







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WESTERN GROWERS  
FOUNDATION®

## WESTERN GROWERS FOUNDATION

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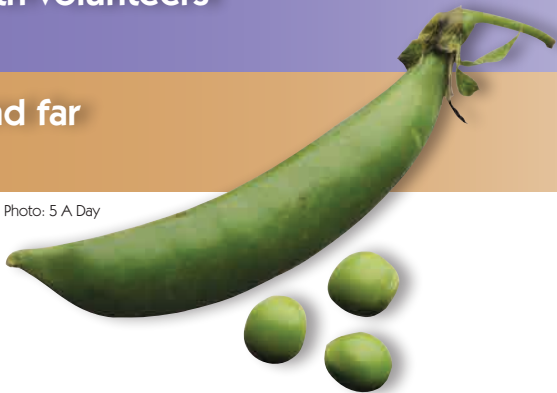
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# about western growers foundation & arizona school garden network



Western Growers Foundation, a 501(c)(3), was created by Western Growers members as a way to give back to their communities. The Foundation's mission is to plant and sustain a fruit and vegetable garden in every willing Arizona and California School. Edible school gardens give children the opportunity to learn where their food comes from and the importance of good nutrition.

## STAGGERING STATISTICS

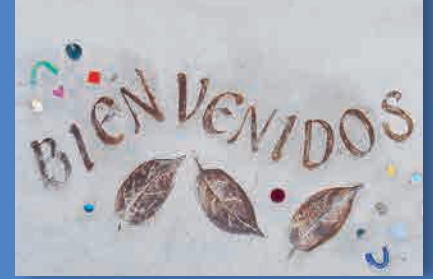
- ▶ Although half our plates should consist of fruits and vegetables – about five to nine servings – the majority of America's children go without eating one serving of fruits and vegetables each day
- ▶ Thirty percent of US children are obese; half are overweight
- ▶ This is the first generation of Americans at risk of having a lower life expectancy than their parents



“If they grow it, they’ll eat it,” says kindergarten teacher Dianne Swanson. Teachers know it, studies show it: children involved in edible gardens are more likely to eat fresh fruits and vegetables.

*Founded in 1926, Western Growers is a trade association of local and regional family farmers growing fresh produce in Arizona and California. Our members provide half the nation's fresh fruits and vegetables including a third of America's fresh organic produce. For generations we have provided variety and healthy choices as the first line of defense against obesity and disease. We grow the best medicine in the world.™*

Arizona School Garden Network is a project of Western Growers Foundation to create a virtual network of like-minded organizations to support edible school gardens.



## THOUGHTS FROM AN ARIZONA FARMER

Mary Barkley, Third Generation Farmer, Yuma, AZ

In the United States, we have been a rural nation until less than a hundred years ago. We had kitchen gardens and we lived on farms. So we knew how to grow our food; we knew where it came from and what it took to get our food to our tables. But in the last century, we Americans have moved to the cities; farmers have decreased in population and supermarkets became the source of our food. It's very convenient and we surely have had enough food to get to the supermarkets and to the tables of most people in our country – at least to those with grocery stores in their neighborhoods.

In 1810, 90% of the US population was employed in farming; in 1910, 30%; today, it's just 2%. Today, that wonderful connection of land, plants, harvest and dinner table has been lost to most of us.

A school garden can forge that connection to farm and food for school children and their families. Gardens can illuminate our understanding of how we all must work to accomplish what we want and need to have in our lives. The act of tilling the soil, planting the seed and tending the garden until harvest is an illustration of how our labors can result in a wonderful outcome.

The school garden can be a real life metaphor in almost anything we attempt in our lives. The work can be hard, but it is enjoyable as well. When we work in the garden, it may be physically demanding, yet it connects us to the sun, the earth and nature. Then when the harvest is done, the results are so rewarding – delicious tomatoes, crisp carrots, or sweet peas.

School kids who get to work in the school garden will be interested in eating the food their gardens grow. Those carrots or kale that picky eaters refused now become desirable morsels to show to their parents and eat at the dinner table. Growing your own food is the best way to find out how delicious those healthy veggies really are. Teachers know it and school gardens show it: if the students grow it, they'll eat it.

Then the other gain is the knowledge that people labor like this for our benefit all the time. The farmer works to bring food to our world's tables. When schoolchildren have their school gardens, they begin to understand how the food we enjoy is grown. The goals that school children have met in their gardens by growing from "field to fork" can show them the wonderful, bountiful world of growing food for our tables.

Let's encourage the edible school garden for its many benefits. The connection to soil, seed and labor, the meeting of goals, enjoyment of nature, teamwork, learning the benefits of delicious fruits and vegetables, and the recognition of the contribution of the people who grow our food for us are all things that will enrich young lives. School gardens are so much more than an additional activity to entertain. They help grow understanding of what's basic and important in our lives.

"Every individual matters.  
Every individual has a role to play.  
Every individual makes a difference."  
Jane Goodall

# introduction to school gardens

## WHAT IS A SCHOOL GARDEN?

A school garden is an innovative teaching tool and strategy that lets educators incorporate hands-on activities in a diversity of interdisciplinary, standards-based lessons. The garden engages students by providing a dynamic environment in which to observe, discover, experiment, nurture, and learn. It is a living laboratory where lessons are drawn from real-life experiences rather than textbook examples, allowing students to become active participants in the learning process. Through the garden, students gain an understanding of ecosystems, an appreciation for food origins and nutrition, and knowledge of plant and animal life cycles. At the same time, they learn practical horticultural skills that last a lifetime.

## WHERE DID SCHOOL GARDENS COME FROM?

The school garden movement originated in Europe and arrived in the United States in the 1890s. Gardens sprang up at schools all over the country during the early 20th century, with particular booms as Victory Gardens intended to increase the food supply during World War I and World War II. During the 1950s, the number of gardens decreased as schools placed more emphasis on technology. However, the environmental movement of the 1970s renewed educators' interest. More recently, the popularity of school gardens as an educational tool has steadily grown as a way to teach healthy eating behaviors and a way to incorporate and increase hands-on learning experiences in interdisciplinary lessons.

## WHAT DOES A SCHOOL GARDEN LOOK LIKE?

School gardens come in all shapes and sizes, with a common focus on growing plants. A school garden may be as small as a few pots of herbs growing on a windowsill or as large as a half-acre plot of vegetables in a schoolyard. Gardening programs are flexible enough to fit the needs and resources of every school.

## WHY GARDEN WITH KIDS?

Educational philosophers going back to the 17th century have promoted the use of gardening to achieve learning objectives and support the mental, emotional, and social development of youth. Students enjoy gardening activities, and teachers and parents say that gardening programs:

- › Address multiple learning styles
- › Provide opportunities for interdisciplinary lessons
- › Improve environmental attitudes
- › Promote good nutrition and exercise
- › Teach patience and responsibility
- › Instill a positive work ethic



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"You are  
what you  
eat."

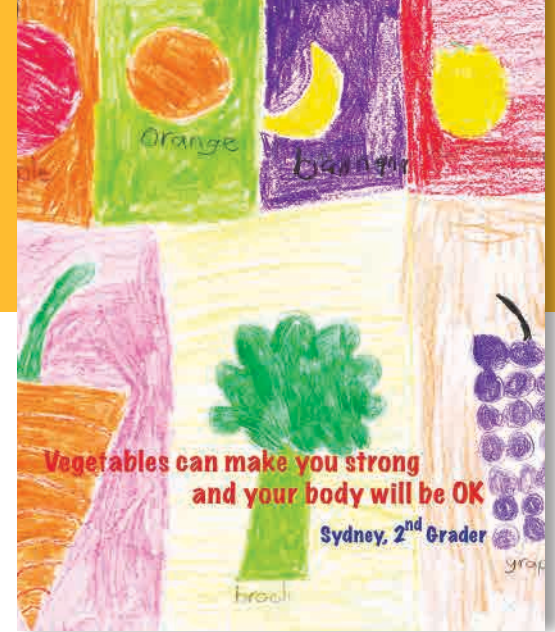
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- › Increase students' self-esteem
- › Build classroom relationships, improve teamwork, and strengthen school spirit
- › Beautify the environment

In addition to anecdotal evidence, a growing body of research-based literature supports the use of youth gardens as a beneficial teaching tool. Research has found that participation in youth gardening programs can have the following impacts on students:

- › Improve self-esteem and attitudes toward school<sup>1</sup>
- › Improve social skills and behavior<sup>2</sup>
- › Improve environmental attitudes, especially in younger students<sup>3</sup>



- › Increase group cohesion<sup>4</sup>
- › Improve interpersonal relationships<sup>5,6</sup>
- › Increase interest in eating fruits and vegetables and improve attitude toward fruits and vegetables<sup>7</sup>; improve attitude toward vegetables and toward fruit and vegetable snacks<sup>8</sup>
- › Significantly increase science achievement scores<sup>9,10</sup>
- › Increase self-esteem, help develop a sense of ownership and responsibility, help foster family relationships and increase parental involvement<sup>11</sup>
- › Improve life skills, including working with groups and self-understanding<sup>12</sup>

When investigating the benefits of school gardens, it is helpful to divide them into four categories: academic achievement, a healthy lifestyle, environmental stewardship, and community and social development.



## ACADEMIC ACHIEVEMENT

Academic achievement is the primary focus of educators throughout the country. Their aim is to ensure that students perform at satisfactory levels defined by local, state, and national academic standards. All lessons and activities must complement mandatory standards to merit the use of valuable classroom time.

A school garden is a perfect tool to provide hands-on learning experiences for any academic subject. Science is the most common subject linked to gardens. Many teachers use the garden as a laboratory to introduce students to scientific methods through plant-related experiments. Additionally, a garden provides a place to study weather, insects, soil, and other environmental matters. It's the ideal habitat model for studying ecosystems. Real-life garden experiences contribute greatly to students' comprehension and retention of new science knowledge; in fact, participation in a gardening program increases science achievement scores, as noted above.

In addition to science, the garden provides opportunities to teach mathematics, history-social science, English-language arts, and visual and performing arts. Concepts that seem abstract in the classroom come alive in a garden setting. For instance, students find taking daily measurements of garden bean plants and then charting the growth rate to determine the fastest-growing plant in the garden much more exciting than charting numbers provided by a textbook. Chapter 3, *Linking Gardens to School Curriculum*, provides additional details and specific examples of how to integrate gardening activities into the classroom.

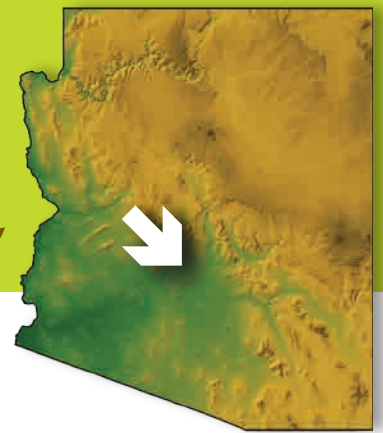


## A HEALTHY LIFESTYLE

Beyond academics, the garden provides broader life lessons, including contributing to students' knowledge of how to maintain a healthy lifestyle.

# program spotlight

Salads & Salad Mixes, Broccoli, Cabbage, Carrots, Herbs, Radishes, Cauliflower, Potatoes, Flowers, Tomatoes, Bell Peppers



## Hopi Elementary, Phoenix, AZ

### Nutrition Education

#### A healthy garden makes for healthier students

Barbara Halden, Chair of the Garden Committee for Hopi Elementary, has put a lot of effort into the school's garden. The garden program at Hopi is driven by the PTA with the support of Principal Lori Colling. Under Halden's direction, the garden has grown like a healthy garden would be expected to grow.

Halden started the garden over concerns about children's obesity. She saw the garden as an opportunity to expose the students to other varieties of foods. This included healthier foods that could potentially be an option in the cafeteria. By educating the students on what it means to eat healthy, the lesson is taught through gardening practices.

"Children learn differently by doing hands-on work in an environmental change," said Halden. "We connect what is happening in the garden with what the students are learning in the classroom."

The garden is at its core training in nutritional education. With over 800 students involved in the garden program on campus, this endeavor reaches each student. The students learn about each step involved with growing and farming. From planting and harvesting, to eating and selling herbs and flowers, the students are involved in each part of the process. Lessons are also being taught about insects, pesticide education, and the life cycle.

According to Halden, parent volunteering will be the future of the program as it continues to grow. She has already recruited and trained several parents and looks forward to the future of the garden with support from local college interns as well.



When Barbara Halden was asked what's the theme of the school garden?

She said, "The most important thing about coming to the garden is it's a fun day to be in the garden."



Arizona is experiencing a major health crisis as the number of overweight and unfit youth grows at an epidemic rate. Approximately one in three children is overweight or at risk of becoming overweight, and almost 40 percent of school-age children are considered unfit. The increase in number of weight-related chronic diseases such as diabetes is of great concern, and the need for prevention education is critical.

Garden programs work to combat the epidemic by teaching youth about healthy lifestyles that include proper nutrition and physical activity. Through a gardening program, students gain first-hand experience with fresh fruits and vegetables. They discover that produce does not magically appear on the grocery store shelves, and they learn the important role of agriculture in our society. The pride and curiosity sparked by growing fruits and vegetables along with the knowledge of where they come from motivates students to try eating them, oftentimes leading to more positive attitudes and eating behaviors. Fruits and vegetables are an important part of the diet not only because they provide essential vitamins, but also because they are linked to prevention of such health problems as cancer and heart disease. Studies show that a majority of children do not eat the recommended amount of fresh fruits and vegetables each day, so they are missing out on these benefits. A garden program increases produce availability and creates opportunities to teach students what they should eat for good health through fun, hands-on experiences. This information can also be shared with students' families.

A healthy lifestyle is more than just eating right, though. Students also need to adopt good exercise habits. The garden provides a wide range of physical activity through digging, planting, and weeding. The garden activities are often so captivating that students do not even realize they are exercising. And unlike some other activities they participate in during their school years, gardening is an activity they can participate in for the rest of their lives.

### ENVIRONMENTAL STEWARDSHIP

A school garden is a powerful environmental education tool. Through gardening, students become responsible caretakers. They have an opportunity to engage in agricultural practices on a small scale, learning about the responsibilities and impacts of land cultivation. They explore the web of interactions among living and nonliving components of life. By doing so, they develop a greater understanding of the natural world.

Students also learn the importance of caring for natural resources. A garden of native plants or drought-tolerant plants, for example, provides an excellent

"We are  
part of  
the earth  
and it  
is part  
of us...  
What  
befalls  
the earth  
befalls  
all the  
sons of  
the earth."

Chief Seattle, 1852



Photo: 5 A Day

opportunity to teach students about water conservation. They will observe that choosing the right plants and irrigation for the garden results in a beautiful landscape that is also environmentally friendly. Additionally, gardens teach about waste reduction through composting. Students who learn sustainable garden practices can more readily consider conservation issues from a local and global perspective.

For many children, a garden offers the only chance to get close to nature. Some lack access to gardening spaces because of their living situations; others have limited exploratory free time outdoors. School garden educators in urban environments frequently find their programs provide students their first opportunity to dig into the soil and watch a plant grow.

Establishing a connection with nature at an early age is extremely important. Researchers have discovered that childhood experiences with nature are strongly linked to adult attitudes toward plants. Participation in gardening during childhood is the most important influence on adult environmental attitudes and actions, and even in urban areas where green spaces are limited, gardening programs for children can provide a strong enough connection to instill appreciation and respect for nature in adulthood.<sup>13</sup>

## COMMUNITY AND SOCIAL DEVELOPMENT

Community and social development lessons do not receive the attention that academic achievement does, but they are as crucial to the survival of our country as reading and writing. Children must learn how to take responsibility for their environment and develop a strong sense of community to ensure the continuation of our society.

Gardens create opportunities for students to work cooperatively and to develop responsibility. They will quickly learn the negative consequences associated with forgetting to water their plants on a hot day and will work hard to make sure it does not happen again. Plants will also provide positive reinforcement in response to proper care by growing or producing fruits. On a personal level, gardening builds confidence, self-esteem, and pride as students watch their efforts turn into beautiful and productive gardens. It also teaches them patience as they wait for a seedling to sprout or a tomato to ripen.

Gardens provide unique opportunities for cross-generational connections. While gardening, children interact with teachers, parents, and community volunteers,



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providing opportunities for social interaction that are often lacking in our society. The garden allows children to ask questions, share thoughts, and work cooperatively toward a common goal. In addition, school gardens give children the opportunity to showcase their products at local fairs. For information on how to submit entries, see Resources From Near and Far (page 84), for Web links to Arizona's fairs and expositions.

Through gardening, students help to beautify the school grounds. Some will find it their only chance to contribute positively to their environment. The praise they receive from other students, parents, teachers, and community members will create a sense of community spirit and introduce them to the benefits of volunteering.

Above all, gardening is fun, and once the skills are acquired it can become a lifelong hobby. Exploring the outdoors, planting in the soil, watching seeds grow, and harvesting the bounty are enjoyable and memorable ways for students to spend their time.

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# planning your school garden



After identifying the need for a garden at your school and recognizing the benefits a gardening program will provide, it is time to begin to make your vision a reality. This book will guide you through the basic steps of creating and maintaining a school garden, including:

- › Seeking administrative approval
- › Creating a support network
- › Identifying goals and linking the garden to your curriculum
- › Designing the garden
- › Identifying supply needs and funding needs
- › Obtaining supplies and funds
- › Planting the garden
- › Maintaining the garden
- › Sustaining the garden

## **STEP 1: Seeking Administrative Approval**

Your first step is to gain the support of your school's administrators. Before setting up a meeting, take time to develop an outline of your vision. Begin your outline with ideas for how you can incorporate the garden into the standards-based curriculum as a hands-on interdisciplinary teaching tool, which is a make-or-break element in receiving approval. Also include the ways you think the garden will benefit your students and the community, a list of potential supporters, and a tentative plan of action, including the steps you will take to create a school garden (you can use this chapter as your plan). Developing a thoughtful and professional outline will indicate your level of commitment to the project and will inspire confidence in your proposal.



For most educators, the principal's office will be the first stop. An enthusiastic and supportive principal is key to the development of your school garden, whether approving and arranging teacher time for workshops, or finding and tapping funding sources. Your principal can also be an important promoter of the garden project to your school district and community. It is essential that the principal be an active participant in the process.

Other school administrators can also play an important role. Seek your principal's guidance on additional contacts, who may include your superintendent, school board members or other local government officials, and even state and federal legislators. It's worth your while to gain their support and approval from the start. They love to be involved and associated with innovative programs, and their support can translate into tangible and intangible contributions.



## STEP 2: Creating a Support Network

Once you have a green light from your administrators, it is time to develop your support network. You will quickly find that garden programs are more work than one person can sustain, so to ensure success, enlist other teachers, school staff, students, parents, and community volunteers to serve on a garden planning and advisory team (*which we will refer to as the “garden team”*). Members of this team can help you set goals and can provide ideas for ways to integrate the garden into the curriculum. They may promote the program to other parents and community members, secure necessary supplies, provide horticultural expertise, assist with classroom lessons (*it is often helpful to have an extra set of hands during classroom gardening projects*), or aid in maintenance of the garden. By gathering input and help from a diverse group, you will strengthen the creativity and ingenuity of your program. Their involvement will multiply your resources and create active supporters for your efforts.

Before asking people to be a part of the garden team, envision how you would like them to participate and what their responsibilities will be. How often and when would you like to meet? Do you want them to help in planning, implementing, or maintaining the garden, or help in all stages? Even though roles may shift during the life of the garden, always try to communicate needs and expectations clearly.

Not all members of this team need to contribute in the same way. Although it is easier on you to find individuals willing to help with all aspects, you will probably find more people willing to take on responsibilities that build on their individual strengths and fit their available time. An important volunteer to look for is someone willing to serve as a garden coordinator to help organize communication, scheduling, and other details. Because of the demands of this position, you may want to recruit two or three people to share this job. Your garden coordinators will help support you as the garden program grows in size and scope. Look for individuals who are good at delegating responsibilities and following up to make sure jobs are completed. It is best not to have coordinators who want to control all the work because they will deter other volunteers and are likely to burn out. Many successful school gardens are fortunate enough to find funding to pay a garden coordinator.

Begin building your network by conducting a brainstorming session with potential supporters. Spread the word by presenting the project idea at a faculty, school board, or PTO meeting and inviting people to join the brainstorming session. Send an email invitation to the entire school community. Notify other community members of the upcoming session by hanging posters, sending out a newsletter, or placing announcements through local newspapers, radio, or television. Promote the meeting on the school website.



At this first meeting, present your initial vision for the school garden and the role the garden support team will play, and then develop a list of people interested in serving on the garden team. Many times people are hesitant to sign up through large meetings, so you will want to follow up with personal invitations to individuals you feel would make valuable members of the team.

Get as many people involved in the project as you can. The larger the project, the larger the support network you need. The more people involved, the more likely it is that your program will be successful, because the weight of the project will not rest on one individual. Make sure to involve anyone who may have a direct stake in your program, such as neighbors whose property will abut the garden, local garden club members, and green industry employees. It is important to contact these key players early in the planning stages to establish a feeling of “ownership.” When people are involved in the decision making and active in the upkeep, they are usually more supportive and less likely to get bored and quit.

Create a group of people who will work well together and invest the time, energy, and patience to accomplish their goals. The committee should be composed of focused individuals who are willing to meet regularly and share in the responsibility of actually getting the garden started. Potential team members include:

**Teachers.** Involving other teachers in garden efforts is very important. Teachers are valuable contributors because they have a firm understanding of curricular goals, know your students well, and have access to school facilities and supplies. Additionally, it’s more fun to approach the garden as a teaching team, and it takes the burden off one educator to keep the program alive.

**Maintenance Staff.** Many teachers have noted that a good relationship with the custodian is critical to a successful garden program. The custodian can help you find valuable resources like storage closets and water sources. Also, because the maintenance staff frequently works year-round, they can help keep an eye on gardens during breaks and vacations. Include your maintenance staff in early planning discussions, especially those related to garden location. If these staff members are involved in the planning process, they will feel ownership of the program and will be less likely to view it as an inconvenience or an unnecessary addition to their workload.

**Food Service Staff.** Food service staff may be able to provide resources to aid in food preparation for nutrition lessons. Also, lunchroom scraps can provide excellent materials for your compost pile.





**Students.** Teachers across the country have discovered that when students are involved in all stages of the process, they are more invested in the project's success and inspired to care for and respect their schoolyard oases. By valuing students' opinions and encouraging them to make decisions, educators cultivate motivated, confident, and collaborative learners. Teachers say that although relinquishing some control and inviting students into the decision-making process isn't necessarily easier or more efficient, it is always rewarding.

**Parents.** Parents will be enthusiastic about any program designed to provide additional learning experiences for their children and will have a strong stake in the success of your program. You may find a parent with a horticultural background who can provide expertise, or a parent with excellent organizational skills willing to serve as a volunteer coordinator. Parents often have connections to funding and supplies, as well.

**Community Volunteers.** Additional community members add depth to your program and open up new opportunities for resources. Look for volunteers with garden experience and ties to the horticulture industry. In addition to providing connections to necessary supplies, they may be willing to provide technical advice, for example, diagnosing problems and leading special garden activities or workshops. Contact local farmers along with public and private organizations related to the agriculture industry. Gardens are like small farms, and agriculture professionals have a lot of knowledge and materials to share. Community volunteers might include garden club members, college students enrolled in plant sciences or education programs, botanic garden staff or volunteers, plant nursery staff, landscape designers or architects, and Cooperative Extension Service Master Gardeners.

Don't forget your school's neighbors! Your garden is more than an addition to your school; it also affects the neighborhood. The neighbors can help keep an eye on it when school is not in session. They might also be willing to help with summer maintenance and weekend watering.

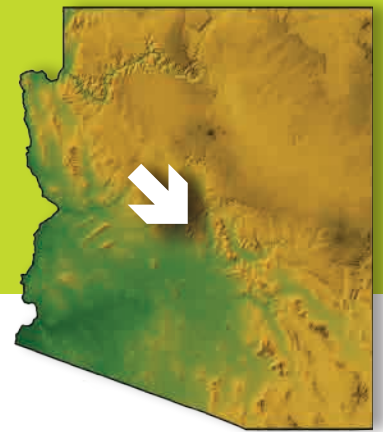
It takes time and energy to develop your support network, but it is worth the effort. Involving the school and the local community in a schoolyard project:

- ▶ Promotes project sustainability because responsibilities don't fall entirely on the shoulders of one champion
- ▶ Decreases the likelihood of vandalism because more people have a stake in the success of the program
- ▶ Provides connections to potential volunteers and donors of labor, plants, money, and supplies
- ▶ Encourages cross-generational mentoring and friendships among students, teachers, and a diversity of community members
- ▶ Brings needed expertise and fresh ideas to the project

Chapter 10, Working with Volunteers, has more information on involving volunteers in your garden.

# program spotlight

**Lettuce, Spinach, Tomatoes, Onions, Garden Beans, Radishes, Cabbage, Marigolds**



## **Paradise Valley Christian, Phoenix, AZ**

### **A Garden Comes to Life**

#### **How the lettuce experience fueled the body and minds of the students**

Ms. Downs's third grade students were delighted to come back to class with an actual real life head of lettuce grown in their school's garden. Having just left their hands-on garden experience, the children came back to class eager to share ideas and thoughts. There was a big root that they hadn't seen before that "felt like a finger" and the little roots that "felt like hair." "Why does lettuce have different kinds of roots?" Ms. Downs asked the class.

"To take in water!" Said a student.

"To keep the lettuce in the soil!"

"To suck up nutrients!"

"All great answers," said Ms. Downs. "Now let's taste our lettuce." After washing the lettuce, Ms. Downs offered students a leaf to eat. Several asked for seconds.

"We want to accentuate our existing programs, including our science program," said Head Master Sheryl Temple. "We created a living classroom for all our grades."

Parent involvement has also been a key to success for the school garden. Hans Berglund's daughter attends Paradise Valley Christian and he helped fund the school garden program. Berglund, who is President/CEO at Agroplasma Inc. and a member of WGA, matched the garden grant and helped build 20-garden beds. Another parent, Bill Jacoby, helped with the landscaping.

"As a parent I was intrigued by looking at the WGA website's motto," said Berglund. 'If they grow it, they will eat it.' The school garden enforces this motto." The process of planting, growing, and eating has introduced to the students the learning of caring for yourself and your community. It has also brought the ideas home to the dinner table.

"We also have a home garden and my daughter eats a plate of fruits and vegetable each night," said Berglund.

With students, teachers, and parents involved with the Paradise Valley Christian school garden, a successful learning experience is in progress.



### STEP 3: Identifying Goals and Linking the Garden to Your Curriculum

The first job of your garden team is to identify goals for the school garden. Your goals must tie in with your current curriculum – the garden is a tool to help you accomplish your learning objectives, not an added task for your workload. Begin your team’s goal-setting meeting by sharing information about required academic standards, then brainstorm ways to accomplish these learning objectives through garden lessons. Use these questions as a guide:

- › What topics do you want to teach through the garden?
- › What plants do you want to grow?
- › Do you want to use the garden once a year for an in-depth special study or incorporate it into a yearlong interdisciplinary curriculum?
- › Do you want to develop the garden around a central theme or create small garden areas with multiple themes?
- › Which classes will be involved in the garden? Do they want their own gardening space?

When setting goals, remember to start small and leave room to dream. You can accomplish this by setting both short-term and long-term goals. For instance, you may want to create a butterfly garden in a half-acre courtyard at the school. Make it a multiyear project and break it into stages to keep the work at a manageable level, so that you don’t exhaust the enthusiasm of your students and volunteers early on by preparing soil and removing weeds on a large area. In addition, this method allows for project growth each year, adding momentum to your efforts and creating feelings of ownership from new participants.

After your brainstorming sessions, make sure to get your goals into writing. Create a summary document and distribute it to all the participants. Also share your plans with other teachers, administrators, and community members. This document will help to raise awareness of your new project, spreading excitement and anticipation.

### STEP 4: Designing the Garden

With goals in hand, you are ready to design your garden. The garden design should be practical, functional, and fun! Involve your students and garden team in the process. A school garden can be as small as a few containers in a courtyard or as large as a 10-bed vegetable garden in the playground. Chapter 5, *Designing Your School Garden*, will walk you through the steps of designing your garden.

### STEP 5: Identifying Supply Needs and Funding Needs

Before you begin searching for financial support and donations, make a list of materials and supplies needed. Estimate the costs for the entire project and prepare a realistic budget. Remember to include expenses for the site



development and improvement, operation, curriculum, and miscellaneous items. If you skip this step and do not take time to organize your efforts, you might end up with an abundance of supplies, but still be missing key items. Chapter 6, Finding Supplies and Funding Your Garden, gives detailed information on this important aspect of school garden projects.

### **STEP 6: Obtaining Supplies and Funds**

Once you've accurately identified what your garden project needs, you're ready to take the next step to meet those needs. Finding the resources to implement your vision may be a challenge, but it is also an opportunity to get more of your community actively involved and invested in your program. Most schools find funding and supplies through donations, grants, and fundraising projects. Chapter 6, Finding Supplies and Funding Your Garden, will guide you through this process.

### **STEP 7: Planting the Garden**

The most exciting part of the process is always Planting Day. Watching a landscape design turn into a garden energizes students and adults. Chapter 7, Planting Your School Garden, will walk you through the basics of garden installation, including preparing the soil, laying out the design, and digging in.

### **STEP 8: Maintaining the Garden**

Students learn about nurturing and responsibility when they participate in garden maintenance. Chapter 8, Maintaining Your School Garden, provides an overview of basic maintenance tasks. However, care will vary greatly depending on the size of the garden, the plants in it, and its environment.

### **STEP 9: Sustaining the Garden**

There is more to continuing your garden than keeping the plants alive. Considering the time and resources invested, your garden program should serve as an education tool for this year's students and for students using it 10 years from now. You also should create a positive garden experience for all participants. Chapter 9 provides tips from experienced school garden educators on how to sustain your garden efforts, including ideas for outdoor classroom management and communicating success.

This guidebook concludes with a resource section to aid you in beginning your school garden. Even though having a garden teaching tool is the ultimate goal, remember that each step of this process provides valuable learning experiences for you and your students. Don't get bogged down in the details – enjoy the adventures along the way!



# linking gardens to school curriculum



The following pages provide ideas on how to integrate gardening with classroom curriculum. Although science is the most natural fit, with the school garden playing the role of science laboratory, the classroom garden can also act as a springboard for a wide range of lessons in mathematics, history-social science, English-language arts, visual and performing arts, and health. Begin by looking at the education standards and your own curriculum goals and making a list or map of areas you intend to cover. Make a second list of garden tasks, projects, and goals, and match them with the student outcomes detailed in the standards. Next, select or develop specific activities that can help students achieve the standards. The lists that follow represent just a sampling of garden-focused subject area activities to get you started.

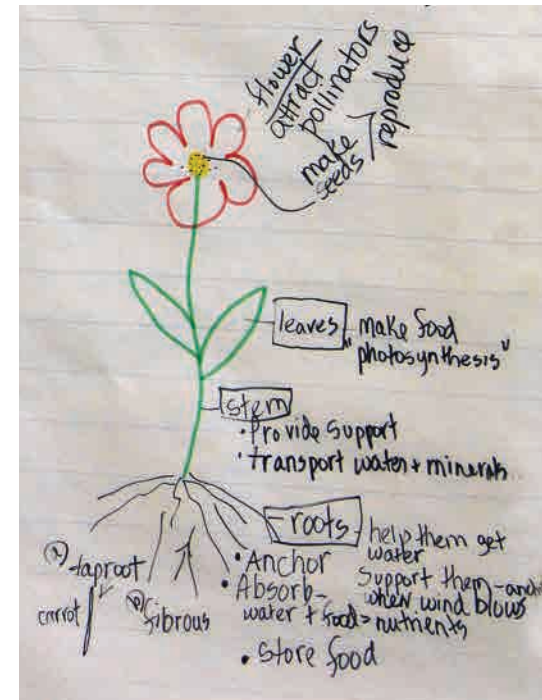
Free garden curriculum resources for teachers are plentiful. A few places to start include:

- ▶ Western Growers Foundation: [www.westerngrowersfoundation.org](http://www.westerngrowersfoundation.org)
- ▶ Arizona Department of Agriculture: <http://www.azda.gov/Common/arizonagrown.aspx>
- ▶ Arizona Department of Education: [www.azed.gov/health-nutrition/school-gardens](http://www.azed.gov/health-nutrition/school-gardens)
- ▶ Arizona Department of Health Services: <http://www.azdhs.gov/phs/oeh/fses/school-garden/index.php?pg=resources>

Keep in mind, websites change frequently, so if these particular pages aren't available as you are doing your research, do not be discouraged! Western Growers Foundation, Arizona Department of Education, Arizona Department of Health Services and Arizona Department of Agriculture are among several organizations that will continually be updating information to support your efforts. Check with these websites often.

## SCIENCE

The garden provides ample opportunity for making science inviting and relevant to students' lives by inspiring active exploration and problem solving. The garden encourages inquiry as students use their senses, reasoning, and communication skills to find answers to questions. These experiences can help improve students' attitude toward science. Key science concepts that can be explored in the garden include organisms, cycles, basic requirements for life, plant anatomy, adaptations, food webs, decomposition, interdependence, ecological principles, pollination, and diversity of life. Students practice and hone scientific process skills by observing, classifying, inferring, measuring, predicting, organizing and interpreting data, forming hypotheses, and identifying variables.





Below are a few ideas for life, physical, and earth science activities in the classroom garden.

## LIFE SCIENCE

- › What are the differences between living and nonliving things? How are humans like plants? How are they different? Distinguish and describe differences and similarities.
- › How does a plant grow? Observe the life cycles of plants using fast-growing plants in your classroom.
- › What do plants need to grow? Do all plants need the same things? Study the various conditions that different plants need to grow. Compare the things people need to the things plants need. Create experiments investigating what happens when plants are exposed to different amounts of light, water, air, space, and nutrients.
- › Investigate the functions of different plant structures (cotyledons, roots, stems, leaves, flowers, fruits, and seeds).
- › How do plants reproduce? How do seeds work? Dissect flowers and seeds. What factors influence germination of seeds? Create experiments to investigate how light, heat, and moisture affect germination.
- › Explain to students that some characteristics are inherited and others are caused by the environment. Locate examples of both in your garden.
- › How do plants use energy from the sun to make food? Discuss photosynthesis. Do plants need light to photosynthesize?
- › Discuss how plants adapt for survival. Research adaptations of seeds for dispersal and adaptations of flowers for attracting pollinators. Observe pollinators in the garden.
- › Investigate the impact of environmental changes on plants.
- › Study wildlife and insects along with their habitats.
- › Investigate food chains and webs. Demonstrate how plants are the primary source of energy for all food chains.

## EARTH SCIENCE

- › Create a garden weather station. Record daily measurements and compare conditions with plant growth.
- › How are some soils different from others? Compare and contrast the properties of different types of soils (density, air spaces, presence of living organisms, composition, texture, smell, appearance).
- › Simulate soil erosion in your classroom garden. Observe the difference in soil loss when water is splashed on a tilted, planted pot, and on a tilted, unplanted (but soil-filled) pot.



## PHYSICAL SCIENCE

- › What is pH? How does it affect plants? Use litmus paper or a test kit to test the pH of different soils. Investigate how plants respond to soils with different pH levels.
- › Simulate the water cycle in the indoor garden by covering it with a “dome” of clear plastic. Study and observe the transpiration, evaporation, and condensation of water.
- › What are the properties of different types of light? Cover pots with cellophane of different colors to screen out all but one wavelength of light from plants. Observe plant growth.
- › How does energy change to matter during photosynthesis?

## MATHEMATICS

The garden provides a plethora of opportunities to practice basic mathematical activities such as calculations, comparisons, measurements, and varied representations of data (charts, graphs, etc.). Math becomes practical and relevant when students implement concepts they have learned in the classroom in a real-life garden setting. Designing and planting a garden takes mathematical problem solving and practice. The hands-on applications presented by gardening activities can help to motivate students often confused by abstract textbook questions and examples.

Here are a few math activity ideas:

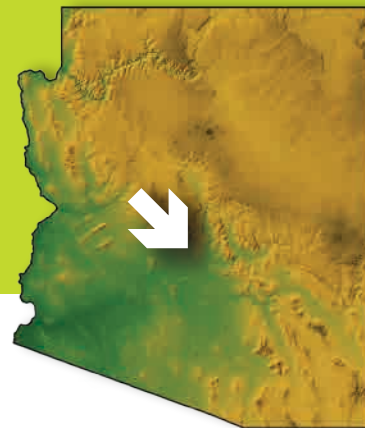
- › Measure the growth rates of plants and display results on different types of graphs. Make predictions regarding future growth. Use standard and nonstandard units of measurement.
- › Host a bean race. Plant a number of beans at the base of a trellis and track their growth on a chart. Determine the rate of growth and award the fastest plant a blue ribbon.
- › Using information from seed catalogs, predict dates of germination and maturity.
- › Plan backward from a desired harvest date to determine when each crop should be planted.
- › Measure your garden parameters and calculate the area. Use graph paper to make a map to scale of your garden.
- › Calculate amounts of fertilizer to use per quart and per liter of water.
- › Chart temperatures of the air and soil in your garden in Fahrenheit and centigrade.
- › Determine the weight and volume of soil mix when wet and dry. Determine the volume of soil in a rectangular window box.
- › Investigate vegetable prices in a supermarket. Track the amount of produce harvested in your garden and use the market prices to determine the value of your harvest.
- › Count the number of seeds planted and the number of seeds that sprout and calculate the germination rate.





# program spotlight

Kale, Flowers, Pumpkins, Onions, Herbs & many other fruits & veggies



## Faith North Montessori, Phoenix, AZ

### A Sustainable Garden

### A decade of gardening on campus has grown into more than just a school garden

Several years have passed since Faith North Montessori received funding from WGA to start its school gardens, which is still thriving under Principal Susan Engdall. According to Engdall, the startup funding allowed some in-ground gardens that were experimental. Today these gardens have evolved into beautiful raised beds that are filled with organically composted soil from their own composters.

“We have chickens and rabbits to complete the compost cycle,” said Engdall. “The animals also act as advocates for the care of the environment and to ease separation anxiety for our youngest students.”

The school garden has an element of ownership with the students. They create the garden plans based on what to grow, when to grow it, and how to harvest it. The students also use the garden for more formal botany studies. The Faith North gardens are planted in the fall and spring where the students harvest flowers to any kind of vegetable capable of growing in Arizona. They have solar cookers as well and make salads to eat at lunch. The students also make kale chips, smoothies, and use some of the greens to feed the animals. Over the years, the school has fundraised to provide the outdoor environmental education teacher who helps the students learn about taking care of the garden and its inhabitants.

The Faith North garden has come a long way for a campus that was void of any resemblance of a garden. This garden is now set and in place with a group of teachers and students using it daily for learning and much more.



From Principal Engdall on the theme of the school garden:

“A small green space in a large urban center devoted to inspiring in our children, the care of the earth, the care of one another and lessons of sustainability.”

“When we came to Faith North nine years ago, there was one tree in the courtyard and not even a bird could be seen. Today there are so many birds that the children have bird watching assignments. . . also the beds at the entrance to school were looking tired so the students did replants with desert plantings. Today it is beautiful and welcoming.”

Principal Susan Engdall



- › Measure the height of a group of plants and determine the mean, median, and mode.
- › Calculate serving sizes of different fruits and vegetables using common cooking supplies.
- › Make a recipe that uses fruits and vegetables from the garden and requires various measuring techniques.

### HISTORY—SOCIAL SCIENCE

Plants are an important part of world history. They have influenced human civilizations and economies since the beginning, and as the base 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 students about specific historical events and cultures, and also to introduce current events like the impact of biotechnology. Some gardening activity ideas:

- › Research and report on cultural or ethnic differences in food consumption and gardening practices.
- › Research agricultural history and create a timeline of important events.
- › Visit some local farms and interview farmers about choice of crops, growing practices, marketing, and farm history.
- › Study the contribution of Native American foods and other cultures' foods to our history and diet. Grow samples in the school garden.
- › Research the histories of classroom garden plants. Discover where they originated, the impact they've had on our diets, and how today's varieties differ from the original plants. Locate their origin on a map and then trace their movement around the world.
- › Use the Thanksgiving holiday to explore meals throughout history and the different crops grown and harvested at that time of the year.
- › Complete a site analysis of the school garden and create a garden map noting important features, including a north arrow.
- › Trace the path of a fruit or vegetable from the field to the table.
- › Use the classroom garden to complement a study of the influence of climate on food production.
- › As a class, develop garden rules and then vote on them.

### ENGLISH-LANGUAGE ARTS

Reading and writing are two very important classroom basics, and mastery of these skills provides students with the power to succeed. Relating language arts exercises to the garden can add an element of fun, too. Example activities:

- › Keep daily garden journals documenting observations, weather conditions, and classroom activities.



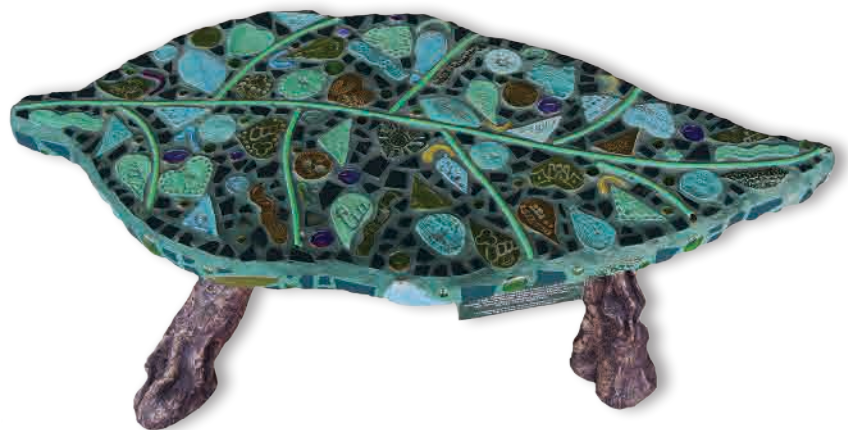


- › Research the growing habits of the school garden plants using the Internet and reference material. Create a planting schedule based on the information.
- › Write letters to local merchants explaining the school gardening project and asking for donations.
- › Write thank you notes to volunteers and garden sponsors.
- › Write, illustrate, and publish a collection of garden stories and poems.
- › Brainstorm different adjectives to describe each plant in your garden.
- › Study new vocabulary that relates to plants and gardens.
- › Publish a class newsletter with student articles about the garden and distribute it to other classrooms and parents.
- › Write step-by-step instructions for common garden activities.
- › Follow written instructions to perform a garden task like planting seeds.
- › Read books and stories about plants and gardens.
- › Write a research paper on a favorite plant, including source citation.
- › Prepare and deliver a presentation about the garden for other students, teachers, and parents.
- › Learn about the origins of scientific plant names.
- › Read a garden magazine article highlighting a plant and distinguish between the facts and opinions presented by the writer.
- › Research the nutritional value of your favorite garden vegetable and then write a script for a 60-second advertisement designed to get more people to grow and eat it.

## VISUAL AND PERFORMING ARTS

Nature is the inspiration for many works of art, dance, music, and drama. Your school garden is a small piece of nature that can inspire budding artists. Activity ideas:

- › Create paintings and drawings of garden plants.
- › Paint a class garden mural to hang in the hallway for parents' night.
- › Make a seed mosaic.
- › Create a color wheel collage using pictures from old seed catalogs.
- › Make musical instruments from gourds and learn how to play them.
- › Make prints using paint and stamps made from various plant parts.



- › Create and perform a garden-inspired dance expressing the growth of a seed or the opening of a flower bud.
- › Pantomime various gardening tasks (transplanting, fertilizing, sowing seeds, pollinating).
- › Learn a collection of songs that relate to food, gardens, and the environment.
- › Draw your dream garden.
- › Listen to the music of composers inspired by nature.
- › Build clay or tissue paper models of flowers.
- › Use leaves to make crayon rubbings or fossils in clay.
- › Using a movie camera with single-frame capability, make a time-lapse film of a plant growing.
- › Create a skit about food safety.
- › Paint a classroom mural using samples of different soils as the medium.

## HEALTH AND NUTRITION

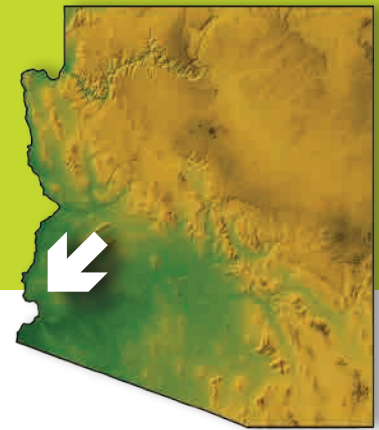
Research continues to document the significant health benefits of eating fruits and vegetables, and yet most children do not eat the recommended daily amount. Growing fruits and vegetables in the school garden improves students' attitudes toward these healthy foods and motivates reluctant eaters to try them. You can use the garden as a hands-on tool to teach nutrition lessons, including the importance of fruits and vegetables and proper food preparation techniques. Specific activity ideas:

- › Compare the importance of nutrients in the health of humans and of plants.
- › Study the nutritional 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.
- › Study adaptations of plant parts that make them good food sources.
- › Sprout various seeds for eating.
- › Conduct a blindfolded taste test using classroom-grown vegetables and supermarket vegetables.
- › Experiment with food preservation techniques, such as drying, freezing, and canning.
- › Grow a salad garden and give students a chance to sample the harvest with a salad party.
- › Invite a grocery store employee to talk to the class about where their products come from.
- › Visit a local farm.
- › Create brochures with information on daily food intake recommendations.



# program spotlight

**Spinach, Butter Lettuce, Red Leaf Lettuce, Cilantro, Radish, Romaine Lettuce, Red Romaine, Spring Mix**



## **Gary Knox Elementary, Yuma, AZ**

### **Food Safety**

#### **The school garden teaches healthy habits by following guidelines**

During the summer of 2012, the staff at Gary A. Knox Elementary began planning a schoolyard garden. After reading the research about the educational impact of school gardens, the school felt they couldn't live without one. A proposal was constructed and they decided to solicit donors from the Yuma community to fund the endeavor. Vic Smith, owner of JV Smith Companies, volunteered to fund the entire project.

“As we looked at hot topics in our agriculture community, we saw that food safety was getting more and more attention not only statewide but nationwide,” said Principal Hurt.

The result was a 63-bed garden was built and planted. The first garden beds included spinach, butter lettuce, red leaf lettuce, cilantro, radish, romaine, red romaine, and spring mix. The food safety education garden had launched at Gary Knox Elementary.

#### **Gary Knox Elementary Food Safety Rules**

- ✓ WASH YOUR HANDS before working in the garden
- ✓ WASH YOUR HANDS after working in the garden
- ✓ WASH YOUR HANDS before eating
- ✓ WASH YOUR HANDS after using the restroom
- ✓ WASH YOUR HANDS after handling soiled items
- ✓ NO SPITTING in the garden
- ✓ NO PICKING YOUR NOSE in the garden
- ✓ NO URINATING OR DEFECATING in the garden
- ✓ NO GOING TO THE GARDEN IF YOU ARE SICK (runny nose, coughing, stomach hurting)
- ✓ BE CLEAN (shower everyday)
- ✓ NO PERSONAL BELONGINGS in the garden

These practices have now become second nature to the students.

It is common to see some students who are coughing or have colds sitting outside of the garden, while their classmates work in the garden. Students know if they are sick or getting sick, they stay out of the garden. They know the importance of the garden staying germ-free.

“This year has been a wonderful learning experience for our staff, our students and our school community. Our school garden is flourishing!” Said Principal Hurt.





Tucson Village Farm

- › Plan a day's menu that includes all components of a balanced diet.
- › Keep food journals that highlight how many fruits and vegetables are eaten and describe any new produce tried.
- › Invite chefs from the community to do cooking demonstrations for students and parents. Coordinate a cooking lesson in your school's kitchen using the produce your class has grown.
- › Ask cafeteria managers to share safe food handling information and provide tours of school kitchens.
- › Invite a registered dietitian to visit classrooms and discuss healthy food choices and healthy preparation methods in connection with *MyPyramid.gov*.
- › Present a skit or puppet show about food safety.
- › Use *MyPyramid.gov* to help you choose a healthy diet. Come up with tasty recipes that use lots of fruits and vegetables and little fat or sugar.
- › Create a classroom or school recipe book that features produce grown in school gardens.
- › Compare the nutritional content of different colors of a specific variety of vegetables, e.g., salad greens. Graph the Vitamin A content in the lighter-colored greens and in darker greens. Contrast this with other vegetables.
- › Research and compare fruits and vegetables with various origins. Identify cultural dishes and their preparation methods. Host an "international day" and provide healthful samplings of fruits and vegetables from those cultures.
- › Incorporate literature using the book *Stone Soup* and involve students in making their own stone soup. Have students discuss the benefits of the ingredients and how they fit into MyPyramid.
- › Research cultural holidays and the symbolism of particular fruits and vegetables that are included during those holidays. For example, identify the symbolism of tangerines in the Chinese New Year celebration.
- › Create a public service announcement or school announcement promoting fruits and vegetables. The promotion could highlight something growing in the garden, a fruit or vegetable offered in the cafeteria, or both. This will encourage students to develop skills for marketing food choices.
- › Grow and use fresh herbs to flavor your dishes with natural ingredients and decrease the use of salt in recipes.
- › Visit a local farmers' market or start a school farmers' market.



Western Growers Foundation

These ideas are just a sampling of the classroom gardening activities available to you. Search books, magazines, and websites for additional ideas. Also, as you grow with your garden, you will create many activities of your own. Be sure to pass them along to other teachers and parents.

# promoting healthy living

A child's mental and physical development is closely tied to good nutrition and healthy eating habits. Health habits also affect children's behavior and social growth. As an educator, you may use numerous teaching strategies to engage students, but you will quickly learn your efforts are ineffective if a child's diet has not met his or her basic nutritional needs. It is important for a child to consume a well-balanced diet and participate in regular physical activity if he or she is to experience success in school. In addition, developing positive eating habits during childhood contributes to optimal health, boosts self-esteem, and decreases the risk of immediate and long-term health problems.

Because children spend much of their time at school, educators like you play a powerful role in influencing students' physical activity and the food choices they make both at school and at home. You can incorporate nutrition education and physical activity throughout the curriculum and reinforce these subjects through hands-on activities that allow students to practice smart decision-making skills. A growing number of children are overweight, unfit, or both, and shortfalls in recommended nutrients and regular physical activity are contributing factors. Thus, it is important for schools to establish an environment that fosters the development of healthy lifestyles.

A healthy school environment provides students with opportunities to gain knowledge of and practice positive eating and exercise behaviors. Schools can use multiple strategies to create this environment, but the school garden has proven to be a very useful tool. It is a fun and effective way to introduce nutrition basics and provide opportunities for physical activity. Research on the health benefits resulting from school garden programs has found:

- › Students who plant and harvest their own fruits and vegetables are more likely to eat them.<sup>1</sup>
- › Students with garden experience who participated in a nutrition education program not only ate more fruits and vegetables to begin with, but also demonstrated greater increases in consumption by the conclusion of the program.<sup>2</sup>
- › Students who participated in classroom nutrition education programs in conjunction with growing vegetables in outdoor gardens demonstrated an increase in nutrition knowledge and improved preference for vegetables.<sup>3,4</sup>
- › Students participating in a full food system program (“seed-to-table”) who made the greatest gains in overall understanding of ecological principles also made significantly greater gains in the number of fruit and vegetable servings they reported eating.<sup>5</sup>





Because of scientific research results like these as well as copious anecdotal evidence, the use of gardens in teaching nutrition has become a more frequent practice. Some of the nutritional concepts introduced and reinforced by the garden are below.

### **THE IMPORTANCE OF FRUITS AND VEGETABLES**

Fruits and vegetables are a vital part of a healthy diet, providing many of the nutrients children need for growth, development, and prevention of chronic diseases later in life. These include essential vitamins and minerals, dietary fiber, water, and phytonutrients. Unfortunately, most children are not eating enough fruits and vegetables to meet the recommendations of the most recent Dietary Guidelines for Americans because they lack access to a variety of fresh produce and because their existing food preferences do not include fruits and vegetables. School gardens help promote fruit and vegetable consumption as a means of shaping food preferences early in children's lives and can serve as a source of fresh fruits and vegetables in children's diets. Students will try foods they would normally turn away because of the additional motivation and excitement of eating something they grew. They also learn the skills to grow their own food, offering a lifetime of potential fresh foods.

### **THE ORIGINS OF FOODS**

Through the garden, children gain an appreciation for the origin of their food. By participating in food production, they discover that food does not magically appear on the table or at the grocery store, but rather is produced on a farm. Because of this experience, they are better able to grasp concepts related to agriculture and its importance to the social and economic makeup of Arizona. This experience also leads to students' appreciation of the work that goes into the food they eat and respect for the environment that allows it to grow.

The garden provides opportunities to teach students about the importance of the soil in the production of food, increasing their esteem for this vital natural resource. They learn how the soil provides important nutrients to ensure that the plants are healthy and productive. Fertilizing your garden replenishes the nutrient content of the soil. Increasing nutrient availability to the plants to help them grow is an essential step in raising healthy, nutritious foods.

### **HEALTHY FOOD CHOICES**

An important part of gardening is learning to meet plants' basic needs for good growth and production. Nourishing your garden replenishes the nutrient content of the soil to grow strong plants just as eating healthy foods helps children grow up healthy and strong. If your students neglect their plants by forgetting to water them or by not providing proper fertilizer, they will immediately see the signs of stress. Compare the basic needs of plants to the basic needs of people. Teach students how important it is for them to nurture their own bodies just as they care for the plants in their garden.



## FOOD PREPARATION

Students can grow fruits and vegetables in their garden, and after harvest, they can learn and practice proper food handling techniques, food preparation, and cooking skills. Although the garden will focus on fruits and vegetables, you can use recipes that teach students how to incorporate other healthy foods like whole-grain carbohydrates and low-fat dairy and protein products to achieve a balanced diet. Cooking demonstrations and hands-on cooking activities help students gain experience and confidence in their food preparation skills.

## PHYSICAL ACTIVITY

In addition to encouraging good eating behaviors, gardening is enjoyable, relaxing, and a great form of physical activity. A benefit of adding gardening to a regular exercise program is that it is an activity that can be enjoyed for a lifetime. Go for Green ([www.goforgreen.ca](http://www.goforgreen.ca)) provides the following examples of physical benefits of garden activities:

- › Digging involves weight lifting, abdominal stressing, and partial squatting.
- › Pruning makes you hold your arms up while stretching.
- › Weeding involves squats and forearm stretches.
- › Planting requires many muscles to be used, as you dig, mix soil, lift, carry, and backfill, often in a squatting position.

Other sources of physical activity in the garden include turning compost heaps, clearing out beds for a new planting, mixing potting soils, lifting planters, raking leaves, hoeing, digging fence post holes, moving soil between beds, and spreading mulch.



Western Growers Foundation



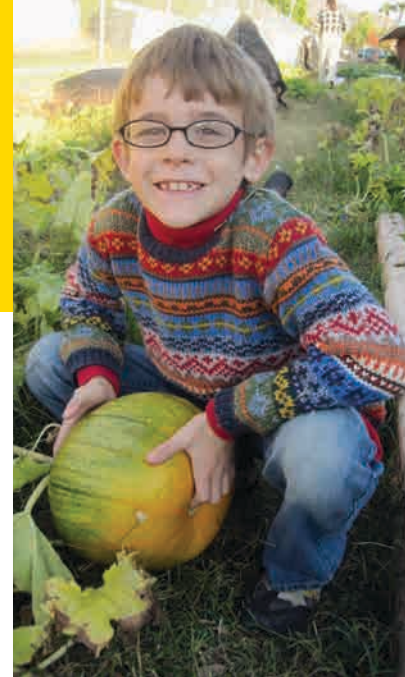
Tuscon Village Farm

### United States Department of Agriculture MyPyramid.

The United States Department of Agriculture (USDA) has created many resources to help educators introduce basic nutrition education into the classroom, including the MyPyramid.gov tool. Visit [www.mypyramid.gov/kids/index.html](http://www.mypyramid.gov/kids/index.html) to download nutrition education classroom activities to supplement activities in the garden.

### SUMMARY

Through garden programs, students learn skills they can use throughout their lifetime to engage in physical activity and increase their consumption of fruits and vegetables. Teaching students how to incorporate hobbies like gardening into their lives will help fight food-related health problems through adoption of activities supporting better nutritional choices. Use of the garden as a health education tool will have an impact on students' choices today and well into the future. Check out the Resources section of this book (page 84) for additional ideas for using the garden to grow healthy kids.



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- 2 Foerster, S., J. Gregson, D.L. Beall, M. Hudes, H. Magnuson, S. Livingston, M.A. Davis, A.B. Joy, and T. Garbolino. 1998. *The California Children's 5 a Day Power Play! Campaign: Evaluation of a large-scale social marketing initiative*. Family and Community Health 21(1):46-64.
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# program spotlight

Beans, Corn, Squash



## West Sedona Elementary, Sedona, AZ

### Sustainability in Sedona

#### Hopi dry farming techniques bring the community together through working at the school garden

“Sustainability is a big factor for us here at West Sedona Elementary,” said Principal Lisa Hirsch, where the school garden is not just about growing but a place dear to the community.

Using the Hopi dry farming methods, the school has focused growing beans, corn, and squash. At this K-8th grade campus, the students are being taught about the larger issues of Arizona agriculture and invasive species. STEM (science, tech, engineering, and math) is the core philosophy where each grade level is learning something in the garden. Even the kindergarten students are planting the seeds. The STEM program is in conjunction with Northern Arizona University.

The surrounding community has also embraced the school’s garden. Being an art community, the garden is connected to the art of Sedona and its people. Song and dance around the garden is a regular occurrence along with the elders of the community assisting with traditional Hopi dry farming techniques.

The garden is key for integrating life and science lessons at school. Linda Crawford, who teaches 2nd, 3rd, and 4th grade classes at West Sedona Elementary, helps oversee the garden while Principal Hirsch focuses on partnerships with NAU, Gardens for Humanity, and a Master’s Garden Program with tree donations to name a few.

“This visual garden centers on the themes of sustainability, community, and art,” said Hirsch.

The arts represent the Hopi side of the different backgrounds in the community along with the ethnic knowledge from the community about the actual growing process.

“Several kids have an understanding of the local lifecycle of growing from living in a ranching family,” said Hirsch.

The connection between the culture of Sedona and health can be found in the garden representing the sustainable teachings at West Sedona Elementary.





# designing your school garden

To prepare for the design phase of your school garden, put on your creativity hat, adopt an adventurous attitude, and open your mind to all possibilities. Gather ideas from other schools, botanic gardens, magazines, garden shows, websites, and the imagination of your students and garden team. As you plan, remember to look at the future garden through the eyes of a child.

Your students and garden team need to be active participants during this phase. Throughout the process, they should feel like valuable contributors. A strong connection during the design process will ensure they become diligent caretakers once the garden is installed.

As you plan, there are two very important things to keep in mind:

**Your school garden should be both fun and functional.** Make sure your design will result in a garden that will fulfill your needs and help you accomplish your curricular goals.

**Keep it simple.** Dream big, but start with a plan that is manageable for your school. Consider developing a three- or five-year plan, adding a few components each year. Remember that it is the smiling children learning in the garden that makes it beautiful, not the fancy and complicated planting design.

## HOW TO GET STARTED

Begin designing by gathering ideas from existing school gardens either by visiting local schools or by browsing the Web. You may also want to visit a local botanic garden or arboretum. Although your group has different spaces and resources available to it, you will get a feel for characteristics that are appealing by visiting these sites. Do you like gardens with sitting areas? Do you like vegetable gardens? What type of paths do you prefer?

Next, give your students and garden team a chance to brainstorm. Asking them to draw their idea of the perfect garden is a good place to start. Give everyone a chance to share their drawings and make a list of all the elements included. See if you find common trends. For instance, do a lot of the gardens include birds or butterflies? If so, you might want to establish a garden supporting wildlife. Are there many fruits and vegetables? Maybe you want to focus on edible plantings. The class can choose the best – and most practical – elements of each to incorporate into a final design. As you review these ideas, remind everyone of your curricular goals. Are there any strong connections between the dream ideas and the goals you have adopted?





## TYPES OF GARDENS

Although no two gardens look exactly alike, there are some basic planting techniques used for constructing indoor school gardens and some different techniques used for those outdoors. Indoor garden options include windowsill gardens and stands with grow lights. Outdoor options include in-ground beds, raised beds, and container gardens.

## INDOOR GARDENS

The simplest form of indoor gardening is to grow plants in front of windows that receive a decent amount of sunlight. Windows that face south and west are best, and they usually receive enough light to grow leaf and root vegetables (beets, carrots, lettuce, onions, and radishes) and herbs. East-facing and north-facing windows do not receive as much light, so they will limit planting options mostly to houseplants. Spend a few days monitoring the light available through the window to determine whether there is a sufficient level for an indoor garden.

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

## OUTDOOR GARDENS

The traditional outdoor garden is planted in the ground of a schoolyard. During the site analysis described below, you will evaluate your soil and determine whether this is a good option for your class. Unless the area has been cultivated before, you will often need to amend and till compacted soil before you begin planting.

Raised garden beds are another option commonly used by schools. Create a raised bed by shoveling soil from surrounding pathways or bringing in new soil or compost to create mounds that are one to two feet taller than the adjacent paths. The top of the mound should be flattened to decrease soil erosion. Raised beds look nice, support healthy plant growth, and keep people on paths. The loose soil encourages roots to grow strong and deep, and the garden soaks in moisture easily. In areas with cool, wet spring weather, soil in raised beds drains and warms more quickly so you can get started earlier.



To create more permanent, defined raised beds, make one- to two-foot-tall frames using materials like recycled plastic lumber, rot-resistant wood such as cedar or redwood, stones, or concrete blocks and then fill the frames with soil. Although rot-resistant pressure-treated wood is available for purchase, it should not be used in the garden because of the toxic chemicals on the treated wood. Framed raised beds can be built over soil or on top of concrete or asphalt surfaces. Although making framed raised beds is more expensive than planting directly in the ground, it does offer a number of benefits. Framed raised beds are more permanent and define the garden bed area. You can choose your own soil, making them easier to cultivate and eliminating worries about toxins such as lead. They usually have fewer problems with weeds and drainage. They may help with pest control by making it easier to scout for insects and install gopher wire barriers. Additionally, raised beds can be built high enough for wheelchair accessibility.

A third outdoor option is to plant in containers. Examples of common containers are clay and plastic pots, large wooden barrels, and buckets. However, you can use anything that holds soil and has drainage holes. You can even use an old bathtub. If you experience warm days but cold nights, or if you have concerns about vandalism, you can create an indoor/outdoor garden by growing plants in buckets with handles, or pots with wheels, and moving them indoors at night.

## SITE ANALYSIS

Once you decide what type of garden will best fit your needs and resources, you need to find a place to put it. It is best to locate your garden in a prominent area of the schoolyard to increase involvement and decrease the likelihood of vandalism. To determine the usefulness of a site, your garden team needs to complete a site analysis. A site analysis involves investigating and evaluating the growing and environmental conditions of potential garden areas. You may conduct several analyses before you find a site that is just right.

At some schools, only one site will be available. However, if that is the case, you should still perform the site analysis because it will help you determine what you can plant. During the site analysis, you need to investigate:

**Size and Existing Features.** The available land at a site is important. Although you may start small, it is a good idea to have room to expand as your program grows. Ask your students to measure the parameters of the proposed site and make note of existing features like plant materials, pathways, fencing, water sources, shaded areas, etc. Using grid or graph paper and an appropriate scale, sketch a garden layout.



**Soil.** A nutrient-rich soil with good texture and plenty of organic matter will help your garden thrive. On the flip side, poor soil will frustrate even the most experienced gardener. Determine the texture of your soil (amount of sand, silt, and clay) and test for pH and nutrient content. Do-it-yourself soil kits are available from most garden centers, or contact your local Cooperative Extension Service office for information on soil testing labs.

You may also want to test for lead contamination. Find out as much as you can about the history of the potential garden site. If the site is located in an urban area, previously contained houses or other structures that were painted with lead paint, was once used for dumping, was exposed to lead-based pesticide treatments, or is close to a heavily traveled road, you should test for lead. Call your local public health department office to find out where soil lead testing is available. The presence of lead does not need to deter gardening efforts. If the schoolyard soil is not suitable for gardening, you can garden in raised beds or containers.

**Sunlight.** Most flower, vegetable, and herb gardens need to be exposed to full sunlight for at least six hours a day. Students can check the potential garden site at different times during the day and year to see how much sun it receives. Use a compass to identify which direction is north. Determine the path of the sun throughout the day to anticipate shadows. In wintertime, remember to factor in shade that will be cast by tree leaves in the warmer months. Use shade areas for gathering places or to plant shade-tolerant crops such as lettuce.

**Water Sources.** Access to water is essential for gardening, and the closer the water is to the garden, the better. If a water source is not conveniently located, the job of watering can become time-consuming and limit garden growth. There are various systems to consider: watering cans, garden hoses, drip irrigation, overhead watering. Drip irrigation and water-conserving sprinkler systems are often the most water- and time-efficient. Determine which water systems will be available to you at the potential location.

**Water Drainage.** How water moves through the site is also important. You don't want to plant a garden in a consistently wet low spot unless you are planting wetland or water plants. Visit the site after a rain. Does the water puddle or does it drain away? Both slope and soil type affect drainage. In addition to low spots, avoid steep slopes; if that's not possible, consider terracing or raised beds.

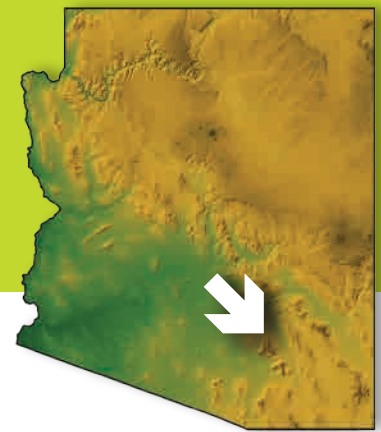
**Accessibility.** It is important for your site to be easily accessible both during class time and outside class. If your garden is a short walk from the classroom, there





# program spotlight

**Squash, Artichoke, Greens, Broccoli, Tomatoes, Peas, Beets, Nastursiums, Marigolds, Strawberries, Orange Trees**



## **Tucson High Magnet School, Tucson, AZ**

**With a Little Time and Soil**

**Farming the new school way**

At Tucson High Magnet School, there are three teachers that lead the school gardening program. Mark Pagels, who teaches Biology and Plant Biology is one of the garden leaders. For Mr. Pagels, the school garden comes in very handy, especially considering the classes he teaches.

“The next step here is to promote cross curriculum studies by bringing other classes into the garden through farming studies in other areas like Art and History and not just the Science classes.” said Pagels.

Two years ago the garden began. When an area was found near the back of the school the farming program broke ground. Since then a second rooftop garden is in the works where tomatoes are currently grown hydroponically in the greenhouse located on the roof of the science building. The hydroponic system was a direct result of finding a way to conserve water.

Worms are used in the gardens that have been fed fruits and veggies from the cafeteria. The wastes from the worms are then used to complete the sustainable path. About 40 students a week use the garden and the early development of the garden is off to a great start. The goal of the school garden is to be organic and sustainable. A new project for the garden program is building a chicken coop to move closer to sustainability.

As a result of the garden program, the students have taken to the different interactions between plants and animals, they have learned how food grows and the length of time it takes, along with organic plant harm prevention plans, according to Pagels. A recent science project has focused on the kinship between plants and how certain plants compete for nutrients and other help in the growing process.



will be more teacher involvement than if the site is a long trek across the school grounds. A garden close to the classroom is more convenient, more visible, and easier to incorporate into the curriculum on a regular basis.

The path to the garden should be level and handicapped accessible, a minimum of four feet, and preferably six feet, wide (check with your school district for specific accessibility regulations). Also, the garden should be accessible to students when they are not in class so they explore and enjoy it on their own. Finally, place the garden in a visible location so all students, teachers, parents, and community members can enjoy its beauty, thus adding to their support and enthusiasm for the garden.

**Security and Safety.** Do not choose a site near heavy road traffic or close to other potential hazards. If possible, locate your garden within sight of classrooms and neighbors so a close eye can be kept on it. You may want to use fences to help with protection on weekends and during extended breaks.

**Future Uses.** Check with your school principal and administrators about long-term plans for your site. Don't invest large amounts of energy and money in a site slated to become a new cafeteria or classroom wing.

After collecting all this information, decide whether or not the site will work for your school garden. If you have concerns, conduct additional site analyses to see if there are better options. If there are no other options, research plants that will grow in the existing conditions. For instance, if the available area is poorly drained, perhaps a habitat of water plants is the best selection. Although this may lead to a garden that differs from the original vision, it will still be a viable outdoor classroom and will provide an important lesson for the students about choosing sustainable and environmentally friendly landscape plans.

## NEEDS INVENTORY

Once you nail down a site, it is time to complete a needs inventory. Start by comparing your brainstorming ideas with the curricular goals. What garden components from the brainstorming list complement those goals?

To help you get started, here is a list of common school garden components:

**Garden Beds.** You can create garden beds in various shapes and sizes. If you keep the growing areas no more than four feet wide, everyone involved in the program should be able to reach all plants. Although it is common to align rectangular beds evenly in rows, some school gardeners avoid doing so, believing that it leaves



little room for creative inspiration. Some try circular gardens, sliced, pie fashion, by pathways. Others are inspired by the natural world. You might arrange your planting beds in other geometric designs around a central meeting area, or scatter beds of different sizes and shapes throughout the garden site.

**Paths.** Paths reduce the risk that plants will get trampled, and they organize traffic flow. Make main pathways four to six feet wide to accommodate wheelchairs and wheelbarrows. Keep paths distinct and weed-free. If steady foot traffic doesn't do the trick, you can cover paths with mulch, such as shredded bark or wood chips. To help keep down weeds, lay down sheets of black-and-white newspaper, cardboard, or landscape fabric before mulching (cardboard is often the least expensive and most effective choice). Alternatively, you can plant pathways with grass and mow it, or, in permanent garden sites, you can use asphalt, bricks, pebbles, or crushed stone.

**Irrigation.** Although watering by hand using watering cans and/or hoses is an option, in most areas of Arizona, this job becomes cumbersome and can detract from the garden experience. Drip irrigation and water-conserving sprinkler systems installed before planting will save time and often result in a healthier garden.

**Gathering Places.** In a shady part of the garden, a picnic table, bench, or group of hay bales or logs provides an ideal place for cleaning and sorting vegetables, conducting outdoor lessons, doing arts and crafts, writing in journals, or just getting relief from the sun.

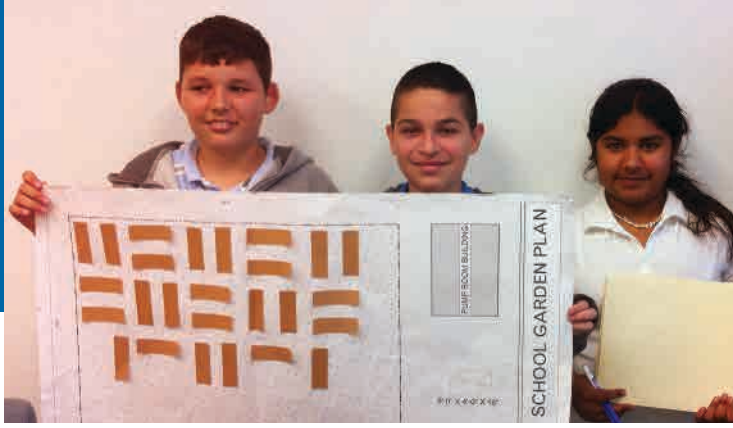
**Toolshed or Storage Area.** A toolshed or storage area is a good central location for cleaning, organizing, and protecting tools and equipment.

**Compost Areas.** If you designate a place for a compost pile, students can convert garden and lunchroom waste into a rich, soil-building ingredient and witness the wonders of decomposition. You can create simple freestanding piles or make an enclosure from chicken wire, wooden pallets, concrete blocks, or lumber. Even an old garbage can with holes punched in it will suffice. Make sure the structure has openings for air circulation.

**Weather Station.** Consider cultivating keen weather watchers by incorporating a weather station into your garden. Students can monitor a variety of conditions and determine how different factors affect garden life.

These are just a few component ideas. As you continue the design process, you may add to your needs inventory.





## PUTTING DESIGN ON PAPER

With the completed site analysis and needs inventory in hand, take a copy of the garden layout developed in the site analysis and work with the garden team and students to create a landscape design. Landscape designers begin this process by drawing bubble diagrams. In a bubble diagram, you define uses for spaces rather than laying out detailed plans. Lay a piece of tracing paper over the map or copy it onto an overhead and use additional overheads for sketching. Draw a bubble representing each component of the garden (beds, sitting area, pathways, etc.). Bubbles can be drawn quickly and in different colors. The idea is to experiment by putting the bubbles in different configurations (e.g., placing the sitting area in the middle of the garden versus placing it on the side), shapes (e.g., circular beds versus rectangular beds), and sizes (e.g., a few large garden beds versus multiple small beds) until you develop a general idea of where to place the different components.

Once there is an idea of where to place things, create a more detailed design. Begin by defining beds and walkways. Be sure to draw the plan to scale so that you are accurate in the use of space. Also create a plan for irrigation. Although you will need to leave room to be flexible, careful planning is important to help determine supply and material needs.

The last step will be to select plants. You and your class should choose plants that can grow successfully in your region and that can be properly cared for and harvested when the students are around. When possible, incorporate drought-tolerant and native plantings; they will ease maintenance and serve as a tool for teaching sustainable landscape practices. Deciding where to place the plants in your garden takes some consideration. Plants have different space, light, and temperature requirements. Use books and websites to research potential plants. You may also want to seek advice from local garden center employees, other school garden coordinators, plant nursery workers, or your local Master Gardeners and Cooperative Extension office.

Although the designs do not need to be complex, if you have a large project, you may want to consider finding a local landscape designer who is willing to donate time. He or she can make sure you've considered all available options and potential problem areas and help you move the design forward. Try to find someone who will engage students and the garden team in the planning and design process.

## FOCUSING THE DESIGN

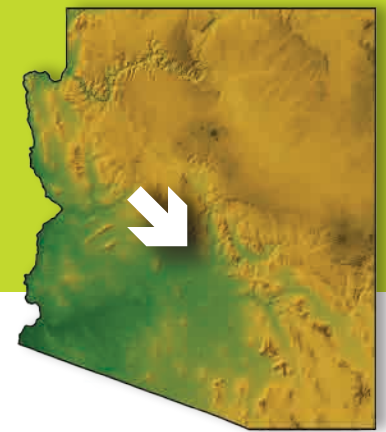
There are such a wide variety of plants and activities you can incorporate in your school garden that the design process can sometimes feel overwhelming. Your team may provide tons of great ideas and suggestions, and, in trying to incorporate them all, you may end up with a garden requiring extensive funding and maintenance. One method to help focus the garden design process is to decide on a central theme. Designing a garden around a theme allows the team to create a meaningful space using a slightly narrowed vision. Inspirations for themes can come from topics within the curriculum, the interests of the students, specific plant materials, or even a favorite book or movie. Some examples of popular theme gardens:

- 】 Alphabet garden
- 】 Butterfly garden
- 】 Children's literature-based gardens (e.g., Peter Rabbit garden)
- 】 Cut flower garden
- 】 Edible garden (note: any garden on this list can include edible plants)
  - ✔ Herb garden
  - ✔ Pizza garden
  - ✔ Salad garden
  - ✔ Salsa garden
  - ✔ Soup garden
  - ✔ Stir fry garden
- 】 Historical garden (e.g., Mission San Agustín Garden, Victory garden)
- 】 Native American garden
- 】 Native plant garden
- 】 Multicultural garden
- 】 Peace garden
- 】 Rainbow garden
- 】 Sunflower garden

In addition to helping with the design process, a theme may also provide you with creative press release ideas and fundraising connections. Involve your students and garden team to help choose your garden theme. Make sure the theme creates excitement and enthusiastic support to continue your school garden's momentum.

# program spotlight

**Amaranth, Chioggia Beets, Arugula, Kohlrabi, Purple Carrots, Pumpkins, Corn, Beans, Squash, Chile Peppers, Cilantro**



## **Madison Simis Elementary School, Phoenix, AZ**

### **A Long Lasting Garden**

#### **Science comes to life in the garden program**

Madison Simis has a ten-year-old school-wide gardening program called DIGGS (Discovery is Growing Gardens at Simis). All 982 students in grades Kindergarten to 4th grade are gardening at school through the program. Volunteers deliver the curriculum weekly in the classroom and in the gardens that include 63 raised beds.

Mitra Khazai, Chair of the DIGGS Program, credits the kids, administration and volunteers for the success of the garden. The garden has been central in developing learning about the local environment, plants, and culture of the area.

“The garden is a place where the kids can learn about how fruits and vegetables grow. It really brings science to life,” said Khazai.

Each grade level plants a different garden, including:

**Kindergarteners** – They plant a salad garden and sample their produce at their end-of-season salad party. The students explore the garden’s world on a bug hunt, looking at a new seedling to understand germination and watching a bee pollinate a flower.

**1st graders** – Students plant varieties of sunflowers. They also learn about botany, geology, entomology, and of course, gardening.

**2nd graders** – Students plant a vegetable of their choice, this year they had 26 varieties to choose from, including Chioggia beets, arugula, kohlrabi and purple carrots.

**3rd graders** – These students plant a salsa garden and pumpkins. The pumpkins are harvested and decorate their classrooms. They learn about chili peppers, the water cycle and the nutrient cycle by preparing and maintaining their own compost piles.

**4th graders** – Students plant a Native American Three Sisters Garden, which includes corn, beans and squash, along with amaranth and gourds. They learn about ethno-botany or how Native Americans used the native plants.

“The teachings about the plants and how it relates to the native people provide a context of what the students are learning,” said Khazai.



# finding supplies and funding your garden

For those planning youth gardens, there is never a shortage of ideas for programs and activities. But do you find the room quiets when the topic switches to funding the project? The good news is that a gardening program does not need to be huge to be successful – students can learn as much from a 4- by 8-foot raised bed as from a half-acre plot. But even on a small scale, your gardening program will need basic supplies like soil, tools, and plants, of course. So where can you go to find these materials?

Finding the resources necessary to begin and maintain a youth garden is always a challenge, but it does not need to be a roadblock. Think of your funding search as an opportunity to provide additional community members a chance to participate in an extraordinary and powerful youth program. Search out people and organizations who share your love for children and who can benefit from being a part of your success.

## IDENTIFY SUPPLY AND MATERIAL NEEDS

First and foremost, do not search for funds until you complete the preliminary planning and design steps. Donors and funding organizations want to invest in long-term ventures and will look carefully at your support network and plans for implementation to determine whether your program will last. Create a firm foundation before you gather the supplies to build.

Once you have in place a garden team, a set of clear goals, and a design, develop a list of resources needed to implement the program. Although miscellaneous needs will arise, you should be able to develop a detailed list of the supplies and materials you will need to make your garden a reality. Make sure to estimate your needs as accurately as possible. Remember to include expenses for the site development and improvement, operation, curriculum, and miscellaneous items. Why is this list so important? You don't want to be missing important supplies that delay garden implementation, nor do you want to end up with supplies you cannot use. A vague request for supplies for a new school garden could result in 10 garden hoses and one shovel, when what you really need is 10 shovels and one hose. Having this list in hand as you search for support will also demonstrate the organized and professional nature of your garden and give potential sponsors confidence in both you and the program.

The needs of each garden will vary on the basis of location (indoor versus outdoor), size, number of students participating, and plantings. Common items needed by school gardens follow.



**Plants.** It is not a garden without plants. Plants may be started from seed, grown from cuttings, or purchased as mature plants. Most classrooms begin their gardens by planting seeds because they are relatively inexpensive, and their growth helps students to visualize the full life cycle of a plant. It is also easy to find donations of seeds from local garden centers or seed companies near the end of the summer because many companies want to get rid of excess stock then. Seed packages are dated, and even though most garden centers and seed companies will not sell seed with older dates, packets kept in a cool and dry location will have high germination rates for many years.

**Curriculum Books and Resources.** There are a lot of solid resources available to aid you in this process. A list of resources is included on page 84. A detailed, prewritten curriculum is especially valuable if you are using volunteers to aid in the teaching process.

**Soil and/or Compost.** Whether you are gardening in the ground or in containers, you will need rich, high-quality soil and compost for your plants. Many municipalities where green waste is collected give compost and mulch to residents.

**Irrigation Supplies.** Plants need water. Irrigation supplies include watering cans, hoses, and sprinklers. Experienced gardeners know that automatic irrigation – for instance, drip irrigation systems or sprinklers – is an important asset for school gardens. If you plan to water with watering cans, make sure they are small enough for students to carry when full.

**Child-Sized Garden Tools.** It is important to use the right tools for the job. Although you may want a few adult-sized tools for parents and volunteers, smaller and more lightweight tools are safer for children to use. When selecting tools, look for durable, well-made, properly sized products. Watch out for donations of poorly maintained or unsafe garden tools. Examples of tools you may need: hoes, rakes, digging forks, digging spades, shovels, hand trowels, hand cultivators, buckets, and a wheelbarrow or garden cart.

**Child-Sized Gloves.** Soil is teeming with life, which is important for the health of your plants. However, it may also include organisms or trash items that are not beneficial for your students. Gloves help protect students from sharp rocks or trash buried in the soil and prevent undesirable organisms from getting under fingernails or into cuts.



Tuscon Village Farm





**Fertilizer.** Even with the most fertile soil, your plants will probably need additional fertilizer for healthy growth. Let the soil test results from your site analysis and the plants' needs be your guide. Nutrients may be added by applications of compost, organic fertilizers like fish emulsion, or synthetic fertilizers like slow-release pellets. Always read and follow the warning labels on fertilizer products and store in a secure location. All fertilizers should be handled by adults or under close adult supervision.

**Garden Stakes and Row Markers.** Label your plants to keep track of what, where, and when you plant. Although at the time of planting, you may think you will remember this without writing it down, once you expand your garden and begin different classroom experiments, it is easy to forget.

**Mulch.** Outdoor gardens benefit from the addition of two to three inches of mulch added to the soil. The mulch helps to slow water loss from evaporation, moderate soil temperatures, decrease soil erosion, and decrease the spread of soilborne diseases. There are a number of different materials you can use as mulch, including shredded wood, straw, plastic, and newspaper. Many tree service companies will donate wood chip mulch to worthy projects such as school gardens.

**Money.** Sometimes there are items or services you will need funds for, such as renting a tiller or paying a water bill. Also, you may run into miscellaneous expenses that you did not originally anticipate. It helps to have a small amount of cash available to your garden project to accommodate fees and surprise expenses.

Once you have a list of needs, where do you begin your search? First, determine whether or not your school or school district has internal supply funds to help with your program. Internal funding may be limited, but it never hurts to try; after all, you are competing for funds with a smaller number of people. Next, look for additional local resources within your community. Businesses like to support local initiatives because it helps them strengthen their ties to the community, closely track the progress of their investment, and reap public relations benefits from their generosity. For instance, a garden business that donates plants hopes the students' parents will acknowledge the investment made in their children and respond by shopping at that store. After looking locally, expand your search to regional, state, and national opportunities.

Most school gardens use three main approaches to seek funds: donations, grants, and fundraising projects. You will probably want to use a combination of these strategies to secure the funds needed to begin and maintain your garden program.





## DONATIONS

Seeking donations is a task that many people dread because they often hear “no” numerous times before getting a “yes.” Before you begin your quest, create project folders for your school garden that you can take with you and leave with each potential donor. The folders will show that your effort is well organized and that the program has the full support of the school administration. The project folder does not need to be flashy, but should include an enthusiastic endorsement letter from the director, principal, or coordinator; a one-page project description; a garden plan; a list of people who support the project; a list of garden needs; and personal appeals like quotes or drawings from students.

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 may have community connections that can fulfill your needs. Reach parents in parent volunteer meetings, school newsletters, and email appeals.
- ▶ Identify potential donors by matching your needs with their services and products. Meet with potential donors in person, if possible.
- ▶ Know the tax status of your school or organization and the name businesses should use when making out checks.
- ▶ Businesses receive requests for donations all the time, so be professional and organized. Ask only for appropriate amounts of cash and specific materials.
- ▶ Remember that businesses need to sell their products and make a profit to survive. Be ready to tell them why they should invest in your school garden project and how you will recognize them if they do support it.
- ▶ Money may be the first gift that comes to mind, but other donations can be just as valuable. These may include plants and seeds, lumber, soil, amendments, fencing, tools, release time for employees who wish to participate, and in-kind gifts like use of equipment.
- ▶ Acknowledge all donations, large and small, in the form of notes, posters, banners, and so on. Include students in the acknowledgment process.
- ▶ If you do not like to ask for donations, find someone on your garden team who is more comfortable doing so. Donors pick up on hesitation and are more likely to say “no” to a person who lacks enthusiasm and confidence.

When people say “no,” accept it gracefully and thank them for their time. Who knows? They may change their mind or you may need to approach them about other opportunities in the future.



## GRANTS

A number of grants are available that provide money and materials to help fund youth gardens.

Grants generally require completion of an application, and may or may not result in funds being awarded. Grants come from a number of sources, including public funds (local, state, and federal government) and private funds from foundations (general, community, corporate, family), corporations, and other resources.

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

- › Find grants with requirements that match your needs.
- › Do your homework. Research the programs supported in the past and the current priorities of the organization.
- › 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 he or she be able to translate your goals and purpose?
- › Submit the application before the deadline.

## FUNDRAISING

If you've already got a school garden, using garden projects to raise money not only provides funds for future expansion or special projects, but also provides students with business experience. Fundraising projects can be used to prepare students for a career in horticulture, engage students in authentic problem-solving challenges, involve students in educating the public, help students develop positive job-related or social skills, teach economics and math, help revitalize a community, and build school/community partnerships.

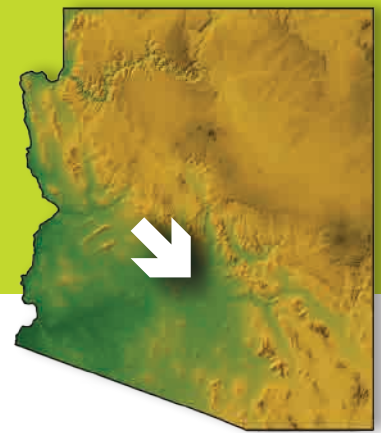
Here are a few fundraising ideas:

- › Plant and sell vegetable, herb, or flower seedlings.
- › Create and sell craft projects from the garden, such as potpourri, pressed flower stationery, or dried flower arrangements.
- › Sell cut flowers or blooming potted plants for special occasions.
- › Save and package seeds to sell.
- › Make an edible product like salsa or jelly.
- › Host a silent auction or raffle. Combine with a dinner or special event like a garden tour.



# program spotlight

**Okra, Corn, Green Beans, Red Beans, Broccoli, Brussel Sprouts, Beets, Radishes, Onions, Carrots, Cabbage, Lettuce, Cucumbers, Squash, Bell Peppers, Peppers, Herbs, Tomatoes**



## **Vista Grove Prep Academy, Mesa, AZ**

### **The Farmers Market From Seed to Stomach**

“We had a parent five years ago donate a raised garden box because she wanted to see green on campus and see the kids gardening like they did back in her homeland of Japan,” said Chris Cafaro who oversees the garden program at Vista Grove Prep Academy, a K-8 school. Today over 100 students are involved with the garden program. Cafaro teaches 5th grade and incorporates his science lessons with garden teachings.

Over five years later, the garden is now full of six raised garden boxes full of blossoming plants. The garden has arrived at this point through years of work and support from the community. The boxes and mulch were all donated and funding has helped support the garden.

“The kids helped build this garden and pounded nails with the hammer to build the boxes,” said Cafaro.

Cafaro has become a sort of local gardening guru and helped other people in the community build their own home gardens. He has also found a great location at Vista Grove Prep Academy where the pollination season is intense and allows for several varieties of sustainable growth. The result is a phenomenal growing garden.

Teaching the students where their food comes from is the theme of the garden at Vista Grove. For Cafaro, he wanted to make a point that the food at the grocery store doesn’t grow at the grocery store. His goal is placing a coral on campus and having chickens for a functioning farm and developing a farmers market on campus.

“I’d like the students to understand the self-sustainability of gardening and farming,” said Cafaro.

With the students, teachers, staff, and community involved, this garden has the support needed to keep growing long into the future.

“We’ve been blessed by so many people in the community to help with the garden over the years,” said Cafaro. “The garden brings a lot of smiles and it’s a lot of fun for the kids.”



- › Hold a spring garden sale with plants started by students or donated by local gardeners and nurseries.

Before organizing a fundraising event, seek approval from school administrators. Also, check with governmental offices to see if you will need a special license (such as a nursery license or food handlers' license). Finally, before the event takes place, establish financially sound procedures for handling and depositing money.

### **FOLLOW-UP ACTIVITIES**

It is extremely important to follow up with your donors not only to show appreciation, but also to update them on your progress. If you create a sense of involvement in the program, they will want to contribute 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, however, when you receive a donation or grant (no matter how small) make sure that you send a thank you note written either by you or by one of the students involved in the program. Some additional ideas for follow-up:

- › Post a sign or plaque in your garden recognizing all contributors.
- › Plan a formal dedication ceremony for new gardens to recognize contributors and involve the community.
- › Create a website so donors can track progress. Include an acknowledgment of their contribution on your site.
- › Send a regular print or email newsletter.
- › Send a card with an update on progress, such as a “First Day of Spring” card.
- › Host a garden party and invite all funders and sponsors to participate.
- › Recognize contributions 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.

These tips should help as you search for support for your school garden program. Also remember your “C’s” – be creative, clear, concise, concrete, consistent, complete, cohesive, compelling, confident, convincing, and competent. Finding supplies and securing funding are activities you will engage in not only at the beginning of your school gardening pursuits, but also continuously to help sustain your garden (see Chapter 9, Sustaining Your Garden, for more information). A positive attitude will serve you well in your pursuit.



# planting your school garden

After planning and preparation, the excitement builds to the day when everyone can really “dig in” and get their hands dirty. Watching the garden design magically come to life sparks curiosity and amazement in both youth and adult participants. Although planting involves a lot of hard work, gardeners are usually too captivated by the activity to notice.

This chapter offers some planting basics and tips for garden installation. It is important to remember that your focus is on creating an educational tool, and planting is just part of the learning process. Planting Day should be the beginning of a wonderful exploration. Base planting decisions on researched methods, but leave room for students to experiment. Some of your team’s design ideas may thrive and others may fail; just keep trying until you are successful. If you approach the garden with a positive and adventurous attitude, the students, parents, and other garden team members will follow.

## PREPARING THE SOIL AND BEDS

Your team’s first step will be to prepare the soil and beds. This procedure will vary greatly in time and intensity depending on the size of the project and the location and type of the garden.

## INDOOR GARDEN

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

If installing grow lights, follow the directions included with the materials or research an approved design. Be sure to follow all safety precautions and, if possible, ask your school district’s electrician to review construction.

For indoor gardens, your team will need to obtain a supply of containers and soil. A wide range of pots can be used. Just make sure they have drainage holes at the bottom to avoid waterlogged plant roots. Plastic pots are the most common containers because they generally are inexpensive, can be reused, and are light-weight. You could also use clay pots, fiber pots, school milk cartons, growers’ flats or market packs, egg cartons, plastic planting bags, and plastic soda bottle bottoms. Students may be able to bring many of these items from home.

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



root aeration, and root movement, yet heavy and spongy enough to provide anchorage and to hold on to adequate water and nutrients. Additionally, it is easy to transport and readily available in most garden stores. Another good feature of such potting mixes is that most are sterilized so that they do not contain weed seeds, insects, or diseases that could flourish in the favorable conditions of an indoor garden. And soilless mix doesn't produce mud, so if it gets on clothing, it brushes off easily.

## OUTDOOR GARDEN

**Container Gardens.** For smaller planting projects, preparing container gardens is much easier than in-ground or raised beds. First, obtain appropriate containers. Your class can use just about any container that will hold soil and has holes for drainage. Examples of common containers: clay and plastic pots, wooden barrels, window box planters, and plastic or metal buckets. Your team can also be creative and use items like bathtubs, wheelbarrows, shoes, and hollowed-out pumpkins or gourds. Smaller containers will need more frequent watering and fertilization than larger containers. Just make sure, if you are planting fruits and vegetables, that the containers were never used to hold toxic materials.

Fill your chosen containers with a good potting soil mix. Although you can use garden soil, it tends to compact in containers, making it heavy and poorly drained, so it is best to use potting soil designed for containers. Potting soil can be obtained from garden centers.

Most common garden plants will need eight to twelve inches of soil at the most, so if the chosen containers are deeper than that you may want to add a layer of rocks (will add weight) or Styrofoam peanuts (make sure they are made from plastic, not biodegradable materials) at the bottom. This layer can help with drainage in addition to decreasing the amount of soil needed.

**Raised Beds.** As mentioned in Chapter 5, *Designing Your School Garden*, there are two different ways to make raised beds. The simplest way to create a raised bed is to measure and stake each planting area (use a string from stake to stake to better delineate the garden bed), then loosen the existing soil with a spading fork and add soil, compost, or both until the bed is eight to twelve inches high. The soil can be brought in from another location or taken from surrounding areas. Rake the surface smooth to create a flat-topped bed, which increases water retention and decreases soil erosion.

To create permanent, well-defined raised beds, create frames using rot-resistant wood, such as cedar or redwood, or other materials, such as recycled plastic boards, bricks, rocks, or cement blocks. When installing framed raised beds, consider installing landscaping fabric to suppress weeds from growing up in your



bed and/or gopher wire as a barrier. Avoid pressure-treated lumber; it has been treated with toxic chemicals. Fill beds with soil or a mixture of soil and compost.

Raised beds have numerous benefits. They look neat, support healthy plant growth, and help keep young students on paths. The loose soil encourages roots to grow strong and deep, and moisture soaks in easily. In areas with cool, wet spring weather, soil in raised beds drains and warms more quickly, allowing gardens to be started earlier. Conversely, in arid areas, raised beds soak up available moisture well, but they also dry out more quickly. Beds that are constructed slightly below the soil surface conserve moisture more effectively than do raised beds.

**In-Ground Beds.** If your team is installing an in-ground garden, begin by tilling the ground to loosen the soil and help in removal of weeds. Tilling is a process of turning the soil to improve its structure. It is also called **cultivation**. You can till the soil by hand using shovels or digging forks, or mechanically using a tiller.

Soil is composed of sand, silt, and clay particles and has pore space reserved for water and air. An ideal garden soil is made up of 50 percent soil particles and 50 percent pore space (half filled with water and half filled with air). How the soil particles and pore space are configured is called the soil structure. Over time, as we walk on the soil, and through other environmental forces, the soil becomes compacted and the structure loses important pore space. By tilling the soil, we decrease compaction and increase the pore space. This improves the soil structure and makes it easier for you to plant and for plants to establish their roots.

Avoid tilling excessively wet or dry soil. If the soil is too dry or too wet, tilling can actually damage the soil structure rather than improve it. To test soil moisture, scoop up a handful of soil and try to create a ball. With perfect moisture, the soil will form a stable ball but will crumble easily when touched. If it is too dry, it will not stick together. If it is so tightly stuck together that it will not come apart when touched, it is probably too wet. Tilling dry soil is backbreaking work that results in a dusty mess and drifting soil particles. If the soil is dry, water the garden thoroughly one to three days before tilling. Wet soil, on the other hand, will stick to shoes and tools. Tilling in this condition will destroy air pore space; the weight of the wet particles will cause them to collapse into each other when turned. If the soil is too wet, give it time to dry out before tilling. If your area is experiencing heavy rainfalls, your class may need to cover the soil with plastic to decrease water exposure.

If the garden is fairly small, the soil can be tilled by hand with a shovel. This is a great activity for students with excessive energy. Try to turn the soil to a depth of one to two feet if possible. One method used to ensure a thorough tilling of soil by hand is called **double digging**. To do double digging, begin by having students



dig out a row of soil in the garden approximately one foot wide and one to two feet deep and place the soil in a wheelbarrow. Next, dig out another row of soil one foot wide and one to two feet deep, and move this soil into the first empty row. Have students continue to move across the bed until they reach the end and then dump the wheelbarrow full of soil from the very first row into the last empty row. Although double digging is a lot of work initially, it ensures a thorough job of turning the soil and a bed that is easy to work in.

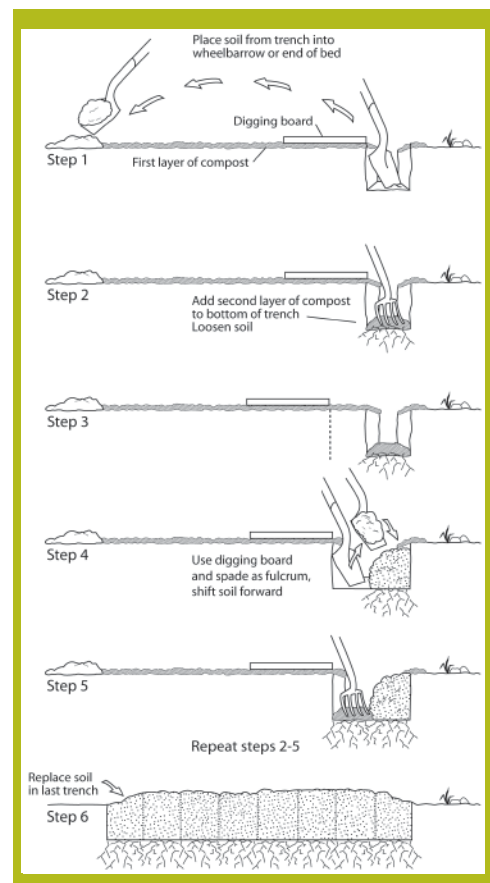
Your class can also till the soil mechanically using a tiller. Tillers are like small plows that work to loosen and turn the soil with blades powered by gas or electric engines. They come in a wide range of sizes and can often be rented from local landscape centers. If your site is larger than an acre, consider using a farm-sized tractor with plowing attachments to break up the soil. The difference between using a shovel and using a tiller is like the difference between using a spoon and using an electric mixer when you're mixing cake batter. Both will get the job done, but they vary in the time and energy needed for completion.

If you are concerned about the composition or nutrient content of the soil, add a layer of compost when tilling. Compost is made up of decaying organic matter. The organic matter increases the moisture retention of the soil, and as it breaks down, it releases important nutrients. Also, as it decomposes, it provides additional pore space, improving the soil structure. First, till the garden once to break up the compacted soil. Next, add a 2- to 4-inch layer of compost to the surface and then till the garden again to incorporate it into the soil.

Tilling should be done several weeks before the planting season and again right before Planting Day if possible. Add any soil amendments such as compost or topsoil during your first till. Remove weed and grass plants during tilling. Grass and weeds will compete with garden plants for water, nutrients, and space. After tilling, rake the garden soil smooth, being careful to avoid walking through the beds so as not to compact the soil.

Although the landscape plan provides a general idea of the shape of the beds before tilling, after preparing the soil, you should stake out the beds. If planning straight rows, position stakes in the corners of the future beds and connect them with a length of string. For beds with a curved outline, lay a garden hose or length of rope on the ground as a guide. Remember to keep beds narrow enough so that kids can reach the middle of the bed without stepping in it.

After outlining the beds, install the irrigation system, if any. The next step will be to add the plants.



Cathy Reinhart/UCSC CAFS



## OBTAINING PLANTS

Plants may be started from seed, grown from cuttings, or purchased as mature plants. Most classrooms begin their gardens by planting seeds because they are relatively inexpensive and their growth helps students to visualize the full life cycle of a plant.

## SOWING SEEDS

Seeds may be planted outdoors directly into the garden or started inside on a windowsill and later transplanted to an outdoor garden (or remain as indoor plants). At the end of this chapter are fall and spring planting guides with information about common vegetables, fruits, herbs, and flowers planted from seed in school gardens.

## PLANTING SEEDS OUTDOORS

In moist, but not wet, soil, have students make holes or shallow trenches, place seeds in these holes, and then cover them with soil. In most cases, they will find proper seed spacing and depth information on the back of the seed packets. If this information is not available on the packet, check planting guides for more details. It is important to avoid planting seeds too close together. Crowded seeds compete for resources as they grow. Place a label with the date and crop or variety name where it can easily be seen.

After planting, ask responsible students or adult volunteers to water the seeds with a gentle spray. If the water spray is too forceful, the seeds will move from their original planting spot, and seedlings will emerge in clumps. Make sure the initial watering is thorough enough to moisten the soil to the depth of the planted seed. They may have to provide a succession of gentle sprays to moisten the soil appropriately, allowing the water to soak into the soil before applying another gentle spray. Flooding newly planted areas can cause the soil to slick or form a “crust” that will inhibit germination. Overwatering causes a shiny soil surface; this is a sign to stop and let the water soak in before applying more. After planting, it is important to keep the soil constantly moist so the seeds will germinate. However, too much water will encourage disease and decrease germination rates.

## PLANTING SEEDS INSIDE TO TRANSPLANT OUTDOORS

Starting seeds indoors extends the growing season, allows greater variety in plant choice, simplifies care of newly germinated seeds, and produces a lot of plants for less money. In most growing regions in Arizona, it is a good idea to start vegetable seeds indoors to get a jump on spring planting so your class will have more mature plants to harvest by the end of the school year. Some vegetables, such as beans, carrots, and squash, prefer to be sown directly in the garden. Others, such as basil and lettuce, can be started indoors or direct seeded. Refer to the planting guides at the back of this chapter or read the information on seed packets for more information on growing time.

**When to Plant.** The best time to start seedlings depends on the crop and the climate. Generally, seeds should be started three to eight weeks before



the typical last frost date for your area, or so that plants mature before excessive heat arrives.

**Containers.** Any container at least three 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 standard sizes, and some are reusable.

**Potting Mix.** Use a soilless seed-starting mix, available at any garden center. 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.

**Temperature and Light.** Indoors, most seeds germinate best at soil temperatures between 70 and 75 degrees and air temperatures between 65 and 70 degrees. Once they're up, seedlings need lots of light, or they'll grow tall and weak. Relying on sunlight may limit seed options; grow lights and fluorescent lights provide more control over light availability. If you use grow lights, keep the tops of the seedlings within a few inches of the bulbs and leave the lights on for 12 to 16 hours a day. Check seedlings daily and raise the lights as they grow taller.

**Water and Fertilizer.** Until seeds germinate, keep the soil moist by spraying it with a pump sprayer or mister. Cover the pots with clear plastic to preserve moisture. Once the first seedlings germinate, remove the plastic and place the container under lights. Consistent moisture is very important, but be careful that soil doesn't get too wet, because excess moisture can cause rot.

Begin fertilizing the seedlings when they have their second set of true leaves. (The first leaves that emerge upon germination are seed leaves, also called *cotyledons*; they do not have veins as the true leaves do.) Use a mild fertilizer diluted for seedlings as directed on the product label. Some seed-starting mixes contain fertilizer, but your seedlings may use it up before the class is ready to transplant them. Always follow the warnings on fertilizer products and store them in a secure location.

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

When it's time to transplant, water the seedlings well beforehand. Have students dig a hole for each transplant, spaced as noted on the seed packet. As they plant, your class may want to incorporate compost or fertilizer beside the plant to add to soil fertility (if using liquid fertilizer, read the label carefully; seedlings require a weaker solution than established plants). Instruct students



to firm the soil around the root ball, water it well, and mark the bed. To reduce transplant shock, avoid transplanting in midday heat.

## PLANTING SEEDS INSIDE FOR INDOOR GARDENS

Use the directions above to start seeds for indoor gardens. However, instead of transplanting them outside, replant them in larger pots as they grow. Many plants can be grown from seed in indoor gardens. Low-light plants for windowsill gardens include vegetable plants with leaf or root crops, such as beets, carrots, collards, lettuce, mustard greens, parsley, radishes, Swiss chard, and turnips. With grow lights, your class can also raise beans, cucumbers, eggplants, peanuts, peas, peppers, and tomatoes. Some flowering plants you might want to try indoors: ageratums, alyssum, coleus, impatiens, marigolds, morning glories, nasturtiums, petunias, snapdragons, and zinnias. Many herbs can also be started from seed indoors. These include basil, catnip, coriander, chives, dill, marjoram, spearmint, oregano, sage, summer savory, and thyme. Indoor plants are usually smaller than outdoor plants and have lower production rates; however, they still provide excellent learning opportunities for your students.

## GARDEN INSTALLATION

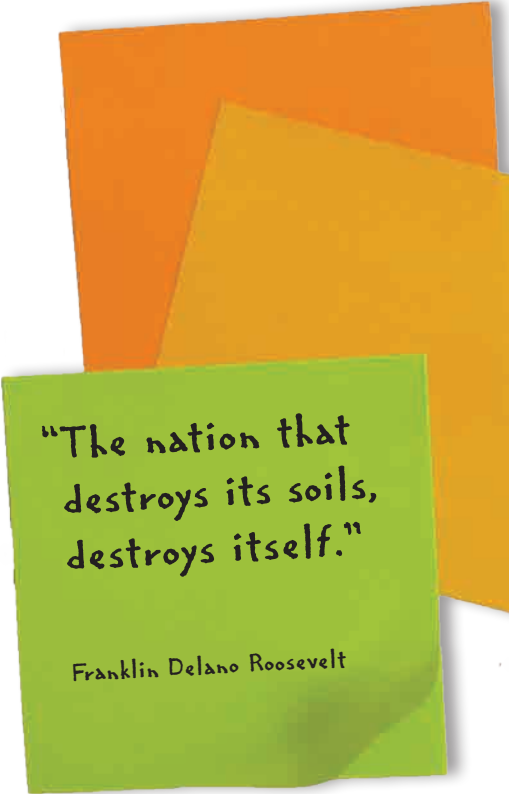
Although you can add plants to your garden at any time, many schools dedicate one day to a majority of the installation. This allows students to come prepared and helps in coordinating volunteer recruitment efforts. Careful planning is needed to ensure a successful Planting Day.

### Prior to Planting Day:

- ▶ Ask your students to research the growing needs of the plants you are planning to include in the garden. This will increase their involvement and understanding of the planting process.
- ▶ Recruit members of the garden team and additional adult volunteers to help on Planting Day. It is important to have extra hands and eyes to keep up with all the activities. Talk to the volunteers about how important it is for each child to be an active participant in the project.
- ▶ Publicize Planting Day to keep the community informed of your project. Newspapers love to run community-interest stories, and installing the garden provides wonderful photo opportunities.
- ▶ Make a list of all the tasks to be completed on Planting Day and be prepared to divide them among multiple small groups of volunteers and students.
- ▶ Take a “before” picture of the site for class archives.

### On Planting Day:

- ▶ Encourage students to apply sunscreen and wear hats. Require everyone to wear closed-toe shoes.



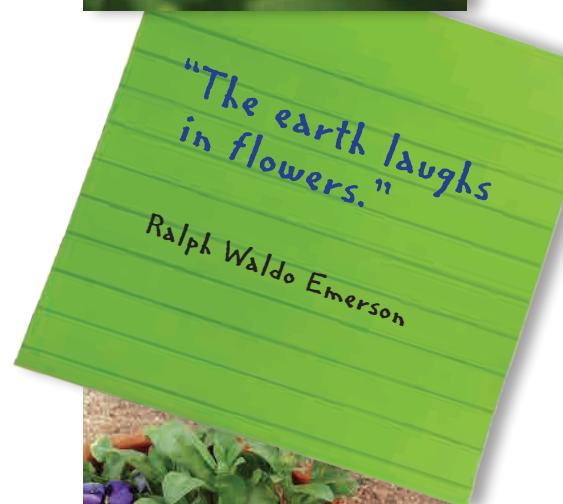
“The nation that  
destroys its soils,  
destroys itself.”

Franklin Delano Roosevelt

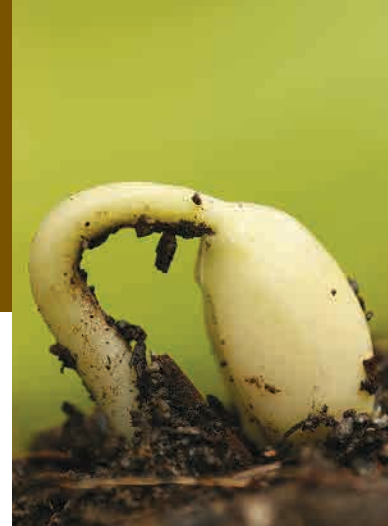
- › Begin your day with safety instructions and ground rules. Teach students how to use the tools, how to hold tools with sharp edges pointed down, and that they must walk, not run, when carrying them. Remind students to keep tools below the waist when working in the garden and to leave rakes, hoes, and shovels pointed down and out of pathways when not in use. Provide the right size of tools and gloves for your students.
- › Go over the design of the garden with the students and volunteers to make sure everyone knows how the garden is supposed to be installed. Lay out the beds as a group to avoid confusion, and have hard copies of the design available. If the area is large, lay out the beds prior to Planting Day to save time (make sure to involve students; this is a great math activity).
- › Demonstrate proper planting and watering techniques and describe all the plants to be installed in the garden. If you do not feel comfortable with the demonstrations, recruit an experienced gardener or a member of the garden team to serve as a guest speaker.
- › Divide the students into groups and have an adult volunteer available to work with each small group. Make sure the volunteers understand what their group should work on. Installation should be a hands-on experience for all students; working in small groups ensures that everyone will have a chance to participate.
- › Keep a first-aid kit in the garden and provide plenty of drinking water to prevent students from getting dehydrated.
- › Take lots of pictures to chronicle your work.
- › Remember to HAVE FUN!

#### After Planting Day:

- › Water plants with a gentle spray and check to see that the plants' root zones are moist.
- › Make sure to clean all tools and store them in a safe location.
- › Thank all students and volunteers for their hard work.
- › Take "after" pictures of the newly planted garden.
- › Share details from Planting Day with school administrators, sponsors, and the community through letters, the school website, and newsletter and newspaper articles. Thank them for their support. This follow-up will allow supporters to see the result of their contributions.
- › Incorporate the garden into the curriculum and continue with basic maintenance activities.



# school garden planting guides



## KEY TO PLANTING GUIDE HEADINGS

**Crop.** This guide provides detailed information about crops commonly planted by seed in school gardens. We encourage you to experiment with additional plants that grow well in your area. Check with local gardeners, your Cooperative Extension Service office, and garden center employees for suggestions.

**Plant Seeds Indoors.** Many seeds can be started indoors and then transplanted to outdoor gardens. This column provides you with the weeks to plant your seeds indoors relative to your first or last frost date. Your Cooperative Extension Service office can tell you the frost dates in your area.

**Plant Seeds or Transplants Outdoors.** Some seeds can be planted indoors or outdoors. Other seeds will not transplant well and should be sown directly into outdoor gardens. This column provides you with the weeks to plant your seeds in outdoor gardens and also the approximate time to plant seedlings started indoors in outdoor gardens relative to your first or last frost date. Your Cooperative Extension Service office can tell you the frost dates in your area.

**Planting Depth.** Generally, seeds should be planted at a depth that is two to three times their width. This column lists specific planting depths in inches. Some of the crops listed either require light to germinate or are too tiny to be buried under soil. A “0” appearing in this column indicates that the seeds should be planted on top of the soil and pressed down lightly with a smooth surface, but not buried.

**Spacing of Plants.** Plants should be grown a certain distance apart to ensure they do not crowd each other and inhibit healthy growth. This column gives the recommended spacing for mature plants in inches. Since not all seeds will germinate, seeds should be planted closer than the distance needed by mature plants. Follow the spacing recommended on the seed packet when planting seeds outdoors. If more seeds germinate than expected, you may need to thin the crop.

**Days to Germination.** This column tells you approximately when seeds will sprout given reasonable conditions. Temperature and moisture can greatly affect this rate.

**Days to Harvest.** This column tells you approximately when plants will be ready to harvest. Temperature, water, and a number of other environmental factors can affect this rate.

**Good Source Of.** This column gives information on vitamins and minerals provided in substantial amounts for fruit and vegetable plants.



# vegetable planting guide



Crop	Plant Seeds Indoors (weeks before transplanting)	Plant Seeds or Transplants Outdoors 10 – 1000 ft	Elevation 1000 – 2000 ft	Elevation 2000 – 3000 ft	Elevation 3000 – 4500 ft
Beans	1 week	2/1-3/1 & 8/1-9/1	2/15-3/15 & 7/25-8/15	3/1-4/1 & 7/15-8/15	4/25-7/15
Beets	×	9/15-3/1	9/1-3/15	8/25-4/1	3/1-5/15
Broccoli	4-6 weeks	9/1-1/1	9/1-12/1	7/25-10/1	2/15-8/1
Cabbage	4-6 weeks	10/1-12/1	9/15-1/1	9/1-2/1	3/15-5/1
Cantaloupe	2 weeks	12/1-4/10	2/15-4/1	3/15-6/1	5/1-6/20
Carrots	×	7/15-8/15 & 9/1-1/1	9/1-3/1	8/25-3/15	3/1-5/10 & 7/15-9/15
Cauliflower	4-6 weeks before	10/1-12/1	9/15-1/1	9/1-2/1	3/15-5/1
Celery	8-10 weeks before	10/15	8/15-10/15	8/1-10/15	5/15-6/20
Corn	1 week before	2/15-3/1 & 7/30-8/30	2/15-3/15 & 6/20-7/20	3/15-4/1 & 7/15-8/15	5/10-7/15
Cucumbers	1-2 weeks before	12/1-4/1	3/1-4/1 & 8/15-9/15	3/20-5/15 & 8/1-9/1	5/10-6/15
Garlic	×	9/1-12/1	9/1-12/1	9/1-1/1	2/15-4/10 & 9/15-11/15
Lettuce (Head)	4-5 weeks before	9/20-11/20	9/1-1/1	9/1-2/15	2/15-3/15 & 7/15-8/15
Lettuce (Leaf)	4-5 weeks before	9/20-1/1	9/1-3/1	8/20-4/1	3/1-4/15 & 7/15-9/15
Onions (Green Bunch)	×	9/15-1/15	9/1-2/1	8/15-2/1	2/15-5-1
Onions (Seed)	×	11/1-12/15	10/15-1/1	10/15-1/1	1/15-3/15 & 9/15-11/15
Onions (Sets)	×	11/15-1/15	11/2-2/1	11/1-2/15	9/15-11/15 & 2/15-4/15
Peas	4-6 weeks before	9/10-9/20 & 1/20-2/15	8/15-9/15 & 10/15-12/15	8/15-9/15 & 2/15-3/15	2/1-3/15 & 8/25-10/15
Peppers	6-8 weeks before	2/1-3/15	3/1-4/1	4/1-6/1	5/10-6/1
Potatoes	×	9/1-2/15	2/1-3/15	2/15-5/1	3/20-4/20 & 7/25-8/15
Pumpkins	×	7/15-8/15	7/1-8/1	4/1-7/15	5/15-7/1
Radishes	×	9/1-4/1	9/1-4/15	8/5-5/1	3/1-5/15 & 7/15-9/15
Spinach	3-4 weeks before	9/15-2/1	9/1-2/1	8/20-3/1	2/15-4/15 & 9/15-10/15
Squash, Summer	×	12/15-4/10	2/1-5/1	3/15-7/15	5/10-7/15
Squash, Winter	×	7/15-8/15	7/1-31	7/1-31	5/10-7/1
Tomatoes	6-8 weeks before	1/1-3/15	2/15-3/15	3/15-4/15	5/1-6/15
Strawberries (Alpine)	3-5 weeks before	10/15-12/15	10/15-12/15	9/15 - 11/15	9/15-11/15
Watermelon	2 weeks before	12/15-4/1	2/15-4/1	3/15-6/1	5/10-7/15

× Not Recommended

<b>Elevation 4500 - 6000 ft</b>	<b>Elevation Above 6000 ft</b>	<b>Planting Depth (inches)</b>	<b>Spacing of Plants (inches)</b>	<b>Days to Germination</b>	<b>Days to Harvest</b>	<b>Good Source of</b>
5/15-7/1	5/25-6/15	1	6-8	4-10	60-80	Vit. C, fiber
5/1-7/15	5/15-6/15	1/2	2-4	7-10	50-75	Greens high in Vit. A, C, iron, calcium
4/1-7/15	Not Adapted	1/4	15-18	5-10	60-75	Vit. A, C, folate, calcium, magnesium, fiber
×	×	1/4	18	4-10	60+	Vit. C, fiber
5/15-6/15	5/25-6/10	1	24-36	7-14	60-90	Vit. A, C, thiamine, potassium
5/1-7/15	5/15-7/1	1/4	2	10-17	60-80	Vit. A, fiber
×	×	1/4	15-18	5-10	60-72	Vit. C, folate, potassium
6/1-7/15	Not Adapted	1/4	6	7-12	75-100	Fiber
5/25-7/1	6/1-6/10	1	12-15	3-10	50-95	Thiamine, folate, potassium
5/15-6/15	6/1-25	1	12-24	3-8	60-80	–
4/1-30	Not Adapted	1/2	4-6	10-15	90-120	Vit. A, C, folate
7/1-8/1	6/1-6/30	1/4	10-12	4-10	45-60	Vit. A, K, calcium
3/15-4/15 & 8/1-9/15	5/1-7/1	1/4	10-12	4-10	45-60	Vit. A, K, calcium
4/15-5/1	5/1-31	1/4	4	4-12	60-85	Vit. C
2/15-4/15 & 10/15-1/1	4/1-30 & 10/15-1/1	1/4	4	4-12	60-85	Vit. C
11/1-2/1 & 4/1-15	11/1-2/15 & 4/15-6/1	1/4	4	4-12	60-85	Vit. C
2/15-8/15 & 8/1-9/1	5/1-6/1	1	4	6-15	55-75	Protein, Vit. B1
5/10-8/25	5/15-6/1	1/2	10-12	8-20	70+	Vit.C
5/10-6/1	5/15-6/1	6	10-12	10-15	70+	Vit. C, B6 <sup>l</sup> , niacin, copper, potassium, fiber
5/20-6/15	5/25-6/10	1	36	7-10	90+	–
4/1-6/15	5/15-6/15	1/4		3-10	25-40	–
4/1-5/15	5/1-6/1	1/4	4-8	6-14	40-60	Vit. A, C, K, iron
5/1-7/1	5/15-6/15	1	15-24	3-12	60-85	Vit. A, C, fiber
5/15-7/1	5/15-6/10	1/2-1	24-36	4-10	80+	Vit. A, C, potassium, fiber
5/10-6/1	5/25-6/10	1/4-1/2	18-24	6-14	65-85	Vit. A, C, potassium, fiber
4/15-5/15	4/15-5/15	1/8	6-8	20	85+	Vit. C, fiber
5/1-6/1	Not Adapted	1/2-3/4	24-36	7-10	75-100+	–

# herb & flower planting



Crop	Plant Seeds Indoors (weeks before transplanting)	Plant Seeds or Transplants Outdoors Elevation 10 – 1000 ft	Elevation 1000 – 2000 ft
Basil	3-4 weeks before	Feb 15-May 1 & Sept 15-Nov 30	Feb 28-May 1 & Sept 1-Nov 30
Catnip	6 weeks before	Feb 15-May 1	Feb 28-May 1
Chives	6 weeks before	Sept 15-March 30	Sept 15-March 30
Cilantro	×	Feb 15-May 1 & Aug 15-Nov 30	Feb 28-May 1
Dill	×	Feb 15-Sept 1	Feb 28-May 1
Oregano	6-8 weeks before	Feb 15-May 1	Sept 1-Jan 15
Parsley	4-6 weeks before	Jan 15-April 30 & Aug 15-Oct 30	Feb 1-April 30
Sage	4 weeks before	Sept 15-March 30	Sept 15-March 30
Mint	6 weeks before	Feb 15-May 1	Feb 28-May 1
Thyme	8 weeks before	Feb 15-May 1	Feb 28-May 1

× Not Recommended

Crop	Plant Seeds Indoors (weeks before transplanting)	Plant Seeds or Transplants Outdoors 0 – 2499 ft	Plant Seeds or Transplants Outdoors 2500 - 4999 ft
Alyssum	×	Oct-April	Aug - Sept & March - April
Calendula	6-8 weeks before	Feb 15 - April & Oct - Dec	Aug - Oct
Cosmos	4 weeks before	March 1 - May & Oct - Dec	April - June
Gaillardia	×	Feb 1 - June & Oct - Dec	Fall to Spring
Hollyhocks	6-8 weeks before	Sept 15 - Dec & Jan - May	April - Aug & Dec - March
Marigolds	8-10 weeks before	March 1 - July & Oct - Dec	April - May & Aug - Sept
Nasturtiums	×	Feb 1 - Sept	April - May
Poppy (California)	×	Oct - Dec	July - Sept
Sunflowers	×	Feb 1 - Aug & Oct - Dec	April - June
Tithonia	6-8 weeks before	March 1 - July & Oct. - Dec.	May - June
Zinnias	6 weeks before	March 1 - Aug	April - June

× Not Recommended





**Elevation  
2000 – 3000 ft**

**Planting Depth  
(inches)**

**Spacing of Plants  
(inches)**

**Days to Germination**

March 15-May 1	1/8	6-12	7-10
March 15-May 1	1/8	12-18	5-14
Sept 1-March 30	1/4	8-12	5-14
March 15-May 1	1/2	12-18	10-15
March 15-May 1	1/4	3-12	20-25
Sept 1-Jan 15	1/8	8-12	8-14
Feb 15-April 30	1/4	6	11-27
Sept 1-March 30	1/4	12	14-21
March 15-May 1	1/8	18	10-16
March 15-May 1	1/8	6-12	20-30

**Planting Depth  
(inches)**

**Spacing of Plants  
(inches)**

**Days to  
Germination**

**Days to  
Harvest**

**Edible?**

0 (press into soil)	8	5-20	–	Yes
1/4 - 1/2	10-12	5-15	40-50	Yes
1/4	8-24	5-7	90-100	No
1/4	15	7-14	–	Seeds
0 (press into soil)	24	10	120-150	Yes
1/8	10-12	5-10	70-80	Yes
1/2	6-12	7-14	40-60	Yes
1/8	6-12	14-28	55-60	No
1-2	12-24	7-14	80-120	Yes, seeds
0 (press into soil)	24	10-15	75-105	No
1/8	6-12	5-10	70	No

# maintaining your school garden



The excitement of Planting Day is hard to top, but it is the continual care and observation of plant growth that strengthens students' connection to the land and broadens their understanding of the environment and food systems. Once plants are in the ground, you will need to maintain the garden through regular activities such as watering, thinning, weeding, fertilizing, mulching, composting, and monitoring for pests. These activities promote healthy plants by providing for their needs. The five basic needs of plants are water, light, nutrients, air, and a place to grow.

**Water.** Plants use water for a number of important processes, including photosynthesis (production of food) and transpiration (evaporation of water from the leaves into air that cools the plant and creates pressure to move water from roots to leaves). Water also aids in the absorption of some nutrients.

**Light.** Energy from light is captured to use during photosynthesis.

**Nutrients.** Just as people need vitamins, plants need special nutrients to help them grow properly and for their biological processes to function. The top three essential nutrients for plants are nitrogen, phosphorus, and potassium. Most plant nutrients are provided by the soil, and we increase their availability through fertilization.

**Air.** Plants take in carbon dioxide and oxygen to use during photosynthesis.

**A Place to Grow.** Plants need a place to call their own with room to grow to maturity.

The need for each of these components varies by plant. Research your school garden plants to learn how to care for them properly. Plants also provide signals when they have a need. For instance, a plant needing water will wilt, and the leaves of a plant needing nitrogen will turn yellow. It is important for your students to discover and understand these signals.

This chapter provides background information on some of the techniques your team will employ to maintain the garden, along with an overview of seasonal garden tasks. It concludes with tips for dealing with such common challenges as how to maintain the garden during summer breaks and how to deal with vandalism.



## WATERING

As a general rule, during active growth most plants require about one inch of water (from rain or irrigation) per week. In hot, dry, and windy conditions they need more. In cool and humid conditions they need less. Feeling the soil around the plants is the best indicator of when it is time to water. The soil should be moist, but not too wet. Poke your finger about one inch down in the soil. If the soil feels dry, then it needs additional water.

Plants wilt when not enough water is getting to the leaves. However, do not automatically assume that you need to water wilted plants, because they may also wilt when there is ample or excessive water. Test the soil first. If the plants are wilted but the soil is wet, it is still a sign that the leaves are not getting enough water – but it is a root problem. If the plant is new or recently transplanted, it may just need some time for the root system to become established. Sometimes new roots cannot keep up with the water demands of the leaves. If the problem continues, it could mean the roots have a fungal disease. In this case, remove the plant and the soil around it to prevent possible disease spread.

When you or your students water, apply the spray to the base of the plant and avoid excessive moisture on the leaves. The plants are absorbing water through their roots, so the water needs to be in the soil. Additionally, water on leaves can lead to a number of disease problems. Water plants in the early morning to cut potential losses by evaporation. Apply water slowly to give it time to sink into the soil. If water is applied too quickly or with too much force, it will run off into drainage areas along with loose soil and new seeds. Children often water until the soil looks moist on the surface, but that might not be enough to benefit the plant. After watering, it is always a good idea to check the soil by poking a finger into the soil around the plant's roots.

A number of watering tools are available. Watering cans and garden hoses are the least expensive alternatives. However, they take quite a bit of time and close monitoring. Other alternatives are soaker hoses, drip irrigation, and sprinkler systems. These require less time and can be linked to automatic timers, easing the chore of watering during weekends and long breaks. These tools are more expensive, however, so you may need to look for additional funds or donations.

## THINNING

Many times more seeds are planted than can grow to maturity in the available space. Once the seeds germinate, you and your students need to “thin” your crop by removing some of the seedlings growing too close to each other. Although it is never easy to remove plants, if you leave too many plants in a small space they will compete for resources and will not be able to grow to their full potential.



Western Growers Foundation

When your students thin, instruct them to identify the healthiest seedlings and remove the others. One technique is to pull out the less-healthy seedlings. However, doing so risks disturbing the roots of the plants you want to keep. An alternative is to cut the tops off the unwanted seedlings, after which the roots will eventually decompose. Thinning can be a challenging activity for younger children, and they may need close guidance.

You can place thinned plants in a compost pile or worm bin. Also, some vegetable sprouts are edible and full of nutrients – perfect for a great nutrition lesson and tasting activity.

## WEEDING

Weeds are plants growing in the wrong place. You should remove all such plants because they will compete for space, light, and water with your intended crops (and many times weeds will win, because they are well adapted to your conditions). First, you and your students need to learn how to identify the seedlings of your crops. After students know what to keep, they will know what to remove. Pull weeds by hand or remove them by hoeing or cultivating around the plants, staying far enough away to prevent damaging the wanted plants or their roots. With either approach, make sure the roots of the weed are completely removed.

To ensure that weeding does not become an overwhelming job, encourage students to monitor the garden continuously and remove weeds when they are small. If weeds are allowed to grow for too long, they will flower and spread seeds, which will escalate the weed problem. One simple way to decrease weed problems is to apply a layer of mulch to the soil.

## MULCHING

Outdoor gardens benefit from the addition of two to three inches of mulch on top of the soil. The mulch helps to slow water loss from evaporation, moderate soil temperatures, decrease soil erosion, and decrease the spread of soilborne diseases. You can use a number of different materials as mulch, including shredded wood, leaves, straw, plastic, and newspaper. The various mulches offer different benefits. For instance, organic mulches (shredded wood, leaves, or straw) will eventually break down and help improve soil structure. Plastic mulches will increase the soil temperature. Choose mulch according to your plants' needs, mulch availability, and visual preferences.

## FERTILIZING

For healthy growth, all plants require certain nutrients. The three they need in the largest quantities are nitrogen (N), phosphorus (P), and potassium (K). Nitrogen is important for stem and leaf growth and for the photosynthesis process. Phosphorus promotes root growth and improves flowering and fruiting.





Potassium contributes to root development, the overall growth of the plant, and disease resistance. Other essential nutrients are equally important, but plants require them in much smaller amounts.

Plants acquire most nutrients from the soil by absorbing them through their roots. During the site analysis discussed in Chapter 5, *Designing Your School Garden*, you completed a soil test that provided information on the nutrient content. It is common to find that your soil is low in nutrients, especially the “big three.” Since nutrients aren’t always abundant enough in soil to support healthy plant growth, gardeners make up the difference by adding fertilizer.

A number of different types of fertilizers are available. Some deliver nutrients to your plant immediately; others release nutrients slowly over time. Examples of common fertilizers are liquid or solid synthetic fertilizers, slow-release pellets, compost, fish emulsion, and dried manure. Any product sold as a fertilizer will have a nutrient analysis on the label with three numbers. The numbers represent what percentage of the three major nutrients – nitrogen (first number), phosphorus (second number), and potassium (third number) – the fertilizer contains. The product label should also tell you how much to use for different crops and areas. Check with school administrators to see if there are any restrictions on the type of fertilizer your class may use in the garden. Always follow the warnings on fertilizer products and store in a secure location. Fertilizers should be handled by adults or under close adult supervision.

You might think that if a little bit of fertilizer will help your plant grow, a lot of fertilizer will result in an even better harvest. However, the phrase “the more the better” is not applicable to fertilization. Excessive fertilizer can contribute to plant diseases and lead to runoff of the extra nutrients. So make sure to apply only the amount you need.

Fertilizing is not a one-time event. As plants grow, they deplete the soil’s available nutrients, so you will need to constantly monitor nutrient levels and provide additional fertilizers when needed. Keeping soil healthy is the key to maintaining healthy and productive plants.

## COMPOSTING

In the natural world, decomposers such as earthworms, sow bugs, slugs, molds, mushrooms, and bacteria use dead plants and animals as food, breaking them down into smaller particles and thereby releasing nutrients back into the soil. In the garden, we simulate this decomposition process by creating compost piles.

Compost piles are made up of garden waste and other organic matter high in carbon and nitrogen and exposed to moist conditions to attract decomposers. As the decomposers use the composted organic



matter for energy and maintenance, they break it down into simpler molecules. This process gives off heat, which in turn speeds up decomposition. Compost can be made in freestanding piles (three- by three- by three-foot is an optimal size) or contained in special bins as long as it receives proper water and air movement.

Once the materials are broken down, the compost can be incorporated into the soil to increase the nutrient content and improve the structure. For more information on creating a compost pile, contact your local Cooperative Extension Service office.

## MONITORING FOR PESTS

Your garden ecosystem is home to many insects and other organisms, and only a handful of them are actually harmful to plants. Even when plant pests are present, they are not necessarily a threat to the garden. Like healthy people, healthy plants are usually able to ward off some stress and handle minor damage while continuing to perform well.

In order to keep pest problems to a minimum, the best practice is to monitor the garden regularly. Insect and disease problems are easiest to fix if caught early. Check the plants for plant-eating insects like aphids and scale (they often hide under the leaves). If found early, their populations can be controlled through handpicking or using a high-pressure water spray. Also look out for leaf spots, which can be a sign of fungal or bacterial disease. Remove leaves with signs of disease so it does not spread through the bouncing of irrigation and rainwater. Place plants you suspect of being diseased in the trash rather than a compost pile.

When you find signs of pests, your first step should be to identify what is causing the problem. This can be an exciting investigative activity for your students. Once your sleuths identify the problem, you need to decide whether the damage is significant enough to warrant any action. Tolerate some plant damage. Observing the interactions in a garden ecosystem is an important part of the learning process for your students. Many plant pests have natural predators, and if you remove the pests, your students will never get to see the predators in action. For example, ladybugs are ferocious aphid consumers. However, if you don't have any aphids, then you also won't attract any ladybugs.

If the damage becomes more severe, decide whether or not the plants are worth keeping. Disease problems are often a sign that the plants are not well adapted to the environment, so pulling them up and replacing them with crops better suited to the location may be the easiest solution. If you feel that more control is necessary, such as the use of pesticides, check with school administrators and maintenance personnel. Schools have strict pest control regulations.



Tucson Village Farm



In addition to monitoring the plants and providing proper maintenance to promote good plant health, here are some additional techniques to minimize pest and disease buildup in the 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 particular 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 keep students out of the garden when it's wet so they 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.

**Plant appropriate varieties for your area.** Many plants will not thrive if they are grown in the wrong climate zone.

**Clean up your garden.** Diseases 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 the garden inviting to pest predators such as ladybugs, wasps, lacewings, and birds. Flowers and herbs provide nectar to predatory insects, and a water source such as a fountain or bath will attract birds. Growing perennial plants (those that last two or more seasons) helps to provide year-round habitats for beneficial organisms. Install barriers. You can place floating row covers made of lightweight fabric over plants to protect them from invading pests. The fabric allows light, moisture, and air to pass through. However, 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 may 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 two inches above and below ground prevents cutworm damage.

### **Common Pest Problem: Gophers**

Gophers are small, grayish-brown, thick-haired burrowing rodents. They live and travel in underground tunnels that they dig with their large claws. Gophers eat plants from the roots up, pulling them into their tunnels. The best way to control gopher damage in a school garden is to install gopher wire as a physical barrier. Use galvanized mesh wire with openings no larger than 3/4 inch. Bury it in the soil at least one foot deep, and make sure you have enough wire so that the edges come up to ground level. If you need to overlap pieces of wire, overlap them by one foot. In a raised bed, staple the wire to the bottom of the frame. The deeper you bury it, the less the chance of catching or tearing it with digging tools.

## SUMMER MAINTENANCE

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

**Choose low-maintenance plants to begin with.** 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 out-compete weeds. Choices vary by region and with the amount of rain or irrigation available to the garden. Check with your local Cooperative Extension Service 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 two- to three-inch layer of more durable organic mulch, such as shredded bark.

**Install irrigation.** Drip irrigation equipment is available at most home improvement stores, and you can set it up to run on inexpensive timers. Find volunteer help. Enlist the help of parent volunteers or service organizations such as FFA, 4-H, Scouts, and church youth groups. Create a schedule so that the grounds are checked regularly. Provide detailed care instructions. If your class has planted summer crops, you can offer the harvest to the volunteers as a reward. You may want to hold a work day one Saturday per month to knock down weeds or perform other large tasks.

**Host a summer camp.** Many schools offer summer school classes or children's summer camps. Get in touch with teachers or summer camp counselors to see whether 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 the vegetable harvest as is ready. Pick flowers and press or dry them for art activities in the fall. Before leaving for the summer, remove all the plants and then do one of the following:

- › Cover it up. Cover the garden with a thick layer of mulch to discourage weeds and decrease water loss. The mulch will break down over the summer, providing organic matter and enriching the soil for next year's crops.
- › Solarize. Solarization is accomplished by covering moist soil with clear plastic to use the sun's energy to kill weeds and soil-dwelling pests.

## ADDITIONAL GARDEN TASKS

In addition to ongoing maintenance, there will be seasonal garden tasks for your students to complete. Examples of these tasks:

### Fall

- › Plant and harvest fall vegetable crops
- › Plant native and drought-tolerant plants
- › Save seeds from summer-blooming annuals and perennials
- › Gather leaves for composting
- › Remove summer crops
- › Plant spring-blooming bulbs
- › Plant cover crops
- › Mulch to provide protection against winter weather

### Winter

- › Plan the spring garden
- › Force bulbs indoors
- › Grow indoor plants from cuttings
- › Obtain spring garden supplies
- › Plant bare-root trees
- › Start seeds indoors
- › Prune fruit trees and perennial shrubs

### Spring

- › Clean out winter debris
- › Prepare soil for planting
- › Transplant seedlings
- › Direct sow seeds
- › Harvest spring vegetables

### Summer

- › Plant summer vegetables or prepare garden for summer break
- › Schedule volunteers to help with summer care
- › Keep weeds under control
- › Deadhead flowers and harvest vegetables
- › Collect supplies for fall garden

For more information on seasonal gardening tasks, sign up for a regional email reminder from such organizations as the National Gardening Association, [www.garden.org](http://www.garden.org), or Rodale, [www.organicgardening.com](http://www.organicgardening.com). They will send timely reminders of seasonally appropriate gardening tasks.



- › 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. It also helps maintain or even increase the nitrogen content of the soil. The next fall, till the cover crop into the soil and plant the new garden.
- › Plant for fall. If there is not going to be much activity in the school garden during the summer, it might make sense to plant a garden in late May or early June that will be ready for harvest in the fall. Many vegetable varieties have varied “days to harvest” times. For example, some corn varieties take 70 days to harvest and others need close to 100 days. Choosing crop varieties with long “days to harvest” times, like winter squash, pumpkins, popcorn and other grains, soybeans, tomatoes, peppers, and eggplants will provide a bounty when you return to school.

## VANDALISM

There is nothing more discouraging to the students than to watch their garden become the victim of vandalism. After all the time and sweat poured into the garden, it is very frustrating to discover senseless damage. In addition to damage, sometimes a harvest is stolen, robbing students of the chance to taste the fruits of their labor. To decrease the incidence of vandalism:

**Choose a site in a protected or highly visible location.** Perhaps your school has a courtyard or an area protected by a fence. Although students should have the opportunity to explore the garden during the day, you can secure it at night and over weekends and breaks. Placing your garden where it is a centerpiece of the school can often deter vandals.

**Post signs with information about the garden.**

Posting signs expresses a sense of ownership and lets outsiders know the purpose of the garden and who is maintaining it. Although it is not a foolproof security system, a sign that reads “Do Not Pick” or “Please Let Our Plants Grow” may deter unauthorized harvesting by invoking a sense of wrongdoing.

**Create a mobile garden.** Grow plants in containers with handles or wheels that can be moved out into the sun during the day, but secured indoors after school hours.

**Involve neighbors in the project.** The school’s neighbors can help keep an eye on the garden when teachers and students are not around.

**Identify potential vandals and involve them in the garden.** If they feel like they are part of the garden, not only will that keep them from vandalizing the garden, it may also make them more protective of it.



# sustaining your garden

Completing the installation of a school garden is a huge feat. Take time to appreciate your accomplishments and acknowledge the contributions of others to the garden effort. Bask in your success and take the opportunity to recharge your batteries. Appreciating the moment will help energize you for the next stage of garden development – adopting a plan for sustainability.

In addition to establishing a schedule for garden maintenance, your team needs to plan intentional activities to help sustain the garden. The garden should play an important role in the academic lives of your current students and also be a useful tool for future students. To truly sustain the garden program, you must tie it closely to your curriculum, maintain the approval of your administrators, attract additional garden team members and volunteers, and find new sources of financial and material support. Most importantly, the garden should continue to inspire excitement in your students, their parents, other teachers, administrators, volunteers, and the community.

This chapter offers suggestions for activities to help maintain the momentum and sustain the school garden program. As with the previous stages of garden development, you would do well to create a plan for sustainability, outlining specific steps to take and a timeline for their execution. Garden activities promoting sustainability do not spontaneously occur. They must be carefully planned and purposefully implemented.

## USING YOUR SCHOOL GARDEN

It seems obvious, but in order to sustain the garden, your team must actively use it. Plan garden time into the weekly schedule. Implement lessons around garden activities and experiments. Encourage other teachers and youth groups to use the garden, too (after establishing some basic guidelines for use). Increased involvement will add value to its role as an educational tool. To use the garden effectively, make sure to match lessons and activities with your curricular goals, adopt good outdoor classroom management techniques, create measurements for success, and document all your efforts.

## INTEGRATING THE GARDEN INTO THE CURRICULUM

In today's educational climate, teaching mandatory curriculum standards and passing related standardized tests are top priorities. A school garden can be a natural tool for teaching these standards, and promoting that use of the garden



helps to secure administrative support. Review Chapter 3, Linking Gardens to School Curriculum, to remind yourself of the possibilities. Share your activities with other teachers and your principal on a regular basis so they are informed of the academic benefits of the garden.

## OUTDOOR CLASSROOM MANAGEMENT

Working with students in an outdoor learning environment is different from teaching in a traditional classroom setting. To make sure your time in the garden is both productive and enjoyable, here are a few tips on classroom management:

**Establish garden rules.** Create a set of simple rules and share them with students before you go out to the garden. Additionally, post the rules in the garden as a reminder. Try to phrase them in a positive way. Rules may include items like remembering to walk on paths, asking before you pick, and remaining in the garden area during class. Keep the list short so rules are easy to remember and follow.

**Train students on using tools.** Before going out to the garden, show students all the different tools they may use and demonstrate the proper way to use them. Make sure they know to carry the working end of the tool below their waist and not to run while holding tools. Also discuss proper storage of the tools and why it is important not to leave them lying in pathways.

**Recruit help.** You will need at least one other adult in the garden to be prepared for emergencies (if one child needs special attention, you cannot leave the rest of the class outside alone). Depending on the size of your class, it may be preferable to have three or four adult volunteers. Keeping the activities hands-on is an important aspect of learning in the garden, and this is hard to accomplish without plenty of volunteer support.

**Divide your class into small groups.** Smaller groups allow for more hands-on experience. It is best if you have a volunteer to lead each group, but if that is not possible, provide clear instructions for what each group should



accomplish. Choose the groups carefully, taking care to match up students who will work well together.

**Provide a comfortable sitting area.** If you are planning to talk to the class as a whole for an extended time in the garden, use an area where they can comfortably sit to listen. Trying to talk to the group in a small space with obstructed views turns into a frustrating experience, and students quickly lose interest. It is best if this area allows them to sit in a circle or semicircle so they can clearly see you and feel connected to the rest of the group. Some schools create sitting areas with benches, hay bales, or even a well-maintained lawn area. If you do not have a good sitting area in your garden, deliver all group presentations or demonstrations in the classroom and reserve the garden for the smaller group activities.

**Be prepared for emergencies.** Always have a first aid kit in the garden. Know if any of your students have special health concerns, such as asthma or an allergy to bee stings.

## CREATING MEASURES FOR SUCCESS

It is important for you to measure the impact of the garden on your students, as with any other education program. In the early planning stages, you developed a list of goals for the garden. In the sustaining stages of the program, review these goals and develop a method to determine whether your efforts are meeting them. Create two or three different measures of success. For example, if one of your goals was to improve science achievement, consider creating a pre- and post-knowledge test for your students or compare student science grades. Written test scores are the most common way to quantify achievement in our society, but you can also use methods like tracking change in disciplinary actions and attendance records (signs of personal behavior change) or recording changes in the amount of fruits and vegetables discarded from lunch trays (signs of nutritional behavior change). Consult with expert school district personnel and local researchers for ideas on ways to measure the benefits of the school garden.

## DOCUMENTING EFFORTS

In the midst of an active garden program, it is easy to neglect the job of recording your efforts. But keeping track of your progress is critical. Keep a notebook of your activities with detailed descriptions and photos. Track all donations of funds and materials along with the names of the donors. Also log all the positive feedback you receive from students, parents, and community members. You will draw on this information as you share your work with administrators, look for additional funds, and recruit new volunteers.



## COMMUNICATING WITH YOUR SUPPORT TEAM

Clear communication with administrators, parents, the garden team, additional volunteers, and donors will play an important role in sustaining your gardening program. All of these stakeholders were integral to the creation of the garden, and they will continue to be strong supporters as long as they feel that their contributions are valuable and that they know how they can continue to support you. Clear communication gives them a sense of ownership of the garden, and in turn they will feel responsible for keeping it alive.

A way to foster this connection is to set up a regular system of communication. Some ideas for communicating with your group:

- › Write a monthly or quarterly newsletter (sent through mail or email) with summaries of the recent events and a calendar of upcoming events. Be sure to include student-written articles and photos.
- › Establish a garden website that is updated regularly. Send out a monthly email to notify supporters of updates and remind them to visit the site.
- › Hold monthly or quarterly garden workdays to provide hands-on involvement.
- › Hold a semiannual or annual garden party to recognize donors and volunteers.
- › Find a way to communicate with supporters that is comfortable for you and is accessible to your audience, and then stick to it on a regular schedule. If possible, decrease the workload by finding a reliable volunteer to help you develop your communication pieces.



## PROMOTING THE GARDEN TO THE COMMUNITY

In addition to communicating with your support team, communicate success with community members who are not directly involved in the garden. Promoting the school garden in the community helps to establish a solid reputation, which not only validates the efforts of your current team, but also helps with recruitment of new members. You cannot rely on a small number of volunteers and donors to sustain your gardens year after year because interests and time or funding availability may change. Also, if you expect too much from your supporters, you risk burning them out. Be on a constant lookout for additional partners. What's more, by promoting your garden, you may inspire other schools to begin gardening and increase the enthusiasm and support for school gardening throughout the community. To promote your garden effort in the community:

- › Write press releases and send them to local media outlets.
- › Invite the press and government officials to special garden events.

- › Use your students' new horticultural expertise to help with a special community beautification project or service project.
- › Host annual garden tours open to the public (this can also become a fundraising event).
- › Network and share your story everywhere you go!

## GARDEN PROGRAM EXPANSION

All the items mentioned so far will help to maintain excitement and momentum around the school garden program. However, nothing is as powerful as adding a new element to the program each year. 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. As time goes by, envision a dynamic garden program that you can cultivate and grow to ensure sustainability.

You may have established a sense of evolution by dividing the original design into stages for implementation over several years. As you add each new section, review the plan and let current garden team members be involved in revising it so that they will be invested in its implementation.

If you did not begin with a multiyear plan, let each year's garden team brainstorm a new project. Perhaps there is a new curricular requirement you would like to teach through the garden, and the team can work to provide the necessary resources. For instance, maybe you originally constructed a butterfly garden to teach about habitats, and now you want to expand to teach nutrition too. Depending on space, you can install new raised beds or containers to grow vegetables. Or maybe the initial garden focused on one grade level, but after seeing its success, additional grade levels would like to get involved.

The new program element does not need to be large in size or scope to stir people's excitement. A special stepping-stone workshop could be conducted to add art to an existing butterfly garden, or a new trellis could be built for a vegetable garden. The main thing is for new team members to know their efforts are adding to existing resources and feel that they are making valuable contributions to the garden.



## FINDING FUNDS AND SUPPLIES

Many school gardens struggle with finding funds for garden maintenance. Two ways to bolster funding efforts have already been mentioned: actively promoting the garden in the community and adding a new element each year (it is often easier to find funds for new projects than for existing projects). A third way to secure funding is to establish an annual fundraising event.

Establishing a consistent fundraising event can provide you with a secure source of money each year. Look for a garden product that can be created from your existing resources and will be valued by your community. For example, have children collect and package seeds, then sell them at a garden tour. Linking garden activities and moneymaking opportunities increases the educational value of the fundraiser and adds an element of enthusiasm and pride because students feel connected to their product. Also, if the event is something that can be repeated each year, it will gather a strong customer base.

Fundraisers must be designed to meet the unique needs and audiences of each school. What works for one school garden may not work for another. There is great value in investigating existing fundraising ideas, but spend time accessing your own resources to find a good fit. Your school may try several different projects before finding the right one.

## ATTRACTING HELP TO SUSTAIN THE GARDEN

The need for a large support team to sustain a garden program cannot be overemphasized. A garden is not an individual endeavor. You will need lots of help when planning, raising funds, planting, conducting activities, and maintaining the garden. Active volunteers are an important component of any school garden program, and as you work to sustain your garden you will need to find ways to keep current volunteers as well as attract new volunteers. Chapter 10, Working with Volunteers, covers this topic in more detail.

In addition to volunteer support, many schools have discovered the benefits of a part-time or full-time paid garden coordinator position. A paid coordinator has



more time to devote to planning and teaching in the garden. Often, volunteers are drawn in many different directions, but a paid employee is able to focus on specific job responsibilities. Along with the paycheck comes a stronger obligation and higher expectations. A paid coordinator can often provide more continuity and commitment than a volunteer.

A garden coordinator should have both an education background and horticulture experience. The coordinator helps to alleviate some of the workload associated with the garden, such as communication with volunteers, planning of fundraising events, and purchasing of supplies. However, the hiring of a paid garden coordinator does not mean classroom teachers are not involved in the garden experience; instead, it allows them to focus their energies on the lessons.

Some garden coordinators are based at one school. Others work with multiple schools in a school district. Talk to your principal and local administrators to explore possibilities and resources.





# working with volunteers

Volunteers contribute a wealth of experience and enthusiasm to a gardening program. They also bring abundant skills, fresh ideas, and extra hands to help with garden activities. There are a number of best management practices to adopt when working with volunteers, but communication is the key. If you effectively communicate your needs and expectations, provide volunteers with the information needed to complete their assignments, and follow up with clear words of appreciation, you will have strong volunteer relationships.

## ESTABLISHING ROLES FOR VOLUNTEERS

Before recruiting, define the role you want volunteers to play in your garden program. Create a list of specific jobs you need help with and also when these activities should take place. Do you want volunteers who can be there on a weekly basis or just for special events? Do you want them to help plan and prepare garden programs, or do you just want them to help with the activities?

Keep in mind that people volunteer for different reasons, and any group of people will have a wide range of talents. If you communicate the jobs available for volunteers to complete, then they can determine whether your opportunities match their interests and skills. The time you spend preparing for volunteers and establishing clear responsibilities will help you create an effective and efficient volunteer team.

All volunteers want to feel that they are contributing in a meaningful way. Involve them in as much of the planning and decision making as possible to create a sense of ownership and independence. Although you will certainly need help with some “grunt work,” as long as volunteers know their efforts are helping the program, they will feel like valuable team members.

## RECRUITING VOLUNTEERS

Once you know how you are going to use volunteers, begin the recruiting process. Look for volunteers who will encourage exploration and inquiry-based learning during garden activities and who will approach the garden with a fun and adventurous attitude.

Most schools find their strongest volunteers through parent groups. Reach out to parents in newsletters, on the school website, at parent meetings, and at open houses. Additionally, search for volunteers through local horticulture clubs (garden club members, college horticulture departments), “green industry” businesses



(garden centers, landscape design firms), senior citizen organizations, and service organizations (Cooperative Extension Service Master Gardeners, Rotary, Boy Scouts, Girl Scouts, and local corporation's volunteer service programs). The garden team members who helped plan the garden will often be transformed into a core of strong volunteers. Another possibility is to recruit older students to provide support for garden activities. Elementary school students love to interact with middle school and high school students. A mentoring relationship provides an excellent learning experience for the older students, too.

Some volunteers will be available only for special events. For instance, a Boy Scout might develop an Eagle Scout project at your garden. Other volunteers may be available to help on a regular basis, for example, a stay-at-home parent with a horticulture degree. Garden programs benefit from a diverse set of volunteers.

As you reach out to potential volunteers, schedule a special meeting to share information about the program and the opportunities available. If possible, hold this event during the same hours you typically need volunteer help. If people are available for the informational meeting at that time, they may well be available to volunteer in the future during the same time frame.



In both written and oral requests, be sure to inform potential volunteers of your expectations, including time commitments and tasks. Be as specific as possible; give the dates and times their services will be needed. Also check your school's policy on volunteer recruitment procedures. Most schools require volunteers to complete a background check with fingerprinting before service can begin. Individuals should be informed of this type of requirement during the recruitment stage. When people sign up or indicate an interest in volunteering, follow up with a phone call or in person to reiterate these expectations and give them a chance to ask questions. Not all individuals are a good fit with a school garden program, and it is best for both parties to figure this out during the recruiting stage rather than in the middle of the program.

Although mass recruiting is less time consuming, keep in mind that people like to be asked in person. It is a first step in making them feel important; it conveys respect and builds confidence. Consider making phone calls or sending personal invitations to individuals you have met who would be good volunteers or who have been recommended to you by others.

The recruiting process may sound like a substantial undertaking, and it is. However, you will be rewarded by a supportive, dedicated, and informed volunteer group who will help sustain your garden efforts.

## ORIENTATION

After recruiting volunteers, you need to continue strong communication skills through orientation followed by appropriate training. You will begin by orienting the volunteers to the program, the students, and the school. Start by once again reminding them of your expectations. Next, brief them on school policies. For example, let them know where to park, where to sign in, and what the procedures are for screening. Introduce volunteers to key school personnel like the principal and office secretaries. After this overview, provide the group with a tour of the garden and school. They need to know things like the locations of bathrooms, how the students will travel to the garden, where tools are stored, etc. In addition to an in-person orientation, provide this information in writing for later reference.

## TRAINING

You will also need to provide training to properly prepare the volunteers for their jobs, whatever they may be. The most important thing is to always provide clear instructions as to what you want them to do and give them a chance to ask questions. To be successful, volunteers must know what is expected of them. Provide background on any specific skills or knowledge needed to complete tasks by sending copies of your lessons a week ahead of time, or links to information on websites or recommended books.

In addition to regular training and information related to activities and programs, it is a special treat for volunteers to attend “advanced training.” For instance, you can invite a guest speaker to introduce a new curriculum or teach volunteers about inquiry-based learning techniques. Depending on their level of involvement, certain volunteers might be invited to attend trainings conducted for educators by school districts and other organizations. Training is a powerful tool to motivate your volunteers and keep them excited about your program.

## COMMUNICATING WITH VOLUNTEERS

As previously mentioned, clear communication with volunteers is essential. When communication is poor, volunteers feel uninformed, unimportant, and underappreciated. Disorganization and lack of communication will frustrate them, and they will quit. Here are a few communication tips for working with volunteers:

**Keep a good record of volunteers with up-to-date contact information.**

It would be unfortunate to accidentally miss someone.



**Establish a standard method of communication that is delivered consistently.** This may be a weekly email, a monthly newsletter, or a regular website posting.

**Choose a method that works well for you and your volunteers.** By establishing a routine, you remind yourself to communicate with your volunteers, and in turn they have a place to go for the latest information.

**Create a written schedule of events that is accessible to all volunteers.** It can be mailed out or posted on a website. Make sure you have an effective way to notify volunteers if any changes are made (via either email or a phone tree).

**Hold a regular volunteer meeting either monthly or quarterly.** Personal contact allows for more interactive discussions, and it is very important for volunteers to have a chance to provide you with feedback and suggestions for the program. This is also a great time for you to show your appreciation for their work.

**Provide members of the group with comments about their job performance.** Although a formal evaluation may not be possible, volunteers need constructive feedback so they can learn and grow during this experience.

With your busy schedule, it may seem overwhelming to find time for this level of communication. If you feel that you cannot maintain strong communication, seek out a volunteer willing to assume this role. Communication is not a task that can be neglected even briefly without negative consequences. It is the key to a successful volunteer experience (for the volunteers and for you)!

## RETAINING VOLUNTEERS

All the suggestions mentioned thus far will contribute to the satisfaction of your volunteers and help you retain them. In a school setting, you will naturally lose volunteers as students graduate and families move, but by adopting good techniques, you can decrease the number of people who quit because of a negative volunteer experience.

If you are concerned about volunteer retention, take time to find out why people sign up. Volunteers often pitch in because they care about the project and its participants. Some may have children in the program with whom they want to spend more quality time; others may want to be more involved in their communities, meet new people, or make a difference. To keep volunteers interested and motivated, it is important for you to understand and meet their



needs as much as possible while still meeting yours. For instance, if someone volunteers because she wants to spend time with her child, but you never assign her to work with her child's class, she will not stick with it for long. Or, if someone volunteers in order to meet new people, and you always ask him to assist with individual preparation, he will get discouraged and quit.

Also remember that volunteers should support, not replace, educators. Although you may find volunteers who are willing to take on significant planning and educational delivery responsibilities, most volunteers will feel overwhelmed if left on their own to teach a full lesson, or will feel they lack proper guidance. Classroom teachers should be present during all garden activities.

As discussed earlier, not all individuals have the personalities and skills to be strong garden volunteers, so if you find your needs and their needs do not match, you may suggest other volunteer opportunities that would be better suited for them.

## **VOLUNTEER APPRECIATION**

Volunteers need to feel appreciated. To be sure, contributing to the community is personally satisfying. Also, working with students and watching their curiosity and excitement bloom is motivational and inspiring. But in addition to these rewards, you should implement both informal and formal methods of thanking your volunteers.

Informal ways to thank your volunteers include simple thank yous and smiles when they come to help or a quick email after activities. More formal thanks include handwritten notes (from you and the students), small gifts from the garden (like pressed-flower bookmarks or herbal sachets), and recognition of volunteers in newsletter and newspaper articles. If possible, hold a special event each year focusing on volunteer appreciation, such as a ceremony in the garden or a luncheon. This event can be specifically hosted for garden volunteers, or you can work with other teachers to recognize volunteers in several programs.

Involve your students as much as possible in appreciation efforts. This helps them learn the importance of being grateful and showing respect for those who help them. It is an important life lesson that is often overlooked in our fast-paced society.



# resources from near and far

**NOTE:** Keep in mind, websites change frequently, so if these particular pages aren't available as you are doing your research, check out [www.westerngrowersfoundation.org](http://www.westerngrowersfoundation.org) for additional links.

## Producepedia

[www.producepedia.com](http://www.producepedia.com)

## University of Arizona

<http://sgdschoolgardens.arizona.edu/>

## Arizona Department of Agriculture

<http://www.azda.gov/Common/arizonagrown.aspx>

## Arizona Department of Education

[www.azed.gov/health-nutrition/school-gardens](http://www.azed.gov/health-nutrition/school-gardens)

## Arizona Department of Health Services

<http://www.azdhs.gov/phs/oe/fses/school-garden/index.php?pg=resources>

## Arizona Farm Bureau

<http://www.azfb.com/>

## Arizona Grown

[www.arizonagrown.org](http://www.arizonagrown.org)

## Arizona Farm to School

<http://www.farmentoschool.org/AZ/programs.htm>

## National Organization Agriculture in the Classroom

<http://www.agclassroom.org/kids/stats/arizona.pdf>

## Fruits and Veggies More Matters

[www.fruitsandveggiesmorematters.org](http://www.fruitsandveggiesmorematters.org)

## Harvest of the Month

<http://www.harvestofthemonth.cdpf.ca.gov/>

## Life Lab

<http://www.lifelab.org/>

## Champions for Change – My kitchen, my rules

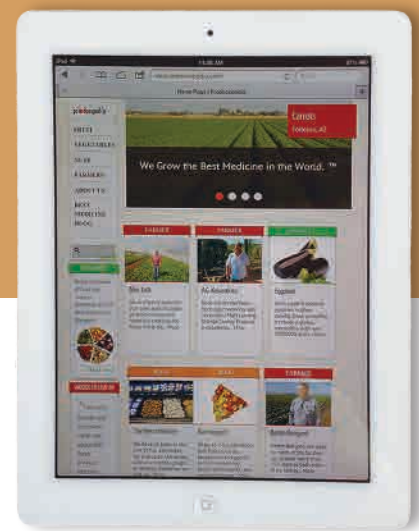
<http://www.cachampionsforchange.cdpf.ca.gov/en/index.php>

## National Gardening Association



[www.garden.org](http://www.garden.org)

## Choose MyPlate.gov

<http://www.choosemyplate.gov/>







**Gardens for Learning** is a comprehensive guidebook that provides a strong foundation to support the growing school garden movement. It was developed by a team of experienced garden educators, nutritionists, state officials, and other garden experts. This guidebook is a must-have resource for anyone looking to enhance learning through the use of gardens in schools and other community settings.



1110 E. Missouri Avenue, Suite 340, Phoenix, Arizona 85014  
17620 Fitch Street, Irvine, California 92614

Western Growers Foundation, a 501(c)(3), was created by Western Growers members as a way to give back to their communities. The Foundation's mission is to plant and sustain a fruit and vegetable garden in every willing Arizona and California School. Edible school gardens give children the opportunity to learn where their food comes from and the importance of good nutrition.



[www.westerngrowersfoundation.org](http://www.westerngrowersfoundation.org)