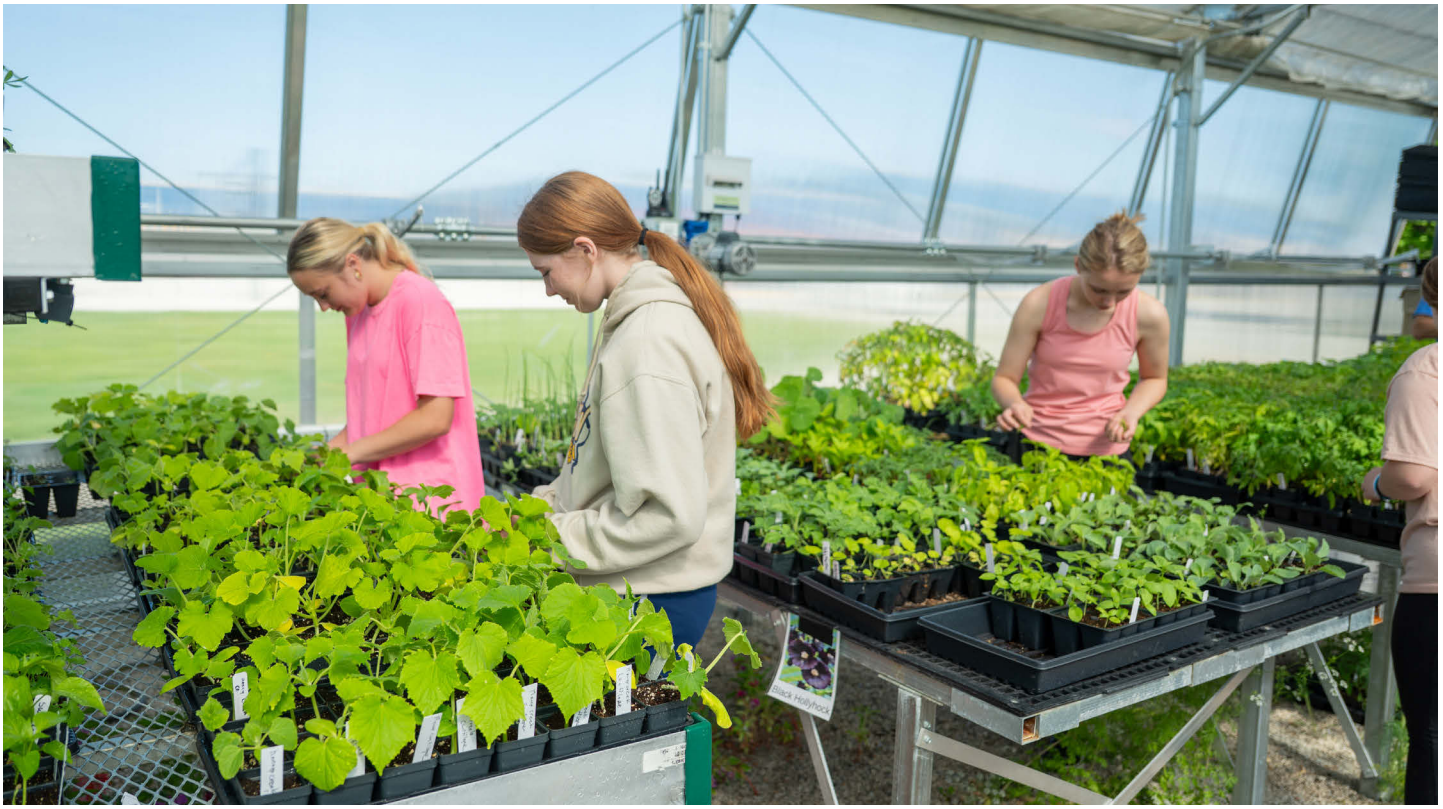
From Greenhouse to Cafeteria



A toolkit for creating and revamping greenhouse programs in Nebraska schools

CENTER *for* RURAL AFFAIRS

Revised 2026

From Greenhouse to Cafeteria

East Butler Public Schools was one of the early pilot sites for the Center for Rural Affairs' Greenhouse to Cafeteria program and continues to grow vegetables for their cafeteria. Instructor Shane Hennessy served as a resource for other schools when the program launched.

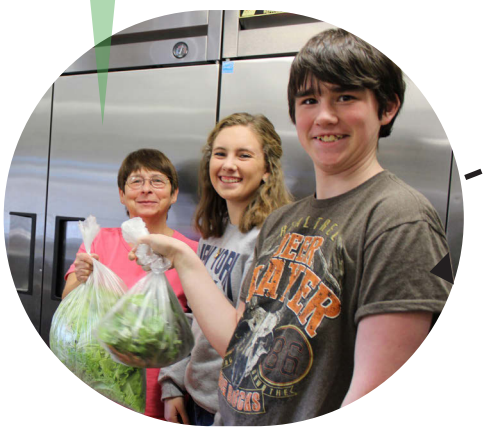
"I like that this activity is not ordinary. It's outside of the classroom." -Morgan Osmera, sophomore

Morgan Osmera waters blooming plants. Students are responsible for weeding, cleaning, and watering beds, and harvesting vegetables.

"It's cool to have a connection with our lunch. We're able to eat the food we've grown." -Brittany Timoney, senior

Students Illyana Hamicksburg, Alex Chritiansen, and Brittany Timoney cut lettuce for the day's lunch and learn tips from Kirstin Bailey, Center for Rural Affairs project associate. The greenhouse contains raced beds and a hydroponics growing system.

"The food comes straight to the cafeteria, there is no in-between. And, the kids like lettuce." -Kathy Pelan, head cook



Head Cook Kathy Pelan receives lettuce from Brittany Timoney and Alex Chritiansen. She then distributes the greens to grades kindergarten through 12th during lunch.

"We brag it up at lunch that we took care of their food. It's great seeing something you did." -Illyana Hamicksburg, junior

Instructor Shane Hennessy helps students weigh lettuce before taking it to the cafeteria. The two bags totaled 3.25 pounds, which was the largest harvest so far in the school year. | Photos and story by Rhea Landholm

Introduction

Growing food is part of Nebraska's rich agricultural heritage, and that experience belongs in our schools. Across Nebraska, schools are building and revitalizing greenhouse programs to teach science, math, entrepreneurship, and nutrition while strengthening connections between students and their school meals.

Greenhouse education in Nebraska has evolved from simply building or refurbishing structures to developing integrated, curriculum-connected, and food system-aligned programs. Schools are integrating greenhouse production into curriculum, aligning harvest schedules with menu planning, developing food safety practices, and exploring preservation and season extension strategies. This toolkit reflects lessons learned.

This Greenhouse to Cafeteria toolkit provides guidance for schools that are starting from scratch as well as those looking to strengthen or revamp existing programs. It includes planning tools, production guidance, curriculum considerations, and examples from Nebraska schools. Whether your goal is food production, improved nutrition, hands-on academic learning, or a combination of all three, this resource is designed to support practical implementation.

Strong greenhouse programs are built through collaboration. Successful schools involve administrators, teachers, food service staff, students, parents, and community partners from the beginning. When aligned with clear goals and shared responsibility, a greenhouse can become more than a facility. It can become a living classroom and a source of pride for an entire school community.

We hope this toolkit serves as a practical guide and an encouragement to schools across Nebraska. The Center for Rural Affairs remains committed to supporting districts through technical assistance, training, and peer learning opportunities as greenhouse programs continue to grow statewide.

Good luck,

Kirstin Bailey
Senior Project Manager
Center for Rural Affairs

Jenna Sutterfield
Local Foods Associate
Center for Rural Affairs

Cait Caughey
Senior Project Associate
Center for Rural Affairs

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About the Center for Rural Affairs: Established in 1973, the Center for Rural Affairs is a private, nonprofit organization with a mission to establish strong rural communities, social and economic justice, environmental stewardship, and genuine opportunity for all while engaging people in decisions that affect the quality of their lives and the future of their communities.

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Launching a greenhouse project

A Greenhouse to Cafeteria program can serve as a powerful starting point for hands-on learning, improved nutrition, and stronger school-community connections. What begins as a single greenhouse or classroom project can grow into an integrated program that connects curriculum, food service, and student leadership. Think of key people in your community who could assist, such as local growers, school clubs, and agriculture extension agents. As people have a chance to help shape the project, they will become more invested in ensuring it becomes a reality. With thoughtful planning and collaboration, a greenhouse can become a catalyst for broader food system education and long-term impact within your school.

Managing the program

School districts can be complex, with management levels ranging from a single teacher to the president of the school board. A greenhouse project can be administered from any one of these levels, depending on the program goals. Clarify this early in the process. Often, strong administrative support translates into a larger impact, but on the other hand, may be more complex to manage. Consider the following management levels and keep in mind that a greenhouse doesn't need to be limited to a single program.

Organized by one or several teachers: Common for a small teaching greenhouse that supplements a few classes, curriculum driven and limited to just one or a few classes. May also be appropriate for extracurricular groups, such as FFA, that can utilize the greenhouse during classes or in after school programs. Embraced by the whole school and championed by the principal: Large scale, involves multiple classes and grades, can be curriculum driven and/or provide healthy food for students.

Driven by Child Nutrition Programs or the school board: May support projects at multiple schools and focus on vegetable production, with goals to provide fresh produce in school meals or cultivate healthy eating habits for students. Curriculum and educational goals can be supported by sharing greenhouse management and access with interested teachers. If focusing specifically on nutrition, school nurses can also serve as greenhouse allies. Nurses often have specific goals centering on student health and nutrition, and greenhouses can be a tremendous tool in achieving these goals.

To ensure long-term success, clearly define leadership roles and year-round responsibilities early in the process, including who will oversee greenhouse care during weekends, holidays, and summer break.

Forming a greenhouse committee

While a greenhouse program can be administered at any of the levels mentioned above, a more comprehensive approach is to form a greenhouse committee. A committee will ensure buy in from different staff and encourage collaboration on the project. A well-rounded team will include staff from diverse programs. Each staff member can assume different responsibilities related to the greenhouse, for instance an FFA instructor may lead production education while food service staff or a school nurse may be in charge of nutritional programs. The committee may be mostly adults, but student leaders should be included as well, as they'll benefit the most from the greenhouse. Creating interest and forming a committee ahead of time will help your greenhouse become a reality. By having strong participation from a variety of areas of the school, your greenhouse can be a more comprehensive program, and more likely to have continued support.

Inviting collaboration

Regardless of who administers your greenhouse program, supporters, participants, allies, and champions are all vital to your success and can be drawn from within the greater school community. Certain members of the school community are essential to a successful program. Invite anyone who is interested to help plan and decide the purpose and goals of your greenhouse program. Particularly include anyone who will be directly a part of the project, including students, staff, and teachers.

Administrators

Permission from the school principal is of course necessary, but active support from within the administration of a school may be equally important. Starting and running a Greenhouse to Cafeteria program is a complex endeavor requiring significant investment of money, resources, and time. Without the security of a supportive school administration, a program will be difficult to launch and sustain.

Teachers

Whether academic achievement is your primary goal, or maybe your goal is increased access to nutritious food for your students, teachers are key to your success. At least one teacher should be engaged and committed to get the program running.

Students

Students receive the majority of benefits from any school greenhouse project. Even before your program begins, let the students know it is coming, how they will be involved, and communicate the excitement of the project. Students can help plan or implement, and their excitement can encourage other teachers, parents, and administrators to get involved.

Parents

Parents are a source of potential knowledge, labor, supplies, and funds, in addition to encouraging their kids to be excited participants. Parents can also petition the school on your behalf, by showing that they and their children find the Greenhouse to Cafeteria project beneficial.

Food service staff

If providing students with a healthy diet is one of your greenhouse goals, you'll need the support of your food service staff. They will be the team incorporating the harvest into meals and planning new menu items. They should be involved with the project and offered resources on fresh food safety and meal preparation.

School nurses

As health educators, school nurses can play a key part in forming a greenhouse. They can provide examples of health curriculum to be used in greenhouse programming or advise on which vegetables to grow as nutritious supplements to school meals.

Staff

School staff can provide essential skills in construction, set up, and operation of a greenhouse facility, particularly custodial and maintenance staff.

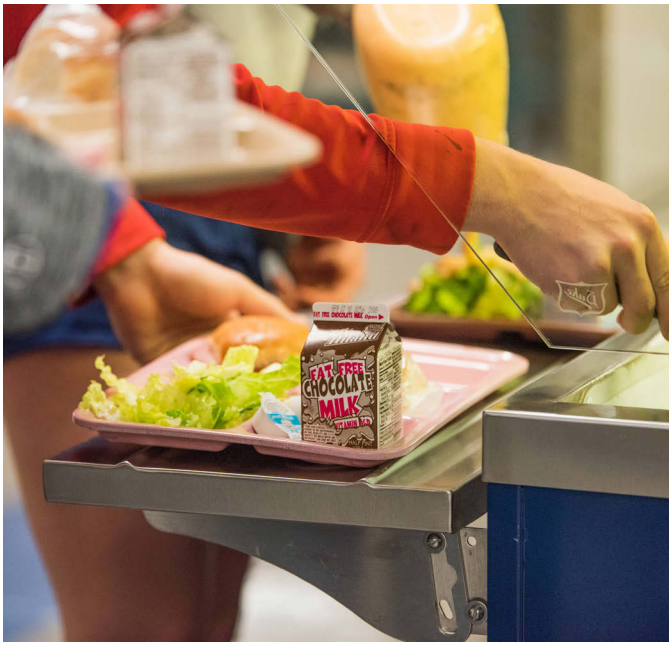
Purpose and goals

Greenhouse to Cafeteria projects come in many forms with various objectives. Early in the process of starting a school greenhouse program, you and your team of supporters should map out the specific purpose and goals of your project. Common reasons for starting a school greenhouse program include food production, academic achievement, and improved health or nutrition. These reasons are described in more detail below, although your particular program may be a combination of these or other reasons. A well formulated plan helps to clearly communicate your purpose with school staff, administrators, parents, and the community.

Health and nutrition

Growing and harvesting vegetables is a great entry point to increase student consumption of produce. Greater interest in, knowledge of, and willingness to try fresh vegetables can be generated through greenhouse and garden activities. Studies have shown that students who participate in school gardens are interested in eating the fruits of their labor, tend to choose more fresh and healthy meal options, and have healthier lifestyles.

As one teacher said, “We went into a kindergarten classroom, cut their lettuce, and allowed them to take it home to share with their family for supper. The next day, one student came back saying he was so mad at his mom. She ate the lettuce when she got home (before supper) while he was playing outside and he didn’t get any of it.”



Academics

When guided by teachers, students can meet specific learning objectives by participating in the activities of the greenhouse. There are many curriculum guides that link growing, planting, and harvesting activities with standards-based educational outcomes. Subjects available to integrate with your greenhouse include biology, chemistry, mathematics, entrepreneurship, and many more academic topics. Implementing a curriculum can be as simple as purchasing a guide and following the lesson plans. However, evidence shows the most successful curriculums are paired with frequent training sessions for teachers on how to use and apply curriculum.

Production

With a little knowledge, infrastructure, and effort, large quantities of high-quality vegetables can be grown in a school setting. A successful food production system can provide one, two, or several crops, and can be designed to provide daily or weekly harvest. For example, maybe you can supply all the salad for your school, or tomatoes for several schools. Food safety is extremely important when food is destined for the school cafeteria or student consumption, so plan to include training and development of a food safety plan for harvest and food storage. Expect to spend time daily on the management of a production focused greenhouse system.

Production goals should be aligned with cafeteria needs, storage capacity, and menu planning to ensure harvested produce can be used effectively. Schools may also consider how greenhouse production connects with broader procurement efforts, including sourcing additional local products or incorporating preservation strategies to extend the use of seasonal harvests.

Creating curriculum

A whole school approach

In some cases, an entire school may be engaged around the greenhouse, with classes or subject areas from many different grade levels developing some activity, exercise, or assignment that is linked to the project. A greenhouse may be used daily for teaching or lessons, which can incorporate greenhouse operations such as managing the nutrient balance of the water, planting new seeds, harvesting the crop, keeping records, and tracking costs/income. Harvested produce can go to the school cafeteria and be consumed by students, contributing to nutrition and healthy eating habits. Excess produce can be sold for income, which may present a compelling opportunity for student business and entrepreneurship training.

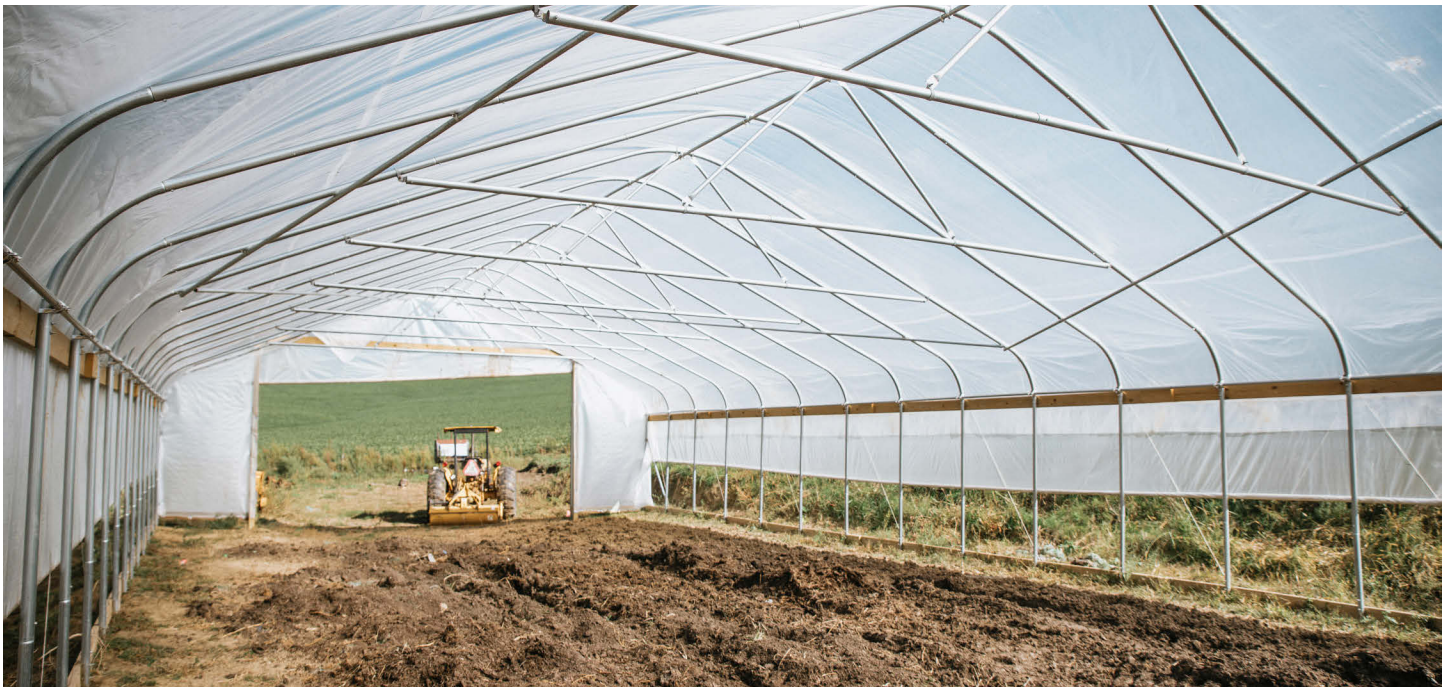
A classroom approach

In a more modest approach, individual teachers can make use of the greenhouse program to supplement or complement their specific curriculum. Teaching guides have been developed to link all the major and many minor subject areas to school gardens, including entrepreneurship, science, language arts, and health, to name just a few. Teachers may include greenhouse-linked lessons on a monthly, weekly, or daily basis.

Student clubs or after school programs

Students may be involved outside of class in a club or after school program that incorporates the greenhouse growing operation into its activities. FFA, 4-H, FCCLA, SkillsUSA, entrepreneurship or culinary clubs, Junior Master Gardeners, or a school 'Garden Club' are common student organizations of this type. Students also can be engaged in the cafeteria, through eating the produce itself, nutrition education, or farm to school activities such as Nebraska Thursdays, voting on a vegetable of the month, or competing to develop a healthy food recipe using local ingredients.

Designing a greenhouse system



The greenhouse

The goals of your project will help tell you how large and how many greenhouses are needed. Maybe your school already has a greenhouse that can be repurposed or refurbished, if not you will need to build new. In addition to providing water, cooling, and heating, the key resource your greenhouse should provide is light. Choosing a high quality, warranted covering is the best way to ensure good light over many years, which can be supplemented with greenhouse grow lights. Ultraviolet protected polyethylene film or rigid polycarbonate panels are the two most common options. In your greenhouse, you will also need a growing system, such as hydroponics, aquaponics, or soil-based system.

A **hydroponic system** uses water to grow vegetables without soil. Two recommended types are the "floating raft" and "nutrient film." Nutrient film places plants in a trough, like a PVC pipe with holes, and runs the water/nutrient solution through the pipe and over the roots. A floating raft system employs a large, shallow pool of water/nutrient solution with floating styrofoam sheets suspending plants so their roots extend into the water. Hydroponics will require pumps, filters, and reservoirs, and nutrients in the form of water soluble elements and chemicals formulated for hydroponic systems.

Aquaponics is a variation of hydroponics that includes fish production in separate tanks, and uses the fish wastewater to fertilize the vegetable plants. This system provides both protein and produce. It can also be configured as a fish only system, which typically consists of tilapia, carp, or catfish.

Soil-based systems use growing trays or pots filled with potting soil and raised up on tables or "benches." As plants grow and are harvested, the soil becomes depleted of nutrients or harbors plant disease and must be discarded and replaced. Either irrigation (mist or drip) or hand watering will be required. If you prefer in the ground growing, consider a "high-tunnel" or a garden outdoors.

Right-sizing your greenhouse:
Questions to ask before you build

Before investing in a greenhouse structure or system, take time to assess your school's capacity, long-term goals, and ongoing support. Visiting other schools and learning from their experiences can provide invaluable insight. Consider the following questions.

Program Vision
- What is the primary goal of your greenhouse program: production, academics, nutrition, entrepreneurship, or a combination?
- How will this structure support that goal?

Staffing and Leadership
- Who will serve as the primary lead for this project?
- Who is responsible for daily management?
- Who will care for the greenhouse during weekends, holidays, and summer break?
- What happens if a key staff member leaves?

System and Technical Capacity
- How technically advanced is the system you are considering?
- Do you have staff members who are comfortable managing pumps, sensors, nutrient systems, or automation?
- What kind of technical support is available if equipment fails?
- Are replacement parts readily available and affordable?

Cafeteria Alignment
- How much produce can your food service realistically use?
- Do you have adequate storage space?
- How will harvest timing align with menu planning?

Financial Sustainability
- How will you budget for seeds, nutrients, soil, water, electricity, and replacement supplies?
- Is there a long-term plan for maintaining equipment and replacing parts?
- Will this greenhouse require ongoing grant funding, or is there a sustainable funding model in place?

Learning from Others
- Have you visited other schools with greenhouse programs?
- Have you spoken with teachers and food service staff about their lessons learned?
- What challenges have other schools experienced?
- Starting with a right-sized, realistic system allows your greenhouse program to grow sustainably over time.

Maintaining a greenhouse system

Food production

Common crops include lettuce, tomatoes, cucumbers, strawberries, other leafy greens, and herbs, although there are many more options. You will need space and a system for germinating seeds and starting whatever crop you choose before transferring seedlings to the growing system. Make a planting and harvest schedule for each crop. Also, plan daily monitoring of your growing conditions and expect to adjust the water, light, temperature, or fertility in your greenhouse on a daily basis. Factor in significant time to harvest and package your produce.

Harvest

Particularly in a managed greenhouse system, your produce will need to be harvested several times a week, or even daily, depending on the crop and planting schedule. Timely harvest keeps the plants healthy and stimulates continuous production, and also helps reduce some plant diseases. Be sure to employ good harvest practices to ensure food safety and quality, and have a plan in place for packaging, storage, or distribution, as appropriate.

Plant, pest, and disease control

Careful monitoring for plant disease or pest insects is crucial to maintaining a good growing environment. Because a greenhouse is a closed environment, when an outbreak occurs it can often spread rapidly and become very difficult to eradicate. Insects can often be controlled using an “Integrated Pest Management” approach, which may call for releasing beneficial insects to counter the pest, such as ladybugs or praying mantises. Try to avoid chemicals, such as pesticides, to reduce the risk of exposure to students and harvested food.

Additional responsibilities

Maintenance of the system, care over weekends and holidays, and over the summer break all present a major demand of time and knowledge. These responsibilities must be made clear and someone specific should be assigned to keep the system running.

Maintaining a greenhouse system, continued

Operational rhythm: Daily, weekly, and annual tasks

Consistent attention is key to a successful school growing program. Establish clear routines to prevent small issues from becoming major problems. Defined responsibilities and simple tracking systems help ensure continuity throughout the school year.

Daily (or two to three times per week)
- Watering, as appropriate for the system and crop
- Temperature and ventilation checks, especially in greenhouses
- Quick visual scan for pests, disease, or plant stress
- Confirm shade cloth and environmental controls are functioning properly

Weekly
- Trellising, pruning, or thinning as needed
- Harvesting and updating harvest logs
- Cleaning debris and maintaining walkways
- Inspecting fans, irrigation lines, and equipment

Monthly or seasonal
- Start new crops according to the production plan
- Review crop plan and adjust as needed
- Deep clean tools and shared equipment
- Review supply inventory, including seeds, growing media, and nutrients

Annual planned production pause
Most school greenhouse programs benefit from a planned production pause once per year. A two- to four-week reset period during summer or winter break allows time to disrupt pest cycles, sanitize surfaces, and evaluate systems before the next growing season.

During this pause, consider:
- Removing all plant material and debris
- Disinfecting benches, trays, and tools
- Cleaning fans, vents, and aspirator filters
- Inspecting irrigation systems and replacing worn components
- Reviewing shade cloth installation and storage
- Evaluating crop performance and updating plans
- Completing the School Greenhouse Evaluation Worksheet

Building in an intentional production pause improves plant health, reduces recurring pest pressure, and supports long-term sustainability.

Schools are encouraged to complete the School Greenhouse Evaluation Worksheet annually as part of their planned production pause. This tool helps identify structural, environmental, safety, and operational gaps before they become costly problems. Regular evaluation supports long-term sustainability and continuous improvement.

Common challenges and considerations

Even well-designed greenhouse systems can struggle without careful attention to daily operations, seasonal adjustments, and clear procedures. The following are common challenges observed in school greenhouse programs, along with practical considerations to help prevent them.

1. **Seasonal Light and Shade Management:** Light management is one of the most overlooked factors in school greenhouses. During late fall and winter, shorter daylight hours naturally slow plant growth. Without supplemental lighting, winter production will likely decrease, and harvest expectations should be adjusted accordingly.

   In contrast, during late spring and summer, intense sunlight and heat can quickly stress crops. Shade cloth plays an important role in regulating temperature and protecting plants during warmer months. In Nebraska, shade cloth is typically installed from May through mid-October and removed as daylight hours shorten.

   Leaving shade cloth on year-round can significantly reduce available light during fall and winter, limiting plant growth. Likewise, neglecting to install shade cloth during hot months can lead to heat stress and reduced yields. Adjusting shade seasonally rather than treating it as a permanent fixture helps maintain consistent and healthy production.

2. **Sensor and Aspirator Placement:** Environmental sensors and aspirators function as the "nervous system" of a greenhouse, feeding information back to the control system. If sensors are mounted too high or far above plant level, they may not accurately reflect the temperature and humidity conditions your crops are actually experiencing.

   Sensors should be positioned near plant height to capture meaningful environmental data. Aspirator screens and filters should also be inspected and cleaned regularly to ensure accurate readings. Dirty or improperly placed equipment can lead to incorrect system responses, such as unnecessary heating, cooling, or irrigation adjustments.

3. **Overly Complicated Watering Systems:** Irrigation systems should support learning and plant health, not create confusion. During the school year, students should have opportunities to observe and participate in watering as part of the educational experience. Overly complex systems can reduce engagement and make troubleshooting more difficult.

   Automated irrigation can be valuable for maintaining consistency during weekends and school breaks. Strive for a balance between hands-on learning and automated support. Simpler systems are often easier to manage and more sustainable over time.

4. **Ongoing Supplies and Operating Costs:** Installing a greenhouse is only the beginning. Successful programs plan for recurring expenses such as seeds, growing media, nutrients, replacement parts, water, and electricity. Even relatively small consumable costs can interrupt production if no operating budget is in place.

   Establishing a modest, predictable annual budget for supplies helps prevent mid-season disruptions and keeps the greenhouse functioning smoothly. Planning for ongoing expenses from the start supports long-term stability and reduces reliance on emergency funding.

5. **Automation and System Understanding:** Automated systems can improve consistency and reduce manual labor, but they do not eliminate the need for human oversight. Greenhouse technology such as environmental controls, irrigation timers, sensors, and nutrient systems requires staff who understand how to interpret data and respond appropriately.

Common challenges and considerations, continued

In programs that rely heavily on automation without regular monitoring, small issues may go unnoticed until they become larger problems. Ensure at least one staff member is trained to understand how the system functions, how to troubleshoot basic issues, and when to seek technical support. Technology should support learning and production, not replace active management.

6. **Student Safety and Supervision:** Greenhouses combine water, electricity, tools, and moving equipment in one space. Clear safety protocols are essential. Ensure electrical components are properly installed and protected from moisture. Keep walkways clear and dry to reduce slip hazards. Store tools and any fertilizers or nutrients securely when not in use.

   Rolling benches and tables should be used carefully and with supervision. Students can be injured by falling from moving tables or getting caught between two benches. Establish clear expectations for how and when rolling tables may be moved. Fans and other mechanical equipment should be properly guarded to prevent accidental contact.

   Students should always be supervised when operating equipment, adjusting systems, or moving benches. A safe greenhouse environment supports effective learning and protects the long-term sustainability of the program.

7. **Documentation and Continuity**: Strong greenhouse programs are built on clear routines and shared knowledge. Documenting daily tasks, system settings, planting schedules, and troubleshooting steps protect the time and effort invested in your program.

   Keep simple standard operating procedures for key tasks such as watering schedules, nutrient mixing, harvest protocols, and system checks. Store manuals, warranties, and vendor contact information in one consistent, accessible location.

   Clear documentation reduces stress, supports substitutes or temporary coverage when needed, and ensures the greenhouse continues to run smoothly even during busy seasons or unexpected changes. A well-organized system makes the program easier to sustain over time.

Troubleshooting: When plants don't cooperate

Even the best-planned garden or greenhouse will hit a few snags. This section gives you quick reference points when something doesn't look right. Don't panic—every grower faces challenges, and each one is a chance to learn. If problems persist, consult local Extension staff or greenhouse professionals for guidance.

Getting started: Planning checklist

Use this checklist during your first planning meetings to clarify roles, goals, and logistics. Strong programs begin with clear leadership, shared ownership, and realistic planning.

People and Roles

- ❒ At least one staff champion identified
- ❒ Core team put together, including teacher, food service, and maintenance support
- ❒ Administrative awareness or approval secured
- ❒ Students involved through class, club, or leadership role
- ❒ Community partners identified (if applicable)

Purpose and Goals

- ❒ Clear program goals documented (education, nutrition, entrepreneurship, etc.)
- ❒ Cafeteria integration or food use plan discussed
- ❒ Initial growing focus selected (garden, greenhouse, indoor system)

Site and Systems

- ❒ Growing space identified
- ❒ Water access confirmed
- ❒ Sunlight and seasonality assessed
- ❒ Basic equipment and supply needs outlined

Operations

- ❒ Planting, watering, and harvesting responsibilities assigned
- ❒ Break and summer oversight discussed
- ❒ Long-term sustainability and leadership continuity considered
- ❒ Initial crop plan drafted

Choosing a growing system

Here's a snapshot of common school-based growing systems and what to consider. Pick what works for your context. Many schools start small with raised beds or containers and expand over time.

System	Best for	Challenges	Seasonality
Garden beds	Hands-on, in-ground learning	Weeds, pests, weather	Spring–fall
Raised beds	Accessibility, easier soil control	Higher startup cost	Spring–fall
Greenhouses	Season extension, large-scale crops	Infrastructure and maintenance	Year-round (with heat)
Containers	Portable, indoor/ outdoor flexibility	Frequent watering needed	Spring–fall or year-round
Hydroponics	Indoor STEM integration, compact	Tech complexity, start-up cost	Year-round indoors

Produce Seasonality Guide for Nebraska

Product	Months in season												Greenhouse grown	Can be stored	Can be frozen fresh
	J	F	M	A	M	J	J	A	S	O	N	D			
Apples							■	■	■	■				X	X
Asparagus				■	■										X
Beets				■	■	■	■	■	■	■	■		Year round	X	
Blackberries							■								X
Broccoli						■	■	■	■	■					X
Cabbage							■	■	■	■				X	X
Cantaloupe								■	■						X
Carrots						■	■	■	■	■			Fall/spring	X	X
Cherries						■	■								X
Cucumbers							■	■	■				Spring/early summer		
Eggplant							■	■	■						X
Garlic								■	■	■	■	■		X	
Grapes								■	■						X
Green beans							■	■	■						X
Herbs				■	■	■	■	■	■	■					X
Kale						■	■	■	■	■			Year round		X
Kohlrabi								■	■	■				X	X
Leeks							■	■	■	■					X
Lettuce						■		■	■	■			Year round		
Onions						■	■	■	■	■			Green onions year round	X	
Peaches							■	■							
Pears								■	■	■					
Peas						■	■	■	■				Spring/fall		X
Peppers							■	■	■	■			Spring/summer		X
Plums								■	■						
Potatoes							■	■	■	■	■	■		X	X
Pumpkins									■	■	■	■			
Radishes					■	■							Year round		
Raspberries							■								X
Rhubarb				■	■	■									X
Spinach				■	■	■			■	■	■		Year round		X
Squash							■	■	■	■	■	■		X	X
Strawberries						■									X
Sweet corn							■	■	■						X
Sweet potatoes									■	■	■	■		X	
Tomatoes							■	■	■	■					X
Turnips				■	■				■	■	■		Year round	X	X
Watermelon							■	■	■						X
Zucchini							■	■	■	■					
*Most garden vegetables can be started indoors in March or April.															
Local year round															
Cheese	■	■	■	■	■	■	■	■	■	■	■	■			
Meats and poultry	■	■	■	■	■	■	■	■	■	■	■	■		X	
Milk	■	■	■	■	■	■	■	■	■	■	■	■			
Beans (dry edible)	■	■	■	■	■	■	■	■	■	■	■	■		X	
Grains and flours	■	■	■	■	■	■	■	■	■	■	■	■		X	

Production plan

Production plans are helpful when preparing for the growing season. A well thought out plan will document each step in your production process (sowing, maintenance, harvest, etc.) and put your school on a path to success. A production plan can also be a learning document where you can add useful information and lessons learned; such as harvesting rates and diseases and pests experienced. It can be a document you return to in following seasons to increase your rate of success. It's important to know that no production plan is the same. Many will be tailored to individual greenhouses or gardens and each variety of vegetable or fruit planted should be well researched. Below is an example of a production plan with common Nebraska produce to get you started. Noted in the first column are planting and harvest dates, these are calculated by beginning with the desired harvest date and then using days to maturity (DTM) to count back to the planting date. **These are only examples under ideal conditions,** a school should calculate their own dates specific to their programs.

The following schedules provide ready-to-use examples for common greenhouse crops. Use them as a starting point and adjust planting and harvest timelines based on your system, lighting conditions, and program goals.

Tips and tricks

Seeds germinate faster and successfully when the soil temp is anywhere from 75 to 80 degrees. You can achieve this with either a seed starting mat, or by placing them on a radiator or on a table with a small heater underneath. Be careful temps don't get too hot or they will not germinate.

	Head lettuce	Cherry tomatoes	Bell peppers
Planting and harvest dates	Planting: Oct. 26 Harvest: Dec. 10 Planting: March 16 Harvest: April 30	Planting: Sept. 6 Transplant: Oct. 11 Harvest: Dec. 10 Planting: Jan. 26 Transplant: March 1 Harvest: April 30	Green Planting: Oct. 18 Harvest: Dec. 10 Planting: March 1 Harvest: April 30 Red Planting: Sept. 28 Harvest: Dec. 10 Planting: Feb. 10 Harvest: April 30
Sowing	Sow in flats, 1 seed/in., or in ¾ in. plug trays, at ⅛ in. deep. If sowing in flats, transplant 1-2 in. apart into pots 2 weeks later.	Sow in flats at ¼ in. deep. Keep temperature at 75-90 degrees for faster germination. When true leaves develop transplant into plug trays or ¾ in. pots.	Sow in shallow flats, 4 seeds/in., ¼ in. deep. Maintain a high soil temp (80-90 degrees) as seeds will germinate slowly and inconsistently in cool temps. When the first leaves appear, transplant into 2 in. cell type containers or 4 in. pots.
Transplanting	3-4 weeks after sowing. Reduce water and temperature 2-3 days before planting to harden plants. Transplant 10-12 in. apart in rows 18 in. apart.	7-8 weeks after sowing. Plant ⅜ in. deep, covering the root ball well and up to the first leaves. Depending on variety plant 2-3 ft. apart.	8 weeks after sowing. Transplant when soil is warm and settled. Plant 12-18 in. apart in rows 24-26 in. apart.
Maintenance	Grows best in temps 60-65 degrees. Sow every 3 weeks for continuous supply. Performs best with consistent, moderate soil moisture throughout germination. Keep cool or lettuce will bolt.	Should be staked, trellised, or caged for best results. High nitrogen fertilizer can cause rampant growth and fruits susceptible to rot. Avoid overhead irrigation to reduce disease. There are many soil-borne diseases that impact tomatoes.	Drip irrigate only to prevent disease. Control insect infiltration using paper cylinder collars. Plant only in well-drained soil and minimize compaction.
Harvest	Should be planted in early spring as it does better in low temps, seeds germinate as low as 40 degrees. Days to maturity is around 45 days. Can be replanted when school starts for a fall harvest.	Days to maturity is about 60 days. Fruit will ripen on the vine with plants producing throughout the season. Harvested fruit can be stored at 45-60 degrees for 4-7 days.	Days to maturity is about 60 days for green varieties, 80 for red. Pick the first peppers when they reach full size to foster additional fruits.
Notes	Can be direct seeded at 2 in. apart in rows 12-18 in. apart.	Don't start too early. Tomatoes need consistently high temps and plenty of sunlight to be successful.	The model seedling will have buds, but no open flowers when transplanted.

Production plan, continued

	Radishes	Peas	Salad mix
Planting and harvest dates	Planting: Nov. 17 Harvest: Dec. 10 Planting: April 7 Harvest: April 30	Planting: Oct. 7 Harvest: Dec. 10 Planting: Feb. 26 Harvest: April 30	Planting: Nov. 12 Harvest: Dec. 10 Planting: April 2 Harvest: April 30
Sowing	Direct seed ¾-1 in. apart, using 2-3 in. wide bands, ½ in. deep in rows 1 ft. apart. Can be sown at any time during the season.	Direct seed in early spring as soon as soil can be worked. Sow 1-1½ in. apart in 3 in. band (25 seeds/ft.), ½-1 in. deep. Space rows 4-6 ft. if tresling, 12-18 in. if not tresling.	Sow in cool soil at 10 seeds/ft., ½ in. deep, in rows 12-18 in apart.
Transplanting	Seed directly.	Seed directly.	Seed directly.
Maintenance	Should be grown rapidly with plenty of moisture. Hot and dry weather hurt growth.	Varieties under 3 ft. tall do not require support. Taller varieties should use a trellis net or chicken wire.	Germinates best in cool weather. If in a warmer environment, water to help keep cool.
Harvest	Radishes are only in prime condition for a few days. Harvest at 3-4 weeks when roots are about the size of a marble. Days to maturity is about 23 days.	Cool weather crops, harvests come early and midsummer pickings are not common. Days to maturity is about 64 days.	Harvest at full size but before bolting. Cut just below the root attachment. Days to maturity is about 28 days.
Notes	Radishes will keep 3-4 weeks in crisp condition if kept at 32 degrees, 95 percent humidity, and in breathable packaging.	Install support when planting. Suspend the bottom of the support just above where the young plant will grow.	For a continuous supply, sow every seven days.

Template

Planting and harvest dates			
Sowing			
Transplanting			
Maintenance			
Harvest			
Notes			

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School Greenhouse Evaluation Worksheet

School: _____ Date: _____ Evaluator: _____

Structural Components

1. Greenhouse Details

Brand:

Manual Present: ☐ Yes ☐ No

Covering Type: ☐ Polyethylene ☐ Polycarbonate ☐ Acrylic ☐ Other:

Condition: ☐ Good ☐ Needs Improvement

Shade cloth installed May–October 15 ☐ Yes ☐ No

Shade cloth removed during low-light winter months ☐ Yes ☐ No

Comments:

2. Flooring and Benching

Flooring Condition: ☐ Good ☐ Needs Improvement

Benching System Condition: ☐ Good ☐ Needs Improvement

Comments:

Environmental Controls

1. Ventilation and Fans

Types of Fans Present: ☐ Exhaust ☐ Circulation ☐ Other: _____

Ventilation Condition: ☐ Good ☐ Needs Improvement

Manual Present: ☐ Yes ☐ No

Comments:

2. Cooling and Heating Systems

Cooling System (shade cloth, drip cooler, cooling pads): ☐ Good ☐ Needs Improvement

Aspirator at plant height ☐ Yes ☐ No

Aspirator filter clean and unobstructed ☐ Yes ☐ No

Heating System: ☐ Good ☐ Needs Improvement

Manuals Present: ☐ Yes ☐ No

Comments:

School greenhouse evaluation worksheet, continued

Plant Care Systems

1. Watering and Fertigation

Watering System Condition: ☐ Good ☐ Needs Improvement

Water pH Level: _____

Fertigation System Condition: ☐ Good ☐ Needs Improvement

Automatic watering programmed for weekends and school breaks ☐ Yes ☐ No

Students responsible for primary watering during school week ☐ Yes ☐ No

Manual Present: ☐ Yes ☐ No

Comments:

2. Pest and Disease Management

Signs of Pests/Diseases: ☐ Yes ☐ No ☐ Not Applicable

Pest Management Practices Adequate: ☐ Yes ☐ No ☐ Not Applicable

Staff Certifications Up-to-date:☐ Yes ☐ No ☐ Not Applicable

Pesticide Signage when in use:

Comments:

Safety and Accessibility

1. Annual Safety Equipment Check

First Aid Kits Checked: ☐ Yes ☐ No

Fire Extinguishers Present and Up-to-date: ☐ Yes ☐ No

Emergency Exits Marked: ☐ Yes ☐ No

Fans properly covered/guarded ☐ Yes ☐ No

Rolling tables secured and used safely ☐ Yes ☐ No

Student greenhouse safety training documented ☐ Yes ☐ No

Comments:

2. Accessibility and Security

Accessible to All Students: ☐ Yes ☐ No

Greenhouse Secured: ☐ Yes ☐ No

Comments:

School greenhouse evaluation worksheet, continued

Administrative and Curriculum Integration

1. Record-Keeping

Records Maintained (Planting, Harvesting, Pesticide Use): ☐ Yes ☐ No

Standard Operating Procedures (SOPs) available in a central location ☐ Yes ☐ No

Greenhouse manuals accessible to staff ☐ Yes ☐ No

Comments:

2. Curriculum Integration

Used in Curriculum: ☐ Yes ☐ No

Subjects Involved: ☐ Science ☐ Agriculture ☐ Environmental Studies ☐ Other: _____

Comments:

Greenhouse Crops

1. Crops Grown

1st Semester:

2nd Semester:

Summer:

2. Crop Management

Crop Rotation Plans Implemented: ☐ Yes ☐ No

Comments:

Maintenance and Operations

1. Cleaning and Upkeep

Regular Cleaning Schedule Established: ☐ Yes ☐ No

Comments:

2. Equipment Condition

Tools and Equipment in Good Condition: ☐ Yes ☐ No

Inventory Maintained: ☐ Yes ☐ No

Comments:

3. Budget and Funding

Adequate Budget for Operations: ☐ Yes ☐ No

Budget includes consumable supplies (seeds, media, nutrients) ☐ Yes ☐ No

Plan in place for summer or extended break oversight ☐ Yes ☐ No

Funding Sources: ☐ School Budget ☐ Grants ☐ Donations ☐ Other: _____

Comments:

School greenhouse evaluation worksheet, continued

Additional Facilities

1. Storage and Work Areas

Storage Facilities Adequate: ☐ Yes ☐ No

Propagation Station Condition: ☐ Good ☐ Needs Improvement

Comments:

2. Safety and Compliance

Pesticide Management Certifications Current: ☐ Yes ☐ No

Safety Training for Staff and Students: ☐ Yes ☐ No

PDP, Pesticide Data Program: ☐ Yes ☐ No

Comments:

Summary

Overall Greenhouse Condition: ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Recommended Action Timeline:

☐ Immediate (0–3 months)

☐ Short-term (3–6 months)

☐ Long-term (6–12 months)

Key Strengths:

Areas Needing Attention:

Additional Notes:

School greenhouse evaluation worksheet, continued

Maintenance and Inspection Log

Use this log to track inspections, cleaning, filter replacements, and other routine greenhouse maintenance tasks.

Date	Task Completed	Frequency	Performed By	Notes / Follow-Up Needed
3/15/2023	Aspirator filter cleaned	Quarterly unless noted	Kirstin B.	Replace next time, dust buildup removed, Check again in 30 days

Recommended Maintenance Items to Track:

- Aspirator filter inspection and cleaning
- Fan and ventilation cleaning
- Shade cloth installation and removal dates
- Irrigation system inspection
- Heating system inspection
- Deep sanitation during planned production pause

Examples and resources

Launching a greenhouse project

- **Center for Rural Affairs farm to school guide** (cfra.org/f2s)
- **Rooted in Nebraska: Teacher's Guide to Specialty Crop Production in Schools** (cfra.org/publications/rooted-nebraska-teachers-guide-specialty-crop-production-schools)
- **National Farm to School Network Resource Database** (farmtoschool.org/resources)
- **Lincoln Public Schools School Garden Manual (2018)** (docushare.lps.org/docushare/dsweb/Get/Document-2241934/School%20Garden%20Manual%202018.pdf)
- **Nebraska Department of Education Farm to School Website** (education.ne.gov/ns/farm-to-school)

Inviting collaboration

- **Out Teach** (out-teach.org)
- **Buy Fresh Buy Local Nebraska – Community Gardening Resources** (buylocalnebraska.org/community-gardening)

Creating curriculum

- **Growing Profits – 4-H Gardening Curriculum** (shop4-h.org/products/2004-gardening-curriculum-level-4-growing-profits)
- **Boulder Valley School District Farm to School Program** (food.bvsd.org/programs/farm-to-school)
- **Teaching in Nature's Classroom** (teachinginnaturesclassroom.org)
- **Big Garden – Skills Library** (biggarden.org/skills-library)

Purpose and goals

- **Nebraska 4-H** (4h.unl.edu)
- **Circle C Market – Our Beginning** (circlecmarket.com/our-beginning.html)
- **The Lunch Box** (thelunchbox.org)

Designing a greenhouse system

- **University of Nebraska–Lincoln Extension – Choosing a Greenhouse Design (G2246)** (extensionpublications.unl.edu/assets/pdf/g2246.pdf)
- **Nebraska Game and Parks – Trout in the Classroom** (outdoornebraska.gov/troutintheclassroom)
- **SARE – High Tunnels and Other Season Extension Techniques** (sare.org/resources/high-tunnels-and-other-season-extension-techniques)
- **Cornell CEA Lettuce Handbook** (cea.cals.cornell.edu/attachments/Cornell%20CEA%20Lettuce%20Handbook%20.pdf)

Maintaining a greenhouse system

- **ATTRA – Organic Greenhouse Vegetable Production** (attra.ncat.org/publication/organic-greenhouse-vegetable-production)
- **University of Massachusetts Amherst – Hydroponic Greenhouse Production Resources** (umass.edu/agriculture-food-environment/greenhouse-floriculture/fact-sheets/hydroponic-greenhouse-production-resources)
- **Summer in the School Garden – A Resource for Working with Volunteers to Maintain Your School Garden** (ucanr.edu/sites/default/files/2015-04/211698.pdf)

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