

Considerations and Resources for School Garden Design in Kansas



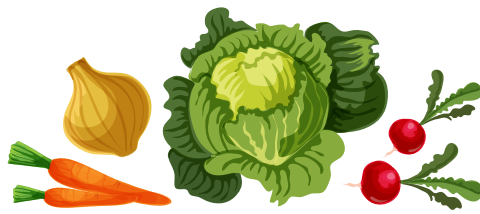
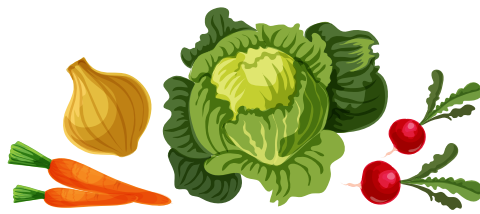


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Considerations for School Garden Design

School gardens provide learning opportunities as well as fresh produce. This publication includes factors to consider, especially early in the garden development process. When planning garden size and layout, think about how the garden is going to be used. A challenge faced by many school gardens is how to have a garden that is large enough to accommodate the number of youth participating without being so large that it overwhelms the caretakers.

It may be necessary to get outside help in working through these considerations, especially some of the technical aspects of choosing a garden location or understanding the local weather and climate. Your local K-State Research and Extension office has professionals that are trained in both facilitation and the science of gardening. Ask for their help in completing these steps if needed. Find your local extension office here: <https://www.ksre.k-state.edu/about/stateandareamaps.html>

Getting Everyone on the Same Page

Working with teachers, administrators, afterschool program staff, and volunteers is critical at this stage, especially if the garden is going to be used by more than one group. Different teachers may have different ideas for how to use the garden and what outcomes they expect to see. Administrators may want to see a garden utilized by the entire school, not just a small group or grade level. Here are some questions to answer that can help sort out these difference:

- 1. What grades and/or teachers want to have access to the garden for learning activities? Do all the teachers in the grade want the same type of access? What about after-school programs, electives, or student clubs?**

The more different groups that plan to use the garden, the more important it becomes to have a garden that is large enough and diverse enough to accommodate many types of gardening activities and learning activities. There are also significant differences in how the students will interact with the garden and what will be engaging as they get older. A garden used for an elective course, after-school programs, or student clubs may yet again have different needs.

- 2. Should the garden be divided into different areas by grade or teacher? Or will the entire garden be used and cared for by all?**

These questions will depend a lot on the way that each school functions as well as the size of the different classrooms and grade levels. The more students a garden needs to accommodate at one time, the larger it may need to be. If there are significant differences between the types of plants and experiences desired by different grades or teachers, it may be more effective to have designated areas for each teacher or grade level.

- 3. Do different teachers want to use or work in the garden with their students at different times of the year, depending on the subjects they are studying?** If the garden will primarily



be used by classroom teachers, it may be worthwhile to determine if different teachers or grades are most interested in using the garden to meet certain standards at specific times of the year or if they want to incorporate the garden into multiple phases of learning throughout the school year.

- 4. Do teachers want to do garden maintenance activities with their students or do they prefer to do garden-based learning activities that are not directly related to garden maintenance?** Depending on the size of the garden and what is being grown, there might be a lot of maintenance to be done or not very much. However, there are almost always routine tasks like weeding and watering to be accomplished. The ability to complete different garden maintenance tasks is going to vary greatly by the age of the students. Especially with younger students, it can be difficult to accomplish both the maintenance tasks and other learning activities at the same time. It may be necessary to have more volunteers to help with maintenance for younger students than older students.

- 5. How many students will be using the garden at one time? Will there be adequate space for all to participate?** There is often a mismatch between the number of students in a classroom with the size of a garden. A 25-student classroom cannot physically fit around a 4-foot by 8-foot raised bed if the expectation is for each student to be able to touch and work with the plants at the same time. This is not to say that the garden itself must be larger, but the space where the garden is located would need to have enough space to accommodate the entire group of students in a way that they can all be engaged with some sort of activity at all times. There is an important balance between classroom management and garden management to consider with the size of the garden space.
- 6. If growing fruits and vegetables, what is the expectation for the harvests? Will there be enough to use with all the participating students? A cooking program? The school lunchroom?** Growing edible crops can sometimes be a frustrating combination of small yields

and excessive bounty, especially in a relatively small garden. If there is a desire for large enough harvests of specific crops to be used in specific situations, it will require careful planning and prioritizing those needs over other garden priorities, a significantly larger garden, or both.

7. Who is responsible for the majority of garden maintenance during the school year?

During the summer? It is critical to determine who will be doing what garden maintenance and when, especially in a shared garden space. Regular watering and weeding is critical to the survival, success, and usability of the garden. Especially in the younger grades, it can be difficult to carry out all required maintenance with just the students in the garden. If there is not going to be a summer program using the garden, there will also need to be a plan for summer maintenance or for using the garden during only the school year. A garden that seems small and barely adequate during the realities of the school year can become large and unmanageable for a single person during the summer. Consider creative solutions that engage families and the community in summer garden maintenance so that it does not fall on only the teachers or school maintenance staff.

8. What are the concerns that need to be addressed related to accessibility and mobility for students, volunteers, and staff?

Make sure to allow adequate space in and around the garden for wide pathways. You will need wide pathways to accommodate larger class groups, as well as students in wheelchairs or with other mobility concerns. This may affect the amount of space that can be planted or the number of raised beds that can be constructed.

Ages and Stages in the Garden

As with any type of youth activity, take into account the age and developmental stage of the children that will be participating.

4-5 Year Olds

- Allow to practice and repeat simple tasks.
- Watering, harvesting red tomatoes are examples.
- Difficulty using tools — small size is helpful.
- Have multiple tools so everyone can participate.
- Help with very active tasks like raking soil before planting.
- Enjoy looking at and touching insects.
- For seed planting, lay out the seeds and have them push into soil or broadcast small seeds.
- Maintain clearly defined pathways.
- Allow lots of cleanup time.
- Have lots of ways to keep them engaged.

6-8 Year Olds

- Need lots of practice with simple tasks: watering, weeding, insect scouting, harvesting.
- May need extra help with planting activities.
- Digging and raking are still good activities.
- Provide opportunities to observe and taste.
- Enjoy scouting for insects.
- May still struggle with small seeds or handling some garden tools.
- Obvious pathways are still helpful.
- Allow time to reflect and express observations.
- Should be able to see differences in plant growth or health.

9-11 Year Olds

- Improved strength.
- Improved hand dexterity and coordination.
- Better able to use tools, construct trellises or compost bins.
- Developing spatial understanding — can participate in garden design and planning.
- Emphasize not just “doing” but “doing well.”
- Not just watering, but watering deeply.
- Begin to enjoy competitions.
- Allow time for reflection or debriefing.
- Have them demonstrate what they are learning or mentor younger students.

12-14 Year Olds

- Strive for independence, responsibility.
- Desire for perfection.
- Allow awkward or clumsy youth to participate without feeling self-conscious.
- Participate in entire planning stage and can develop complex designs.
- Make decisions about the best place for certain plants or what tasks need to be done.
- Activity ideas based on skills and interests:
 - Monitor rainfall, graphing rainfall, making predictions.
 - Journaling, creating signage, painting projects.
 - Studying nutrition, food preparation, etc.
 - Service-related projects — sharing food with those in need, teaching younger youth, environmental stewardship.

15-18 Year Olds

- Allow a lot more independence — adult as advisor not leader.
- Encourage them to think about how systems in the garden, environment, world are interconnected.
- Provide leadership or mentoring to younger youth in the garden.
- Encourage them to investigate things of their own interest in the garden — let them try things without telling them they won't work.

This information was synthesized from the following documents. For more detail, please refer back to the source documents.

- <https://extension.sdstate.edu/ages-stages-garden-4-5-year-olds>
- <https://extension.sdstate.edu/ages-stages-garden-ages-6-8>
- <https://extension.sdstate.edu/ages-stages-garden-ages-9-11>

Choosing a Garden Location

As most schools were not designed with the intention of incorporating a learning garden, often it can be a challenge to identify the best site for the garden. Some of the important considerations include sun exposure, water access, soil quality, and existing usage patterns.

Water Access

No garden in Kansas can expect to be successful long-term without some access to water. Survey the outdoors of the school to locate existing water sources and consider if there are any barriers to easily using that water (gates, fences, locks, etc.). This would be a good time to include maintenance staff in the process so they can provide insights into existing usage areas. Ideally, a good water source should be within easy view and walking distance of the proposed garden location so that turning the water on and off will not take up half of the garden work time. It also ensures safety of students, staff, and volunteers.



Sun Exposure

Depending on what types of plants and learning experiences are desired for the garden, it may be possible to choose a variety of locations. The widest variety of vegetables, flowers, grasses, and other plants will perform best in full sun, meaning at least 6 hours of direct sunlight each day.

On a school campus, it is necessary to consider both shade from trees and the shade of the buildings at different times of day. Inspect potential garden sites in the early morning, mid-day, mid-afternoon, and evening to assess sun exposure. This will provide some idea as to how many hours the site is in full sun. Depending on the orientation of the buildings, it is also wise to consider if there will be significant differences in sun exposure in spring and fall versus summer due to the angle of the sun.

Soil Quality

Between the soil impacts left from the construction process and routine compaction that occurs in high

traffic areas, it can be a challenge to find a location on a school campus that has adequate soils. Many school gardens turn to raised beds and containers to mitigate these challenges, but it is still wise to assess the soil characteristics of any potential garden sites. In some cases, this may also include assessing the site for potential contamination by lead or other heavy metals.

Before finalizing garden plans, have a soil nutrient test completed if you are planning to plant into the existing soil at the potential garden site. Your local extension office can help you with this process. The results will give you information about the soil pH and nutrient levels in the soil that may need to be corrected before planting. It is best to correct major problems and deficiencies before planting.

Soil Drainage

Regardless of whether the garden will be in-ground or in a raised bed, it is critical to assess the ability of water to drain in the potential garden sites. Observe water movement and flow in the potential area during

a rain event, as well as after a significant rainfall to see if water stands for a long period of time, if it flows away from the area, or soaks in easily. In particular, around school buildings, be aware of where downspouts come off the roof or away from parking lots and playgrounds. During rain events, a lot of water can move through areas that otherwise seem dry, moving even raised beds from their locations.

A good way to test drainage is to dig a hole, 1 foot by 1 foot by 1 foot, and fill it with water, then wait to see how long it takes to empty. If water is still standing after 24 hours, the area likely has poor drainage that will negatively affect plant growth. Talk with your local extension agent if you need more assistance in gauging the drainage characteristics of a particular site.

Garden Security

Carefully consider security and safety factors when choosing a garden location. It may ultimately be safer to put the garden in an area where it can easily be seen from many parts of the school, street, and playground rather than tucking it away behind the building in an area that is not easily seen. If the garden can be placed within a fenced schoolyard, that may be beneficial as long as the fence does not prevent regular maintenance and watering. Make sure that there is easy access to first aid materials from the garden space as well.

Weather Safety

Kansas weather can be unpredictable and often garden work may need to be done under less than ideal weather conditions. If possible, locate a garden close enough to a school entrance so that students can return inside quickly if needed. It is also helpful if there is drinking water and shade readily available during hot days. Consider a garden location on the school campus where there is some measure of wind protection as well.

Understanding the Weather and Climate of Your Area

When planning any garden in Kansas, it is important to know what to expect from the weather and climate, as well as how that will line up with the expected school year. On the plus side, Kansas has a long growing season that will accommodate the growth of a wide range of different plants. On the downside, regular heat and drought in the summer can make maintaining a garden challenging for anyone. This becomes more complex when the hope is to have the garden looking great with lots of learning opportunities during the fall and spring parts of the school year.

Two important dates to know with regard to the climate are the last frost date in the spring and the first frost date in the fall. These are typically stated as averages, with the actual last and first frost dates varying by weeks in any given year. These dates, along with the average soil and air temperatures in spring and fall, have great impact on what will be feasible to grow in a school garden during the school year.

- Average Frost Free Period in Kansas: <http://climate.k-state.edu/maps/special/freeze/Average+Frost+Free+Days.png>
- Average Day of First Fall Freeze: <http://climate.k-state.edu/maps/special/freeze/Average+Fall+Freeze.png>
- Average Last Spring Freeze: <http://climate.k-state.edu/maps/special/freeze/Average+Last+Spring+-Freeze.png>
- Kansas Mesonet: <http://mesonet.k-state.edu>
- Kansas Mesonet Soil Temperature Map: <http://mesonet.k-state.edu/agriculture/soiltemp/>
- Cold Sensitivity of Vegetables: <https://bnr.k-state.edu/doc/hort-tips/vegetables/Cold%20Sensitivity%20of%20Vegetables.pdf>

Tools and Materials for a Garden

Having the right equipment, tools, and materials for use in a school garden is the difference between it being enjoyable work rather than exhausting and overwhelming. Most school gardens do not have an unlimited budget, so it is critical to assess what is most important to the garden success and what purchases can be delayed. Develop and follow a plan that will allow for items to be replaced as they wear out and to expand the capacity of the garden with new purchases. Look for grants, donations, and fundraisers that can help pay for many of these items.

Curriculum Options and Lesson Plans

With the increasing popularity of school and youth-focused gardens in the past 10 years, there are many options for lesson plans and curricula available. Some options are free, others have a cost. A list of lesson plans and curricula is provided in the next chapter of this document, School Garden Curricula and Lesson Plan Options.

Hand Tools

Hand tools are critical parts of every garden. Most gardens will require some basics, such as trowels and hoes. Rakes, pitchforks, shovels, and grain shovels may also be important tools to have. Some sort of cutting tools will be needed — whether scissors or pruners.

Good tools that do the right job will make the garden experience much better for everyone. Purchase the highest quality tools that you can afford, while still getting the quantity and variety needed. It is also difficult to determine the type and number of tools needed until you know how the garden will be designed, who is using it for what purpose, and how many students will be doing the same tasks at the same time.

Consider the age and size of the students working in the garden when purchasing tools. Be particularly careful when purchasing child-sized tools for younger students. Many child-sized tools are more toys than tools, especially plastic ones. It may better serve the students and garden to purchase adult garden tools made of lighter-weight materials.

If you are struggling with determining what types of hand tools to purchase, find a local experienced gardener to give you advice on the tools needed for certain tasks and what are sufficient quality for your purpose.

Further Resources

- Video: Investing in Tools: <https://kansashealthyyards.org/all-videos/video/investing-in-tools-small-to-large-gardens>
- Video: Tools for the Garden: <https://kansashealthyyards.org/all-videos/video/tools-for-the-garden>
- How to Clean and Sharpen Garden Tools: <https://bookstore.ksre.ksu.edu/pubs/mf3288.pdf>
- How to Select Quality Landscape and Garden Tools: <https://bookstore.ksre.ksu.edu/pubs/mf3390.pdf>

Harvest Equipment

In any garden that will be growing edible crops, there will be the need for some type of harvest containers and equipment. At a small scale, zip top plastic bags may serve sufficiently for students to harvest into, especially for relatively clean crops like cherry tomatoes or leafy greens. Even small root vegetables may be harvested into bags for washing later. Many common crops do not require special tools for harvest. There will likely be a point where scissors or pruners are helpful to harvest and trim vegetables.

As a garden expands or becomes more complex, it would be worth designating pruners, scissors, tubs, pails, or crates to be used specifically for harvest to reduce risks of foodborne pathogens. There may also be a point where the garden needs its own wash station, both for handwashing and produce washing. This would be particularly important for a school garden that hopes to harvest produce to be used in a school lunch program.

Indoor Seed Starting

Indoor seed starting can be a simple way to expand the amount of the school year that students are working with the garden in some form. Repurpose some containers (add drainage holes) and fill them

with a good quality potting mix or seed starting mix, and you will be well on your way to growing some plants. In most cases, the limiting factor for seed starting is light. There are many options out there for light stands. If you want to try to make your own, a stand made from PVC and a shop light will get you started. You will find that your indoor seed starting efforts have significantly more success when using supplemental lighting.

Another tool to consider if you are going to do a lot of seed starting is a heat mat. These are waterproof mats that can be placed under seed trays to increase the soil temperature during germination, especially in a location where the ambient air temperature is cooler than the seeds prefer.

Further Resources

- Growing Your Own Vegetable Transplants: <https://www.bookstore.ksre.ksu.edu/pubs/MF3126.pdf>
- Starting Plants from Seed: <https://hnr.k-state.edu/doc/hort-tips/Starting%20Plants%20from%20Seed.pdf>
- Video: Easy to Make Grow Light: <https://kansashealthyyards.org/all-videos/video/easy-to-make-a-grow-light>

Large Equipment

Large equipment could include items like tillers, wheelbarrows, and garden carts. Many school gardens will not need a lot of large equipment. In the short term, tillers can be rented or borrowed if needed. Wheelbarrows and garden carts could be brought by volunteers for construction and clean up events. In a larger garden or a garden that relies on a lot of mulch, a wheelbarrow may be a critical tool for early purchase.

An important aspect of deciding to purchase a large equipment item is whether there is a secure storage location. For tillers, there will also be costs associated with fuel and maintenance.

Watering and Irrigation Equipment

Watering and irrigation equipment are arguably the most important to the success of the school garden. Where many other necessary items can be borrowed or rented, watering will be an ongoing task requiring specific tools. Water access and watering practices should be thoroughly explored when discussing the garden purpose, maintenance plan, location, and layout. These will inform what watering tools and equipment will be needed.

At the minimum, a hose that will reach from the nearest water source to the farthest point of the garden is needed. It will likely be necessary to have some watering wands and watering cans for hand watering. Beyond that, those doing the regular garden maintenance should determine what will be most effective. The most efficient type of watering system is drip irrigation, but it is also usually the most expensive. With that in mind, the costs of purchasing the needed watering equipment should receive priority in the garden budget.

Further Resources

- Drip Irrigation for Community Gardens: <https://bookstore.ksre.ksu.edu/pubs/MF3124.pdf>
- Watering Raised Beds, Berms, Containers and Houseplants: <https://bookstore.ksre.ksu.edu/pubs/MF2805.pdf>
- Watering Vegetable and Flower Gardens: <https://bookstore.ksre.ksu.edu/pubs/MF2804.pdf>
- Basic Principles of Water Management: <https://bookstore.ksre.ksu.edu/pubs/MF2799.pdf>
- Video: Save Water: Irrigation for Gardens: <https://kansashealthyyards.org/all-videos/video/save-water-irrigation-for-gardens>
- Video: Watering Your Garden: Tips for Success: <https://kansashealthyyards.org/all-videos/video/watering-your-garden-tips-for-success>
- Video: Efficient Water Use in the Garden: <https://kansashealthyyards.org/all-videos/video/efficient-water-use-in-the-garden>

Raised Beds

Many school gardens choose raised beds for a variety of reasons, including accessibility and to address poor soil quality. When considering raised beds, it is important that they match with the height and arm reach of the students that will be using the garden. Raised beds should not be more than 4 feet wide, and with gardens primarily for young children it may be worth considering as narrow as 3 feet. The length of a raised bed can be variable, but it should not be so long that it is difficult for the teacher or volunteers to move from one side of the garden to the other while working with students.

For a more complete discussion of constructing and gardening in raised beds, refer to the following resources:

- Publication: <https://bookstore.ksre.ksu.edu/pubs/mf2134.pdf>
- Video: <https://kansashealthyyards.org/all-videos/video/building-a-raised-bed-for-gardens>

Season Extension Materials

Season extension materials are structures, tools, and equipment that can be used in the garden to enable crops to be grown earlier in the spring and later in the fall, including through the winter. This can range from very simple items like floating row covers (fabric sheets that are laid over the garden area) to cold frames and even to high tunnels (unheated greenhouses). Plastic mulches can be used to warm the soil more quickly in the spring and allow for earlier planting of many different crops. Low tunnels can be placed over nearly-mature or mature crops in the fall to protect them from a freeze and allow for the harvest season to continue for a few more weeks.

While not essential tools for a beginning school garden, investment in season extension materials can expand the opportunities and horizons of a school garden once the basics have been mastered. Season extension tools also provide a wide range of opportunities for older students to connect their learning about weather systems, mathematics and measurement, climate, engineering, energy, and more to the garden. Season extension tools can give older students

the chance to practice using the scientific method by designing experiments and trials using different planting times and protection techniques.

In a middle school or high school setting, if there is room on the school grounds for a small high tunnel, the opportunities for learning will extend through most of the winter in many parts of Kansas.

Further Resources

- Kansas Garden Guide (pg. 42-48): <https://bookstore.ksre.ksu.edu/pubs/s51.pdf>
- Video: Low Tunnels: <https://kansashealthyyards.org/all-videos/video/low-tunnels-extend-the-growing-season>
- Video: Coldframes and Hotbeds: <https://kansashealthyyards.org/all-videos/video/cold-frames-and-hotbeds>
- High Tunnels: <http://hightunnels.org/>

Seeds and Plants

Depending on the size and complexity of plantings in the garden, the cost of seeds and plants could be fairly minimal or quite high. In some cases, searching out varieties with specific characteristics will be critical to success. In many cases, whatever is cheap and readily available will be sufficient. Working with local partners may help you source seeds and plants more cheaply than you otherwise might be able to afford, especially in smaller communities. There are also national seed grant programs where you can request free or low cost seeds for a school garden.

Further Resources

- Recommended Vegetable Varieties: <https://bookstore.ksre.ksu.edu/pubs/L41.pdf>
- Small and Tree Fruit Cultivars: <https://bookstore.ksre.ksu.edu/pubs/mf1028.pdf>

Soil Amendments

For a new garden, making sure that your garden soil is high quality and productive is a critical step. Whether planting in existing soil or bringing in new topsoil for a raised bed, you will likely need to plan for soil amendments based on a soil test. These amendments

could be compost, fertilizers, or products needed to amend the soil pH. Depending on the size of the garden, the soil quality, and your local resources, these amendments could be fairly expensive. Most gardens will also benefit from the addition of compost, cured manure, or fertilizers on an annual basis. If you do not have a source that can donate these items, you will want to budget for them. Work with your local extension office or another expert to routinely monitor the soil quality of your garden.

Further Resources

- Fertilizing Gardens in Kansas: <https://bookstore.ksre.ksu.edu/pubs/mf2320.pdf>
- Direct Application of Organic Materials: <https://bookstore.ksre.ksu.edu/pubs/MF3373.pdf>
- Fertilizer Types: <https://hnr.k-state.edu/doc/hort-tips/Fertilizer%20Types.pdf>
- Video: Improving Soil for Gardens: <https://kansashealthyyards.org/all-videos/video/improving-soil-for-gardens>
- Video: Organic Matter: <https://kansashealthyyards.org/all-videos/video/organic-matter-improves-soil>

Storage

Even a relatively small garden will quickly accrue a wide range of tools, supplies, and equipment that will need to be stored. If there is not an easily accessible storage area near the garden location, it may be helpful to have a shed or other storage space in the garden itself. Expensive equipment and temperature-sensitive materials may still need to be stored in an indoor space or maintenance area. A storage area near the garden can also be an ideal place to store first aid materials where they are easily accessible.

Trellises, Cages, and Other Crop Support

There is a lot that can be grown in a school garden without the need for trellises, tomato cages, stakes, or other types of crop support. Especially if the garden is primarily going to focus on spring and fall crops or herbs and flowers, there will not be a lot of need for these materials. However, if the garden will be used for active programming efforts during the summer, then having trellises, tomato cages, and stakes will

greatly expand the options for what can be grown successfully and how much can be grown in a smaller amount of space.

If possible, invest in larger, sturdier cages and trellises rather than the cheap, small cages that are easily available from big-box stores. Cages and trellises can easily be made with low cost fencing materials, concrete reinforcing wire, and similar items.

Further Resources

- Video: Growing Vegetables Vertically: <https://kansashealthyyards.org/all-videos/video/growing-vegetables-vertically>
- Video: Maximizing Your Garden Space: <https://kansashealthyyards.org/all-videos/video/maximizing-your-garden-space>
- Video: Stake and Weave Tomatoes: <https://kansashealthyyards.org/all-videos/video/stake-and-weave-tomatoes>
- Video: Tomatoes Need Support: <https://kansashealthyyards.org/all-videos/video/tomatoes-need-support>
- Trellises & Cages: <https://extension.umn.edu/planting-and-growing-guides/trellises-and-cages>
- Stake & Weave Tomatoes: <https://njaes.rutgers.edu/FS1102/>

Finding Local Partners and Resources

When starting a new garden, there is nothing that can replace the advice and expertise of experienced gardeners. If you lack someone with the necessary expertise, it will help immensely to find someone that can provide some guidance. Your local extension office may have agents and/or trained Extension Master Gardener volunteers that can provide some of this expertise, or ideas about who else in your community to approach. Local botanic gardens and parks, garden centers, garden clubs, or farm organizations may be able to help you identify possible partners and volunteers that can fill gaps in knowledge and skills.

It is also critical to the success of a school garden to look for volunteer and expertise in your school community, especially parents and grandparents of students.

Find your local extension office here: <https://www.ksre.k-state.edu/about/stateandareamaps.html>

Food Safety in a School Garden

For a school garden that is growing edible crops, especially if they will be used in a culinary program or a school cafeteria, it is important to implement some basic food safety procedures to prevent problems with foodborne illnesses. Designating special harvest tools and containers and regularly washing those containers is one step. Having an easily accessible handwashing station is another thing to consider. Refer to this resource for a further discussion of school garden food safety:

- Garden to Plate: Food Safety for School and Community Gardens: <https://www.bookstore.ksre.ksu.edu/pubs/MF3152.pdf>

Other Resources

School Garden Development

Books and Other Guides

- Gardens for Learning: Creating and Sustaining Your School Garden: <https://greenourplanet.org/site/wp-content/uploads/2018/04/Gardens-for-Learning-Book-California.pdf>
- Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms: <https://greenourplanet.org/site/wp-content/uploads/2018/04/Guide-for-Creating-School-Gardens.pdf>
- *How to Grow a School Garden: A Complete Guide for Parents and Teachers* by Arden Bucklin-Sporer and Rachel Kathleen Pringle
- Nature Conservancy: How to Build a School Garden <https://www.nature.org/en-us/about-us/who-we-are/how-we-work/youth-engagement/nature-lab/school-garden-resources/>

- Starting a School Garden Program: <https://kids-gardening.org/create-sustain-a-program-starting-a-school-garden-program-overview>
- Steps to a Bountiful Kids' Garden: <https://www.gardeners.com/buy/bountiful-kids-garden/8593689.html>

Grants and Fundraising

- Funding a School Garden Program: <https://kids-gardening.org/create-sustain-a-program-funding-a-school-garden-program/>
- KidsGardening Grants: <https://kidsgardening.org/grants-and-programs/> and <https://kidsgardening.org/grant-opportunities/>
- Annie's Grants for Gardens: <https://www.annies.com/grants-for-gardens/>
- Whole Kids Foundation Grants: <https://www.wholekidsfoundation.org/programs>
- Other Organizations & Resources to Support School Gardens
- Kansas Association for Conservation & Environmental Education: <https://www.kacee.org/kansas-school-gardens>
- Kansas Farm to School: <http://www.farmtoschool.org/our-network/Kansas>
- Kansas City Schoolyard Gardens: <https://kccg.org/schoolyard-gardens-2/>
- Life Lab: <https://lifelab.org/for-educators/schoolgardens/>
- Kids Gardening: <http://kidsgardening.org>

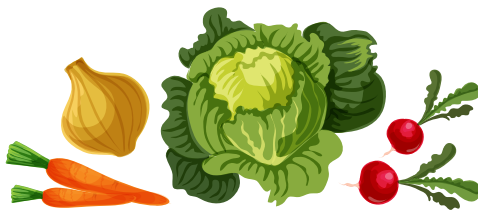
Kansas Gardening

- Horticulture Information Center: <http://hnr.k-state.edu/extension/info-center>
- Kansas Garden Guide: <https://bookstore.ksre.ksu.edu/pubs/s51.pdf>
- Vegetable Garden Planting Guide: <https://bookstore.ksre.ksu.edu/pubs/mf315.pdf>

- Gardening on Brownfields: Testing Your Soil: <http://www.bookstore.ksre.ksu.edu/pubs/MF3095.pdf>
- Gardening on Brownfields: Historical Property Usage: <http://www.bookstore.ksre.ksu.edu/pubs/MF3096.pdf>

Composting

- Making Compost, A Beginner's Guide: <https://bookstore.ksre.ksu.edu/pubs/MF1053.pdf>
- Quick Composting: <https://bookstore.ksre.ksu.edu/pubs/MF3372.pdf>
- Using Compost: <https://bookstore.ksre.ksu.edu/pubs/MF3370.pdf>
- The Composting Process: <https://bookstore.ksre.ksu.edu/pubs/MF3369.pdf>



School Garden Curricula and Lesson Plan Options

This document details a number of the different school gardening lesson plans and curriculum books that are available for use with a school garden. Some of the materials are free and others have a cost associated with them. The materials are divided by grade level, although there can be a lot of crossover in some of the materials.

K-State Research and Extension does not endorse any of the following curricula, lesson plans, or the content contained therein. The materials are provided to give you a wide range of options for your consideration so that you can determine what will work best in your context.

Early Childhood and Preschool

- Cultivating Joy and Wonder: educating for Sustainability in Early Childhood Through Nature, Food, and Community: https://store.shelburnefarms.org/product/cultivatingjoy/education_resources
— Cost: \$45.00
- Farm to Childcare Curriculum Package: <https://www.iatp.org/documents/farm-to-childcare-curriculum-package>
— Cost: Free

- Garden Adventures: <https://www.gardeners.com/buy/garden-adventures/8593680.html>
— Cost: \$19.95
- Grow It, Try It, Like It: <https://www.fns.usda.gov/tn/grow-it>
— Cost: Free
- Sowing the Seeds of Wonder – Discovering the Garden in Early Childhood Education: <http://www.lifelab.org/store/curriculum/#ssw>
— Cost: \$16.95
- Sow it. Grow it. Eat it. Know it. Primary Lessons for Classroom & Garden: <http://www.growing-gardeners.net/wp-content/uploads/2011/03/Primary-Lessons-for-Edible-Garden.pdf>
— Cost: Free
- The Garden Classroom: Hands-On Activities in Math, Science, Literacy & Art: <https://www.amazon.com/Garden-Classroom-Hands-Activities-Literacy/dp/1611801648>
— Cost: \$21.95

Elementary

- 4-H Gardening Curriculum Set & Bingo Bundle: <https://shop4-h.org/products/2016-gardening-curriculum-bingo-bundle>
— Cost: \$52.95
- Afterschool Agriculture: Acres of Adventure: <https://shop4-h.org/products/afterschool-agriculture-acres-of-adventure-1>
— Cost: \$9.95
- Agriculture in the Classroom – Kansas Lessons: <https://ksagclassroom.org/education-center/lesson-plans/>
— Cost: Free
- Agriculture in the Classroom National Curriculum Matrix: <https://www.agclassroom.org/matrix/>
— Cost: Free
- The Bee Cause 6 Week Bee Unit: <https://www.thebeecause.org/6-week-bee-unit/>
— Cost: Free
- Bee Smart School Garden Kit: <https://www.pollinator.org/bee-smart>
— Cost: \$85-175
- Books in Bloom: Discovering the plant biology in great children’s literature: <https://www.gardeners.com/buy/books-in-bloom/8593675.html>
— Cost: \$29.95
- Botany on Your Plate: <https://www.gardeners.com/buy/botany-on-your-plate-book/8593676.html>
— Cost: \$21.95
- Children’s Garden Book List: <https://www.growpittsburgh.org/garden-and-farm-resources/school-gardens-2/childrens-garden-book-list/>
— Cost: List is free, books are not
- Classroom Victory Garden Project: <http://classroomvictorygarden.org/>
— Cost: Free
- Clean: Slow Food USA’s School Garden Curriculum: <https://slowfoodusa.org/wp-content/uploads/Slow-Food-USA-Clean-Curriculum-Low-Res.pdf>
— Cost: Free
- Cornell Garden-Based Learning Activities: <http://gardening.cals.cornell.edu/lessons/activities/>
— Cost: Free
- Cultivating Learning with School Gardens: <https://agricorps.org/school-garden-curriculum/english/>
— Cost: Free
- Dig Art! Cultivating Creativity in the Garden: <http://gardening.cals.cornell.edu/lessons/curricula/dig-art-cultivating-creativity-in-the-garden/>
— Cost: Free
- Dig In! Standards-Based Nutrition Education from the Ground Up: <https://www.fns.usda.gov/tn/dig-standards-based-nutrition-education-ground>
— Cost: Free
- Edible Schoolyard NYC: <https://www.edibleschoolyardnyc.org/educators/curriculum/>
— Cost: Free
- The Garden Classroom: Hands-On Activities in Math, Science, Literacy & Art: <https://www.amazon.com/Garden-Classroom-Hands-Activities-Literacy/dp/1611801648>
— Cost: \$21.95
- Gardening Lab for Kids: 52 Fun Experiments to Learn, Grow, Harvest, Make, Play, and Enjoy Your Garden: <https://www.amazon.com/Gardening-Lab-Kids-Experiments-Hands/dp/1592539041>
— Cost: \$16.90

- The Great Garden Detective Adventure: <https://www.fns.usda.gov/tn/great-garden-detective-adventure-standards-based-gardening-nutrition-curriculum-grades-3-and-4>
— Cost: Free
- Green Thumb Challenge: <http://www.greeneducationfoundation.org/greenthumbchallengesub/curriculum-and-activities/curriculum.html>
— Cost: Free
- Grow Pittsburgh Garden Lesson Plans: <https://www.growpittsburgh.org/garden-and-farm-resources/school-gardens-2/lesson-plans/>
— Cost: Free
- The Growing Classroom: <https://lifelab.z2systems.com/np/clients/lifelab/product.jsp?product=1&>
— Cost: \$39.95
- Growing Gardens: Youth Grow Lesson Plans: <https://www.growing-gardens.org/wp-content/uploads/2013/03/Growing-Gardens-Youth-Grow-Lesson-Plan-Manual-Jan-2016.pdf>
— Cost: Free
- Growing Good Kids Book Award List: <https://jmgkids.us/bookawards/>
— Cost: List is free, books are not
- Growing in the Garden: Local Foods and Healthy Living Curriculum: <https://store.extension.iastate.edu/Product/Growing-in-the-Garden-Local-Foods-and-Healthy-Living-Curriculum>
— Cost: \$35.00
- Growing Minds, Farm to School: <https://growing-minds.org/garden-lesson-plans/>
— Cost: Free
- Junior Master Gardener Level 1 – Grades 3-5: <https://www.agrilifebookstore.org/JMG-Teacher-Leader-Guide-p/jmg-006.htm>
— Cost: \$56.00
- Junior Master Gardener Learn, Grow, Eat, Go!: <https://www.agrilifebookstore.org/Learn-Grow-Eat-and-Go-p/jmg-001.htm>
— Cost: \$52.00
- Junior Master Gardener Literature in the Garden: <https://www.agrilifebookstore.org/JMG-Literature-in-the-Garden-p/jmg-010.htm>
— Cost: \$48.00
- Junior Master Gardener Wildlife Gardener: <https://www.agrilifebookstore.org/JMG-Wildlife-Gardener-p/jmg-009.htm>
— Cost: \$48.00
- Kansas School Gardens Activities: <http://www.kansasgreenschools.org/kansas-school-gardens-activities>
— Cost: Free
- KC Schoolyard Garden Lesson Plans: <https://kccg.org/schoolyard-garden-lesson-plans/>
— Cost: Free
- Kids Gardening: Garden Lesson Plans: <https://kidsgardening.org/lesson-plans/>
— Cost: Free
- Life Lab Garden Lessons & Downloads: <https://lifelab.org/for-educators/schoolgardens/#lessons>
— Cost: Free
- LiFE: Growing Food: <https://www.gardeners.com/buy/growing-food/8593681.html>
— Cost: \$32.95

- LiFE: Farm to Table and Beyond: <https://www.gardeners.com/buy/farm-to-table-beyond/8593679.html>
— Cost: \$32.95
- Math in the Garden: <https://www.gardeners.com/buy/math-in-the-garden/8593685.html>
— Cost: \$29.95
- My First Garden from Rodale Institute: <https://rodaleinstitute.org/education/school-gardening-curriculum/>
— Cost: Free
- Nature Conservancy: Elementary Lesson Plans: <https://www.nature.org/en-us/about-us/who-we-are/how-we-work/youth-engagement/nature-lab/elementary-lesson-plans/>
— Cost: Free
- Nature's Partners: Pollinators, Plants and You: <https://www.pollinator.org/pollinator.org/assets/generalFiles/curriculum.pdf>
— Cost: Free
- Pollinator LIVE: A Distance Learning Adventure: <https://pollinatorlive.pwnet.org/index.php>
— Cost: Free
- Pollinator Partnership Curriculum: <https://www.pollinator.org/pollinator.org/assets/generalFiles/Gardens-Curriculum-2010-one-doc.pdf>
— Cost: Free
- Project Seasons: https://store.shelburnefarms.org/product/179/education_resources
— Cost: \$24.95
- The School Garden Curriculum: An Integrated K-8 Guide for Discovering Science, Ecology, and Whole-Systems Thinking: <https://www.theschool-gardencurriculum.com/>
— Cost: \$34.99
- School Garden and Nutrition Curriculum from Denver Urban Gardens: <https://dug.org/school-garden-curriculum/>
— Cost: Free
- Seed to Salad: <http://gardening.cals.cornell.edu/lessons/curricula/seed-to-salad/>
— Cost: Free
- Sow it. Grow it. Eat it. Know it. Elementary Lessons for Classroom & Garden: https://growinggardeners.files.wordpress.com/2010/09/lcng_lower_el.pdf and https://growinggardeners.files.wordpress.com/2010/09/lcng_upper_el.pdf
— Cost: Free
- University of Georgia School Garden Curriculum: <https://extension.uga.edu/programs-services/school-garden-resources/curriculum.html>
— Cost: Free
- Whole Kids School Garden Lesson Plans: <https://www.wholekidsfoundation.org/assets/documents/school-garden-lesson-plans.pdf>
— Cost: Free

Middle School and High School

- 4-H Gardening Curriculum Set & Bingo Bundle: <https://shop4-h.org/products/2016-gardening-curriculum-bingo-bundle>
— Cost: \$52.95
- Agriculture in the Classroom – Kansas Lessons: <https://ksagclassroom.org/education-center/lesson-plans/>
— Cost: Free
- Agriculture in the Classroom National Curriculum Matrix: <https://www.agclassroom.org/matrix/>
— Cost: Free

- Cultivating Learning with School Gardens: <https://agricorps.org/school-garden-curriculum/english/>
— Cost: Free
- Discovering Our Food System: <http://gardening.cals.cornell.edu/lessons/curricula/discovering-our-food-system/>
— Cost: Free
- Edible Schoolyard NYC: <https://www.edibleschoolyardnyc.org/educators/curriculum/>
— Cost: Free
- Farm to School Youth Leadership Curriculum: <https://www.iatp.org/documents/farm-to-school-youth-leadership-curriculum-all-lessons-and-work-sheets>
— Cost: Free
- The Food Project: Food System Curriculum: <https://thefoodproject.org/curriculum/food-system/>
— Cost: Free
- The Food Project: French Fries and the Food System: <https://thefoodproject.org/product/french-fries/>
— Cost: \$24.95
- The Food Project: Growing Together: <https://thefoodproject.org/product/growing-together/>
— Cost: \$24.95
- The Food Project: Hunger and Homelessness Curriculum: <https://thefoodproject.org/curriculum/hunger-and-homelessness/>
— Cost: Free
- The Food Project: Sustainable Agriculture Curriculum: <https://thefoodproject.org/curriculum/sustainable-agriculture/>
— Cost: Free
- FoodSpan: Teaching the Food System from Farm to Fork: <https://www.foodspan.org/>
— Cost: Free
- Garden Genetics: Teaching with Edible Plants: <https://my.nsta.org/resource/?id=10.2505/PKEB199XT>
— Cost: \$7.83 (e-book)
- Green Thumb Challenge: <http://www.greeneducationfoundation.org/greenthumbchallengesub/curriculum-and-activities/curriculum.html>
— Cost: Free
- Growing in the Garden: Local Foods and Healthy Living Curriculum: <https://store.extension.iastate.edu/Product/Growing-in-the-Garden-Local-Foods-and-Healthy-Living-Curriculum>
— Cost: \$35.00
- Growing Minds, Farm to School: <http://growing-minds.org/middle-and-high-school-resources/>
— Cost: Free
- Math in the Garden: <https://www.gardeners.com/buy/math-in-the-garden/8593685.html>
— Cost: \$29.95
- Junior Master Gardener Level 2 – Operation Thistle Seeds of Despair: <https://www.agrilifebookstore.org/JMG-Level-2-Seeds-of-Despair-p/jmg-008.htm>
— Cost: \$48.00
- Junior Master Gardener – Operation W.A.T.E.R. Dr. Thistle Goes Underground: <https://www.agrilifebookstore.org/JMG-Level-2-Dr-Thistle-Goes-Underground-p/jmg-011.htm>
— Cost: \$48.00
- LiFE: Growing Food: <https://www.gardeners.com/buy/growing-food/8593681.html>
— Cost: \$32.95

- LiFE: Farm to Table and Beyond: <https://www.gardeners.com/buy/farm-to-table-beyond/8593679.html>
— Cost: \$32.95
- LiFE: Choice, Control and Change: <https://www.gardeners.com/buy/choice-control-change/8593677.html>
— Cost: \$32.95
- Maize Activity Guide for 5th to 8th Grades: <https://lifelab.z2systems.com/np/clients/lifelab/product.jsp?product=14&>
— Cost: \$19.95
- Nature’s Partners: Pollinators, Plants and You: <https://www.pollinator.org/pollinator.org/assets/generalFiles/curriculum.pdf>
— Cost: Free
- Nourish Food + Community: What’s the story of your food?: <https://www.nourishlife.org/teach/curriculum/> and https://www.schoolgardens.org/uploads/1/0/8/4/108474255/curriculum-nourish_food_community.pdf
— Cost: Free
- Pathways Through Horticulture: <https://www.mnla.biz/page/hcurriculum>
— Cost: Free
- Pollinator LIVE: A Distance Learning Adventure: <https://pollinatorlive.pwnet.org/index.php>
— Cost: Free
- Pollinator Partnership Curriculum: <https://www.pollinator.org/pollinator.org/assets/generalFiles/Gardens-Curriculum-2010-one-doc.pdf>
— Cost: Free
- University of Georgia School Garden Curriculum: <https://extension.uga.edu/programs-services/school-garden-resources/curriculum.html>
— Cost: Free
- Youth Grow: Leadership in the Garden: <http://gardening.cals.cornell.edu/lessons/curricula/youth-grow/>
— Cost: Free



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**Kansas State University Agricultural Experiment Station
and Cooperative Extension Service**

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