

MyGarden

Horticultural Guide Growing Food with Kids in Michigan Schools

The logo for Michigan State University Extension is centered on the page. It features a large, faint, light gray background graphic of a stylized 'S' shape. Overlaid on this is the text 'MICHIGAN STATE UNIVERSITY EXTENSION' in a serif font. 'MICHIGAN STATE' and 'EXTENSION' are in a dark green color, while 'UNIVERSITY' is in black. The text is arranged in three lines, with 'MICHIGAN STATE' on the top line, 'UNIVERSITY' on the middle line, and 'EXTENSION' on the bottom line. There are thin horizontal lines separating the top two lines and the middle two lines.

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I. **Planning a New School Garden**

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I. Planning a New School Garden

In this section are a series of steps to consider when starting up a new garden program. School gardens are an opportunity to be creative and engage the entire school community in developing something unique. Keep in mind that there is no one “right way” to start a school garden program. There are many excellent resources (refer to p. 5) related to starting such programs. Consider examining some of these other resources, along with visiting other school garden programs to learn from their experiences. There is no need to reinvent the wheel!

A. Seek Approval

Before investing a lot of time and energy in planning a new school garden, first make sure the project will have **approval from your school administration**, most importantly, the school principal. Set up a meeting with the principal and be ready to explain the vision for starting a garden, how it will benefit students academically, and relate to school-wide health awareness efforts. Depending on the school district, there may be other key school administrators to seek approval from, such as the school board or superintendent. It may be helpful to refer to [existing research](#), compiled by the National Gardening Association that documents the positive impact of school gardens.

B. Develop a School Garden Team

Once administrative approval has been obtained, find out who in the school community is interested in helping to develop a garden project at your school. Many schools find it helpful to form a **school garden team** (or committee) that meets regularly to provide oversight to planning and overall implementation of the garden project, as well as provide a vehicle for decision-making. Key people to include in a school garden team include teachers, students, parents, food service staff, custodians, and interested community volunteers. There are many advantages to building a strong, diverse garden committee. A school garden is more than just a garden, it represents an opportunity to build a community within the school, and strengthen relationships with community organizations, agencies, and volunteers. Each team member brings a different set of skills and/or contributions to the table. Areas of expertise might include gardening, volunteer management, fundraising, food preparation, event coordination, technology, nutrition education, photographers, communications and publicity, school curriculum, scheduling, student mentoring, afterschool programming, evaluation, etc. Identifying different strengths and skills of the team members will help the garden project become a vital part of the school community, and hopefully include meaningful integration into the school curriculum, foodservice, and school wide nutrition efforts. Involvement by a well-managed diverse group of people will ultimately provide for a more vibrant and sustainable project. A pitfall of some school garden projects is when an individual controls the garden project, often at the expense of involving other volunteers. To avoid this, take the time to develop your school garden team, defining individual roles, as well as developing a framework for decision-making and management of the garden.

Some things for your school garden team to consider include:

- What are the vision and goals for having a garden?
- Who will be involved with the garden?
- Where will the garden be located?

- What supplies and resources are needed?
- Where will any funding come from?
- How will it relate to the school curriculum?
- How will the garden produce be used?
- How will decisions be made regarding the garden operation?
- How will the impact of the garden on student learning and behavior be determined?

C. Connect to School Wellness Policy

Since 2006, every school district that participates in the USDA School Lunch program is required to have established a “Wellness Policy,” usually overseen by a school wellness committee. Contact your school principal to find out if there is way to connect the school garden to the wellness committee. If no such committee exists in the school building, perhaps there is enough interest to start one? This committee may be interest in supporting the garden project, and connecting it to school wide efforts to increase awareness of healthy eating habits. Integrating a school garden program in to the *language* of the school wellness policy may also be helpful in determining the long-term success of the program.

Components of a Wellness Policy

As required by law, a local wellness policy, at a minimum, shall include:

- *Goals for nutrition education, physical activity and other school-based activities* that are designed to promote student wellness in a manner that the local educational agency determines is appropriate.
- *Nutrition guidelines* selected by the local educational agency for all foods available on each school campus under the local educational agency during the school day with the objectives of promoting student health and reducing childhood obesity.
- *Guidelines for reimbursable school meals*, which are no less restrictive than regulations and guidance issued by the Secretary of Agriculture pursuant to Subsections (a) and (b) of Section 10 of the Child Nutrition Act (42 U.S.C. 1779) and Section 9(f)(1) and 17(a) of the Richard B. Russell National School Lunch Act (42 U.S.C. 1758(f)(1), 1766(a)0, as those regulations and guidance apply to schools.
- A plan for measuring implementation of the local wellness policy, including designation of 1 or more persons within the local educational agency or at each school, as appropriate, charged with operational responsibility for ensuring that each school fulfills the district's local wellness policy.
- *Community involvement*, including parents, students, and representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy.

D. Other Resources for Starting a School Garden Program

Online

[Gardens for Learning – Creating and Sustaining Your School Garden](#)

By the California School Garden Network, 2006. This 98 page guide is an excellent, comprehensive guide for school garden programs can be downloaded for free as a PDF by clicking on “publications” at: www.csgn.org

[School Garden Wizard](#)

Created for America's K-12 school community through a partnership between the United States Botanic Garden and Chicago Botanic Garden. The website contains a five section guide to creating and using school garden. The topics are: “Making the Case,” “Plan for Success,” Create the Garden, “Learn in the Garden”, and “Keep it Growing.” Visit: www.schoolgardenwizard.org

[Sowing the Seeds of Success](#)

This 28-page booklet details the organizational steps needed to initiate a gardening project that involves kids and the community, and to ensure program success over the long term. Key chapters highlight how to define roles and responsibilities, form and manage partnerships, create an identity, raise funds, and more. A PDF of the guide can be downloaded at:

<http://www.hort.cornell.edu/gbl/pubs/sowingseeds.pdf>

[Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms](#)

Getting Started is a 51-page guide designed and published (2007) by the Center for Ecoliteracy in collaboration with Life Lab Science Program, a national leader in garden-based education. A PDF can be downloaded for free at:

<http://www.ecoliteracy.org/sites/default/files/uploads/getting-started-2009.pdf>

[Cornell Garden-Based Learning](#)

Free online resources for engaging children and empowering youth in the garden. Website contains activities, resources for starting a garden program, gardening information,

<http://blogs.cornell.edu/garden/>

[Kids Gardening, National Gardening Association](#)

Website contains a variety of resources related to school gardens, including planning, funding resources, and gardening information. <http://www.kidsgardening.org/>

Books

Digging Deeper: Integrating Youth Garden into Schools & Communities – A Comprehensive Guide. By Joseph Kiefer and Martin Kemple. Food Works and the Common Roots Press in Partnership with the American Community Gardening Association (ACGA), 1998.

Nourishing Choices: Implementing Food Education in Classrooms, Cafeterias, and Schoolyards. By Eve Pranis. National Gardening Association, 2008.

E. SELECT A SITE

As with any garden, one of the most important steps is selecting the best site for the garden. Here are some factors to consider:

- **Proximity:** Is the garden located near the school building, ensuring quick and easy access for students and teachers? The garden will not only be more visible, but will also be visited more frequently, as precious class time will not be spent walking to and from the garden. Having the garden in a place where the entire school community can see the garden on a regular basis allows for more students (and adults!) to observe the garden, even if they are not always directly involved.
- **Sunlight:** A minimum of six hours of direct sunlight is recommended. If you intend to garden year around, or at least in spring and fall, you will want to make sure the site also receives adequate winter sun. For example, if you plan to eventually install a greenhouse, or other season –extending device, a site with full winter sun is desired.
- **Water:** Don't underestimate how important having easily accessible water is to the success of your garden. Make arrangements with school administration and maintenance staff, so that you have access to water when needed, especially when the school is closed (vacations, weekends, evenings). Water used for irrigation and hand washing in the garden should be potable, or safe to drink.
- **Check for Underground Utilities:** Areas around schools and other buildings often have buried utility (electric, gas, water, cable, etc.) lines. Before you finalize the site of your garden, work with your school maintenance department to identify any buried lines. A service such as Miss Dig can provide this assistance for no charge. Be sure to keep these records on file somewhere handy for future reference. For the safety of your gardeners, avoid locating your garden on top of buried utility lines.

MISS DIG System, Inc. is a Michigan-wide one-call excavation safety and utility damage-prevention company started in 1970. One toll-free call is all it takes to have MISS DIG notify the more than 900 participating members to stake their underground utility lines and provide overhead electric line assistance to ensure adequate clearances are maintained. Homeowners or excavators can call MISS DIG at **800-482-7171** 24 hours a day, seven days a week. Website: <http://www.missdig.net>

F. Evaluate Soil Quality

Evaluating the soil at the garden site is essential for determining how to proceed in establishing the garden. Determine if the soil is particularly rocky, compacted, or shallow. Work with school maintenance staff and administration to identify any past uses of the future garden site that may be cause for concern (e.g. fuel tank storage, old septic field, etc). Assistance in assessing soil quality can also be provided by the local county MSU Extension office.

- **Soil testing** will provide baseline information about the soil, including information about the soil's ability to supply nutrients to plants for adequate growth. A regular soil test, conducted by a lab such as the MSU Crop and Soil Science Lab, will provide information about soil pH, available phosphorus, potassium, calcium, and magnesium levels. Contact the local MSU Extension office for information on how to test the soil. Having soil tested annually also provides multi-year scientific data for students to examine.
- If there is any chance the site may have been contaminated with heavy metals (especially lead), or other chemicals, it is wise to have soil tested for contaminants. At a minimum, testing soil for the presence of lead is highly recommended. This is particularly important for gardens being established in urban areas, and/or on sites where buildings existed prior to 1978 (when lead use in paint was banned), or in areas that have may have been exposed to heavy vehicle exhaust (especially prior to 1986 when lead was banned from gasoline). Additional information about lead hazards and protecting children from lead poisoning can be obtained from the **Lead Hotline** (1-800-424-LEAD [5323]), operated by the **National Lead Information Center** (NLIC), from the U.S. Environmental Protection Agency **Lead Awareness Program** (website: www.epa.gov/lead). Many labs provide soil testing services that include lead testing.

Soil Testing Services

- **Crop and Soil Sciences Lab at Michigan State University – East Lansing, MI.** (Tel: 517-355-0218; Website: www.css.msu.edu) Provides standard soil testing services (\$12 in 2010) for home lawns and gardens, as well as supplemental testing for lead (\$23 in 2010). Contact your local MSU Extension office for soil testing services.
- **Soil and Plant Tissue Testing Lab at the University of Massachusetts – Amherst, MA.** (Tel: 413- 545-2311; Website: www.umass.edu/plsoils/soiltest). Their standard soil test service (\$9 in 2010) includes testing for extractable heavy metals (e.g. lead).

How Much is Too Much Lead?

According to the EPA, lead is considered a hazard when equal to or exceeding 400 parts per million (ppm) of lead in bare soil in children's play areas. It general, for adults, growing produce in soils that exceeds 300 ppm is not recommended, and that children should not work in garden soils with lead levels exceeding 100 ppm. The main risk from lead contaminated soils is not so much that plants uptake lead, but rather from the inhalation and ingestion of contaminated soil and dust. If tests reveal high lead levels, work with a local Extension office and/or Health Department to decide how to proceed. For additional

information, refer to the University of Minnesota Extension Bulletin FO-02543 “Lead in the Home Garden and Urban Soil Environment.”

Strategies for minimizing exposure to lead contaminated soil

- Garden in containers, rather than in the ground.
- Construct raised beds on top of contaminated soil, filling them with new soil. A liner can be used to separate the contaminated soil beneath from the new soil.
- Clean up after gardening. Students should wear gloves or wash hands after gardening. Avoid tracking soil into buildings on shoes or clothing.
- Before consuming, wash all garden produce well with a solution of water containing 1% vinegar or .5 % soap.
- Work with experts to remove contaminated soil from site, and replace with new (uncontaminated) soil. (May be expensive)
- Add compost or other organic matter. Research shows that organic matter binds to lead and makes it less available to plants.
- Maintain soil pH at 6.5 and above. Lead is less available to plants at this higher pH.
- The minimal amount of lead that is absorbed by plants tends to concentrate in leaves and the outer parts of roots – rather than the fruits (parts that contain seeds). Plant more fruit producing plants (cucumbers, peppers, eggplants, and tomatoes) – and avoid planting leaf crops (lettuce, cabbage, etc). Peel root crops before eating.

G. Garden Safety Checklist:

- When first establishing garden, have soil tested for lead.
- Use ‘organic’ gardening methods. For safety of students, chemical herbicides and pesticides should not be used in school gardens. Avoid chemically treated seed.
- Avoid using chemically treated wood products in food gardens (e.g. lumber used for raised beds or fences).
- Water used for irrigation and hand washing should be potable (a.k.a. safe to drink).
- Any animal manure used in the garden should be composted first, or sterilized (available commercially). Because of possible pathogens, avoid using fresh or aged manure.
- Examine site before having students work there. If broken glass or other trash is an issue at your site, plan to have adults clean it up – or have students wear gloves in garden.
- If garden is located near high traffic area, consider installing a fence or shrubs to reduce emissions from entering garden site.
- Have students wash hands after gardening and garden produce before consuming.
- Be aware of student allergies and avoid planting poisonous plants.

II. Funding and Resources

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A school garden doesn't have to cost a lot of money. Often times, many resource and people in the community will be more than willing to help or donate supplies to a well-planned school garden project. Start small and grow the garden project little by little, year by year!

A. Ideas to Consider:

- Develop a list of items needed for the garden program, and then prioritize it according to what is needed most. Use the list to decide how to spend any funds available to the garden program, and for communicating to potential donors.
- Network with people in your community! Let them know about your project, the reasons behind it, and what assistance would benefit your program (volunteer assistance, donated tools, plants, money, etc.) Put together a project folder that outlines the vision, goals, and budget for the project – useful for sharing during meetings.
- Seek grant funding, or donations from local businesses and/or community organizations. Consider contacting your school PTO, local garden clubs, health department, and garden supply stores for possible support.
- Hold a fundraising event, such as a “garden dinner” featuring produce from the garden. Charge admission to raise funds for the garden. Provide tours of the garden. Include a silent auction or raffle with items donated from local businesses.
- Sell garden-related items such as plant markers, seeds ceramic pots, or stepping stones.
- Have plant sale in the spring (perhaps with plants grown by students).
- Start a brick engraving program, and sell engraved bricks for your garden. For example, each brick might sell for \$50.

B. Other Resources:

- Contact your local MSU Extension office to find out what resources might be available.
- Contact your county sheriff's department. Sometimes confiscated materials such as grow lights can be donated to schools.
- According to [Memo SP 32-2009 from the USDA](http://www.fns.usda.gov/cnd/Governance/Policy-Memos/2009/SP_32-2009_os.pdf) (dated July 29, 2009), school food service funds from a nonprofit school food service account can be used to purchase seeds and other items (fertilizer, watering cans, rakes, etc.).
http://www.fns.usda.gov/cnd/Governance/Policy-Memos/2009/SP_32-2009_os.pdf

C. Grants:

- The National Gardening Association maintains a list of organizations that provide grants for school garden programs. To find a list of grants, visit:

MICHIGAN STATE UNIVERSITY EXTENSION

D. Support from Michigan State University Extension

The mission of MSU Extension is “Helping people improve their lives through an educational process that applies knowledge to critical needs, issues, and opportunities.”

Effective 2010, the work of MSU Extension is divided into four broad programming initiatives designed to meet Michigan's most pressing needs in the following four key areas:

- Enhancing Michigan's First Green Industry: Agriculture & Agribusiness
- Preparing Michigan's Children & Youth for the Future
- Greening Michigan: Leveraging Natural and Human Assets for Prosperity
- Improving the Health & Nutrition of Michigan's residents

Every county in Michigan has an MSU Extension office, which is staffed with a variety of educators specializing in fields related to agriculture, youth, health and nutrition, and greening economies. Due to limited resources, not every county is staffed in all program areas – but offices to do have a variety of resources that may enhance school garden programs. Don't hesitate to contact the county office and find out what is available in your area!



Of particular interest may be connecting to the local **Master Gardener Volunteer Program**. Volunteers in the Master Gardener program have received forty hours of intensive training in a variety of gardening topics, and provide volunteer assistance and leadership to community based gardening projects. There may be a Master Gardener Volunteer (or several!) in your community that would be interested in assisting with some aspect of your school garden program. For example, Volunteers might teach an afterschool garden club (such as **Junior Master Gardener**), provide technical assistance with starting and maintaining the garden, or lend an extra hand to a teacher working in the garden with students.

III. Digging In!

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Gardens come in all shapes and sizes. Don't give up just because there is no perfect place to put a school garden. Think creatively, and work with what space is available. Developing an outdoor garden space is ideal, but may not be possible in every situation. In reality, this is a fact of life for many home gardeners. Families that rent homes, live in apartments, or tend to move a lot may all have a difficult time gardening in the ground. For more information about gardening in containers, refer to page 19.

Assuming there is a suitable site for establishing a garden outdoors; the school garden team will want to decide what shape the garden should take the first year. A general recommendation is to start small, and expand from there (as funding becomes available).

A. Raised Beds

Many schools choose to establish **raised garden beds**. In a school garden setting, raised beds tend to have a number of advantages over traditional ground level gardening. The beds can be raised up, for example 6-12 inches high – or, just at ground level, with permanent pathways in between.

Advantages of raised beds include:

- Students know where to walk, thus protecting the garden beds from compaction – and trampled crops.
- Soil amendments (e.g. compost) can be directly applied to soil where plants will grow, thus saving money, time, and resources.
- They tend to be more productive.
- They are less prone to compaction, thereby requiring minimal, if any cultivation.
- Allow for better drainage (e.g. on compacted or wet sites).
- Work in difficult sites, such as on parking lots and rooftops.
- Soil in raised beds warms earlier in the spring, giving your garden a jumpstart.

Disadvantages of raised beds include:

- Depending on what materials (wood, bricks, etc) are used to frame in your garden beds - this approach may be more costly.
- They often dry out faster than ground level gardens, thus requiring more frequent watering.

Things to Consider

- When choosing material to construct your bed from - if using wood, longer lasting lumber such as cedar will cost more. While less expensive, pine, spruce, or fir cost much less, but won't last as long.
- Be sure all wood products are untreated. Many wood products are treated with chemicals.
- Depending on what you grow, most plants can do well in a depth of 6-12 inches, but 18 -24 is better.
- Teach students to walk on pathways only, and avoid stepping on the beds, which will cause soil compaction.
- If you are filling your raised beds with new soil, a 50/50 ratio of finished compost to

screened topsoil is ideal.

- Be creative! Your beds can vary in size and shape!



This raised bed is constructed from a layer of cinder blocks. Herbs such as chives, mint, are planted in the holes in the blocks in the end of each bed. Garden and photo by Karen Schmidt.

B. Removing Existing Vegetation

If starting a garden from scratch, it may be necessary to remove existing vegetation. There are a number of ways this can be accomplished.

If the goal is to plant the garden the season in the same season as starting the garden, it will be necessary to first remove any existing vegetation. Two ways to accomplish this include removing the sod (or other herbaceous (non-woody) vegetation by hand - use a spade to lift up vegetation, carefully shaking soil from roots). Another method would be to use a sod cutter (can be rented at many hardware or garden supply stores), which cuts the vegetation, which can then be peeled back.

If starting to prepare a garden space in a year or at least several months in advance, another method is to cover the soil up for several months with wet newspapers, cardboard, or plastic covering with 4-6 inches compost, or 8-10 inches straw. (Be careful the edges are secured so the wind doesn't blow it all away!) The key is to block all light from reaching the soil, snuffing out the plants below – and preventing germination of any weed seeds in the soil. A sign that the area is ready to garden in is that the plants are *completely* decomposed, usually at least 8 – 12 weeks of the growing season (e.g. May 15- July 1). This method is also useful for enlarging an existing garden (for example, consider snuffing out an area that pumpkins are allowed to sprawl across).

C. Highlight School Gardens

Leland Public School

The Leland School Public School garden was first started in the spring of 2008. Gardeners removed the sod from limited 2 ft X 15 ft areas, after loosening the soil, and working in some compost, these beds were planted days later. The grass between the beds, and surround the garden was “snuffed out” with a layer of landscape fabric, covered by a thick layer of straw.



Photos by Richard Allen

The following spring, the grass was completely gone, and eighteen 2 X 8 ft. raised beds were installed. To provide a neat, weed free appearance (that would not require mowing!), landscape fabric (aka weed barrier) was laid down between and around the beds, and then covered with woodchips.



Photos by Richard Allen

Leelanau Children's Center ~ Garden in a Day

This school selected an "H" shaped raised bed for their early childhood center. The garden has an interesting shape, and no part of the garden bed is wider than 2 ½ feet, providing for easy access by young gardeners. After constructing the frame from donated lumber, the bed was filled with a 50/50 mixture of topsoil and compost, all without removing existing vegetation first. The frame was staked at the corners, to prevent it from shifting, all without digging up the lawn. The result was a garden that was established very quickly!



A teacher at the Leelanau Children's Center, consults with MSUE Master Gardener Volunteer (right).



Later that same season, the "H" garden was expanded.

Photos by Pam Schmidt

Benodjenh Headstart Center, Suttons Bay

High school students working on a community service project, and Master Gardener Volunteers, installed this garden in the fall of 2009. The garden consists of 14 beds measuring 3 X 3 ft, and 6 larger beds measuring 4 X 8 ft. The beds were placed directly on the existing grass, and then filled with a mixture of 50/50 compost and topsoil. The next week, students at the school planted garlic, giving the students something to look forward to seeing emerge in the spring.



Photo by Pam Schmidt

D. Basics of Container Gardening

For situations that are limited by space or where there is no suitable place to garden outdoors... don't give up! Container gardening may be just the ticket! Many garden-based learning projects lend themselves to growing plants in the classroom (or in containers placed outdoors).

Advantage & Disadvantages

Container gardens will dry out more quickly than gardens in the ground. Larger, deeper containers will dry out less quickly. As plants grow larger and roots fill up more of the container, watering even more frequently (often daily) is necessary. Advantages of using containers include: they can be used where no appropriate site for a garden is available; they can be moved easily (for example, containers can be moved outdoors during daytime, and inside at night); they can be maintained indoors or outdoors, so long as they have adequate light; and they generally have fewer pest problems.

Choosing the Right Container

Just about anything can be used as a container for growing plants.... however, some will work better than others. For short lived plants such as baby lettuce, paper milk cartons or cups may do the job, but for longer lived plants like tomatoes, choosing a container that will last the entire growing season becomes important. Containers should generally be at least 6-10 inches deep for smaller crops, and 18-25 inches for larger plants such as peppers or tomatoes. Always be sure containers have adequate drainage. This can be provided with holes along the bottom of the container, or even along the side of the container, close to the bottom. To keep soil from passing through the drainage hole, consider placing a piece of mesh screen over the hole. If growing indoors, containers should be placed on a tray or other container that will prevent any excess water from making a mess in a classroom. Container gardening is an opportunity to re-use items that might otherwise be disposed of... consider growing plants in old buckets, bushel baskets (lined with plastic), plastic shoe boxes, coffee cans, old bathtubs or washtubs, or old window boxes. You can also purchase containers specifically designed for gardening, such as the EarthBox (see information below).

The EarthBox™

This company produces a uniquely designed container for growing vegetables, called the EarthBox. Each reusable container cost about \$55, and has dimensions of 29" L x 13.5" W x 11" H. Containers are large enough to grow two tomato plants. They are designed to be watered from the bottom

www.earthbox.com

Plant Selection

Just about any vegetable can be grown in a container, but some will do better than others. For example, some plants that do well include lettuce, Swiss chard, spinach, radishes, carrots, culinary herbs, tomatoes, peppers, green beans, onions, and radishes. More challenging are larger plants such as corn, melons, squash, and cabbage. When selecting varieties, look smaller, compact varieties, more suitable for growing in containers. For example, look for the terms, "compact,"

“dwarf,” and “bush” varieties. Seed packets and plant labels often indicate if recommended for container gardening. Consider planting a container with a combination of plants that are suitable for growing together. For example, plant a couple of basil plants with a tomato plant in a large container. A common mistake to avoid is planting too many plants in one container, or not a large enough container in the first place. If plants are too crowded, they will become stunted, and be less productive or – not productive at all. If the goal in gardening with students is to grow something they will be able to harvest and eat, consider growing something that grows quickly such as radishes or baby lettuces (or other greens). When teaching kids to garden, resist setting students up for failure by planting crops that are doomed not to mature because of space issues.

Planting Information for Growing Vegetables in Containers

Information adapted from: Bulletin #E-545 “Vegetable Gardening in Containers” by Joseph G. Masabni, Texas A & M System. Retrieved from http://aggie-horticulture.tamu.edu/publications/guides/E-545_vegetable_gardening_containers.pdf on 2/21/10.

Broccoli	2 gallons, 1 plant
Carrot	1 gallon, 2-3 plants. Use pots 2 inches deeper than the carrot length
Cucumber	1 gallon, 1 plant
Eggplant	5 gallons, 1 plant
Green Bean	2 gallons minimum, space plants 3 inches apart.
Green onions	1 gallon, 3-5 plants
Leaf lettuce (heads)	1 gallon, 2 plants (for heads)
Baby leaf lettuce	1 gallon, space plants 1-2 inches apart, and harvest at 1-3 inches.
Culinary Herbs (e.g. Parsley, basil,)	1 gallon, 3 plants
Pepper	5 gallons, 1-2 plants
Potato	5 gallons, 1 plant
Radish	1 gallon, 3 plants
Spinach	1 gallon, 2 plants
Swiss Chard	1 gallon, 1-3 plants
Tomato	5 gallons, 1 plant
Turnip	2 gallons, 2 plants

Soil for Container Gardening

Avoid using regular garden soil for container gardening. This soil tends to be heavy, and tends to provide inadequate drainage. Instead, consider either making your own ‘soilless mixture’ or purchase a commercially available planting mix such as Bacto[®] or Jiffy Mix[®].

A simple recipe for a soilless mixture would be:

- 1 bushel peat moss (about 9 gallons)
- 1 bushel horticultural grade vermiculite
- 1 lb dolomitic limestone
- ¼ lb of 20% super phosphate
- ½ lb of 5-10-5 analysis fertilizer

IV. Maintaining the Garden

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A. Tools for the School Garden

Depending on the size of the school garden, and the age of the students, it is surprising how much can be done with very few tools. Instead of buying an arsenal of tools upfront, borrow tools to get started – and figure out which tools are worth investing in.

Bare Essentials: A few tools to start with include:

- Hand trowels – surprisingly inexpensive (as little as \$2 for plastic ones)
- Hand cultivators
- Garden hose
- Sprinkler
- Garden rake
- Garden spade

Other Helpful Items:

- Automatic timer
- Kid sized rakes or spades
- Watering cans
- Buckets
- Garden gloves – recommended for soils containing high lead levels
- Wheel barrows or garden cart
- Digging fork
- Rain gauge, weather station
- Scale for weighing harvested produce
- Compost bin
- Fence
- Trellis
- Bench or table
- Worm bin
- Toolshed
- Greenhouse or passive solar hoophouse
- Coldframe for season extension
- Row cover fabric for season extension and insect control
- Grow lights for starting plants

Sources for Tools and Equipment

- Create a wish list for your garden, and publicize what your garden needs in school newspaper, sign in your garden, or local newspaper.
- Scour garage sales and discounted goods at garden supply stores.
- Many tools and resources related to gardening with youth can be purchased from the Gardening with Kids online store, www.GardeningWithKids.com, operated by the

B. Water

Most vegetable plants do best with approximately 1 inch water per week. If you have extremely sandy soil (low in organic matter that retains water), you may need to water more frequently. Mulching your garden will help retain moisture.

C. Weed & Pest Control

Pesticides are chemicals used to control weeds, insects, and disease. Due to the nature of school gardens, pesticides are **not** recommended for use in school gardens. They need to be handled carefully and can be dangerous, especially around children. Controlling pests and weeds naturally (without synthetic chemicals) provides an opportunity for students to learn about natural cycles, and sustainable gardening practices.

Weeds can often overwhelm a garden if not properly controlled. A key strategy for minimizing weeds in a garden is preventing weed seed from germinating in the first place. A heavy layer of straw, at least 8-10 inches can do this job. Pathways and garden border areas can be maintained with landscape fabric (or other material) covered with thick layer of mulch.

Once your crops get going, it might not take long for some garden **pests** to take residence in the garden. These pests offer a wonderful learning opportunity – students have the opportunity to study ecosystems in action. Work with students to monitor beneficial insects vs. problem insects. For the safety of gardeners, chemical insecticides are not appropriate in a school garden. When pests do become a problem, if it becomes necessary to control them, try having older students hand pick them (place in jar of soapy water), before resorting to other methods. Generally speaking, healthy gardens tend to not be as susceptible to pest problems.

Pest control methods:

- Hand picking
- Barrier (such as row cover fabric)
- Insecticidal soap (e.g. 6 TB Ivory Snow, and 1 gallon water)

Common Pests

- Colorado potato beetle – hand pick insects and eggs
- Squash bug – trap and hand pick
- Tomato hornworm – hand pick
- Slugs & snails

V. What to Plant

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V. What to Plant

One of the most important aspects to determining *what* to plant is really considering what the plan is for the harvested crops. How many people have made the mistake for growing rows and rows of cabbage, zucchini, or some other vegetable, only to discover there was no plan on how to use it? If the produce from your school garden is going to be incorporated into the school food service, communicating with the food service director about what would be most valuable would be important. If produce is going to be incorporated into the classroom learning activities, then it will be necessary to work with teachers and students to determine what to plant.

A. Planting for Fall Harvest

If the goal is to maximize the number of students involved with harvesting and consuming the produce, you may want to consider planting crops that are harvested in the fall. For example, crops like onions, potatoes, winter squash, cabbage, kale, carrots, peppers, and beets can all be harvested in the fall – and there is less concern that crops will go to waste in the garden (as with crops such as cucumbers, green beans, or tomatoes – which all must be harvested in a timely manner.)

B. Examples of Theme Gardens

- Pizza Garden
- Food Pyramid Garden
- Pioneer Garden
- Salad Garden
- Salsa Garden
- Stir-fry Garden
- Soup Garden
- Three Sisters Garden

C. Resources Related to Food Gardening

Food Gardening Guide, National Garden Association

<http://www.garden.org/foodguide/browse>

Gardening in Michigan, Michigan State University Extension

www.migarden.msu.edu

Kids Gardening, National Garden Association

www.kidsgardening.com

Square Foot Gardening Foundation

www.squarefootgardening.com

Four Season Harvest, by Elliot Coleman. Chelsea Publishing Company, VT. 1999.

Weedless Gardening, by Lee Reich. Workman Publishing, New York. 2001.