



School Gardens

Indiana Grown for Schools Network
Farm to School Toolkits

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GETTING STARTED

INTRODUCTION

Image: Hylton. (2019). "Gardening With Kids." UF/IFAS Extension, Leon County. <<http://blogs.tallahassee.com/community/2019/04/16/gardening-with-kids/>>.

School gardens can increase academic achievement and foster a positive learning environment for students and teachers. They create opportunities for educational engagement, and can result in enhanced psychosocial development. School gardens can increase student intake of fresh produce, promote lifelong healthy eating habits, and encourage picky eaters to try new foods. As you read through the toolkit, remember to check the index of resources at the conclusion of the document for additional helpful resources not cited directly.



59.4%

of Indiana School Food Authorities
provide food, nutrition, or
agricultural education.

28.2%

of Indiana Schools have
edible gardens.

WAYS TO USE YOUR SCHOOL GARDEN



There are a number of different ways to use your school garden. Work with your team to identify the needs in your school, and establish the goals for your garden.

LEARNING

School garden programs can improve students' leadership, decision-making, communication, self-understanding, volunteerism, and teamwork skills. School gardens can positively impact students' grades, knowledge, attitudes, and behavior.

Gardens also offer students hands-on learning opportunities to explore the growing process and try fresh produce. School gardens can be used in a variety of ways to meet curriculum standards in math; history and social studies; reading; engineering and technology; visual and performing arts; and health and physical education.



Image: Axe. (2019). "10 Awesome Austin Orgs Bringing Better Food to Schools." Food Tank. <<https://foodtank.com/news/2018/12/10-awesome-austin-orgs-bringing-better-food-to-schools/>>

EATING

The fresh produce grown in your garden may be used in a variety of ways. Access to fruits and vegetables have been historically limited in the U.S. public school system. Additionally, few alternatives meet Smart Snacks in School nutrition standards. School gardens can combat these issues by providing easy access to fresh produce. Food grown in the garden may be used for:

- Taste tests and in-classroom activities
- Donations to local pantries and feeding programs
- A garden to school cafeteria program
- A summer meal program
- Generating revenue for the school by creating a school farm stand or farmers market

Students with frequent, high-quality opportunities for hands-on nutrition learning have been found to eat up to three times more fruits and vegetables at lunch, regardless of where the produce was sourced.

Students who attend schools with regular school garden lessons have been shown to have greater access to fruits and vegetables at home when compared to those who attend schools without curriculum implementation. By offering repeated exposure, school gardens help to build emotional connections to the food that is grown, an essential component in changing students' eating behaviors for life-long healthy habits.

Another option for utilizing what is grown in the garden is to donate produce to local pantries and feeding programs. One of the easiest places to donate would be a food pantry based at the school. Starting a food pantry on school grounds can result in an indispensable resource for families, while simultaneously instilling the value of community action projects and volunteering in students. The produce could also be donated to a local pantry, allowing the school's garden to address food insecurity within the community.

FUNDRAISING

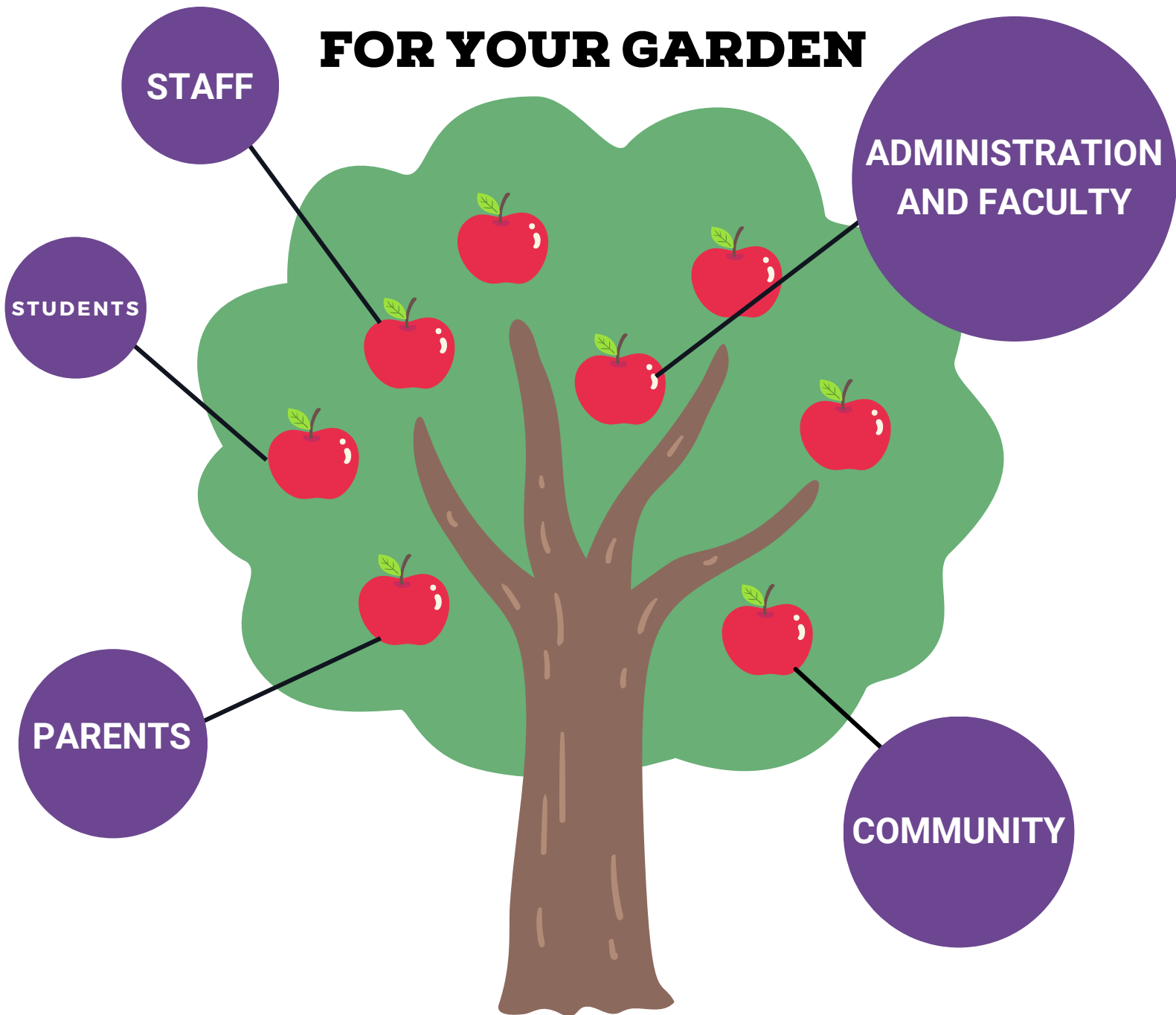
School gardens may present a beneficial fundraising opportunity. Students could create a school farm stand, or even a school farmers' market. This not only works as a way to raise money, but also acts as an opportunity for students to learn essential career building skills throughout their education from Pre-K through high school. Other fundraising ideas include selling plants, seedlings, a recipe cookbook (featuring recipes from students and teachers, focused on fresh produce grown in the garden), flowers, and dried herb bouquets.



Deciding a school garden will be a great addition to your school is just the first step. Now you will need to build support from school administration and staff. In this toolkit we offer multiple strategies for gaining support for your school garden, including how to get support, who to approach, and ways to fundraise for your garden. Taking time to verify that you have proper support is essential to ensure your garden will thrive and survive long term.

**Now
What?**

BUILDING SUPPORT FOR YOUR GARDEN



GARDEN COMMITTEE

A key aspect of successful, long-term school garden programs is a garden committee. A garden committee should include individuals from administration, faculty, and staff, as well as parents and community members. Each committee member should be assigned specific tasks and duties, with a point person at the school designated to offer support and hold members accountable.

Building Support

FORMING A GARDEN COMMITTEE

Administration and Faculty Support

In most schools, administrative permissions must be granted before program implementation may begin. Additionally, having an array of faculty involved in the program allows the garden to be utilized in a variety of classroom subjects and lessons. If you do not have the support from other faculty members, creating and maintaining a school garden program may not be practical.

Staff Support

Support from the school's staff may lead to additional resources for you to pull from. Staff may have significant gardening experience or other useful skills they are willing to offer. For example, if you plan to incorporate produce from the garden in the school's cafeteria, it is essential that you have the support of the cafeteria staff. This will not only ensure this goal is feasible, but allow staff to become involved through offering insights and opinions on what items would be best to include in the garden.

Building Support

FORMING A GARDEN COMMITTEE

Community Support

Community support can come from general community members, local nurseries, or [Purdue Extension Master Gardeners](#) and staff in the form of technical assistance, garden maintenance in the summer, class time support, garden-based curricula, and funding sources. Another place to look for community support is in [local food councils](#). Members of a local food council may have interest in engaging with your school garden and supporting it in a number of ways.

Parent Support

Parents can act as a bridge between the school and community, as they often have connections to both. They may be able to assist with the garden itself or in connecting you with fundraising resources and other community support. As mentioned earlier, parents are essential members of a garden committee and their skills and expertise should not be overlooked. Parents may be utilized for tasks from grant writing to garden management.

Building Support

DIRECTING A GARDEN COMMITTEE

Prior to actually starting the school garden, the committee should determine what they hope to accomplish and the benefits of doing so. It is important that the committee consider both the challenges and benefits prior to the implementation of the school garden program. It may also be advantageous for the committee to create a checklist of all tasks that need to be completed each season. Committee members will change as time goes on, so it is important to start the committees with a solid foundation.

"In summary, while excellent soil and plants may be important factors to the foundation of a garden, dedicated people are the foundation of the garden program. Your garden committee is the sunshine, water, and nutrients that will help make your school garden program grow"

- KidsGardening.org



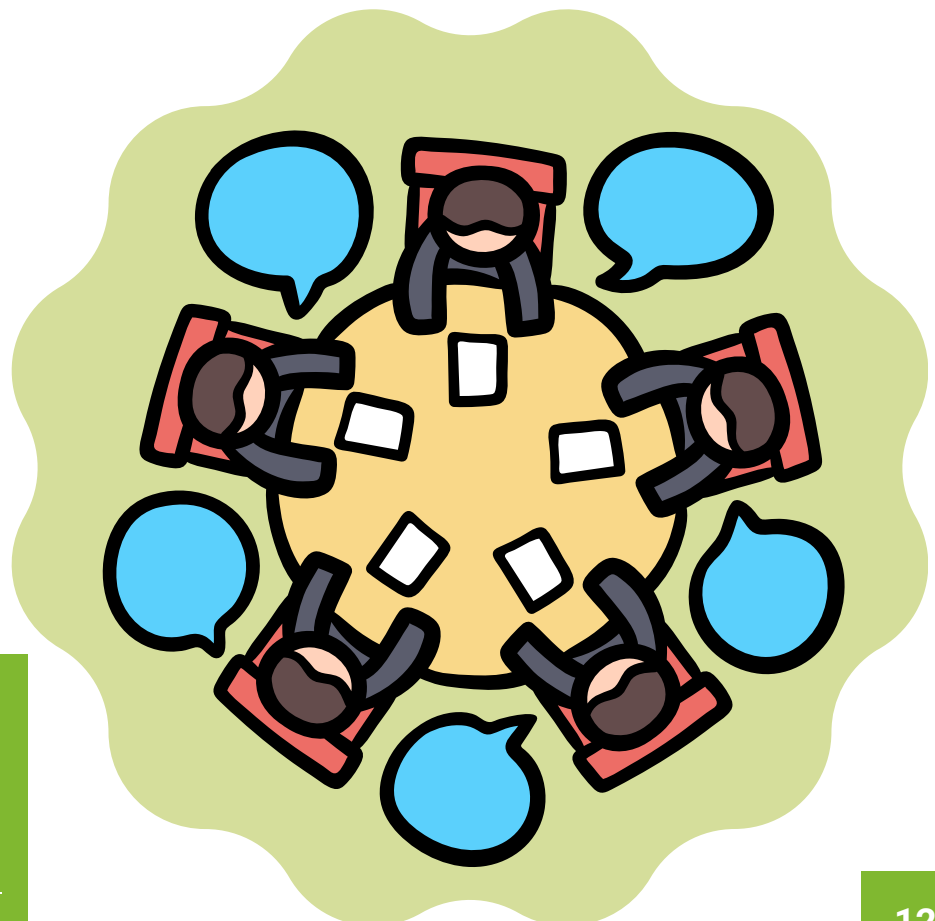
Crop Planning and Rotation Schedule



Summer Maintenance



Grant Applications



Committee Checklist Resources:

- [School Garden Checklist](#)
- [A Step-by-Step Guide to Get Your School Garden Growing](#)
- [Forming a Garden Committee](#)

Building Support

SUSTAINABILITY

When planning for your school garden, it is important to consider a variety of factors to ensure it will be sustainable for years to come. The garden committee should decide who all will be involved in the garden, how they will be involved, and what the garden program will look like (both in the short- and long-term).

Another way to improve the sustainability of your garden is to incorporate school garden language into your school's wellness policy. You can accomplish this by embedding school garden language into existing sections or adding new sections specifically for the garden. It is important to consider how the garden will be cared for when school is not in session. Create a kids summer gardening program or summer volunteer schedule to help maintain the garden over the summer break.

Resources on Sustainability:

- [Getting a School Garden Blooming - The Garden Committee](#)
- [Incorporating School Garden Language into a School Wellness Policy](#)
- [Summer in the School Garden](#)



Image: Axe. (2019). "10 Awesome Austin Orgs Bringing Better Food to Schools." Food Tank. <<https://foodtank.com/news/2018/12/10-awesome-austin-orgs-bringing-better-food-to-schools/>>.

Building Support

FUNDING

It is beneficial to secure funding from multiple sources to ensure you will still have funding even if one source is lost. Take advantage of grant opportunities from the local, state, or federal level, and lean on the resources available to different members of your garden committee. You may also be able to secure donations from local companies such as hardware stores or nurseries. These donations could either be monetary or items needed for your garden.

Grant Resources:

- [Starting a School Garden: A Toolkit for Success](#)
- [Farm to School Grant Program](#)
- [KidsGardening: Grant Opportunities for School and Youth Garden Programs](#)
- [Seed Your Future: Educator Grants](#)
- [Funding Opportunities for High Tunnels through the USDA NRCS](#)

If you are utilizing your school garden for produce in your cafeteria, you may be able to use funds from your school's nonprofit school food service account toward the school garden. In order to do this, it is required that "funds are supporting the operation and/or improvement of the school meals program and that all expenses are allowable (i.e. necessary, reasonable, and allocable) in accordance with the Office of Management and Budget (OMB) Guidance under the "Cost Principles for State, Local, and Indian Tribal Governments." This is something that would be beneficial to discuss with your Food Service Operations team.

For more information about utilizing these funds for your school garden, it may be helpful to visit resource from the USDA: [Farm to School and School Garden Expenses](#)



CHAPTER 1

SCHOOL GARDEN READINESS

Image: Canva Pro (2021)

Before you implement, it is important to thoughtfully plan all aspects of your school garden program. While not all school gardens will look the same and the planning and implementation process will vary from school to school, there are some key common steps for sustainable school garden programs. The order of these steps will not be the same for every program. Additionally, each step has any number of tasks that could be included within it. These steps will vary from school to school and be dependent on your specific program.

PRE-PLANTING CHECKLIST

Key steps to take or consider before getting started:

- Obtain approval from the appropriate individuals (Administration, Principal, etc.)
- Establish support from multiple groups (Faculty and Staff, Parents, Community, etc.)
- Work with stakeholders to create a vision for the garden
- Find an appropriate location for your garden, ensuring good and safe soil
- Develop a budget
- Gather funds for your garden (Grants, Fundraising, Donations)
- Establish a Garden Committee
- Create a plan for garden maintenance year round
- Purchase necessary planting supplies

ADDITIONAL CHECKLIST RESOURCES

- [School Garden Checklist \(page 7-8\)](#)
- [USDA's People's Garden Initiative: School Garden Checklist](#)
- [DC Office of the State Superintendent of Education: Checklist for Starting \(and using\) a School Garden](#)
- [Ohio State University Extension: Checklist for Starting a School Garden](#)
- [The USDA Farm to School Planning Toolkit: School Gardening Questions to Consider \(page 38\)](#)

Choosing the Garden

It is important to pick the right location and type of garden to fit your school's or program's needs. One of the first steps in choosing your garden is to evaluate the indoor and outdoor spaces you have available. Potential sites may include the school yard, parking lot, space for an indoor tower garden, rooftops, a sunny windowsill inside a classroom, or a greenhouse. If you don't have any available space on your premises, it may be beneficial to consider options within the community such as vacant lots, city parks, community gardens, or indoor community centers.

There are various types of gardens. These types include historic and cultural gardens, container gardens, windowsill gardens, pizza gardens, flower mazes, sensory gardens, snacking and sipping gardens, art and sculpture gardens, hydroponic gardens, tower gardens, and Zuni Waffle gardens. The type of garden you select will be dependent on the space you have available, accessible resources and budget, and the vision for your garden. When planning and creating your vision for the garden, it is important to think big but start small. For a more detailed list of the types of gardens you might create, see Appendix B.

Additional Resources:

- [Types of Gardens \(page 25\)](#)
- [USDA: Start a School Garden - Here's How...](#)



Choosing the Garden

Questions to ask your Garden Committee when choosing a space for your garden:

- Is the location easy to get to? Is it safe to access?
- Is there a water source nearby? Is it safe and reliable?
- Will this space be big enough long term? Will you be able to grow the garden if needed or desired?
- How much sunlight does this location receive? This will impact what you are able to grow. If you have particular items in mind, ensure they will be able to grow in this location.
- Is the soil safe? Has it been tested for contamination (such as from lead or other heavy metals)?
- Will this location be secure? Will anyone else have access to the garden (including both people and pests)?



A photograph of four children in school uniforms (light blue shirts and dark pants/skirts) crouching around a garden bed. They are looking down at various plants, including leafy greens and a carrot. The garden bed is bordered by large, light-colored rocks. The background is a blurred outdoor setting with dry leaves on the ground.

CHAPTER 2

OUTDOOR GARDENS

Image: Sustainable Food Center, Austin TX . (2021). <<https://sustainablefoodcenter.org/programs/grow-local/school-garden-support-training>>.

Where to plant your outdoor garden will depend on a number of factors. Materials and space ready for use, the needs of the plants, and resource availability should all be considered when designing your school garden program. Creating a basic outline of your garden to map out your crops so you know what to plant each season and what resources you will need is a great strategy to ensure your garden's continued success.

Outdoor Gardens

L.A.W.N.S.

Plants, like all living organisms, have basic needs. For most plants, these needs can be summarized by the acronym, L.A.W.N.S: light, air, water, nutrients, and space.

L: LIGHT

Plants call for ample access to sunlight or an artificial light source. Picking a spot that receives at least six hours of sunlight per day is key when planning where to place your future garden. Many crops (like tomatoes and peppers) require full sun, so be sure there are no large trees or buildings nearby that will produce excessive amounts of shade over your plot over the course of the day.

A: AIR

Plants take in carbon dioxide (CO₂) from the air and convert it into glucose through the process of photosynthesis, which is powered by sunlight. Each species of plant's metabolism is different and may require varied atmospheric compositions. Please note that some plants may also be sensitive to temperature or sudden changes in the environment that could limit optimal plant growth.



W: WATER

The garden should be watered once a week if adequate rainfall has not been received. Most vegetables require a minimum depth of 1" of water during that time, though some species, such as tomatoes, prefer double (2") of water per week. You can test if your garden needs water by digging an inch or so into the soil of the bed and making sure the soil is moist. In stretches of hot and/or dry weather, watering frequency should increase.

Outdoor Gardens

L.A.W.N.S.

...continued

S: SPACE

Garden size will vary based on available space and volunteers. Roots and leaves need room to spread out as they grow, and each plant has a different minimum standard. If you are unsure about the size of the garden your school can reasonably support, start small with 100 square feet or 4-6 raised beds. You can always expand later.



N: NUTRIENTS

Fruits and vegetables require nutrient rich, well drained soil to reach maximum growth potential. Always conduct a soil test if you are growing on a new plot. Your local Extension office has all the resources you need to conduct a soil test and understand the results. Place the garden anywhere from 75 to 100 feet away from any trees to avoid competition for natural resources your crops will need to thrive in their new environment. Nut trees are particularly notorious for competing with other plants for soil moisture and plant nutrients.

Use L.A.W.N.S. to plan which plant species will thrive in the gardening space your school has available for your program. For a sample lesson plan on what seedlings need to grow into a healthy plant, visit:

<https://biggreen.org/wp-content/uploads/2018/06/3-5-Plant-Needs.pdf>

Choosing an Outdoor Garden Design

From space allocation to plant preference, choosing a good design for your outdoor space can have a big impact on your garden's practicality and long term sustainability. Consult some of the options displayed here to see if an outdoor space will best suit your school's needs and vision.

In-Ground

An in-ground outdoor garden utilizes existing soil and requires limited start-up and irrigation work. For many school and community gardens, growing directly in the ground allows the use of tractors and roto-tillers to initially prepare areas, minimizing start-up costs.

Plots can also be easily exchanged or transported in an in-ground garden and require less water to maintain. Some crops requiring vast space for production or proper pollination are not well-suited for confined outdoor gardening spaces. In-ground spaces afford these crops, such as pumpkins and sweet corn, adequate space to properly grow and mature.

Advanced Tip: Ask your county Purdue Extension office about conducting a soil test before planting an in-ground garden as the composition of your soil can have a profound effect on what plant species will grow best in your selected area.



Raised Bed

A raised bed is a structure constructed above ground-level that is designed to house soil for urban planting. Raised beds are elevated boxes, typically made of wood, that are relatively small in size and filled with enough soil to support plants without using the soil underneath. Benefits to a raised bed design include a longer growing season, reduced hazards to growth such as accidental trampling, easier access to the plant base, less weeding and maintenance, and superior drainage compared to an in-ground bed when properly cared for.

Advanced Tip: Untreated or heat-treated wood contains no questionable chemical compounds that may leach into the soil within the bed, but deteriorates more quickly when in contact with soil and will have to be replaced as frequently as every two years.



Pallet Garden

A favorite of up-cyclers, a pallet garden is a sustainable way to repurpose recycled materials for nutrition education. Pallet gardens are easy to construct and can be placed virtually anywhere- vertically or horizontally- for increased accessibility and convenience. If space is a concern, a pallet garden is a clean option for housing easy-to-pick crops that can be readily adapted for the classroom. A pallet garden is an effective way to grow compact vegetables and herbs like salad greens, dwarf peas, bush beans, basil, and rosemary without a lot of maintenance. Click [here](#) for a materials list and Step-By-Step Guide to building your own pallet garden.



Wall Garden



Also known as the Climbing Garden, a wall garden is a vertical alternative to the raised bed that maximizes available space without sacrificing productivity. Vertical gardening spaces like Portage Indiana's own Green Sense Farms have caused media excitement by extending the growing season to a year-round producer without the use of herbicides, pesticides, or GMOs. This planting method is also an excellent solution for areas where the soil is in poor condition and will not support growing plants in an in-ground space. When creating a vertical garden, consider using a trellis, vertical containers, pockets, or wall or pallet planters to create the garden's basic structure. You will need to purchase your own soil to begin, and be prepared to water your plants frequently since species planted in vertical gardens will have shallow roots. Blackberries, strawberries, peas, tomatoes, pole beans, and herbs are popular choices for compact vertical planting.

Hydroponics



A hydroponic garden is a closed, soil-less system that grows seedlings directly from liquid nutrient solutions. Although lacking the mechanical support of a soil-grown garden, a hydroponics system offers many advantages. Systems can be designed to increase planting density and create gardens in locations where soil would be too poor to support gardening under normal conditions. In fact, many crops can be produced twice as fast in a well managed hydroponic system where growers are able to directly prescribe plants the exact nutrients they need.

Lettuce, spinach, strawberries, and bell peppers all grow well in a hydroponic system. However, plants with extensive roots like turnips or tall crops like corn are still best grown in soil. Plan ahead for the space you anticipate each plant to take up when at full capacity to avoid overcrowding.

Outdoor Gardens

SELECTING YOUR CROPS

When mapping out your space and selecting which crops you will initially plant in your garden, it is important to factor in seasonality, seeding, and potential programs whereby the garden could enrich the surrounding school or community.

Correct timing for planting vegetable seedlings or transplant seeds is determined by two key factors: **temperature tolerance and optimal germination temperature**. For an itemized list of optimal soil temperature ranges for vegetable seed germination in the state of Indiana, consult the following tables:

Table 3. Soil Temperatures for Vegetable Seed Germination

Vegetable	Optimum/Optimum Range (°F)	Minimum/Maximum (°F)
Bean	80/60-85	60/95
Bean, Lima	85/65-85	60/85
Beet	85/50-85	40/95
Cabbage	85/45-95	40/100
Carrot	80/45-85	40/95
Cauliflower	80/45-85	40/100
Celery	70/60-70	40/85
Chard, Swiss	85/50-85	40/95
Cucumber	95/60-95	60/105
Eggplant	85/75-90	60/95
Lettuce	75/40-80	35/85
Muskmelon	90/75-95	60/100
Okra	95/70-95	60/105
Onion	75/50-95	35/95
Parsley	75/50-85	40/90
Parsnip	65/50-70	35/85
Pea	75/40-75	40/85
Pepper	85/65-95	60/95
Pumpkin	95/70-90	60/100
Radish	85/45-90	40/95
Spinach	70/45-75	35/85
Squash	95/70-95	60/100
Tomato	85/60-85	50/95
Turnip	85/60-105	40/105
Watermelon	95/70-95	60/105

Outdoor Gardens

SELECTING YOUR CROPS

Table 1. Some common vegetables grouped according to their relative requirements for cool and warm weather.

Cool season crops for early-spring planting		
Hardy (tolerates hard frost) plant 4-6 weeks before last spring frost (see Figure 1)		
asparagus ⁴	kale ³	potato ⁴
broccoli ²	kohlrabi	radish ¹
Brussels sprouts ²	leek ²	rhubarb ⁴
cabbage ²	mustard ³	spinach ³
collards ³	onion ^{3, 4}	turnip ¹
horseradish ⁴	peas ¹	
Semi-hardy (tolerates light frost) plant 2-4 weeks before last spring frost		
beet ³	celery ²	lettuce ³
carrot ¹	chard ³	mustard ³
cauliflower ²	chinese cabbage ²	parsnip ¹
Warm season crops for later-spring or early-summer planting		
Tender (damaged by frost) plant after average last spring frost (minimum air temp 50°F)		
bean ¹	tomato ²	sweet corn ¹
Very Tender (damaged by light frost and air temperature below 50°F) plant at least two weeks after average last spring frost (minimum air temp 60-65°F)		
cucumber ³	okra ²	pumpkin ³
eggplant ²	pepper ²	squash ³
melons ²	sweet potato ⁴	

Table 2. Cool season plants for late-summer or fall planting (plant at least 4-8* weeks before first fall frost) (See Figure 2)

beet ³	green onion ²	radish ¹
broccoli ²	kale ²	spinach ³
Brussels sprouts ² (transplant by mid-summer)	kohlrabi ²	turnip ¹
cabbage ²	lettuce ³	
collards ²	mustard greens ¹	

* When deciding fall planting dates, consider the days to maturity for your crop and choose faster maturing cultivars when possible.

¹ typically direct-seeded

² typically transplanted

³ can be either direct-seeded or transplanted

⁴ typically vegetatively propagated

Outdoor Gardens

SELECTING YOUR CROPS

Some additional notes regarding crop selection to consider incorporating into your garden committee's annual plan:

Desired harvest time may also impact your decision to plant seeds or starters. For example, if the pumpkins you are preparing to plant will not germinate, grow, and be ready to harvest prior to the school's annual fall traditional celebration according to the estimated growth rate, you may consider opting for some starters to ensure the crops will be prepared for harvest at that time.



Garden accessibility, timing of locally sponsored feeding programs, and seasonal fluctuation of volunteers may also impact which crops you add to your annual planting plan. Ensuring your garden is accessible to community members of all abilities is the first step to fostering communal interconnectedness in your gardening program, a necessary component of the social and health benefits of maintaining a schoolwide garden on or near campus. Constructing an accessible garden may impact what kinds of foods you are able to plant, so plan accordingly.



CHAPTER 3

INDOOR GARDENS

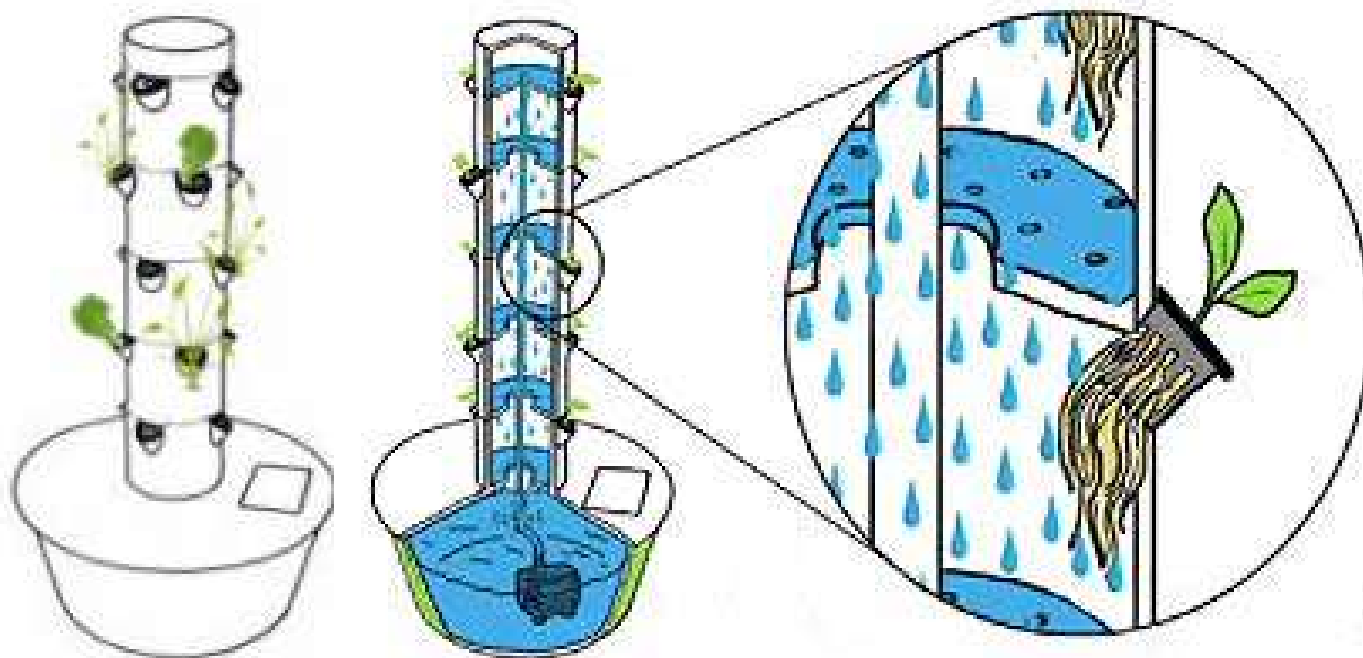
Image: Canva Pro (2021)

No outside space large enough or full of enough nutrients to house a prosperous outdoor garden? No problem! Indoor gardens can be a welcome alternative to the traditional outdoor crop beds. Check out four of the highlighted indoor garden structures below to see if an indoor garden is the right choice for your school or community.

Tower Garden

Tower gardens, also known as aeroponic gardens, allow plants to grow without soil, using only nutrients and water. The tower garden system is a vertical, aeroponic tower structure that takes up very little room and can be placed indoors with sufficient access to light as well as outdoors. Plants require very little care to thrive and do not suffer from weed overgrowth or a wide variety of pest problems or diseases. A tower garden kit should include a germination tray, rockwool cubes, vermiculite, net pots, seed starter kit, pump, timer, drain tube, plant food, pH test kit, pH adjusters, and a measuring cup.

A tower garden can grow many varieties of edible plants and fruiting vegetables (bell peppers, chili peppers, squash, eggplants, tomatoes, cucumbers) grow exceptionally well. Normally, plants are ready to harvest only a few weeks after planting. Special adaptations for a tower garden include refraining from planting root vegetables or grapevines due to minimal space for development and an optional grow cage or an outside structure to support the weight of the fruits.

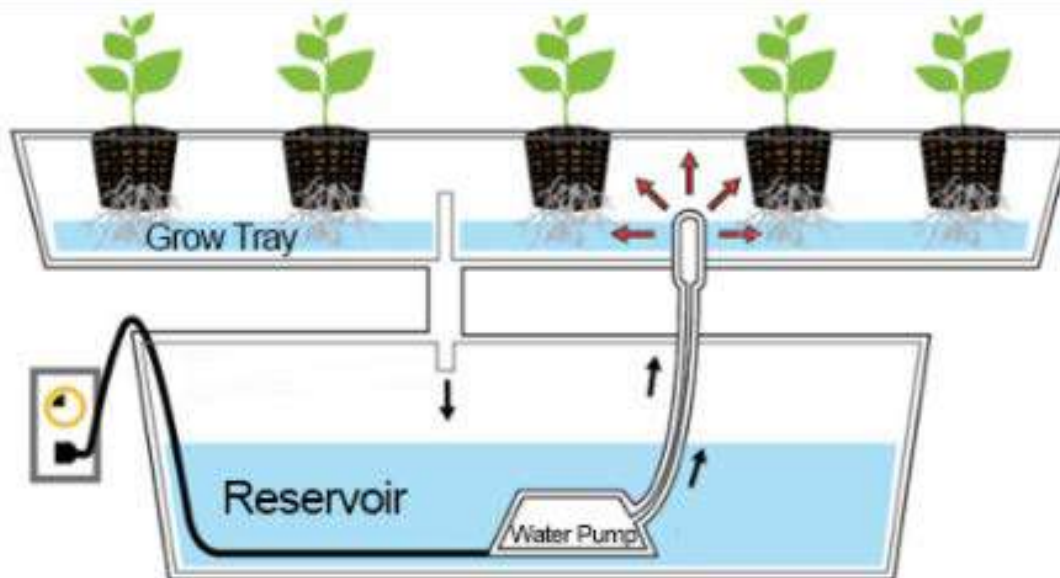


Hydroponic Garden

A hydroponic garden is a closed system that grows seedlings directly from liquid nutrient solutions. Because hydroponic gardens do not use soil, systems can easily be transferred indoors and be placed either vertically or horizontally with adequate lighting. Transitioning from the outdoors offers additional advantages, giving the gardener greater control over growing conditions such as temperature.

Lettuce, spinach, strawberries, and bell peppers all grow well in a hydroponic system. However, plants with extensive roots like turnips or tall crops like corn are still best grown in soil. Plan ahead for the space you anticipate each plant to take up when at full capacity to avoid overcrowding around the roots and at the surface-level to your indoor hydroponics garden.

Grow tray is periodically flooded with the nutrient solution



Nutrient solution returns to reservoir while system is not in operation

Image: "What is Hydroponics." Vegit. <https://www.google.com/url?sa=i&url=http%3A%2F%2Fvegit.co.za%2Fprodhydro.html&psig=AOvVaw1wp4HY7_b7BX8eLhn4BEL-&ust=1629001460785000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCKjntL3Vr_ICFQAAAAAdAAAAABAT>.

Aquaponic Garden

An aquaponics garden is a cultivated, recirculating ecosystem between fish and plants that utilizes natural bacterial cycles to convert fish waste to plant nutrients. Aquaponics uses 1/10th of the water of soil-based gardening and even less water than a hydroponic system. When done successfully, aquaponics will give your students the great satisfaction of looking after fish while growing sustainable food!

To get started, you will need a fish tank, a water pump to send water to the plant media bed and return it to the fish, and some grow media for your plants. Leafy lettuce, tomatoes, watercress, cucumbers, peppers, cauliflower, cabbage, strawberries, ginger, basil, and kale, all do well in aquaponic gardens. Plants to avoid include mint, blueberries, and chrysanthemum flowers due to finicky pH requirements or risk of preventing other plants from growing.

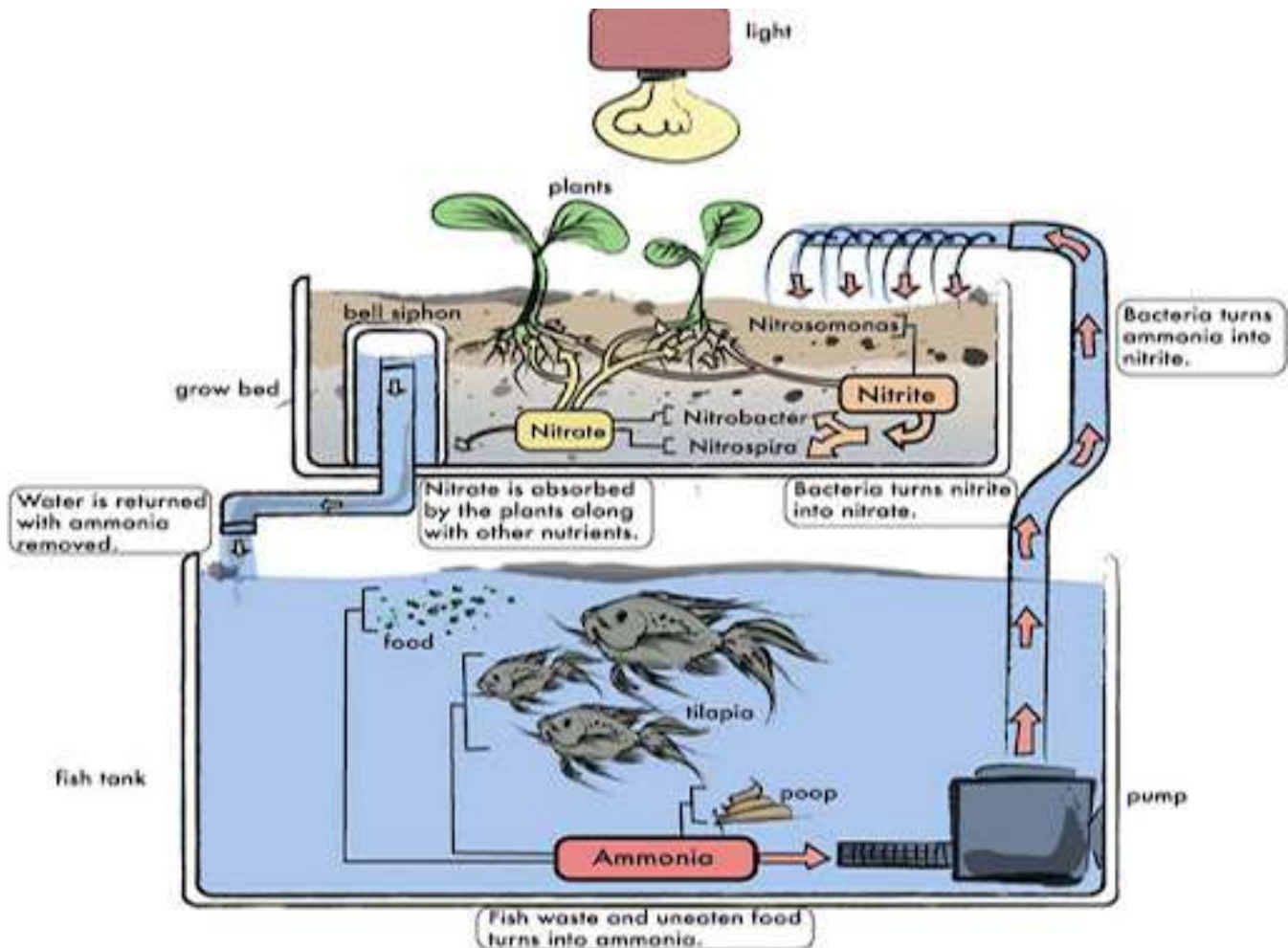


Image: "Hydro/Aquaponics." LEARN2KITE Cabarete. <http://learn2kitecabarete.com/hydroaquaponics/>

Container Garden

Container gardening is the practice of growing plants exclusively in containers rather than planting them in the ground. Containers allow you to create the ideal soil conditions each individual plant requires, and offer placement flexibility to take full advantage of the sunlit areas of your garden for the plants who need it most.

The beauty of the container garden is its unique sustainability factor. A window ledge, discarded lettuce bowls or clamshells, coffee mugs, or shoeboxes filled with a little soil and supplied with adequate light, air, water, nutrients, and space (L.A.W.N.S.), can be transformed into a garden bed. A container garden can be a great way to expand the creativity of your garden program and open avenues for children to explore the concepts of recycling in their curriculum.



Sustainability Tip:
Many vessels can be recycled into a container and given new life as a pot for your garden. Let your students get creative!

Indoor Gardening,
Additional Resources:

- [What is Hydroponics?](#)
- [The Aquaponic Source](#)
- [Six Simple Steps For Creating Your Own Container Garden](#)

A group of diverse children are standing in a garden, holding up various vegetables they have harvested. One child holds a large carrot, another a tomato, and another a bunch of green leafy vegetables. They are all smiling and looking excited. In the background, there are wooden stakes and plants. A blue sign in the foreground reads "Butterfly diner".

CHAPTER 4

HARVESTING FROM YOUR GARDEN

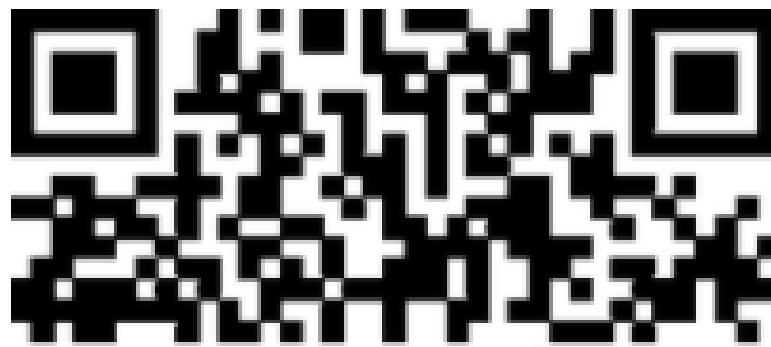
Image: Davis Farm to School. (2018). <<https://www.davisfarmtoschool.org/school-gardens>>

Utilizing the food you have grown reaps multiple advantages: increasing produce intake, instructing students on the plant life cycle in tangible models, fostering connectivity, and empowering students to make healthy and environmentally-conscious dietary choices. Maintaining the safety of your harvest ensures these benefits can continue and your garden will prosper.

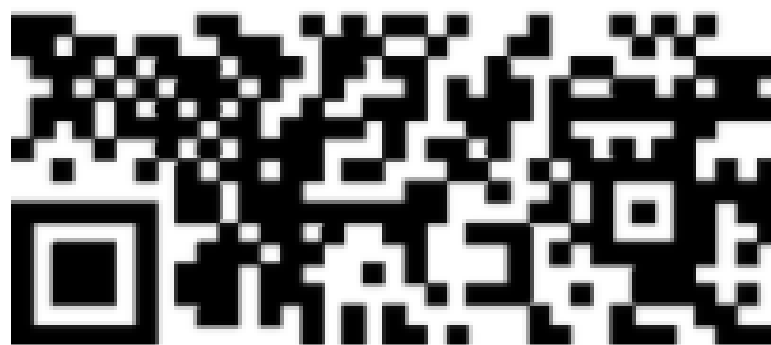
When and how you harvest your plants will vary according to garden type and species planted. Purdue Extension has a resource, FoodLink, that provides information on produce selection, preparation, storage, and nutrition.

When and How to Harvest

When preparing to harvest from your own school garden, it may be useful to introduce FoodLink to students to identify when a fruit or vegetable is ripe for picking or consumption. Downloadable signs with QR codes that link to information on specific crops, like the one below are available for school garden use.



FoodLink



[HTTPS://EXTENSION.PURDUE.ED
U/FOODLINK/PRODUCERS.PHP](https://extension.purdue.edu/foodlink/producers.php)

Harvesting From Your Garden

FOOD SAFETY

It is crucial to instill the importance of washing produce and hand hygiene in any school-based garden curriculum. Washing your hands is a critical component of preventing germ transfer. When preparing any fresh produce, begin with clean hands.



Wash your hands for at least 20 seconds with soap and warm water before and after harvest. It is still important to wash away dirt and bacteria from the surface of produce even if you do not intend to consume the skin or outer coating. For example, you may wish to consider purchasing a produce brush to thoroughly clean the surface layer of cucumbers, melons, or other firm produce in your indoor or outdoor garden.

Consult FDA Guidelines for [Selecting and Serving Produce Safely](#) for more information and other species-specific preparation guidelines. If contamination via viruses, bacteria, or other microorganisms is of concern, refer to relevant portions of the [Indiana State Department of Health's 2016 Infectious Disease Report](#) for prevention tactics.

While awaiting food processing, it is important to consider whether plants you intend to harvest can be kept in the sun or require shade once picked from the stem or vine. Have a plan for storage built into your Garden Committee's year-round maintenance plan that avoids lengthy sun exposure to prevent spoilage and foodborne illness. For best results, harvested produce should be stored at room temperature and away from direct sunlight.

Note: You may not use all the produce harvested at one time. That is okay! There are multiple options aside from the trash that you can employ to keep produce safe and reduce your school's food waste. For example, unused produce may be composted, donated to a local food pantry, or stored via canning or freezing. Visit Appendix A for more information and instructions for using compost in your school's garden or Appendix C for an example of a step by step harvest procedure for students and community volunteers.

WE HARVESTED, NOW WHAT?



LEARNING

EATING

Congratulations! Fruits and vegetables grown in your school garden can now be readily used in lesson plans, carried to the school cafeteria, or both. A well-developed school garden curriculum offers plentiful opportunities for learning during cultivation and post-harvest. Similarly, catering to school lunches enhances the connection between fresh produce and the student body, creating an outlet for inspiring healthy eating choices.

LEARNING

Curriculum Examples and Activities

School gardens foster essential life skills in young children and adolescents and nurture the development of environmental stewardship, interest in the natural sciences, collaboration and decision making skills, and an informed outlook on nutrition. School officials and other garden organizers must communicate the connection between gardening and multidisciplinary learning to donors and identify the desired benefits a garden lesson plan is designed to achieve before planting. Try setting three goals for your garden and brainstorm strategies with your Garden Committee on how best to achieve them.

Gardens are fantastic places to explore adaptations, food webs, decomposition, and biodiversity. Ask directed questions to engage students and encourage them to think critically about the garden they are tending. For a structured approach, task the students with following the scientific method.

For free downloadable, standards-based lesson plans, check out [Purdue University's The Nature of Teaching](#) lesson series. Or, for more inspiration, consult the following school garden curriculum resources:

- [University of Maryland Extension - Engaging Students in Gardening](#)
- [North Carolina State University Extension- Teaching From the Garden](#)
- [Tower Gardens Example Lesson Plans](#)
- [Integrating the Garden into Your Curriculum](#)

Sample Exercise 1

BEGINNER: Exploring Inquiries

1. Ask initial questions

How do vines climb?

2. Research information

Why do vines need to climb?

3. Form hypotheses

I think vines climb to get more sunlight.

4. Identify variables

Do all vines climb the same way?

5. Interpret data

Some vines have tendrils, others have aerial roots, some vines don't climb at all.

6. Draw conclusions

Many vines have specific characteristics adapted for local conditions.

7. Ask new questions

What would be the best vine for a fort?

Sample Exercise 2

ADVANCED: Problem Solving

1. Ask initial questions

Why are the leaves on the tomato plants wilting?

2. Research information

What resources does a tomato plant need to be healthy?

3. Form hypotheses

I think the wilting plants are receiving too much sunlight.

4. Identify variables

Do all tomato plants in the bed receive the same duration of sunlight? Are the wilted plants being adequately watered? Are there any other visible signs of disease in the wilted plants or other plants in the bed? Is it currently the warm or cool season?

5. Interpret data

The soil at the base of the tomato plants with wilted leaves is dry at a depth of one inch. A tree casts a shadow over the bed in the afternoon. This divides the bed into two camps, only one of which is wilted.

6. Draw conclusions

The wilted plants whose soil is dry at the base require additional watering to dampen the soil. The tomatoes not in shadow during the afternoon are receiving more sunlight than required and should be shaded at that time if possible.

7. Ask new questions

What would be the best way to adequately shade the tomato plants overexposed to sunlight during the afternoon? Is there an angle a shade could be placed at to only cover the plants during that period?

EATING

Taste Tests

Allowing students to safely sample from the crops they helped cultivate is a great way to demonstrate the positive impact of a school garden. Schools who have conducted on-site taste tests of foods grown in the school garden see an increase in willingness to try new foods and enhanced interest in garden upkeep. Comparative taste tests provide a multi-sensory opportunity to encourage young people to try new fruits and vegetables. By asking for students' opinions, we demonstrate interest in and respect for their preferences. Students, in return, will often become less reluctant to try something new when given the opportunity to form and express an opinion.



Image: "Farm to school taste tests in school cafeterias." Growing Minds.
<https://growing-minds.org/farm-to-school-taste-tests/>

Taste Testing Event Resources:

- [Western Growers Foundation: Collective School Garden Network Taste Testing Resources](#)
- [Rutgers University: Creating a Taste-Testing Event](#)
- [Green Mountain Farm-to-School Taste Test Toolkit](#)
- [National Farm to School Network](#)

When creating a taste-testing event, consult with your school nurse to determine foods to avoid based on student allergies and intolerances. This will impact what items you choose to include in the taste test activity. Focus on local, seasonal foods sampled from the school's garden. A popular taste testing event format is to use one featured produce item in 3+ recipes for the students to sample and rate. Just keep in mind that additional allergies and intolerances need to be considered if taste testing a recipe involves other ingredients.

EATING

Garden to Cafeteria Program

You may consider equipping your annual garden maintenance plan to include seasonal fruits and vegetables harvested by students and volunteers in your cafeteria's menu. Not only is this a great way to incorporate fresh produce into school-provided snacks and lunches, it is also a great way to reward the community for its hard work to ensure the garden's health and success. Feasibility will depend on a variety of factors including quantity of harvest yield and facilitation of a robust food safety plan.



Overcoming hesitation towards garden to cafeteria programs requires identification, assessment, and resolution of the community's food safety concerns. See Appendix D for an example food safety plan for guidance regarding garden to cafeteria programs.

CHAPTER 5

TIPS FOR GARDEN CARE AND MAINTENANCE



Image: University of Missouri. (2013). <<https://showme.missouri.edu/2013/learning-by-growing/>>.

Continued care and maintenance of your chosen garden design defines the sustainability of your school garden program. For an outdoor or indoor garden space to be adequately maintained from planting to harvest, several factors must be considered. Consult the list below to evaluate whether these adaptations might support the longevity of your chosen garden.

Fertilizer

Fertilizer can be a great way to stimulate microbial activity and improve soil structure by increasing both the water-holding capacity and cation exchange capacity of your soil. Plants starved for nutrients are stunted and can be badly affected by leaf spots, limiting the plant's ability to fight off diseases. Fertilizer can be used as a tool to supplement lacking nutrients, lending to the overall health of the plant.

You need to take care when fertilizing plants since too much of any fertilizer can result in counterproductive, harmful effects such as burnt roots, reducing their ability to absorb water. Dehydration makes plants more susceptible to environmental stress from drought and intense cold or heat. Further, an overabundance of a particular nutrient is another way to put stress on a plant.

Getting a soil test through your local Extension agency will provide you with accurate information on nutrient levels in your soil. The Purdue University Extension can provide you with such resources after you specify your county in the state of Indiana. Testing the composition of your soil will inform your future fertilizer decisions for optimal plant care.

Watering

As a general rule, most plants require about one inch of water per week during active growth. Feeling the soil at a one inch depth around the plants can be one of the best indicators of when it is time to water. The soil should be moist, but not too wet. Weather conditions will impact your classroom's watering schedule and should be checked regularly to prevent over- or under-watering. Apply water at the base of the plant. The plants absorb water through their roots, so the water needs to be in the soil.

Inexpensive tools for watering include watering cans and garden hoses. Soaker hoses, drip irrigation, and sprinkler systems require less time and can be linked to automatic timers (useful for extended summer vacations), though are considerably more expensive. You may need to look for additional funds or donations if considering installing a timed watering system for your garden.



Tools

Purchasing the right tools can greatly enhance your students' gardening experience! What you need will depend on the species you choose to plant and will need to be factored into the budget of your Garden Committee's year-round maintenance plan. Consult the list below for ideas on tools to purchase for maintaining your garden and developing your curriculum.

Garden Tools

- **Small Hand Trowels** - good quality tools for kids can be hard to find, but trowels are easily maneuverable and can be found inexpensively.
- **Spade, Short-handled shovel or turning fork** - are all usually short-handled and are strong tools for digging or turning the soil
- **Rake** - rakes smooth soil, pull out weeds, and gathers leaves and debris.
- **Watering cans** - small watering cans can be managed by young children. Fill a large tub of water and let youth fill their own can.
- **Small buckets** - can be used to collect anything in the garden: weeds, seeds, harvest (use separate food buckets) or carry plants. They can be used as watering cans too.
- **Plant labels** - wooden or plastic plant labels mark the names of plants or mark rows.
- **Twine or string** - youth can use twine to mark rows, for square-foot gardening or to tie up plants.
- **Garden hose** - to provide easy water access, find a hose that is the right length to reach the garden.
- **Garden gloves** - to protect young hands. Single-use gloves can be used for harvesting.
- **Wheelbarrow** - kid-sized wheelbarrows permit youth to complete gardening tasks. Full-sized wheelbarrows can be used by adult volunteers.

Tools for Discovery

It is just as important to have teaching and learning tools in the garden for youth to investigate soil critters, plant growth, and observe the seasons.

- **Hand lens** - give youth a close-up view of the garden and all of her secrets
- **Measuring tools** - rulers, tape measures, and yardsticks allow a student to observe growth, space plants and make math come alive in the garden.
- **Containers** - for collecting living and non-living items for curious inspection.
- **Clipboards** - provide a hard surface for journaling, sketching, poetry and other learning
- **Weather station** - include a rain gauge, thermometer, sundial and a wind instrument to keep tracker of weather in the garden through the seasons.



Image: "Garden Toolkit." North Carolina State University Extension. <https://localfood.ces.ncsu.edu/wp-content/uploads/2020/11/Garden-toolkit.pdf?fwf=no>

Trellises

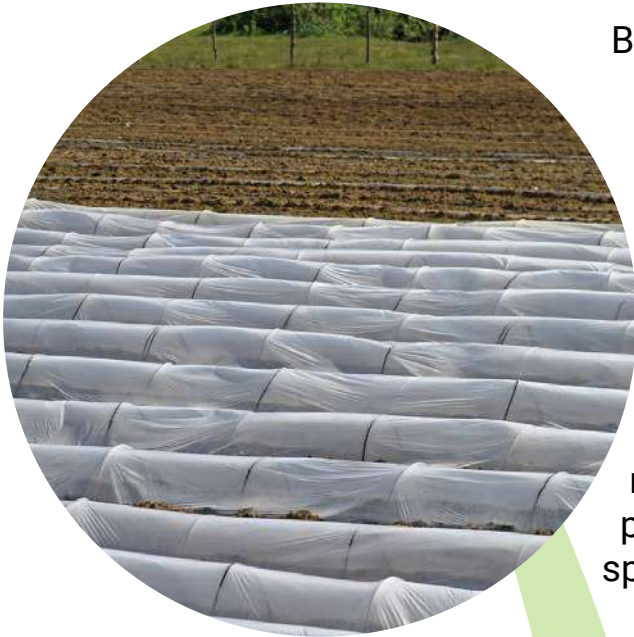
The purpose of a trellis is to support climbing plants, such as peas and other flowering vines. As vines grow onto the trellis, plants are encouraged to grow upwards instead of out along the ground, saving space and limiting the plant's interaction with the soil, which can mitigate disease and keep fruits and vegetables out of the reach of pests. To install a trellis, place the freestanding structure either in front of the desired wall you'd like to cover or in a circle around the plant. As the vine continues to grow, monitor its progress along the trellis and adjust accordingly if veering too far away from the structure.



Image: Jabbour. "The Best Vegetables for a Trellis." Savvy Gardening. <https://savvygardening.com/vegetables-for-a-trellis/>

Weeds

Weeds will likely be a challenge no matter what kind of garden you tend. Thankfully, there are a number of practices you can incorporate into your annual garden maintenance plan to keep them under control.



Before planting, you can rid your bed of weeds by tilling under existing sprouts, using a nonselective herbicide, or covering soil with a clear plastic covering to heat the soil and scorch invaders at their roots.

After planting, more selective methods are required. No one herbicide will control all weeds in all desirable plantings, though a chemical-based weed control is typically not suited for personal gardens. Look at the product label for information on which species are controlled.

Shallow hoeing takes care of annual weeds without destroying perennial roots. Mulch can also be a useful tool to prevent weed seeds from germinating from year to year. Mulches composed of organic material improve soil structure and add nutrients while those consisting of plastic or other artificial material conserves moisture and warms the soil, extending the growing season for warm-season fruits and vegetables.

Pests

IPM, or Integrated Pest Management, is all about preventing pest and disease infection using environmental, biological, and mechanical means before pesticide use. Some of these conditions include planting in the proper location, correct timing, planting disease-resistant varieties, mulching, netting, fencing, sanitizing, and utilizing proper pruning and mowing techniques. Sometimes this can be completed by using advanced gardening techniques such as companion planting, introducing varieties that are favored by the harmful pests' predators. Rotating crops can also prevent colonization of pests by eliminating their food source for part of the year.

If your garden encounters larger pests, such as gophers, there are more direct measures. The best way to control gopher damage in a school garden is to install $\frac{3}{4}$ inch opening gopher wire under the soil. Gophers devour plants from the root. Burying a galvanized mesh wire one foot deep in the soil acts as a physical barrier. Mesh wiring is not necessary for garden types who present a natural physical barrier to the in-ground soil, like container gardens.



Organic and synthetic pesticides can be used safely by appropriately following label instructions. There are publications available related to pesticide use for pest management that are specific to gardeners. Vegetable pest management solutions can be found using the online [Midwest Vegetable Guide](#). Alternatively, consider subscribing to the free e-newsletter, "[Vegetable Crops Hotline](#)," to learn about common diseases and pests affecting gardens, interesting plants, and trends in midwest produce growth patterns. Similarly, consider subscribing to the "[Facts for Fancy Fruits](#)" free e-newsletter for fruit growers.

Diseases

Plants can get sick too! Even indoor gardens are susceptible to disease and infections from bacteria, viruses, or other microorganisms. For example, Tomato anthracnose is a serious disease affecting tomato plants caused by the fungus *Colletotrichum coccodes*.

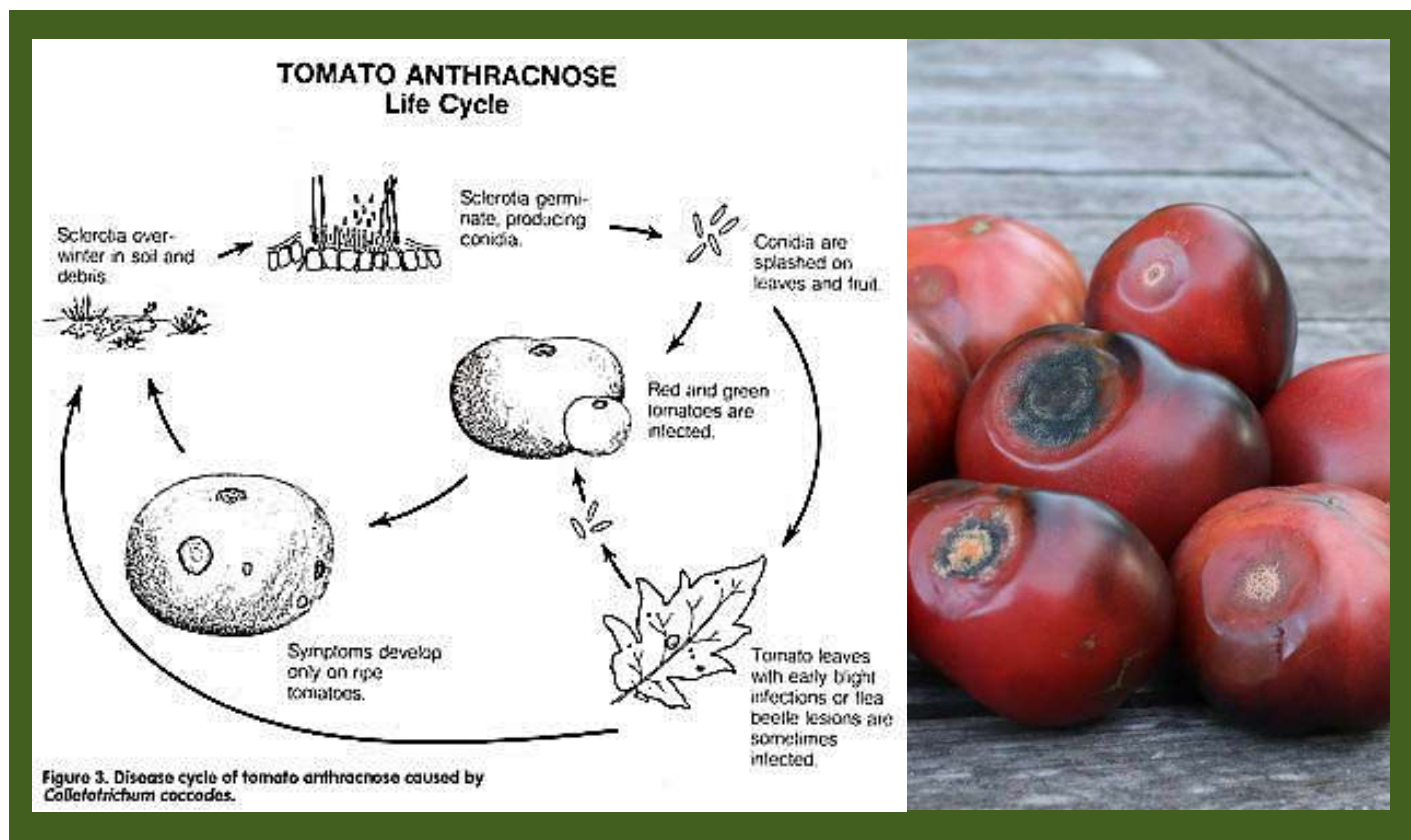


Image: "Tomato Anthracnose Life Cycle." Cornell University Vegetable MD Online.
http://vegetablemdonline.ppath.cornell.edu/PhotoPages/Tomatoes/Tom_Anth/Tom_AnthFS3.htm

The most effective way to relieve your garden of disease is to remove and destroy any infected plants in your garden. For trees, prune out the dead wood and destroy the infected leaves. There are some fungicides and organic solutions that you can utilize to keep your plants healthy if you suspect an infection. Mulching is also a useful tool to limit incidence of soil-borne diseases. Two to three inches over the top of the soil should do the trick! Limited access to light, overuse of fertilizers, improper watering, and humidity are other factors to consider if you notice a difference in plant health.

Make sure to spend adequate time researching diseases or conditions your garden may be susceptible to and indicate measured steps towards prevention in your annual plan.

MORE ON GARDEN MAINTENANCE

For more information on mitigating and managing disease and other above hazards in your garden, check out the following resources:

- [Michigan State University Extension: What organic fertilizers mean to plants and soil](#)
- [Purdue University Extension: Soil Sampling and Testing](#)
- [North Carolina State Extension: Garden Toolkit](#)
- [Collective School Garden Network: Maintaining Your School Garden](#)
- [Purdue University: Control Weeds in the Garden and Landscape](#)
- [Purdue University Extension: Integrated Pest Management Courses](#)
- [Purdue Pesticide Programs: What Gardeners Should Know About Pesticides](#)
- [The Midwest Vegetable Production Guide for Commercial Growers](#)
- [Vegetable Crops Hotline](#)
- [Facts for Fancy Fruits](#)
- [Cornell University: Disease Fact Sheets Listed by Crop](#)
- [10 Ways to Keep Your Garden Healthy](#)



CHAPTER 6

BENEFITS OF A SCHOOL GARDEN

Image: Canva Pro (2021)

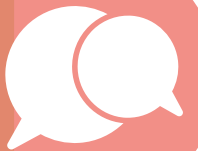
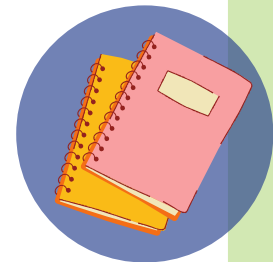
Gardens offer a variety of educational, health, and social benefits. Utilize and advertise these potential benefits to get community members involved with and enthusiastic about supporting a school or community gardening space.

Benefits of A School Garden



Working hands-on in the garden has been shown to improve student's attitudes toward and willingness to try fruits and vegetables.

Gardens offer students the opportunity to learn about the growing process and supply the opportunity for real-life examples of nutrition education concepts and lessons taught in the classroom.



Spending time in the garden improves social skills with peers as they collaboratively contribute to the garden's success.

Gardens provide a place for physical activity and offer stress relief from a high stakes academic or professional environment.



Gardening has been shown to boost your mood and immune system.

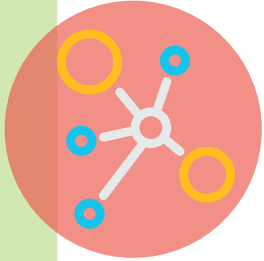
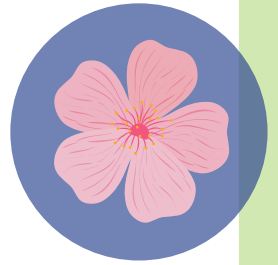
Gardens have been shown to improve job satisfaction and staff retention in schools.



Gardens provide fresh quality produce at competitive pricing or at no cost, depending on how the garden is funded.

Benefits of A School Garden

Gardens work to revitalize and beautify vacant lots and public parks.



Neighborhood gardens strengthen intergenerational social connections within local communities.

Community gardens help overcome barriers to fruit and vegetable intake such as cost and access.



Tending personal gardens minimizes one's environmental impact.

Fruits and vegetables that ripen in a garden have more proteins, vitamins, and minerals than those that are picked early for grocery store procurement, increasing nutrient intake and tasting delicious.



Gardens offer the opportunity to ensure what chemicals are used or not used when growing their food.

School and Community Gardens in Action

Seeing your team's hard work come to fruition is a very special experience for both your students and supporters. Take a look below for a glimpse at some of the above benefits experienced by other school and community garden providers just like you!

1

Paoli FFA

Paoli Schools' Farm to Cafeteria program has been a huge success as both a learning and nurturing opportunity for students to give back to their community. FFA students get hands-on learning about agriculture as well as experience running a business raising pork-based products to be sold to the cafeteria. Thanks to the ingenuity of the school's FFA chapter, students and staff of Paoli FFA raise animals as well as tend to a lively produce bed to the benefit of their schools and surrounding community. This year they sold the school hot dogs, ham, and pork chops to their cafeteria. Except for processing at a USDA certified facility, the pork raised at Paoli Schools is in the students' and school's care from conception to consumption.

The Paoli FFA students have been instrumental in the fight to pass House Bill 1119, allowing public schools or school corporations to purchase up to \$7,500 of food per fiscal year from a youth agricultural education program.

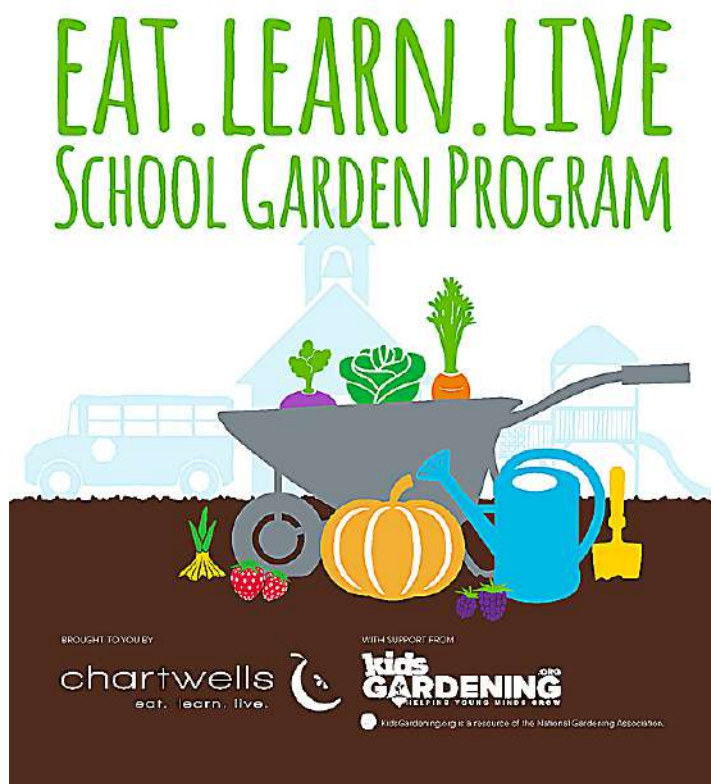
Civic participation has always been a big part of FFA and agriculture. Each year, with the help of Indiana Farm Bureau, the students would visit the Statehouse and see lawmaking in action.



2

Chartwells and Crawfordsville's Hoover Elementary

What began as an idea to connect a Crawfordsville school event to the community resulted in a coalition with a passion to spread the farm to all schools. Chartwells' food services dietitian wanted to celebrate national farm to school month featuring the vegetable of the year: the radish. She reached out to the Purdue Extension team to see if they could persuade a local farmer to participate in a farm-themed launch of the Hoover Elementary "Fuel Up to Play" physical activity grant. The results exceeded all expectations.



A multi-talented team of volunteers, primarily from the Montgomery County Wellness Coalition and the Master Gardeners, planned and conducted activities for this in-school occasion where students enjoyed a salad made with local ingredients, learned about food waste through participation in an apple counting activity, transplanted a seedling in their salad container, and played a game of radminton – badminton featuring a shuttlecock painted like a radish. Summer lunch & learn sessions at the community garden were popular with young learners. Families participated in hands-on gardening activities and kids received a free lunch supplied through the Summer Food Service Program.

Although the project started small, Chartwells continually looked for opportunities to expand their farm to school into the community. What's your next step?



3

R-N- DIY

R-N-DIY, or research and do it yourself, is an online community passionate about bringing the ability to grow fruits and vegetables indoors to homes across the globe. Originating with an idea to equip New York City residents with the ability to grow their own produce, the online resource now provides a collaborative space for garden enthusiasts around the world to share their struggles and successes in designing, constructing, and harvesting from window herb gardens.



Image: Co-founder Britta Riley at a TEDTalk given in May 2011 in Manhattan

The website provides further resources for hydroponic growing kits and preferred gardening supplies utilized by others. The community can be accessed at rndiy.org.

Index of Resources

Introduction

School Garden and Classroom Curriculum Resources

USDA Farm to School 2019 Census: Indiana (IN)

The information collected by the United States Department of Agriculture provides a glimpse into the expanse of the Farm to School Program within the state of Indiana and which components of the initiative schools are implementing.

<https://farmtoschoolcensus.fns.usda.gov/census-results/states/in>

Purdue University: Getting Started in Farm to School

This presentation provided by Purdue University gives a brief overview of the Farm to School Program and simplifies integration with instructions on how to incorporate local foods into the cafeteria. Slides are designed for a school administrative audience to promote Farm to School Resources and can be used to recruit schools for the Farm to School program.

<https://www.purdue.edu/dffs/localfood/wp-content/uploads/sites/7/2016/10/Getting-Started-in-Farm-to-School.pdf>

Impact of garden-based learning on academic outcomes in schools: synthesis of research between 1990 and 2010

This paper, written by D.R. Williams and P.S. Dixon, investigates the impact of garden-based learning on academic outcomes by examining 48 studies conducted between 1990 and 2010. The most successful programs that enhanced student scientific knowledge and social development incorporated experiential learning with in-classroom activities.

<https://naaee.org/eepr/research/library/impact-garden-based-learning-academic>

Purdue University: Farm to School Curriculum Integration

Farm to School is a comprehensive effort to increase access to healthy food options for Indiana students and create new market opportunities for Indiana farmers. The Purdue University Extension is a great resource for garden committee members to reference when implementing their own program.

<https://www.purdue.edu/dffs/farmentoschool/>

Indiana Grown for Schools Network: Focus Areas

The Indiana Grown for Schools Network Focus Areas highlight specific procedures and practices to consider when formatting your garden's own annual maintenance plan.

<https://www.ingrown4schools.com/school-gardens>

Michigan's Agriculture in the Classroom: Educator Center

The National Agricultural Literacy Curriculum Matrix is an online, searchable, and standards-based curriculum map for K-12 teachers.

<https://miagclassroom.org/matrix/>

Life Lab: Academic Content Standards Database

Life Lab connects garden-based learning to new content standards for directed classroom activities.

<https://lifelab.org/standards-database/>

The Whole Kids Foundation and American Heart Association: School Garden Lesson Plans

This guide contains 35 lesson plans for a Pre-K to 5th grade curriculum with activities to engage your students in a fun and educational exploration of fruits, vegetables and healthy eating.

<https://www.wholekidsfoundation.org/assets/documents/school-garden-lesson-plans.pdf>

Wisconsin School Garden Initiative: Connecting Garden-Based Curriculum to Standards

In this document, you will find ways the garden may be incorporated into lessons in various subjects and learn what you may already be doing that aligns with standards in different subjects and with educational standards set by initiatives such as Common Core State Standards Initiative and Next Generation Science Standards.

<http://www.communitygroundworks.org/sites/default/files/Connecting%20Curriculum%20to%20Standards.pdf>

Garden to Cafeteria Resources**Let it Grow: The long-lasting benefits of a school garden – supporting health and wellness, encouraging students to choose nutritious foods**

For educators considering a gardening program at their school, Ellis, Ringstrom, and Siegel offer best practices on fostering a community of health and wellness; what works to foster good nutrition habits; and the benefits of school gardens.

<https://www.gse.harvard.edu/news/uk/18/07/let-it-grow>

Whole Kids Foundation: Garden to Cafeteria Toolkit

This toolkit serves as a guide to fabricating GTC Food Safety Program, offering examples of protocols from other districts and a list of steps to constructing a safety program for a Garden to Cafeteria initiative.

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

Michigan Farm to School: Garden to Cafeteria, A Step-by-Step Guide

This guide serves as a garden to cafeteria program roadmap, covering how to get started, building critical community connections, and developing a garden to cafeteria agreement with outside agencies.

https://www.canr.msu.edu/foodsystems/uploads/files/garden_to_cafeteria_guide.pdf

Minnesota School Garden & Farm to Cafeteria Safety: A Food Safety Operations Manual

This manual's focus is food safety for produce from school gardens or local growers. Following the guidelines outlined in this manual will help cafeteria and school management prevent safety concerns from becoming a barrier to using local foods or establishing a school garden.

<https://extension.umn.edu/farm-school/food-safety>

Farm to Table: Food Safety in School Gardens Toolkit

This toolkit, intended for the use of teachers, garden teachers and volunteers, school food-buyers, and cafeteria staff, serves as a guide for assuring fresh produce's safety from the garden to the cafeteria, classroom, or community.

<http://www.farmtotablenm.org/wp-content/uploads/2013/01/Toolkit-Food-Safety-in-School-Gardens-FINAL.pdf>

Food Pantry Resources

Salud America! School Food Pantry Action Pack

The new Salud America! "School Food Pantry Action Pack" is a free guide to help school personnel talk to decision-makers and work through the logistics of starting a School-Based Food Pantry to help hungry students and reduce local food insecurity.

<https://salud-america.org/new-action-pack-how-to-start-a-school-food-pantry/>

Food Bank of Delaware - Considerations for Starting a School Food Pantry

The Food Bank of Delaware conveniently offers a list of components to address for founding an efficient and effective food pantry using produce procured from a school or community garden.

<https://www.fbd.org/school-pantry-considerations/>

Second Harvest Foodbank of Southern Wisconsin - School Pantry Program Toolkit

This guide describes how to begin a school pantry program and the responsibilities of parties involved in its development and successful implementation.

<https://www.secondharvestsw.org/food-drive-marketing-toolkit/>

School Farm Stand Resources

Michigan Youth Farm Stands Project Toolkit

This project toolkit uses the success of the Michigan Youth Farm Stand to instruct other aspiring garden marketers how to grow and advertise a farm produce stand for fundraising.

<https://www.canr.msu.edu/foodsystems/uploads/files/youth-farm-stand-toolkit.pdf>

Denver Urban Gardens: Youth Farm Stands Toolkit

The purpose of this toolkit is to present the Youth Farm Stand model and how it can be used in a school setting as an educational tool, a way to teach nutrition and healthy eating, and as a community development and inclusivity-building activity.

<https://dug.org/wp-content/uploads/2017/07/17-YFS-Toolkit.pdf>

Kids Gardening, How-to: Starting a School Farmers' Market

How to start a School Farmer's Market urging planners to consider how, where, and to whom they'll promote their fundraising efforts.

<https://kidsgardening.org/wp-content/uploads/2018/02/Garden-How-To-Starting-Farmers-Market.pdf>

Food For Life: School Farmers Markets

Setting up a farmers' market in school is an exciting way of engaging pupils in key curriculum areas by providing a real-life situation with which pupils lead and own their very own business enterprise, addressing what's involved in running a market and how farm stands can enhance learning.

<https://www.foodforlife.org.uk/schools/what-can-you-do/school-farmers-markets>

School Garden Committee Checklist Resources

Jackson County Health Department: School Garden Checklist

This toolkit serves as a broad introduction to creating a school garden, serving garden produce in your cafeteria, and incorporating the garden into your classrooms and lesson plans for members of a school garden committee. It also has a detailed list of the types of outdoor gardens that are commonly employed for lesson plans.

https://static1.squarespace.com/static/5da9e438cef08719caab0b45/t/5dc46eedc6a13f49b7b644a9/1573154548686/school_garden_toolkit_publication11.2015.pdf

A Step-by-Step Guide to Get Your School Garden Growing

This document is a checklist of tasks that will help you to create a sustainable school garden project. [https://cpb-us-](https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/0/4074/files/2014/06/Grow_to_Learn_School_Garden_Guide-1mnkc7t.pdf)

[e1.wpmucdn.com/blogs.cornell.edu/dist/0/4074/files/2014/06/Grow_to_Learn_School_Garden_Guide-1mnkc7t.pdf](https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/0/4074/files/2014/06/Grow_to_Learn_School_Garden_Guide-1mnkc7t.pdf)

Kids Gardening: Forming a Garden Committee

See this resource for a list of a few things to keep in mind to ensure that your garden committee runs as efficiently and effectively as possible from formation to fulfillment.

<https://kidsgardening.org/create-sustain-a-program-forming-a-garden-committee/>

Indiana Food Council Network

The Indiana Food Council Network is an organization coordinated by the Indiana University Sustainable Food Systems Science group working to provide technical assistance and training, connect food councils to state and regional resources, and create links between food councils.

<https://sfss.indiana.edu/projects/indiana/foodcouncils/index.html>

Grant Resources

Farm to School Grant Program

The USDA awards are competitive Farm to School grants that support planning, developing, and implementing farm to school programs as they initiate, expand, and institutionalize farm to school efforts.

<https://www.fns.usda.gov/cfs/farm-school-grant-program>

KidsGardening: Grant Opportunities for School and Youth Garden Programs

This resource offers a list of some additional grant opportunities that support youth garden programs.

<https://kidsgardening.org/grant-opportunities/>

Seed Your Future: Educator Grants

This resource provides a list of organizations known to award financial grants to K-12 educators for the development of school garden programs.

https://www.seedyourfuture.org/educator_grants

Funding Opportunities for High Tunnels through the USDA NRCS

The high tunnel system initiative is an increasingly popular conservation practice for farmers, and is available with financial assistance through the Environmental Quality Incentives Program (EQIP).

<https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=stelprdb1046250>

Farm to School and School Garden Expenses

The questions and answers below address specific scenarios that school food authorities (SFAs) may be dealing with the use of funds from the nonprofit school food service account to cover expenditures related to farm to school activities and school gardens.

<https://www.fns.usda.gov/cn/farm-school-and-school-garden-expenses>

Sustainability Resources

Getting a School Garden Blooming: The Garden Committee

Successful long term school garden programs often share a few common threads, particularly a dedicated garden committee. Consult what factors have traditionally contributed to a sustainable garden program at the following link.

<https://schoolipm.tamu.edu/2017/01/05/getting-a-school-garden-blooming-the-garden-committee/>

Wisconsin School Garden Initiative: Incorporating School Garden Language into a School Wellness Policy

This document serves as a guide for effectively integrating school garden language into a school wellness policy, increasing the sustainability of the school garden.

http://www.communitygroundworks.org/sites/default/files/Incorporating%20School%20Garden%20Language%20into%20a%20School%20Wellness%20Policy_0.pdf

Summer in the School Garden

A resource for working with volunteers to maintain a school garden, the following guide provides helpful tips and templates for garden coordinators to gauge interest in participation from the surrounding community and organize volunteers visiting the garden.

<http://growing-gardens.org/wp-content/uploads/2013/03/Summer-in-the-School-Garden-A-Resource-for-Working-with-Volunteers-to-Maintain-your-School-Garden.pdf>

Chapter 1: School Garden Readiness

Pre-Planting Resources

USDA's People's Garden Initiative: School Garden Checklist

The following USDA sponsored flier provides an effective, condensed example of a checklist of factors a garden coordinator should consider when evaluating the feasibility of a school garden program.

https://letsmove.obamawhitehouse.archives.gov/sites/letsmove.gov/files/pdfs/LM%20School%20Garden%20Checklist_0.pdf

DC Office of the State Superintendent of Education: Checklist for Starting (and using) a School Garden

This checklist serves as a guide to developing new school garden programs, adapted from the checklist created by Dorothy Mullen of the Princeton School Garden Cooperative. It is also useful for existing school garden programs as a “check in” with where they are in their school garden program goals.

<https://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/Checklist%20for%20Starting%20a%20School%20Garden%5B1%5D.pdf>

Ohio State University Extension: Checklist for Starting a School Garden

The following checklist can assist school personnel in starting an educational garden by engaging stakeholders, developing a vision for the garden and its accompanying program, identifying curriculum goals, coordinating volunteers, fundraising, and budgeting.

<https://farmtoschool.osu.edu/files/2018/10/Checklist-for-Starting-a-School-Garden-002.pdf>

The USDA Farm to School Planning Toolkit: School Gardening Questions to Consider

The Farm to School Planning Toolkit guides you through questions to consider and helpful resources to reference when starting, expanding, or sustaining a farm to school program. It is designed for use by schools, school districts, and community partners.

<https://www.uidaho.edu/-/media/UIdaho-Responsive/Files/Extension/topic/small-farms/farm-to-school/usda-farm-to-school-planning-toolkit.pdf>

Choosing the Garden Resources

USDA: Start a School Garden - Here's How...

For anyone looking to begin a gardening program at a school, here are some tips to consider before you get growing, including how to check the health of your soil and select plants.

<https://www.usda.gov/media/blog/2013/08/13/start-school-garden-heres-how>

Chapter 2: Outdoor Gardens

L.A.W.N.S. Resources

Plant Needs: LAWNS

This sample lesson plan from Big Green teaches students to identify what seedlings need to grow into a healthy plant, using the helpful popularized acronym LAWNS.

<https://biggreen.org/wp-content/uploads/2018/06/3-5-Plant-Needs.pdf>

Outdoor Garden Design Resources

Creating a Pallet Garden

This set of step-by-step instructions for creating your own pallet garden for your classroom includes what materials you will need to build a sound structure and maintenance tips for best results.

<https://www.growingagreenerworld.com/creating-a-pallet-garden-step-by-step-instructions/>

Green Sense Farms Guide to Integrating Green Houses and Vertical Farms

Green Sense Farms can help you successfully navigate the complexities of the Controlled Environment Agriculture field.

<https://www.greensensefarms.com/>

The Benefits of Hydroponics: Green Our Planet

Hydroponics allows growers to produce crops in areas where soil is traditionally of poor quality, control temperatures and lighting schedules, and so much more. Learn more about the benefits of hydroponics farming with Green Our Planet at the link below.

<https://greenourplanet.org/hydroponics/benefits-of-hydroponics/#:~:text=When%20Compared%20To%20Traditional%20Soil,a%20well%20managed%20hydroponic%20system.>

Raised Beds vs. In-Ground Gardens, University of Georgia Cooperative Extension

This brief bullet point list curated by the University of Georgia Cooperative Extension groups the advantages and disadvantages of raised beds and in-ground gardens, respectfully, so garden coordinators can make informed decisions regarding the kind of garden they should plant for their desired crops or overall vision.

<https://extension.uga.edu/publications/detail.html?number=C1027-3&title=raised-beds-vs-in-ground-gardens>

Vertical Gardening 101, Edible Indy

This article recounts the benefits of planting a vertical garden and recommends plant species that thrive in similar environments.

<https://edibleindy.ediblecommunities.com/things-do/vertical-gardening-101>

Indiana Environmental Reporter: Vertical Farms for Local, Sustainable Produce

This article explains the recent uptick in vertical gardening for mass produce production and why the gardening practice holds promise for the future of agriculture.

<https://www.indianaenvironmentalreporter.org/posts/vertical-farms-hold-promise-for-local-sustainable-produce>

Hydroponics: A Better Way to Grow Food- National Park Service

This article provides an overview of the different types of hydroponic systems in use (with basic diagrams) and instructions on how to incorporate hydroponics into food service operations.

<https://www.nps.gov/articles/hydroponics.htm>

PennState University Extension: Planting in Sun or Shade

This article defines full sun, full shade, and partial sun and shade along with how to identify these areas in your garden.

<https://extension.psu.edu/planting-in-sun-or-shade>

Resources for Selecting Your Crops

Purdue University Extension: Vegetable Planting Calendar

The planting calendar indicates common spring planting dates and suggests appropriate dates for fall garden planting, matching species to their optimum weather conditions for ease of preparation for year-round maintenance plans and crop rotation schedules.

<https://www.purdue.edu/hla/sites/yardandgarden/wp-content/uploads/sites/2/2016/10/HO-186.pdf>

Grassroots Gardens of Buffalo: Guide for Making Community Gardens Accessible for all Members

This guide is intended for community gardeners and Grassroots Gardens staff members to identify alterations to bed design and crop selection they can make to their garden designs to promote accessibility for community members of all ages and abilities.

https://ppgbuffalo.org/files/documents/environment/a_guide_for_making_community_gardens_accessible_for_all_members_and_checklist.pdf

Chapter 3: Indoor Gardens

Indoor Garden Design Resources

What is Hydroponics?

This resource defines hydroponics and its benefits, distinguishing between the wick, ebb and flow, nutrient film, and continuous drip systems.

<https://www.nal.usda.gov/farms-and-agricultural-production-systems/hydroponics>

The Aquaponic Source

Aquaponics capitalizes on the relationship between water, aquatic life, bacteria, nutrient dynamics, and plants in order to grow plentiful, healthy crops. This resource describes the theory behind traditional aquaponics and four ways indicated methods improve upon the hydroponic system.

<https://www.theaquaponicsource.com/what-is-aquaponics/>

Six Simple Steps For Creating Your Own Container Garden

In this article, school teachers and administrators will find equipment and simplified instructional materials for constructing their own container garden on campus.

<https://www.thespruce.com/container-garden-the-essentials-847853>

Chapter 4: Harvesting From Your Garden

When and How to Harvest

FoodLink, Purdue University Extension

FoodLink's goal is to increase knowledge and awareness (and sales) of locally grown fresh fruits and vegetables by providing students with the tools necessary to ascertain when and how a plant should be harvested to ensure food safety and maintain the plant's nutritional integrity.

<https://extension.purdue.edu/foodlink/producers.php>

Food Safety: Harvest Resources

FDA Guidelines for Selecting and Serving Produce Safely

As you enjoy fresh produce, follow these safe handling tips to help protect yourself and your family.

<https://www.fda.gov/food/buy-store-serve-safe-food/selecting-and-serving-produce-safely>

Indiana State Department of Health's 2016 Infectious Disease Report

The report chronicles the incidence rates of various infectious diseases in 2016 throughout the state of Indiana, including foodborne illness. Prevention tactics shown to be effective in reducing the likelihood of foodborne illness infections are also included.

<https://www.in.gov/health/files/2016-Annual-Report-of-Infectious-Diseases.pdf>

Purdue Agriculture: The Food and Drug Administration (FDA) at a Glance

Among other things, the U.S. Food and Drug Administration (FDA) is responsible for ensuring the safety of our nation's food supply. The attached "Final Rule on Produce Safety" summarizes key requirements, compliance dates, and other information related to evaluating produce safety at the federal level.

<https://ag.purdue.edu/extension/safeproduce/Pages/fda-at-a-glance.aspx>

Curriculum Examples and Activities

Purdue University Extension's FoodLink Nutrition Education Program

The FoodLink Nutrition Education Program works to improve the nutrition and health of audiences with limited resources in Indiana through both the Nutrition Education and SNAP-Ed Initiatives. All are free of charge! See this resource for additional information and access to the "Eat Better for Less" Newsletters.

<https://extension.purdue.edu/article/36763>

Purdue University's The Nature of Teaching Lesson Series

In this lesson series, K-12 students are introduced to the concept of food waste and nutrition-based health and wellness. *The Nature of Teaching* also offers professional development workshops for teachers focused on science, the environment, and getting students connected with nature. Consider reaching out to the Purdue University Extension if you believe your administrative group could benefit from a developmental workshop.

<https://ag.purdue.edu/extension/nature/Pages/default.aspx>

University of Maryland Extension: Engaging Students in Gardening

Consult this resource for lesson plans and recommendations to engage students in gardening and promote healthy behaviors.

<https://mdteachertoolkit.org/gardening-for-nutrition/school-gardens/>

North Carolina State University Extension: Teaching From the Garden

This publication delves into the details of creating an edible garden and how gardens engage students by providing dynamic environments in which to observe, discover, and experiment.

https://growforit.ces.ncsu.edu/wp-content/uploads/2018/02/4H-560_Teach_from_the_Garden-Creat_Learning_Landscapes.pdf?pwd=no

Tower Gardens Example Lesson Plans

With these free, CCSS- and NGSS-aligned lesson plans and learning materials in PDF format, you can use Tower Garden to teach students of all age groups about a variety of subjects, including science, math, literacy, and healthy eating.

<https://www.towergarden.com/grow/lesson-plans>

Integrating the Garden into Your Curriculum

This guide shares ideas on how to integrate a school garden into your curriculum by introducing students to the scientific method. Suggesting application steps for different age groups are presented to best adapt to your intended lesson plan.

<http://www.mastergardenerssandiego.org/schools/gardenbook/curriculum/downloads/Scientific%20Method.pdf>

Western Growers Foundation: Collective School Garden Network Taste Testing Resources

This resource doubles as an overview of taste testing and an almanac of related forms and resources to create your own taste testing event aimed at inspiring curiosity and encouraging students to try new things.

<http://www.csgn.org/taste-testing-resources>

Rutgers University: Creating a Taste-Testing Event

A taste-testing in the school cafeteria is a fun activity to introduce students to nutrient packed foods. See this resource for suggested foods for tasting, recipes, and more tips about safety and spreading the word.

<https://njaes.rutgers.edu/fs1227/>

Green Mountain Farm-to-School Taste Test Toolkit

This detailed guide includes the information, curriculum, and recipes needed for schools and cafeterias to implement monthly Harvest of the Month taste testing events.

http://www.vermontharvestofthemonth.org/uploads/2/8/9/6/28966099/taste_test_guide_final_kh_design.pdf

Chapter 5: Tips for Garden Care and Maintenance

Maintenance Resources

Michigan State University Extension: What organic fertilizers mean to plants and soil

This resource explains how fertilizer may benefit a working school garden by maximizing plant health and fostering a beneficial growth environment.

https://www.canr.msu.edu/news/what_organic_fertilizers_mean_to_plants_and_soil#:~:text=They%20add%20organic%20matter%20contributing,sources%20of%20micronutrients%20to%20plants.

Purdue University Extension: Soil Sampling and Testing

This page offers some guidance as to how and where to get your soil tested in central Indiana prior to planting your school or community garden to make informed decisions about crop selection and future maintenance practices.

<https://extension.purdue.edu/marion/article/4487>

North Carolina State Extension: Garden Toolkit

This flier provides recommendations for adequate gardening maintenance tools and tools for discovery to be used in garden-based lessons.

<https://localfood.ces.ncsu.edu/wp-content/uploads/2020/11/Garden-toolkit.pdf?fwd=no>

Collective School Garden Network: Maintaining Your School Garden

This brief document acts as a simplified guide to maintaining your school garden by attuning to the needs of the plants. It also provides suggestions for seasonal garden tasks to be assigned to volunteers and summer maintenance when school is not in session.

http://www.csgn.org/sites/default/files/GFL_8.pdf

Purdue University: Control Weeds in the Garden and Landscape

See this resource for practices you can incorporate into your garden maintenance plan to keep weeds under control throughout the school year.

<https://www.purdue.edu/hla/sites/yardandgarden/control-weeds-in-the-garden-and-landscape/>

Purdue University Extension: Integrated Pest Management Courses

Developed by entomologists at Purdue University, these noncredit courses provide the latest in Integrated Pest Management (IPM) practices. You may enroll anytime and study whenever and wherever you choose.

https://www.eventreg.purdue.edu/eC2K/Heading.aspx?heading_id=245

Purdue Pesticide Programs: What Gardeners Should Know About Pesticides

This practical guide for non-commercial pesticide use is designed to help growers make informed decisions about preferred pest control methods for insects, weeds, diseases, or other forms of wildlife.

<https://ppp.purdue.edu/resources/ppp-publications/what-gardeners-should-know-about-pesticides-a-practical-guide-for-home-use/>

The Midwest Vegetable Production Guide for Commercial Growers

This Midwest Production Guide supplies production information regarding plant fertility, variety, and pest management recommendations. A unique feature of this resource allows growers to indicate the crop they intend to grow and the pest of concern and, in turn, receive a pest control recommendation specific to the plant and natural threat.

<https://mwveguide.org/>

Vegetable Crops Hotline

A newsletter for vegetable growers prepared by Purdue Extension, growers can keep up to date on arising threats to particular garden species and accompanying tips to help protect their gardens from harm.

<https://vegcropshotline.org/>

Facts for Fancy Fruits

A newsletter for advanced and amateur fruit growers alike, growers who consult the resource receive updates on emerging hot topics in horticulture and crop conditions specific to fruit-bearing plants.

<https://fff.hort.purdue.edu/>

Cornell University: Disease Fact Sheets Listed by Crop

Refer to this resource for a listing of fact sheets, diagrams, and information bulletins on common diseases affecting particular plant species by choosing a vegetable from the visual pull-down menu below.

<http://vegetablemdonline.ppath.cornell.edu/cropindex.htm>

10 Ways to Keep Your Garden Healthy

Consult this article for a list of tested methods for mitigating disease incidence in your garden.

<https://www.finegardening.com/article/10-ways-to-keep-your-garden-healthy>

Appendices

Appendix A: Advanced Gardening Practices

In addition to basic maintenance of your garden of choice, you may elect to entertain one or more advanced gardening practices to enhance soil health, conserve valuable resources, or ensure long-term sustainability of your school or community garden. The following practices are not necessary for a school garden to garner success, though may enhance garden yield and offer additional educational opportunities for older grades to engage with the agricultural cycle. All Indiana counties are covered by Purdue Extension educators who are available to school administrators and garden organizers who wish to understand and/or implement these voluntary practices.

Consult the following link for more information on your county's resources available through the extension program: <https://www.purdue.edu/hla/sites/master-gardener/>

Soil Testing

Conducting a soil test before planting can tell you a great deal of information about the space you will be growing in. County Extension Offices typically have soil test instruction kits you can pick up for free. These kits inform you how to take a soil test and how to mail the sample to a soil testing lab. You don't need fancy equipment to take a soil test, you just need a shovel and a one-gallon bucket. Purdue has several [video resources](#) on how to take a soil sample. Once you send in your sample, it typically only takes a few days to a couple of weeks for you and your county's Extension Educator to receive a copy of the results report. The educator can help you interpret the results of the report if you like. The results will show you the pH, organic matter, and various nutrients currently present in the soil, and provide suggestions for improvement.

If you suspect heavy metal contamination, you will have to take a separate soil test and contact the soil testing lab for pricing and further information. They can only test for one heavy metal at a time, so pricing will vary. Common heavy metal contaminants include lead, arsenic, and cadmium. If these are found in high quantities in your soil, it is best to grow in containers. More information about growing in potentially contaminated soils can be found [here](#) or by consulting resources distributed by the [EPA](#).

Appendix A: Advanced Gardening Practices

Companion Planting

The purpose of companion planting is to pair plants that support each other in some way. One plant may provide nutrients or improve soil quality for another plant, deter a shared pest, provide structural support, attract pollinators, act as a natural mulch and prevent weed seeds from germinating, or offer another benefit. One example of companion planting is the trio known as the three sisters: corn, beans, and squash. In this system beans climb the corn. So the corn is providing structural support. But the beans are also fixing nitrogen in the soil for use by the corn. And the squash acts as a natural mulch to prevent weed seeds from germinating.

Other common combinations used to provide plant support or deter potential pests or disease include basil or parsley and tomatoes, sage and cabbage, garlic and fruit trees, crimson clover and broccoli, or sunflowers and cucumbers. For a more detailed list, consult the recently updated Old Farmer's Almanac here: [The Old Farmer's Almanac: Companion Planting Guide for Vegetables](#)

While companion planting typically refers to vegetable pairs, the benefits of planting in pairs extend to flowers and other edible species. For example, plants favored by aphids, such as nasturtiums, can deter harmful garden pests away from vegetable seedlings. On the other hand, sowing dill nearby, a favorite of aphid-hungry ladybugs, introduces a new predator to the garden food chain that may reduce the number of garden pests affecting the area. The type of garden, its location, and accessibility to potential inhibitors or pests will determine which combinations may prove fruitful to your community's eventual harvest.

Succession Planting

[Succession planting](#) refers to planting crops at different intervals to have harvest throughout the growing season, rather than all at once. You might plant one row of lettuce one day, then plant another row of lettuce two weeks later, for example. Succession planting can also be used to ease a garden's transition between seasons. Warm season crops, such as melons, tomatoes, or squash, can be followed by cool-season crops (beets, kale, and lettuce) for the late autumn and winter harvest. However, if your growing season is over 220 days and you select an outdoor garden design, you might consider taking advantage of the warmer climate in your area by following harvested warm-season crops with a second planting of warm-season crops before transitioning. Additional tips can be found using the resources below.

[Harvest to Table- Succession Planting Gardening Tips](#)

[Growing for Market- Succession Planting for a Longer Harvest Window](#)

Appendix A: Advanced Gardening Practices

Season Extension

You can extend your growing season to start growing earlier and/or later in the year through various means. For example, before planting your garden, you may decide that creating some shade will be beneficial if you are planning to cultivate cooler season crops during the summer growing season. Check out some options below with additional resources for instruction on season extension and planning:

1. Start seeds indoors and [transplant](#) outdoors
2. Plant a [second round](#) of cool season crops in the late summer for a fall harvest.
3. Utilize [row covers/low tunnels or high tunnels/hoop houses](#) to extend the growing season

Crop Rotation

Crop rotation is another way to reduce the risk of pest and disease invasion. You might rotate crops [by plant family](#) because plants in the same family are susceptible to many of the same pests and diseases. Crop rotation ensures that the same plants or plants from the same family will not deplete the same soil nutrients year after year. Consider a multi-year rotation plan to prevent planting one plant family in the same bed each year. Examples of plant families include brassicas (broccoli, cabbage, radishes), or night shade (tomatoes, peppers, eggplant, potatoes). Ideally, you would have a 3-5 year rotation planting schedule. Crop rotation can also be used to improve soil health for next-year's plant. For example, row crop farmers rotate corn and soy because soy is a legume that fixes nitrogen in the soil that is then used by the corn the following year.

Advanced Tip: If you are interested in succession planting, consider [crop rotation](#) in your preliminary gardening plans to maintain soil integrity as you alternate between plant species.

Cover Crops

[Cover crops](#) can be used in smaller garden systems. They are crops that cover the soil when nothing is currently growing there. It is ideal to always have roots in the soil, to improve soil aeration, beneficial microbial action, organic matter, nutrition, and avoid soil compaction. Some cover crops die off naturally in the winter, and others need to be removed in the spring to make room for the target crop. Cover crops that die off over winter would be easier to manage in a smaller school garden system.

Appendix A: Advanced Gardening Practices

Mulching

Mulching the garden bed is another way to keep the soil covered during and after the growing season. Mulching with wood chips, dried grass clippings, or straw during the grow season will prevent disease spreading from the soil to the crops by reducing backsplash from watering. It will also reduce weed seed germination. Mulching outside the growing season, such as when putting the garden to bed for winter, will help warm the soil earlier in the year and reduce soil compaction over winter. During the winter months, you might mulch with any of the materials listed above, or additionally introduce landscape fabric or plastic mulch to the garden to protect the plants from harsh temperatures.

Rain Barrels

Using water from [rain barrels](#) can save both money AND water. However, if you are using a rain barrel for edible crops, be sure the barrel is manufactured using a food safe material, and catch rainwater directly instead of from rooftops or other runoff. If there is a chance that the rainwater was contaminated, wash produce thoroughly with water from a non-contaminated source before consuming. Watering at the base of the plant is also always a best practice.

Composting

Composting is defined as facilitating the decomposition of organic materials into a soil amendment. Compost can be stored in bins, piles, three-stage systems, or tumblers. Ideally, your compost bin would be three by three feet in dimensions, and you would add yard waste and food waste from produce to your compost system. A successful compost system has 2:1 bulk brown:green materials, or carbon:nitrogen. High-carbon, or brown, materials include dried leaves and straw (these materials tend to be dry and look brown). High-nitrogen, or green, materials include most green yard waste and food waste as well as manure (these materials tend to be wet and look green). A successful compost system is turned at least monthly to add oxygen to the system, and maintains a balanced moisture level where the pile is moist but not wet. Avoid adding animal products and processed foods to the compost pile. The compost should smell like soil, not attract pests, and look like soil when it is complete and ready to use. Compost can be used to cover the garden soil as a mulch, or incorporated into the first few inches of soil to add nitrogen to the garden.

Purdue has educational resources related to food waste and composting available at The Nature of Teaching website here:

<https://ag.purdue.edu/extension/nature/Pages/Food-Waste-Lesson-Plans.aspx>

The Wisconsin Department of Natural Resources lists some recipes for successful student composting here: <https://www.eekwi.org/engage/green-healthy/recipes-composting>

Appendix B: "Types of Gardens"

Jackson County Health Department School Garden Toolkit for Success

TYPES OF GARDENS:

There are so many garden designs and themes to choose from, it would be impossible to not find one that suits your school's needs! Some Common Gardens:

- ◆ **Historic/Cultural Garden:** A garden focused on historic garden styles allows the garden to serve as a resource for social studies and other subject curricula. Some examples: Colonial Heirloom Garden, Three Sisters Garden, or French Potager Garden.
- ◆ **Sensory Garden:** These gardens use plants and design elements that allow students to explore the five senses. These gardens are great for younger children and as therapeutic tools.
- ◆ **Container Garden:** Great for areas that are limited in space. Plants are grown exclusively in containers. Containers can be pots, grow bags, or even recycled materials such as old rain barrels and bathtubs. Do not use old tires.
<http://urbanext.illinois.edu/containergardening/herbveggie.cfm>
- ◆ **Art/Sculpture Garden:** These gardens serve as outdoor galleries where students' work can be highlighted.
- ◆ **Pizza Gardens:** These gardens are a fun way to teach children about vegetables in their favorite foods! The garden is grown in a circular shape subdivided into various slices for different crops. Typically these gardens include tomatoes, oregano, basil, bell peppers, onions, and other vegetable toppings.
- ◆ **Snacking and Sipping Gardens:** These gardens contain produce that can be eaten right off the vine, like cherry tomatoes and strawberries. Children will learn to love their vegetables, and the produce can also be used in the cafeteria to aid in a healthier school meal.
- ◆ **Flower Maze:** These gardens are typically larger in size, but allow a fun play space for children, incorporating classes into the planting of the garden will allow them to learn about the lifetime of a flower as they play in the maze.
- ◆ **Zuni Waffle Gardens:** These gardens are based on Native American gardening techniques. The gardens consist of four raised beds. Planting in the three sisters method (Corn, squash, and runner beans) will teach students about beneficial relationships among various plant species, while also allowing for social studies curricula to be taught.

These are just a small sample of the bountiful types of gardens out there! There are many books and web sources that can serve as inspirational guides for your garden plan. For more information view the resources list at the end of this toolkit.



Appendix C:

"Standard Operating Procedure: School Garden Produce" Crawfordsville Community Schools Department of Nutrition Services

Crawfordsville Community Schools Department of Nutrition Services Standard Operating Procedure School Garden Produce

Schools across the nation are using gardens to help children discover where food comes from and to develop healthy eating habits. Gardens provide a way for children to grow, harvest, prepare, and ultimately taste new fruits and vegetables. When appropriate precautions are taken, fruits and vegetables from school gardens can be served safely to students.

The practices addressed in this document will help program operators enhance the safety of fruits and vegetables grown in school gardens. When appropriate precautions are taken, fruits and vegetables from school gardens can be served safely to students. Crawfordsville Community Schools encourages schools and food service staff to incorporate sampling from school gardens as a learning opportunity.

Scope

This procedure applies to all school gardens.

Procedure

Harvesting: Must be led by a Lead Garden Teacher or Master Gardener. The following procedures must be followed:

1. Harvest produce regularly, pick up, and remove rotting vegetables.
2. Wash hands before and after picking produce.
3. Use clean hands when picking produce.
4. Use clean food grade storage containers as harvest containers.
5. Brush, shake, or rub off any excess soil or debris before placing produce in harvest container or bringing into the kitchen.
6. All tools used in the garden must be used, solely, in the garden and cleaned regularly.
7. If any volunteer or student exhibits any of the following signs, they cannot join the garden activities for as long as the symptoms last (to avoid a foodborne illness outbreak):
 - Vomiting
 - Diarrhea
 - Sore throat and fever
 - Jaundice
 - Infected sores or cuts on exposed portions of the arms/hands

Receiving, Washing, and Storage:

1. Accept produce harvested from school gardens, only, when Chartwells K12 associates are present to receive it. Any produce dropped off or left, when staff is not present, should not be used. All produce received will be documented on the garden produce inventory.
2. Produce harvested from the school garden should only be accepted when ripe.
3. The Chartwells K12 associates must wash leafy green vegetables, herbs, and produce in a colander with an antimicrobial wash for produce.
4. Vegetables with a thick, outer skin (tubers, roots, gourds) must be scrubbed with a brush and then rinsed thoroughly.

Appendix C:

"Standard Operating Procedure: School Garden Produce" Crawfordsville Community Schools Department of Nutrition Services

5. Dry produce with a clean paper towel thoroughly, or air dry.
6. Produce from the school garden should be placed in separate food grade storage containers and labeled with the date of the harvest.
7. Stored in the cooler/refrigerator for one day to reduce their internal temperature to below 41°F (do not freeze), unless the particular item is normally held at room temperature.
8. Can be used for service the day after harvest 41°F temperature is below 41°F. Temperature must be recorded on the *temperature log*.
9. Items can be used the day of harvest or stored in the refrigerator for later service.

Responsibility

The Lead Garden Teachers and assigned Chartwells K12 team, at each school site, are responsible for monitoring compliance.

Effective Date:
Revision Date:

Appendix D:

"Food Safety Plan for Gardens"

Chartwells eat.learn.live School Garden Program

FOOD SAFETY PLAN FOR GARDENS

Food safety of the garden begins during the planning stages. Steps must be taken to prevent the risk of contamination if the garden produce will be eaten by students or served as part of the school meal program. The size of the garden does not matter when it comes to food safety, even small gardens pots or single garden beds can harbor harmful microorganisms and impact food safety. This checklist will assist you in understanding the requirements of a food safety plan.

PRODUCTION

Location

Recommendation: Locate gardens away from garbage areas, wells, septic systems, utilities, animals and livestock. The area directly above the growing area should be free of tree limbs or utility lines where birds can perch.	Plan: Explain how the location of your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.	YES	NO	N/A
The garden is not situated near garbage, wells, septic systems, utilities, animals, or livestock. The garden is situated near trees but no branches overhang the garden plot.				

Security

Recommendation: The garden area should be fenced and secure to deter intentional and unintentional visitors. Visitors should not be allowed unless a supervisor is present.	Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.	YES	NO	N/A
The garden is secure because it is positioned within the backside of the school so that visitors would have to go through the school and check in. A security camera watches the garden at all times.				

Fencing

Recommendation: Fence openings should generally be no greater than 1 inch.	Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.	YES	NO	N/A

Soil Testing/Soil History

Recommendation: If commercial soil is not used, soil must be initially tested for volatile organic compounds and lead. Maintain records.	Plan: Describe the results of any soil testing performed or where soil was purchased. Circle at right if your garden fulfills the recommendation.	YES	NO	N/A
Soil lead test level = 11.7 ppm, well below EPA level of 400 ppm suggested for "bare, open play areas" and the National Gardening Association's School Garden Guide suggested level of 100 ppm. A total of 51 VOCs were analyzed and none were found to exceed the detection limit of 1 ppb.				

Appendix D: "Food Safety Plan for Gardens" Chartwells eat.learn.live School Garden Program

PRODUCTION (CONTINUED)

Water Testing

<p>Recommendation: Only clean and potable water should be used in the garden. All water sources for the garden should be tested annually to conform to EPA standards. Records must be maintained.</p>	<p>Plan: Describe the water source for your garden and the results of testing. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>The water source for the garden is the hose/water used by the school, which is municipal water. This water is tested to ensure the safety of the students.</p>				

Compost And Manure

<p>Recommendation: Avoid the use of fresh manure. Composting is very complex and regulations can vary. Use commercial compost whenever possible. If you wish to use compost created on school grounds, explain how you will ensure the safety of your compost (attach additional documentation as needed).</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>Manure of any kind is not used in the garden. Any compost used is provided by the municipality.</p>				

Fertilizer

<p>Recommendation: Only commercial fertilizers should be used.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>If needed, only commercial fertilizers will be used. Commercial fertilizers will only be used if routine garden soil testing indicates low levels of macronutrients or critical micronutrients.</p>				

Pest Control

<p>Recommendation: Avoid the use of pesticides.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>No pesticides are used for weed or insect control in the school garden.</p>				

Appendix D: "Food Safety Plan for Gardens" Chartwells eat.learn.live School Garden Program

SANITATION

Worker Health

<p>Recommendation: There must be a written policy to exclude workers that have recently been ill or exhibit symptoms of foodborne illness such as: vomiting, diarrhea, sore throat and fever, jaundice, infected sores or cuts on exposed portions of the hands and arms. Signs must be posted to reinforce the policy.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>This is indicated in the written "School Garden SOP".</p>				

Handwashing

<p>Recommendation: A handwashing station must be easily-accessible and be stocked with soap, water, towels and a waste receptacle. Training must be conducted for all workers. Handwashing signs must be posted to reinforce the policy.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>Training will be completed by a GAP certified trainer for all involved in the garden. The signs will be posted in the garden's shed. All students must wash hands prior to coming to the garden with stocked hand sinks being easily accessible within the building.</p>				

Restroom Facilities

<p>Recommendation: Restrooms must be available for workers. Restrooms must be kept clean and stocked of supplies.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>Restrooms are available within the school and are kept clean/well stocked.</p>				

Training

<p>Recommendation: Training must be provided to help workers understand the relationship between food safety and personal hygiene. Topics must include proper hand washing, first aid procedures, proper response to blood or bodily fluids incidents in the garden, and the safe handling of produce. Training of each worker must be documented.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>Training will be completed by a GAP certified trainer for all involved in the garden, and all of the stated topics will be covered in the training. The training log will be completed by all Master Gardeners, Lead Garden Teachers, and volunteers to help with the garden.</p>				

Appendix D: "Food Safety Plan for Gardens" Chartwells eat.learn.live School Garden Program

HARVEST

Containers and Equipment

<p>Recommendation: Harvest containers must be food grade and must be washed and sanitized before using. Harvest tools and equipment must also be washed and sanitized before using.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>All harvest containers/tools will be food grade and washed/sanitized appropriately.</p>				

Identification and Traceability

<p>Recommendation: Harvest containers should be labeled to include the product name, harvest date and row/bed or location where the produce was grown.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>Per the training, all garden leaders will label the produce prior to delivering it to the kitchen manager.</p>				

TRANSPORT AND DELIVERY

Transporting

<p>Recommendation: To maintain produce quality and safety, the produce must be refrigerated immediately after harvesting. If the garden produce will be transported, a refrigerated vehicle or other approved method to keep the produce cold at or below 40oF is recommended. Transport vehicles must be kept clean and sanitary.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>We will not be utilizing transport vehicles as the produce will go immediately into the kitchen's refrigerator.</p>				

Receiving

<p>Recommendation: Produce must be inspected at receiving. Unacceptable product must be refused. Acceptable produce must be refrigerated after receiving.</p>	<p>Plan: Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.</p>	YES	NO	N/A
<p>All kitchen managers are trained on receiving product, and they will complete the Produce Receiving Information form to keep with their production records.</p>				

Appendix D: "Food Safety Plan for Gardens" Chartwells eat.learn.live School Garden Program

PRODUCE WASHING

Compass Group Requirements

Recommendation:	Plan:			
Produce must NOT be washed at harvest. Do not hose, spray, soak or use wet towels to wipe produce. Produce washing should only take place in the school kitchen on the day of service.	Explain how your garden meets the recommendation. Circle at right if your garden fulfills the recommendation.			
Only an approved antimicrobial vegetable wash, such as Victory or FIT should be used for washing garden produce. Gardens that have large amounts of produce over several months, should use Victory wash, which can be purchased and installed through Ecolab.		YES	NO	N/A
Produce will not be washed at harvest, but it will be washed prior to service with FIT.				

ANY ITEMS THAT WERE CHECKED "NO" REQUIRE FOLLOW-UP IN AN ACTION PLAN.

Garden Action Plan		School District Name:		
Action	Due	Completed	Initials	Other Required Action
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				