Growing a School Garden:

A Guide for Northeast Iowa Schools

Together, We Grow Healthy Kids.

Northeast Iowa Food & Fitness Initiative

School Gardens: A Place to Learn, Grow, and Succeed.

School gardens are the ultimate outdoor classroom! They provide authentic, real-world, inquiry-based learning that is hands-on, educational, and fun. Best of all, school gardens can be used to integrate any classroom subject while meeting a variety of curriculum standards. Kids are more active and more engaged in a school garden and, as an added benefit, they are exploring and tasting new healthy foods! Research demonstrates that kids love to eat what they help grow, just as they love learning when they are actively involved in the process.

Beyond the education standards, school gardens provide appealing and nutritious vegetables, fruits, and herbs that can be used to supplement the school lunch program and provide the raw materials for classroom activities. There are different models of school gardens all over the world, country, and region. Gardens can serve many purposes and can take many shapes; the only limit is the imagination of you and your students.

This guide presents creative ways to plan, plant, and maintain a garden in Northeast Iowa in a way that aligns planting and harvesting with the school year. We hope that this guide will serve as a helpful and inspiring resource for schools in Northeast Iowa and beyond.

"Growing a School Garden: A Guide for Northeast Iowa Schools" is a collaboration between the Pepperfield Project, Luther College, and the Northeast Iowa Food and Fitness Initiative (FFI). The Northeast Iowa Food and Fitness Initiative is supported by the W.K. Kellogg Foundation Food & Community Program and is working to transform our food and fitness systems. This resource is meant to provide guidance to schools starting their first garden, as well as practical tips for schools that already have gardens.

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"Inch by inch, row by row

Gonna make this garden grow

Gonna mulch it deep and low

Gonna make it fertile ground"

-David Mallett

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CURRICULUM

Easy, Fun Ways to Bring the Garden into Your Classroom

Math

- Gardens provide many opportunities to practice measuring: mapping the garden space, tracking plant growth, ensuring individual plants are correctly spaced, etc.
- Involve the students in drawing up a budget for the garden– this will both improve math skills and make them more aware of all that goes into maintaining a garden.

Science

- Study the life cycle of plants in class; highlight processes such as pollination, germination, photosynthesis, etc.
- Use composting as an opportunity to discuss decomposition.

English

- Incorporate garden-related books into English curriculum, like *The Secret Garden*.
- Use the garden as inspiration for a poetry or journaling unit.

History

- Research plant use in different cultures over time (plants as medicine, food, etc.)
- Trace the history of a specific species growing in your garden.

Art

- Ask students to help create decorations for the garden such as stepping stones, scare-crows, or crop signs.
- Use the garden as inspiration for drawing, painting, or photography.

TIMELINE

Your School's Garden: What to Do and When to Do It

This timeline is split into activities that should happen during the school year and those that take place in the summer. The guide follows the academic calendar, so it starts in September. One of the challenges of having a school garden is that the growing season and the school year don't have much overlap in our region. The Summer Maintenance Guide is meant to assist schools with thinking about how gardens will be tended when school is not in session. Pay attention to special planting instructions regarding timing of plantings in order to ensure a good harvest when kids are back in school. It's also important to keep in mind that if you'd like to start a new garden in the spring, you'll need to start planning for that garden in November.

School Year

September-October

Harvesting: September, October, and November (weather-permitting) mark the culmination of the entire gardening experience, so make use of this bountiful time by involving students and faculty in harvesting, bringing food-related activities to the classroom, and incorporating the produce into school meals.

- Ripe tomatoes and greens like lettuce, chard, and kale can be harvested at any time.
- Colored peppers can be harvested either green or ripe.
- Cucumbers and squash must be harvested every two or three days or they will become too tough to use and will stop producing.
- Melons turn yellowish and often slip off the stem when ripe; watermelons are ripe when the tendril at the base of the stem (where it meets the vine) turns brown.
- Potatoes should be dug once the plants have died back.
- Winter squash, pumpkins, and gourds should be harvested once the vines have died but before hard frosts (30^{oF} or lower) damage the fruit.

Garden Clean-up: Established gardens should be cleaned up before the first snow. This can be done any time in the fall. Pull all dead plant material and compost if an official compost pile has been established at your school. If not simply pile all refuse in an out-of-the-way corner of the garden. Eventually the humus that results can be incorporated into the garden.

New Garden Preparation: New gardens should also be broken in during the fall. Since most will be placed on what was once lawn, sod should be tilled under when the ground is moist (not soggy) at least once in the fall and once or twice in spring.

Planting: If you want spring spinach you can direct-seed it into the garden in early September. It should be ready for harvest early in the spring.

TIMELINE

Your School's Garden: What to Do and When to Do It

November-December-January

Planning Spring Planting: Choose crops and varieties, keeping in mind what students and teachers would like to plant and which crops food service personnel are willing and able to use. The plants listed in this guide are a great place to start!

Obtain seeds, ensuring that the varieties are suitable for this growing zone by checking "time to maturity" in catalogues, or by using knowledgeable sources like Seed Savers Exchange or the Pepperfield Project. Seed Savers has seeds available free through Herman's Garden, and Pepperfield is often willing to donate site-specific seeds to school gardens in northeast Iowa.

Design garden layout, paying particular attention to the space needs of the various crops. (See Planting Guide for details.) Plan indoor locations for seed-starting and growing where maximum light is available. This may not be possible in every classroom, so if sufficiently sunny windows are not available, consider investing in grow-lights or a greenhouse.

February

Review Planting Guide: Develop a planting schedule for the crops your school has chosen to grow. Timing is very important for producing transplants strong enough to plant outside. Take inventory of what supplies you have on-hand and procure materials such as potting soil, containers, label sticks, and watering tools that will be needed throughout the spring.

March

First Week of March: Start broccoli, kale, chard, and kohlrabi in pots inside.

Mid-March: Start peppers and eggplant inside.

Check Plants Regularly: Indoor plants should be checked daily to ensure adequate thinning, watering, and light are being provided.

April

Re-till: It's important to re-till any new garden spaces that were sod in the fall. If the new space wasn't tilled in the fall, till sod under once ground has thawed in the spring, then till again if possible once more before planting time. You could also rent a sod cutter, remove the sod, and till the bare soil.

Early April: In the garden, direct seed any peas, spinach, radishes, greens, cilantro, and dill. If planted early, it's possible these crops could produce a nice harvest in time for summer programs!

Mid-April: Plant tomatoes in pots indoors.

Looking Ahead: Begin to seek volunteers for summer garden maintenance. It works well to have families adopt a week. Plan a few garden orientation meetings for these families prior to summer.

TIMELINE

Your School's Garden: What to Do and When to Do It

May

Early May: Seed potatoes and onion sets are available in early May.

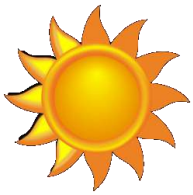
Final Tilling: Can be done any time soil can be worked before the late May planting. (Be careful not to disturb any seedlings already planted!)

Infrastructure: Ensure all infrastructure, such as fencing and trellises, is in place before planting day.

Planning a Planting Day: Planting day should take place mid-to-late May. Planting ideally will involve as many students as possible. Establish groups of students (5 to 12 suggested) and adult helpers (probably one per every 3 or 4 students) to plant in shifts. Larger groups can be tough to coordinate; small groups are recommended.

Planting: After the danger of frost has passed, tomatoes, peppers, and eggplant can be transplanted outside. Cucumbers, squash, and melons can be direct-seeded in late May or planted inside in early May and transplanted out later.

Summer



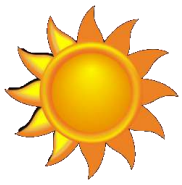
Summer Garden Maintenance

Establishing Community Ownership: This is the best way to ensure success in the garden throughout the summer. Here are some essentials:

1. Leadership: Every garden needs a gardener! The lead gardener can be someone from the school, a parent, or someone else from the community.
2. Maintenance Team: It tends to work best if one family per week "adopts" garden duties. Families should sign up in advance for their week, and it's recommended that a garden orientation be held in the spring for families that have signed up.
3. Regular Garden Checks: The garden should be checked at least once a week (more during droughts or following adverse weather) by the lead gardener or another representative.
4. Oversight: The lead gardener is responsible for oversight of summer maintenance, including reminding families of their scheduled adoption week.

TIMELINE

Your School's Garden: What to Do and When to Do It



Summer Garden Maintenance, continued

Tasks:

1. Water: Check for water needs every week. Seed beds require much more frequent watering until seeds germinate. If there is not much rain, deep watering will be necessary for established plants. This means really flooding the ground while making sure to not displace seeds.
2. Weed: Frequent weeding is best. Light scraping of small weed seedlings on a hot, dry day takes only minutes. Pulling once the weeds get big can take hours. Timing is important –the more often, the better!
3. Trellis: Trellising of tomato vines by tying them to their panels every foot or so of growth is important. In addition, gourd or squash vines need help finding their way up and over arbors.
4. Hill: Hilling potatoes may be necessary mid-summer if tubers are pushing up into the sunlight.
5. Damage Control: Storm damage should be checked for promptly if heavy wind or rain has occurred. Any downed plants should be tied up.
6. Plant: Since schools aren't in session during the summer when early-planted crops will bear fruit some summer planting needs to be done in order to ensure a fall harvest. Be sure that any late June plantings of summer squash, cucumbers, etc. happen on schedule.
7. Harvest: Harvest anything that becomes ripe, even before school starts. It is important to pick summer squash, cucumbers, and beans regularly (at least every 3 days), because bigger fruits begin to stop future production. Consider coordinating with food service to freeze some of this food for later use in school lunch or donating it to a local food pantry or meal program. Families adopting the garden may also enjoy taking home some of the produce!
8. Pests: Inspect for pests that may be causing problems in the garden. Some of the main pests to watch for: flea beetles on brassicas (kale, cabbage, broccoli, kohlrabi, etc.) and eggplant, cabbage butterfly larvae on brassicas, cucumber beetles on cucurbits (squash, melons, cucumbers, etc.), squash vine borers on all squash species but butternut squash, and potato beetles. For details, see Diseases & Pests Guide.

BREAKING NEW GROUND

How to Prepare a New Garden Space

Most school gardens are carved out from lawns surrounding school buildings. When choosing a potential garden site, be sure to consider things such as the sun, wind, proximity to the school building, availability of water, and soil quality. In general, soils are pretty good at school sites, but in some cases building site excavations may have spread clay and/or gravel around buildings. This clay/gravel is sometimes tolerable to lawn grass, but not necessarily to gardens. It's best to check the soil beforehand to be sure it's of garden quality.

There are three options for transitioning lawn into a garden space, depending on how far in advance you begin planning.

Option 1- One Year in Advance

If you allow an entire growing season for site preparation, a process called solarization can be used to kill lawn at the future garden site. In solarization, heavy gauge black plastic should be spread over the entire site and weighted down against the wind. This should be done in the spring once the ground is thoroughly moist from the rains, as no water will penetrate the plastic during the treatment. Heat from the sun absorbed and trapped by the plastic coupled with the lack of sunlight will kill the lawn (though most likely not any residual weed seeds in the soil). Tilling of this ground could take place in the fall or wait until the following spring.

Option 2- Autumn Before Planting

Repeated tilling will kill and compost lawns (and any weeds growing in them), but the process is best begun by at least one tilling the fall before planting. This can be done with a big tractor tiller in one pass. Hand tillers, however, might take two or three tillings to adequately plow turf under. Tilling should be repeated again in early spring as soon as the ground can be worked, followed by one final tilling right before planting.

Option 3- In the Spring

If a lawn consists of lawn species only (rather than quack grass or other tough perennials like dandelions), it may be possible to prepare the ground by spring tilling alone. This process will only work if it is started as early in March as the ground can be worked. This initial tilling should be followed by one in April and one more just before planting time in May. Inadequate tilling will result in clumpy ground that is difficult to plant in, as well as still-living clumps of sod and weeds that will be tough to deal with during the subsequent growing season. If this schedule cannot be achieved, it is possible to rent a sod cutter to remove sod first, then till the open ground underneath. This adds potential cost and deprives the ground of composted organic matter from the lawn. However, if removed sod is not reusable, it can be piled, composted, and added back to the garden later. If sod is in good condition, some schools have been able to offset cost by selling it, while other schools have used the sod themselves in another location on school grounds.

Note on Organic Fertilizers

In any of the above options, till these in during the final tilling before planting in May.

Note on Roundup

It is recommended to avoid using Roundup and other toxic chemicals to kill the lawn in preparation for a garden. Use the alternatives above instead.

INFRASTRUCTURE

The Ins and Outs of Building Your Garden

Fencing

The height and type of fencing depends on the wildlife you're trying to keep away.

Rabbits

Gardens close to school buildings located in the middle of large areas of open lawn will probably not experience deer pressure but will likely receive rabbit visits often. In this case, 3ft. chicken wire supported by steel T-posts is probably enough to keep them out and is also the least expensive fencing. Keep in mind that in many cases plastic fence netting options can be chewed through by rabbits, so it might make sense to invest in a higher-cost option up front.

Deer

Smaller gardens where deer may be a problem will require slightly taller fencing. Various 4 or 5ft. options are available at farm supply stores, usually in 100ft. rolls. Well-anchored 4x4 corner posts should be used to stretch the fence against, and T-posts should be placed in between for added support. These heights should be adequate in small gardens because deer do not like to jump into small, confined spaces.

Deer, however, can jump up to 8ft. Therefore, in larger gardens, it is advisable to use the tallest T-posts you can find and stretch some visible wire across the tops above the fence. This visual barrier is usually enough to discourage deer from jumping over and only in extreme cases would an 8ft. or higher fencing option be necessary. Gates should be as high as the chosen fence and remain closed at all times.

Trellising

Nearly all tomatoes (especially heirloom small cherry varieties) require tying up. In addition, the trellising of vining plants (such as winter squash, gourds, pole beans, or morning glories) adds visual interest to the garden as well as beautiful "garden rooms" which kids adore.

Straight Trellises

- Use cattle or hog panels as trellises, secured to metal T-posts pounded firmly into the ground.
- It is important to be sure that the trellises are not placed broadside to the wind. If there is a strong, prevailing wind from one direction, orient the trellises for least resistance. In our region, strong winds often come from the west, so in that case it would be best to orient trellises east/west.
- If strong winds are not an issue, orient trellises north/south to obtain optimal sunlight. This allows the sun to shine nicely up the aisles.
- Plant transplants about 2ft. apart on one side of the panels.
- As plants grow, tie one end of a long piece of binder twine to one end of the trellis and then, looping around 2-3 plants at a time and through the wire of the panel, pull the plants snug (but not too tight!) to the wire. Repeat for every 2-3 ft. of growth.
- Once a week, check trellises and pull any shoots back through the wire to keep the plants all on the side you are tying up. This is a little task, but without it you will wind up having to tie both sides which adds a lot of unnecessary work.

INFRASTRUCTURE

The Ins and Outs of Building Your Garden

Trellising, continued

Arches

- Using 16ft cattle panels, form an arch by having one person on each end of the panel walk towards the middle as a third person lifts the center up. Pound one or two T-posts in front of each end and tie the panel securely to it.
- Plant along the outside of each side to help train the plants up the wire as they grow. Tie plants to the panels the same way you would on a straight trellis.
- Some fun plants to grow on arches include: morning glories, runner beans, cucumbers, mini watermelons, gourds, and small winter squash such as butternut.

Bean Teepees

Materials:

- Use 6-10ft poles. Young tree saplings are best; willow is perhaps the easiest to find. The number will depend on the diameter of the teepee you plan to build.
- For twine, sisal bailing or binder twine is best because it can be composted along with the vines when cut down in the fall, but if plastic is all that is available at local farm supply stores, it works fine.

Procedure:

1) Tie a string to a stake, pound the stake into the middle of your intended base circle, and have someone walk the circle, holding the string tight and inscribing a circle in the dirt with their hand at the same time.
2) Take 3 poles at even thirds around the circle. Have one person stand in the middle on a chair or bucket and lean the poles to the center. Have others outside check to be sure the teepee is evenly centered, then have the person in the center tie the poles securely together with twine.
3) Choose one of these three legs as one side of the door opening, and place the next pole far enough around the circle for the door (about 3 to $3^{1}/_{2}$ ft.). Place the rest of the poles at about 2-foot intervals around the circle, leaning them against the tie at the top.
4) Once poles are evenly spaced, dig a little hole a few inches deep for each with a trowel or shovel and place each pole firmly in the ground.
5) The person in the center can now tie all the poles securely together, wrapping the twine around a few times tightly so that the poles will not slide or shift.

6) Take one band of twine and run it around the whole teepee, just high enough for an adult to reach, being sure to wrap it once around each pole and pull tight. Remember to leave the door gap open! Tie ends securely. Repeat with a second band of twine at the base (nearly at ground level).
7) Between each pole, tie two vertical strings. Tie the string to the top twine, pull down, cut about 3 inches longer than the distance to the bottom twine, wrap it under the bottom twine and pull taught. Pinch this union tightly with one hand so the string remains taught, then loop the twine around itself and pull tight to form a simple half knot. Tie another half knot to secure the string. Be sure that the twine is as tight as possible, as it will stretch and go slack when moist.
8) Dig a little trench around the base of the teepee (just under the circle of twine), plant bean seeds, and cover.

SUPPLIES & EQUIPMENT

What Every Garden Needs

General Tools

Outdoors

- Trowels (enough to match the number of kids you expect to have in the garden at one time)
- Spading forks (2-3)
- Shovels (1-2)
- Metal garden rakes (2-3)
- Garden hose (long enough to reach entire garden)
- Hose spray nozzle
- Watering cans
- Label stakes
- Marker pens
- Scissors

Indoors

- Milk cartons
- Planting flats
- Planting cells
- Grow lights
- Watering devices for plant starts (small watering cans, cups, maybe even an old teapot!)

Mulch

Some sort of ground protection can be extremely useful for both moisture retention and weed control. Mulches are preferred because they decompose eventually, adding much-needed nutrients to the garden. Here are some suggestions for mulching materials:

- Chopped or composted leaves obtained from city leaf dumps.
- Grass clippings from unsprayed lawns.
- Newspaper and cardboard work well but should be weighted down so as to not blow around the garden.
- Straw. However, take care to find very clean oat or barley straw, as hay is often filled with weed seeds.

Avoid: Using wood chips for annual gardens, since decomposing wood steals much-needed nitrogen from the soil.

SUPPLIES & EQUIPMENT

What Every Garden Needs

Plant Protectors

Young transplants may be very tender at planting time (especially when grown indoors in classrooms or under grow lights) and need protection from late frosts or strong winds. Some older plants also need a little extra protection from dangers such as insect damage. Here are some ideas for keeping your plants safe:

Milk Jugs
You can collect plastic milk jugs throughout the year, enough to place one over each pepper or tomato transplant for the first week or two after planting. Cut the bottom out of the jugs and place over each plant, nestling firmly into the ground. Be careful in hot weather, however, as these jugs (even though the caps are off) may get too hot for plants!

Drain Tile
Cut 1ft. sections from 4in. diameter black plastic drain tile. Press these sections into the dirt around each plant. These will not get as hot as milk cartons and will be adequate for wind protection, but they may not protect as well against frost.

Row Cover Material
This spun polyester material, often sold as Remay, comes in rolls of various widths and can be found at nurseries, garden supply stores, and in catalogues. Row covers help protect certain crops from insect damage, especially flea beetles on brassicas and eggplant and cucumber beetles on seedlings of squash, melons, and cucumbers. Some sort of metal hoops to support the covers can be created from stiff wire, perhaps reformed coat hangers if necessary. (See "Extending the Season" for more detailed information.) If using row cover for insect protection, use a lighter gauge so plants can still get adequate light.

Fertilizers

Animal manure and compost are the best options for maintaining garden fertility. However, each should be used with caution, as noted below.
Inorganic fertilizers are available in both liquid and pellet forms if nutrients, especially nitrogen, cannot be found in a clean, local, or affordable organic form.

Manure (Composted)
Manure can often contain weed seeds, so it is important to know what went into it. If using farm manure, inquire as to the type of animal feed used. Manure from organically fed animals is the safest option, as animals are often fed with hay that has been sprayed with chemicals that persist in manure and can endanger many vegetable crops. Manure should be applied to the garden at least 120 days before the crops will be harvested.

Compost
Garden compost rarely gets hot enough to kill weed and garden plant seeds, so it is important to know what went into it. If you decide to make your own compost, be sure that is meets safe composting guidelines outlined in the "Composting" section of this guide.

COMPOSTING

Turning "Trash" into Tasty Plant Food!

Composting is a great way to cut down on waste and provide your garden with valuable nutrients! If composting is an option your school would like to explore, here are some tips to get you started. More detailed information can be found at epa.gov/wastes/conserve/composting.

DO Compost:

-Fruits and Veggies
-Egg Shells
-Coffee Grounds and Filters
-Tea Bags
-Nut Shells
-Shredded Newspaper
-Cardboard
-Paper
-Yard Trimmings
-Grass Clippings
-Dead Plants
-Hay and Straw
-Leaves
-Sawdust
-Wood Chips

DON'T Compost:

-Black Walnut Tree Leaves or Twigs
*Release substances harmful to plants
-Coal or Charcoal Ash
*Release substances harmful to plants
-Dairy Products and Eggs
*Cause odors and attract pests and rodents
-Diseased or Insect-Ridden Plants
*May transfer disease/insects to plants
-Fats, Grease, Lard, or Oils
*Cause odors and attract pests and rodents
-Meat or Fish (Including Bones and Scraps)
*Cause odors and attract pests and rodents
-Yard Trimmings Treated with Chemical Pesticides
*May kill composting organisms

Onsite Composting

This is typically one of the easier composting methods for schools and as long as food scraps are managed carefully odors and rodents should not be an issue. Onsite composting can be done in a pile or a bin, depending on how much you are composting and your preferred method.

Pile

- Select a dry, sunny spot for your pile, about 3ft. wide by 3ft. deep. You can fence in the pile if desired.
- Moisten dry materials as you add them to the pile, and be sure to bury fruit and vegetable scraps under about 10in. of other composting materials.
- You may notice your pile is steaming; this is good. It will heat up as things begin to break down.
- Cover the pile with a tarp or black plastic to prevent rain from leaching away nutrients. Black plastic absorbs heat from the sun, speeding up the composting process.
- When material is a rich, dark color, it is ready to use. This can take anywhere from 3 months to 2 years in pile composting. Regular turning of the pile with a pitchfork will keep this time period closer to 3 months.

COMPOSTING

Turning "Trash" into Tasty Plant Food!

Onsite Composting, continued

Bin

- Bins can be purchased or you can make your own by following these steps:
  1) Place a brick in the bottom of a large plastic garbage can and surround with woodchips and/or soil.
  2) Drill $^{1}/_{2}$ in. diameter holes in the bottom and sides of a slightly smaller plastic garbage can. Choose size based on how much you will be composting.
  3) Place the smaller garbage can on top of the brick in the large can.
  4) Wrap insulation around the larger can and cover with a lid. This will help ensure that your compost reaches temperatures hot enough to decompose.
- Again, when material is a rich, dark color, it is ready for use. Bins typically take less time than piles and should produce compost-ready material in 2-5 weeks.

Vermicomposting

This type of composting uses worms to turn waste material into nutrient-rich castings (droppings). It's practical for schools and provides another fun teaching tool for kids! It takes up less space than onsite composting, but it does require some maintenance to ensure the worms stay alive.

Worms: The Red Wiggler Earthworm (*Eisenia fetida*) should be used for Vermicomposting. These can be purchased in some gardening stores or ordered online.

Bin: Worm bins can be purchased or easily constructed from plastic tubs or built from plywood.

Bedding: You will need moist bedding for the worms to burrow in and to bury the food in; shredded newspaper, cardboard, or computer paper (with black ink only) work the best. Remember to moisten it before adding to the bin. In addition to shredded bedding, it's advisable to throw in some soil or sand to help the worms grind up food in their gizzards.

Feed: Worms can be fed vegetable and fruit scraps, coffee grounds, tea bags (staple removed), stale bread, and indoor plant trimmings. Bury these scraps in the bedding, a little bit every couple of days.

Compost: The box will need to be emptied every 3 months or so. This can be a fun project for the kids to help with! To separate the worms from their castings, use a stainless steel gardener's sieve. The worms will stay on top, while the castings fall through! You can then return the worms to their box with fresh bedding and food and take the castings out to the garden.

Educate: *Worms Eat My Garbage* by Mary Applehof is a fun book to use in elementary classes to help students understand vermicomposting.

PLANTING SCHEDULE

When to Plant Which Crops

Time of Year	Seed Inside	Seed Outside	Transplant Outside
Early February	Onion, Parsley, Chives		
Early March	Kale, Broccoli, Cabbage, Kohl-rabi, Chard, Lettuce, Oregano		
Mid-March	Peppers, Eggplant		
Early April		Mixed Greens, Spinach, Beets, Radishes, Carrots, Peas, Cilantro, Dill	Lettuce, Onions
Mid-April	Tomatoes, Basil		
Mid-May		Potatoes, Flowers	Kale, Broccoli, Cabbage, Kohl-rabi, Chard, Oregano, Parsley, Chives, Thyme
Late May/Early June		Winter Squash, Melons, Wa-termelons, Pumpkins, Gourds, Cucumbers, Beans (for sum-mer)	Tomatoes, Peppers, Eggplant, Basil
Early July		Lettuce (for fall crop), Zucchi-ni, Summer Squash, Beans (for fall crop), Dill, Cilantro	
Early September		Spinach (for spring crop)	

PLANTING DAY CHECKLIST

What to Do on the Big Day!

☐ **Check tools.** Ensure all garden tools are beside garden location first thing in the morning:

-Rakes	-Water key for outside faucets	-Label sticks	-Plant protectors
-Shovels	-Enough hose to reach the whole garden	-Marker pens	-Mulch
-Trowels	-Watering cans	-Twine	-Scissors

If fencing, trellises, and teepees are not already established, have all materials ready (see Infrastructure section), plus a maul or post pounder and any necessary ties.

☐ **Check transplants.** Early in the morning, make sure all transplants have been well watered and are ready to go.

☐ **Carry-out.** Take all seeds and plants to the garden before students arrive and make sure you know where everything is going to go.

☐ **Review.** Check the "Planting Guide" one more time for a reminder of how each kind of plants or seeds should be planted.

☐ **Lay out.** Go over garden layout with students and have them walk down pathways as a way of defining planting areas (unless raised beds have been established).

☐ **Follow directions.** Follow the "Planting Guide" for handling seeds and transplants. Special care must be taken in removing plants from containers. Burying transplants deeply to cover lower half of stems helps successful rooting. Install plant protectors if necessary.

☐ **Water.** Everything needs to be watered as soon as possible, especially if the ground is dry and the weather is hot on planting day. Soak transplants deeply and sprinkle direct-sown seeds gently but enough to thoroughly wet ground. Continuing to keep the ground wet for the first two weeks is essential. For seed beds, this might mean watering every 1-2 days if there is no rain.

☐ **Follow up.** Plan check ups on the garden to keep tabs on your plants' progress and overall health. It is especially important to ensure that all plants and seeds are receiving adequate water!

PLANTING GUIDE

Helpful Information on Planting and Plant Care

Tomatoes, Peppers, and Eggplant

It is best to start these inside and transplant outside later. Planting times vary, so pay careful attention to the schedule.

Containers (All should be 2-3in. in diameter)

- Milk Cartons: Cut off top, poke holes in bottom or cut two bottom corners for good drainage. At planting time, plants can either be gently tapped out of the carton or the carton can be carefully torn open and the plant removed.
- Peat Pots: If you want to plant the whole pot when transplanting, the bottom should be removed as the pots don't decompose quickly enough to outpace the growth of the plant.
- Plastic Packs: These are great as long as the cells are at least 2 inches.

Planting

- Fill containers with potting mix to $^{3}/_{4}$ in. from the top.
- Poke a finger hole in the soil of each cell no more than $^{1}/_{4}$ in. deep.
- Drop 2-3 seeds in each hole and gently cover with potting soil.

Watering

- Gently apply water to soak through container, while being careful to avoid digging up seeds. Spray bottles are useful for this step, provided enough water is given. If watering transplants in a greenhouse, a Fogg-It nozzle works well.
- Water as needed to keep moist until germination. Seedlings will require more water as they grow larger and should be checked for water needs each day.

Light

- Providing ample light for seedlings can be a challenge in school classrooms. Seedlings must have maximum light in the sunniest windows possible. This often means they cannot be kept in certain classrooms –those that lack adequately sunny windows, and may need to be kept in hallways, cafeterias, or classrooms with southern exposure instead. If necessary, seedlings may be kept under grow lights.

Thinning

- When seedlings begin their second set of leaves, use scissors to cut off all but the one strongest seedling in each container.

Trellising

- Tomatoes should be guided up a trellis as detailed in the "Infrastructure" section of this guide.

When to Plant

- Eggplant and peppers should be planted inside in mid-March, tomatoes in mid-April.
- All should be transplanted out into the garden in late May or early June.

PLANTING GUIDE

Helpful Information on Planting and Plant Care

Kale, Broccoli, Cabbage, Kohlrabi, and Chard

Like tomatoes, peppers, and eggplant, these crops are best started inside and transplanted out later.

Planting

- Follow instructions for tomatoes, peppers, and eggplant.

When to Plant

- Start these crops inside in early March.
- Transplant out to the garden in mid-May.

Lettuce, Mixed Greens, and Spinach

Transplanted

- Plant like tomatoes (previous page) except that smaller containers can be used.
- When transplanted, seedlings should be spaced a foot apart for harvesting as full heads.
- Thin so there is one plant per cell.

Direct-Seeded

- Directly seed in rows 1ft. apart and $^{1}/_{4}$ in. deep, or in beds by scattering seed on the surface and lightly raking into soil.
- In a greenhouse, direct-seeded flats can be sequentially grown for cutting greens.
- In general, direct-seeded lettuce is best cut repeatedly as young cutting greens.

When to Plant

- Spinach and lettuce are not good summer crops and are much better suited for spring and fall production when the weather is cooler. Seasons can be extended in the fall and spring through the use of quick hoops (see "Extending the Season" for more detailed information).
- Lettuce can be started inside in early March and transplanted in early April (or a bit later if heavy frosts are still predicted).
- Both spinach and mixed greens can be direct-seeded in the garden in early April.
- A second crop of lettuce can be planted in early July for a fall harvest.
- Spinach can be planted September 1st and overwintered for an early spring harvest.

PLANTING GUIDE

Helpful Information on Planting and Plant Care.

Winter Squash, Melons, Watermelons, Pumpkins and Gourds

Early indoor planting is not recommended for these crops. Poor lighting in most school settings results in spindly plants that do not transplant well.

Planting

- Direct-seed in locations spacious enough for the vines. Suggested spacing is about 4 feet in all directions, with the exception of trailing winter squash, which requires 6 feet.
- Plant 4-6 seeds in a one-foot circle. Be sure seeds are pointed end down (that's where the root comes out) and are planted $^{3}/_{4}$-1in. deep.

Watering

- Water thoroughly, taking care not to dig up the seeds.

Thinning

- Once seedlings have sprouted, thin to four plants per circle.

When to Plant

- Directly seed in the garden in late May or early June.

Potatoes

A few weeks prior to planting day, procure actual "seed potatoes" from a supermarket, nursery, or Seed Savers Exchange. Don't use potatoes used for eating, as they have likely been treated with a sprout-retardant spray and will not grow.

A few days before planting, cut potatoes into chunks with one or two sprouted eyes, allowing cuts to dry and heal before planting. Small seed potatoes can be planted whole.

Planting

- In rows about $2^{1}/_{2}$ ft. apart, dig shovel scoops 4in. deep and one foot apart. Drop a potato (or piece) in each hole, then cover and water. If soil is already moist and rains are expected soon, no need to water potatoes as they will start to grow in moist ground.

Hilling

- Later in summer, check to see if swelling tubers are pushing up and becoming exposed. If so, mound dirt around the base of the plants. Potatoes exposed to light turn green and become, to some extent, toxic.

Storage

- Harvested potatoes should always be stored in the dark.

When to Plant

- Potatoes can be seeded outside in mid-May.

PLANTING GUIDE

Helpful Information on Planting and Plant Care

Beets, Radishes, and Carrots

Planting

- Direct-seed in rows 1ft. apart and $^1/_4$ in. deep.
- Planting radishes and carrots together can be a good technique because radishes will germinate faster, helping mark the carrot rows. In addition, when radishes are pulled, it helps thin the carrots.

Watering

- Water gently and keep moist daily until germination.
- Beets sprout quickly, but carrots take a couple of weeks. This is one reason why carrots are perhaps best left for gardening programs that have been established for a few years as opposed to newly started school gardens.

Thinning

- When seedlings have a couple of sets of true leaves, thin about 1in. apart for carrots and 2in. apart for beets.

Weeding

- Constant weeding is necessary for these crops, which can make them rather difficult to work with. The best success has been achieved in well-managed raised beds.

When to Plant

- Direct-seed in early April.

Peas

Planting

- Direct-seed 1in. deep and 2 in. apart along a trellis or teepee.
- Peas climb, so be sure to guide them up the trellis or teepee as detailed in the Infrastructure section.

When to Plant

- Peas can be planted as early as April 1st but likely won't produce peas until school is out.
- Some people are beginning to experiment with planting peas in the fall, as peas like it chilly. Perhaps this would be a fun option to explore in your school's garden!

PLANTING GUIDE

Helpful Information on Planting and Plant Care

Onions

Green Onions

- If you would like scallions (green onions) for your school's summer program, they are grown from small onion sets available in supermarkets and nurseries during the spring only. These sets are not designed for growing bulb onions.

Storage Onions

- If you would like to grow big onions for fall harvest, these should be ordered from nursery catalogues during the winter for delivery as bundles of transplants in the spring.

When to Plant

- Both onion sets and transplants of big onions can be planted directly in the garden as early as ground can be worked in April.

Flowers

Zinnias

- Scatter a small packet of seeds down a row about $^{1}/_{2}$ in, deep and cover.
- For larger quantities of seed (especially of saved seed with its flower chaff), pull dirt to both sides of a bed with a rake, scatter seed thinly, and pull dirt back over seed to cover about $^{1}/_{2}$ in. deep.

Nasturtiums and Sunflowers

- These can either be planted early indoors or direct-seeded.
- Plant seeds singly $^{1}/_{2}$ in. deep, 6 in. apart for nasturtiums and 1-2ft. apart for sunflowers.

Morning Glories

- Morning Glories are climbers, so they need some structure to support their growth. This makes them perfect for entry arches and arbors!
- Scatter seeds $^{1}/_{2}$ in. deep in a row directly at the base of whatever structure they are to climb on.
- It's important to note that Morning Glories re-seed rampantly the following year and thus may be a weeding problem.

Watering

- All flower seeds should be watered gently right away and kept moist until germination.

When to Plant

- Flowers can be direct-seeded mid-May.

PLANTING GUIDE

Helpful Information on Planting and Plant Care

Zucchini, Other Summer Squash, and Cucumbers

Planting

- Direct-seed in a cluster of up to 4 plants, each cluster spaced about 4ft. apart.
- Plant seeds with pointed end down and about $^{3}/_{4}$ in. deep.

Watering

- Keep seeds watered until they germinate. After that, watering can be tapered off in frequency but increased in depth.
- Mature plants have deep roots and should be flood-irrigated between rains.

When to Plant

- For a fall harvest of zucchini, summer squash, and cucumbers, direct-seed in July.

Beans

Planting

- Direct-seed with about 4in. between plants and 3ft. between rows.
- Pole varieties (such as Scarlet Runner Beans, etc.) should be planted along a bean teepee or trellis 1in. deep and 2in. apart. As the plants grow, guide them up their trellis or teepee as detailed in "Infrastructure". Some pole varieties can climb over 10ft., so keep this in mind when choosing what they will grow on.

Watering

- Keep seeds moist until they germinate.
- As the plants grow, water less often but more deeply; ground-level irrigation is suggested.

When to Plant

- Beans can be planted in late May for a summer crop and early July for a fall harvest.

HERB GUIDE

A Quick Look at Growing and Using Your Own Herbs

Herbs

Herbs are a great way to add some flavor to meals served in your cafeteria without adding unnecessary salt. They can be used fresh or dried and often can be stored for use in winter months.

Annuals vs. Perennials

Unless noted, all herbs listed in this guide are annuals. They can easily be planted from seed and work great for school programs. Oregano, chives, and thyme are all perennials and can be started from seed as well but it is probably best to start them from young plants purchased at nurseries. If you choose to plant perennials, it is helpful to dedicate a permanent location for them in the garden.

Prep for Winter Use

Herbs can be dried by cutting bunches, tying, and hanging in a dry place. Once dry, crumble leaves off the stems by hand, a fun activity to involve the kids with! Dry leaves can also be chopped in a food processor to prepare larger quantities in a more time-efficient manner. Some herbs, namely basil and parsley, are best stored frozen. Simply chop fresh leaves in a food processor, add a bit of olive oil to the basil, and press mixture into ice cube trays. Parsley can be stored in the same manner, just add water instead of oil.

Basil

Grow

- Start from seed indoors, planting in cells or milk cartons in early to mid-April.
- When seedlings start to sprout, thin to one plant per container and be sure they get lots of light.
- Transplant out in early June.
- Once in the garden, basil will begin to bloom. Cutting back these blooms throughout the summer will encourage branching and increase production in the fall.
- Fall harvests can be used fresh or dried for continued use in the winter months.

Prepare

Basil is delicate and easily bruised, so it is recommended to either tear the leaves or use them whole. One could blend the leaves with oil (similarly to pesto) and freeze in muffin tins or ice cube trays for an easily accessible proportioned amount.

Use

Basil is the backbone to pesto. Adding pesto to Alfredo sauce gives it color and flavor. You could also try making an herbed butter to serve with some fresh bread. Tossing fresh basil leaves into a salad is also tasty, as is combining it with tomato and mozzarella for an interesting twist on grilled cheese. You can stir basil leaves into tomato soup just before serving. It will also compliment many other menu items such as lasagna, egg bake, spaghetti, roasted zucchini, garlic mashed potatoes and glazed carrots.

HERB GUIDE

A Quick Look at Growing and Using Your Own Herbs

Oregano

Grow

- Oregano can be started from seed or plants available at herb nurseries. It is a perennial plant, so after your first year planting it in the garden, it should come back on its own each spring.
- If starting for the first time from seed, plant in flats or containers in March. Transplant out to the garden in late May.
- To start plants from existing gardens, clumps of oregano from previous years can be dug, cut back, and divided during early spring.
- Oregano you intend to store dry is best harvested just prior to flowering, when fistfuls of stems can be cut and dried, then the crisp leaves can be plucked and stored. Fresh oregano can be harvested at any time during the growing season.

Prepare

Oregano leaves can be used whole or chopped.

Use

Oregano is a pungent and slightly peppery herb. You can sauté it with onions, tomato, and garlic and toss with pasta for a tasty dish. You could also top breadsticks or garlic bread with a little before baking them. Oregano is a great herb for boosting flavor of Italian and Latin American dishes like pizza, spaghetti, lasagna, tacos, fajitas, chili, and burritos.

Parsley

Grow

- Parsley seedlings can be slow to start, so it's best to plant seeds early, usually in early February.
- Plant in individual cells or milk cartons, keep moist until germination, and thin to one plant per container.
- Transplant parsley to the garden in mid-May.
- Parsley leaves can be harvested at any time until severe frost damage takes the plants in late fall or early winter.
- Extra parsley you'd like to store is best frozen; chop the leaves in a food processor and pack into ice cube trays with a little water, then freeze.

Prepare

Parsley can be finely chopped. The stems can be used to flavor soups and sauces by letting them steep (similar to thyme) and discarding prior to serving. Parsley can be added to anything acidic like goulash or chili to balance out the acidity and make the dish more pleasing to eat.

Use

Use finely chopped parsley in any dish you would like to add some color and freshness to.

HERB GUIDE

A Quick Look at Growing and Using Your Own Herbs

Chives

Grow

- Chives are perennial and can be started from seed or by dividing existing clumps that come back year after year. You can also obtain plants from a nursery and start those in your school's garden.
- If starting from seed, scatter in a planting flat, cover lightly with planting mix, and keep moist. Seedlings can take awhile to germinate, so it's best to start them in early February. Transplant out in mid-May.
- To prepare clumps from previous years for new growth, dig them up in the spring, pull apart into smaller clumps, and replant.
- It's best to harvest chives during spring or fall, not in summer when they are blooming. After chives bloom, cut them back for regrowth in late summer to ensure a good harvest in the fall.

Prepare

Cut to desired length with knife or scissors.

Use

Chives have a mellow onion flavor, making them delicious in scrambled eggs with cheese. They could also be mixed into a cornbread recipe for a savory twist. Other menu suggestions include: herbed butter, mashed potatoes, orange chicken, roasted zucchini, chicken fajitas, and tacos. Chopped chives add a bit of zing to salads.

Dill

Grow

- Direct-seed dill in early April in patches or rows, gently covering with about $^{1}/_{4}$ in. of soil. Keep thoroughly moist until germination.
- Dill leaves can be cut once plants are big enough.
- If left to send up flower stalks, yellow umbels will produce dill seed. Harvest whole seed heads after flowers have ceased blossoming and begin to dry, then simply rub the seeds off by hand.
- Doing a second planting in early July will ensure you have fresh dill leaves to use in dishes when school starts in the fall.

Prepare

Dill leaf should be coarsely chopped. Dill seed can be used whole (often in breads) or ground.

Use

Dill has a mild anise flavor that wakes up any dish. Try tossing coarsely chopped dill or a bit of ground seed with roasted carrots or zucchini. Or, stir it into potato salad or coleslaw dressed with a mustard vinaigrette. Other menu items you could add dill to include mashed potatoes, sliced cherry tomatoes, cucumber salads, cooked peas, and unbreaded fish.

HERB GUIDE

A Quick Look at Growing and Using Your Own Herbs

Cilantro

Grow

- Direct-seed cilantro in patches or rows and cover with about $^{1}/_{2}$ in. of soil.
- Plant in early April for a summer crop and again in early July for a good fall harvest.
- Cut back leaves periodically for harvest. Leaves from flower stalks can also be harvested, and flowers themselves can be harvested and used as well for obtaining seeds to replant or use as coriander.

Prepare

You can either coarsely chop cilantro leaves and stems or use the leaves whole. To freeze for storage, chop cilantro and add a bit of water before placing in ice cube trays.

Use

Cilantro pairs well with Asian or Latin American foods. Try stirring it into cooked long-grain brown rice and adding some lime. Or mix it into a tomato and fruit salsa. Menu items that pair well with cilantro could be orange chicken, tacos, fajitas, or burritos.

Thyme

Grow

- Since there are many species and varieties of thyme, purchase plants of a good culinary variety of common thyme (*Thymus vulgaris*) from a nursery and plant in the garden about mid-May.
- Thyme can be harvested fresh any time during the growing season, and any extra harvest can be dried and stored for winter use.
- Thyme is a perennial, and once established in your garden it should survive the winter if a little added protection is given in the form of dried leaves, straw, or other winter mulch.

Prepare

Pull thyme leaves from the sprigs— no need to chop! If you are using thyme in a sauce or soup, an easy way to utilize the herb is to wrap it in cheesecloth or coffee filter and steep. When your soup or sauce is ready to serve you simply remove and discard the cheesecloth.

Use

Thyme has fragrant mint and lemon aromas and can be used in a variety of menu items such as Alfredo sauce, herbed butter, rice, or even vinaigrette for a salad.

DISEASES & PESTS

Keeping Your Garden Healthy: Disease Control and Pest Management

Tomatoes

Tomato Hornworm Sphinx Moth

These large, well-camouflaged caterpillars are often responsible for any nibbled leaves of vines you may find mid-summer. They are seldom numerous enough to worry about, but they are great subjects for kids to study. If you happen to catch one, you can keep it in a gallon-sized jar with 4in. of dirt in the bottom. Feed it tomato twigs each day. It will burrow into the dirt when mature, turn into a fascinating pupa, and hatch months later into a large gray mottled sphinx moth.

Leaf Blight

This is a common problem among tomatoes. It is a soil-borne disease, transmitted through water splash. To prevent soil splash, mulch plants right from the start.

Eggplant

Flea Beetles

These tiny black jumping beetles can ravage the foliage of young plants. Either cover plants with Remay until blossoming or dust regularly with Garden Guard, an organic dust which contains pyrethrum. However, a round of flea beetles later in the summer most likely will not hurt the plants enough to prevent a good crop.

Brassicas (Kale, Cabbage, Broccoli, Kohlrabi, etc.)

Flea Beetles

Like eggplant, this family is susceptible to flea beetles when young. Control using the instructions above.

White Cabbage Butterfly Larvae

These well-camouflaged larvae often attack brassicas. This can usually be remedied by simply picking off caterpillars. However, if infestations occur that cannot be controlled with this method, plants can be sprayed every week or two (between rains) with Thuricide, which contains the organic control BT (*Bacillus thuringensis)*. A "sticker-spreader" added to the spray mix helps the spray stick to the waxy brassica leaves.

DISEASES & PESTS

Keeping Your Garden Healthy: Disease Control and Pest Management

Cucurbits (Squash, Melons, etc.)

Striped and Twelve-Spotted Cucumber Beetles
These beetles seldom do severe damage to adults, but they can decimate seedlings. For this reason, emerging direct-seeded crops need to be watched carefully. The easiest way to control the beetles' effect on seedlings is dusting with Garden Guard or covering with Remay.

Squash Vine Borer
This 1-2in. brightly colored day-flying moth looks like a wasp. It is rare that you see the actual pest; instead, you'll often notice its handiwork when it is too late and vines suddenly wilt mid-summer. Since the female moth lays her eggs where the base of the plant enters the soil, thoroughly cover the bases of plants with rags or Remay. This usually discourages egg-laying. Moths do not show up until early summer, so you have a little time to accomplish this, but you should do so as soon as bushes or vines get large enough. The effects of the moth can be avoided in your winter crop of butternut squash since that species is immune to the vine borer.

Squash Bug
This dark gray sucking insect has wingless nymphs which become winged adults and grow to about 1/2 in. long. They lay clusters of shiny dark eggs on squash leaves. They are usually only a threat to the harvest in cases of large infestations. Squeeze one and have the kids smell; their defense odor is… well, see what they think!

Potatoes

Colorado Potato Beetles
These are the main pest of potatoes and can— in extreme cases— completely defoliate the plants. The best control is vigilance; police the plants regularly in search of adults laying clusters of bright red eggs, often found on the undersides of leaves. Smashing egg masses or the newly emerged larvae (which stay together in groups for a while) is the best remedy. Once the plump grubs reach a larger size, they disperse and become very difficult to control, so timing is very important!

More than just the "Bad Guys"

Not all bugs are bad for gardens. In fact, some are beneficial to plants and are important to a healthy garden. Some schools have used this as a science lesson and invested in cheap bug boxes or magnifying glasses that allow students to examine different species.

GARDEN CARE CHECKLIST

Keeping Track of Garden Maintenance

During the summer, it may be helpful to have a checklist for the families and community members who volunteer to take care of the garden. This helps make sure everything gets completed and is an easy way to keep track of what has been done so other volunteers are aware. Here is an example— you can choose to make it more or less detailed based on your garden's needs and how you organize volunteers.

Name	Date	Planted	Watered	Weeded	Other Tasks

EXTENDING THE SEASON

Getting More Out of Your Garden

By extending your garden's season, you wind up with not only more produce but more opportunities for learning in the classroom and more ways to continue to involve students. Here are a few different ways to keep the fun going all year long!

Row Covers

Perhaps the easiest way to extend the season on some crops out in the garden itself is to use row covers. Spun polyester row cover material, usually called Remay, can be purchased at nurseries or ordered online. Remay comes in different grades with heavier gauges offering more cold protection, but less light transmission. If using Remay for season extension use a heavier gauge since the plants will be well established by the time you cover them and insulation from cold will be more important to their survival than exposure to lots of light.

Quick Hoops

Quick hoops are the next step up from row cover; they can be constructed by simply adding wire support under the Remay. This wire support can be in the form of hoops purchased from garden supply stores, or you can make it yourself from stiff wire purchased from hardware stores or even (though a flimsier option) from repurposed old coat hangers –just extend them and bend them into an arch! Quick hoops work best for small-stature crops planted in the fall, such as lettuce, spinach, and cool-weather mixed greens.

Tunnels

Tunnels are more permanent, larger season-extending structures that are more elaborate and a little bit more spendy. "Low tunnels" are comprised of sun-resistant plastic on taller hoops. "High tunnels", hoop houses, and greenhouses are even larger and sturdier options if your school wants to invest in season extension in the long run.

Bringing the Garden In

Some plants, like kale, chard, and other greens, can simply be brought inside for the winter. Dig the plants out of the garden in late fall, transplant into 5-gallon containers of garden soil, and move indoors for continued harvesting. To ease transplant shock, it's best to remove most of the leaves at the time of digging and be sure to give the new leaves adequate time to gradually develop once indoors before harvesting. Annual herbs like dill, cilantro, parsley, and basil can be planted in early fall in large containers indoors for a later fall harvest.

FOOD SAFETY

Growing Produce That is Safe (and Yummy!) to Eat

Having a school garden is great because it provides a more direct connection with food for those growing and eating it and allows greater knowledge and control over production methods. It is important to follow good food safety protocol in order to avoid the risk of pathogenic microorganisms or chemicals that may contaminate your crops. This risk, fortunately, can be greatly reduced by following these safety guidelines and by familiarizing yourself with Federal, State, and Local regulations regarding health and sanitation issues. Another bonus? This creates a perfect opportunity to discuss Food Safety in class with the students!

Location

Where you decide to put the garden can greatly affect the food it grows. Keeping these tips in mind can minimize the possibility of harmful substances coming into contact with your crop.

When selecting a garden site, avoid:

- High-traffic areas
- Areas where water is apt to collect (this is a recipe for disease and it hinders plant growth and proliferation)
- Low areas prone to run-off
- Anywhere near standing water, wells, septic systems, or dumpsters.
- Placing bird feeders or birdbaths around the garden. These attract rodents in addition to birds, thereby increasing the likelihood of contamination through animal droppings.

Before you dig:

- Call Iowa's Digger's Hotline (1-800-292-8989) before turning over any new ground to ensure putting in the garden will not damage any underground pipelines or wires.
- Consult the school's facilities team and/or custodial staff and to make sure pesticides will not be applied anywhere near the garden. A 30ft. buffer strip is recommended.
- It is also important to find out where and when lawns have been sprayed in the past. Tests for herbicides can be expensive, so it is best to locate new gardens where spraying has not occurred for at least a year or two.

Soil & Water

It is extremely important to test the quality of your garden's soil and water to be sure that they are safe for growing produce. You can call your local ISU-Extension and Outreach office (visit http://www.extension.iastate.edu/content/county-offices to find contact information for your county) for more information on how to test your soil and water and where to purchase testing kits. In addition, keep the following in mind.

- For raised beds or indoor gardens, purchase soil intended for use in food production.
- If using soil from the school grounds, it is important to test the lead content. 5-40ppm is natural, but it would be advisable to use purchased soil for levels much higher than that. Gardens should not be located in an area where the lead content measures 300 ppm or more.
- Want to use compost as a soil supplement? Be sure to follow the guidelines detailed in "Composting".

FOOD SAFETY

Growing Produce That is Safe (and Yummy!) to Eat

Soil & Water, continued

- Water should come from a reliable source (such as public or municipal water) and should be potable. Water should not come from a source such as a nearby lake, as this surface water is likely to harbor harmful microorganisms or toxic farm chemicals.
- If your school uses well water, it is advisable to test it once a year to ensure it meets EPA standards.

Materials & Maintenance

Using the correct (clean) materials and keeping up proper maintenance also contributes to the overall safety of your school's garden.

Do Use:

- Non-toxic and non-leaching materials used for containers, beds, stakes, trellises, and fences.
- Clean gardening tools that are only used in the garden.
- Food-grade harvesting materials (like clean containers that once held food or kitchen bowls.) These materials should be used only for harvesting (for example, don't reuse bowls used in class for a science experiment.)

Do Not Use:

- Synthetic pesticides, herbicides, insecticides, or fungicides. (Instead, use organic versions or just pull the weeds –another fun way to involve the kids!)
- Garbage bags, trash cans, or any containers that once held chemicals (even if they have been cleaned) as harvesting materials.

Additional Considerations:

- Keep any pets and/or wild animals out of the garden. Animals and their droppings can carry pathogens and contaminate produce. If this is an issue in your garden, consider installing fencing.
- Keep grass surrounding the garden mowed down. This reduces any edge vegetation that may provide a habitat for rodents.
- Remove any rotting produce that falls.
- Stay away from working in the garden if you are sick, and make sure students do the same!

Harvesting

Cleanliness during harvesting is key to reducing the risk of contamination.

Remember to:

- Wash hands thoroughly with soap and warm water both before and after harvesting.
- Wear gardening gloves if you have any cuts or open wounds on your hands.
- Take care to shake or brush off all excess soil on produce before placing in collection containers.

FOOD SAFETY

Growing Produce That is Safe (and Yummy!) to Eat

In the Kitchen

Despite taking all the preceding precautions, there is still a slight risk of the produce being contaminated once it enters the kitchen. For this reason, extra care should be taken in the use, storage, and preparation of the garden's crops.

In use:

- All food should be received and inspected by food service personnel as with other "conventional" incoming food.
- Following a meal, any leftover produce should be placed in a refrigerator.
- Avoid cross-contamination between washed and unwashed produce.

In storage:

- If you wash the produce prior to storage, make sure that it is thoroughly dried. Any moisture lingering on the food can become a breeding ground for harmful microorganisms. This is especially important with crops such as spinach and lettuce.
- All produce should be stored in bags to keep the refrigerator (or other storage area) clean. These bags should be labeled with the date and whether or not the produce has been washed.
- Produce that needs to be stored at room temperature should be kept in a cool, dry, pest-free, well-ventilated area away from chemicals.
- Monitor produce in storage; any moldy produce should be thrown out.

In preparation:

- Wash hands, workspace, and utensils thoroughly before and after any prep work.
- Wash all produce under cool, running tap water –even produce that was washed prior to storage and produce with a peel or rind that will be removed.
- Do not use soap, detergent, or bleach to wash produce.
- Cut away any bruises that may be on produce before serving.

FOOD SAFETY

Growing Produce That is Safe (and Yummy!) to Eat

The preceding guidelines will greatly help to assure the produce from your school's garden is safe to enjoy. In addition, it is important to keep these general safety tips in mind while working in the garden.

- Be wary of bug bites, sunburn, rashes such as poison ivy and injuries from tools.
- Be mindful of any allergies students may have.
- Remind students not to eat anything from the garden unless an adult has given the okay.
- Make sure students wear good shoes and proper clothing on days when they are working in the garden, and encourage them to bring hats for added sun protection.
- Students (especially younger students) should not be present when powdered materials (some brands of fertilizer, lime, etc.) are being applied to the garden. These may create dust that could be harmful if inhaled, so it is best to have adults or older students equipped with dust masks apply these materials.

HARVEST LOG TEMPLATE

A Sample Harvest Log for Recording Your School's Produce

School gardens are encouraged to track harvests. Not only is it fun to compare one year to another, but some schools also have been able to receive funding towards future or expanded gardens by demonstrating the value of the produce harvested.

NORTHEAST IOWA Food & Fitness INITIATIVE
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School Garden Harvest Log

School Name:

Item Harvested	Date Harvested	Field/Row	Quantity	Unit of Measure	Use in School	(If Sold) Amount	Price
Ex. Carrots	8/23/2013	S. Field	8	Lbs.	Salad Bar		
Ex. Tomatoes	8/23/2013	Greenhouse	10	Pints		10 Pints	2.99
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

School Gardens 101

A guide to planning and planting your school garden

NORTHEAST IOWA Food & Fitness INITIATIVE
W.K. Kellogg Foundation Food & Community Partner

- Planning -

Types of Gardens - **Container gardening**, growing plants in individual containers, is a good solution for gardens with limited space or for plants that don't grow well with others. Use containers with drainage holes to ensure plants don't drown. **Raised beds**, beds constructed out of wood or cinderblocks and filled with soil, are good for areas with poor drainage or a high weed burden. Before filling beds, cover ground with landscape fabric and/or chicken wire if weeds or burrowing pests are an issue. **In-ground** gardening is the most common. The ground will need to be worked up or tilled prior to planting. If weed burden is high, consider mulching or laying landscape fabric before planting. Because it is not elevate, in-ground gardens require less water than containers or raised beds.

Annual vs. Perennial - **Annuals** are plants that germinate, flower, and die in one season. For purposes of gardening, this means new seeds will need to be planted each year. **Perennials** are plants that live more than two years, growing over the spring and summer, dying back in winter, and returning the following spring from their rootstock.

Cool vs. Warm Season Crops - **Cool season crops** tolerate light frost but suffer in heat of summer. They are most productive in spring and fall. **Warm season crops** love heat and will not tolerate any frost. They typically have a longer growing season and thus are often started indoors and transplanted outside when temperatures are 50+.

"Sow Direct" vs. "Transplant" – **"Sow direct"** or **"direct seed"** means the seed can be planted directly into the ground where it will grow. If seeds are small, typically plant more seeds than needed and thin out weaker plants until you have the appropriate spacing. As a general rule, plant seeds twice as deep as its diameter. **"Start"** or **"Transplant"** means the seed must grow indoors prior to transferring to the ground. Plant a few seeds per cell and remove weakest seedlings with scissors. Water regularly and grow under grow lamps or in a sunny window. Without disturbing roots, transplant to outdoor garden space when conditions are warmer.

Additional Resources –

Old Farmer's Almanac: http://www.almanac.com/content/information-about-plants-vegetables-herbs-fruit-guides
Organic Gardening: http://www.organicgardening.com/learn-and-grow/
USA Gardener: http://usagardener.com/index.php

- Planting -

HERBS	When to plant	Annual vs. Perennial	Planting Instructions	Harvest & Storage	Additional needs
Basil	Start mid-April; transplant late May	Annual	Seed ¼ in. deep; plants 10-12 in. apart	Harvest before frost; freeze sprigs in airtight bags and or dry whole leaves	Pinch flower heads for continued growth; harvest regularly for continued growth
Chives	Sow direct mid-May	Perennial	Seed 2-4 in. deep; 12-18 in. apart	Cut down to base when harvesting; avoid harvesting leaves with flowers; use fresh or freeze leaves in airtight bag	Purple flowers are edible, but will scatter seeds if left to ripen; divide plant every 3-4 years
Cilantro	Sow direct April; July for fall crop	Annual	Seed 6 in. apart	Cut large leaves as needed; freeze individual leaves in airtight bags or hang plant cuttings to dry	Avoid growing in heat of summer as leaves will bolt and taste bitter
Mint	Transplant in spring	Perennial	Plant 2 ft. apart	Cut stem 1 in. from ground before flowering or pick leaves as needed; use fresh or dry whole leaves	Very invasive and will take over garden if not contained - best to plant in containers if possible
Oregano	Plant seeds or transplants in Spring	Perennial	Plant 18 in. apart	Harvest as needed before flowers bloom; can be easily frozen or dried	Pinch or trim plant regularly; thin out plants that are more than 4 years old
Parsley	Start early Feb.; transplant mid-May	Biennial (grown as annual)	Plant 6-10 in. apart	Ready to harvest when leaf stems have 3 segments - cut outer leaves as needed; use fresh or dry	Good companion to corn, tomatoes, and asparagus

PLANT	When to Plant	Seas.	Days to harvest	Planting Instructions	Harvest & Storage	Additional Needs
Beet	Sow direct April for summer crop; July for fall crop	Cool	55-65	Seed ½ in. deep; 3-4 in. apart; 8-12 in. between rows	Harvest when 3-4 in. wide; clip off tops and refrigerate fresh 5-7 days	Mulch and water well
Broccoli	Start early March; transplant mid-May	Cool	60 (from transp.)	Plant 12-24 in. apart; 24 in. between rows	Harvest large heads + 6 in. of stem, leaving lower shoots to continue growth; can blanch and freeze	Mulch for moisture and weed control
Cabbage	Start early March; transplant mid-May	Cool	70 (from transp.)	Plant 12-24 in. apart in rows	Cut head at base when heads are firm and desired size; wrap in plastic and refrigerate up to 2 weeks	Gradually acclimate to outdoor temp. before transplanting out; avoid planting with broccoli, cauliflower, or tomatoes
Carrot	Sow direct early April for summer crop; early July for fall crop	Cool	70-80	Seed 3-4 in. apart; 12 in. between rows	May push out of ground when ready; twist off tops, clean under running water, and dry in airtight containers before refrigerating	Prefer loose, wet soil; mulch to keep soil cool
Corn	Sow direct early June	Warm	68-80	Seed 1 in. deep; 16-24 in. apart; 3 ft. between rows	Harvest when silk is green but turning tan on the ends; remove kernels from cob and freeze	Plant in blocks of 4+ rows for pollination
Cucumber	Sow direct early July for fall crop	Warm	60	Seed 1 in. deep; 12 in. apart; 5 ft. between mounds	Cut fruit off vine when 6 in. long; harvest regularly for continued growth; wrap in plastic and refrigerate up to 10 days	Low growing vine - sow in mounded hills or along trellis
Eggplant	Start mid-March; transplant late May	Warm	60-80 (from transp.)	Plant 24-30 in. between plants; 2 ft. between rows	Harvest when skin is shiny and unwrinkled, leaving stem attached; store up to 2 weeks	Stake plants larger than 2 ft. tall
Garlic	Sow direct in Sept. or Oct.	Cool	N/A	Cloves root down; 2 in. deep; 4 in. apart; 6 in. between rows	Harvest when tops yellow and fall over; cure in dry, airy place 2+ weeks; store in cool, dry place	Mulch over winter; remove flowers as plant grows; save "best" bulbs for fall planting
Leafy Greens	Sow direct April for mid-May crop; July for fall crop	Cool	45-60	Seed ½ in. deep; 4-8 in. apart; 6-8 in. between rows	Cut outside leaves leaving smaller ones to mature; refrigerate in plastic bag up to 10 days	Can sow successive crops for continued harvest, avoiding heat of summer
Melon	Sow direct mid-June	Warm	70-90	Seed 1 in. deep; 18 in. apart; 3 ft. between mounds	Ripe if hollow sound when struck; store uncut for 6 days or cut, wrap in plastic, and refrigerate for 3 days	Prune end buds off vines to focus energy on fruits; bees required for pollination
Onion	Buy onion sets; plant mid-May	Warm	65	Bulbs 1 in. deep; 5 in. apart; 12 in. between rows	Tops fall over when bulbs mature; Pull gently from ground and cure in sun for several weeks before storing	Mulch for moisture and weed control; cut any flowering stalks
Peas	Sow direct April for mid-May crop; August for fall crop	Cool	55-75	Seed 1 in. deep; 2 in. apart	Clip or gently pull filled pods off vines; freeze or refrigerate up to 5 days	Climbing vine - plant along trellis or teepee
Pepper	Start mid-March; transplant late May	Warm	70-80 (from transp.)	Plant 18-24 in. apart; 2 ft. between rows	When desired size, cut with small piece of stem attached; refrigerate up to 10 days or prep and freeze	Gradually acclimate to outdoor temp. before transplanting out
Pole Beans	Sow direct late June for August crop	Warm	45-60	Seed 1 in. deep; 3 in. apart	When good size, pick off vine; refrigerate in airtight container for 4 days or blanch and freeze	Plant along trellis or teepee; can sow successively for continued harvest
Potato	Sow direct mid-May	Warm	90-120	Eye up; 1 ft. apart; 4 in. deep; 2-3 ft. between rows; hill as plant grows	After leaves have died, dig up gently on dry day; remove dirt and store in cool, dry, dark place	If cutting seed potatoes into small pieces, let dry a few days before planting; grow in containers for easier harvesting
Radish	Sow direct April for mid-May crop; August for fall crop	Cool	25-35	Seed ½ in. deep; 1 in. apart; 6 in. between rows	Harvest when roots pull out of ground; remove green tops and clean before refrigerating	Avoiding summer heat, can sow successively for continued harvest; Keep soil moist
Squash: summer	Sow direct early July for fall crop	Warm	40-60	Seed 1 in. deep; 2-3 ft. apart; 2 ft. between rows/hills	Harvest frequently for best flavor; Cut off vine and refrigerate up to 10 days or slice, blanch, and freeze	Low growing vine - can trellis if space is issue; mulch and water diligently
Squash: winter	Sow direct mid-May	Warm	110	Seed 1 in. deep; 2-3 ft. apart; 2 ft. between rows/hills	Before frost, cut 3-4 in. of stem off when fruit is ripe, rind is hard, and sounds hollow; cure in sun for 1 week and store in cool, dry place	Grow in rows or hills - small varieties can be trellised; prune vines to focus energy on fruits; bees are crucial for pollination
Tomato	Start mid-April; transplant late May	Warm	70-100 (from transp.)	Plant deeply; 2 ft. apart; 3 ft. between rows	Harvest when skin yields slightly to touch; maintain star-shaped calyx; store in cool, dark place or core and freeze in containers	Gradually acclimate to outdoor temp. before transplanting out; plant along trellis and tie back regularly; Mulch and water well

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