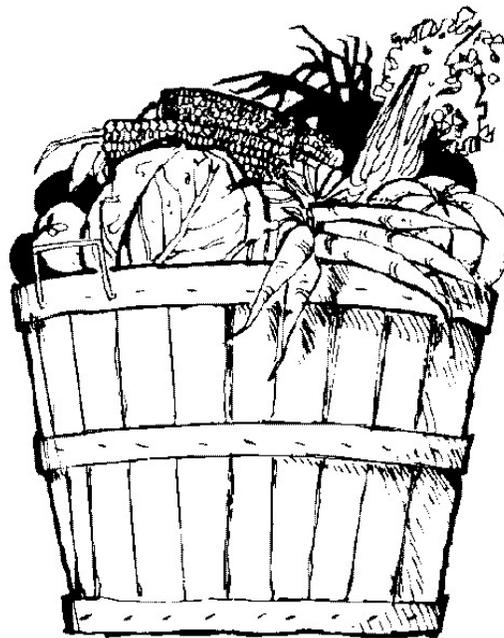


Growing Guide

*Making the most of your
raised bed garden*



Garden Blitz 2020

WELCOME:

Congratulations on your new garden! We know you are eager to get started so we have tried to provide some helpful information about planning, planting, watering, pest control and fertilizing. A thorough reading of this guide should be very useful.



MY PLEDGE TO THE COMMUNITY:

By receiving a raised bed garden from Grow It Forward's Garden Blitz, I am accepting the responsibility to take care of it. I will be rewarded with fresh food of my choosing and the benefits of gardening for years to come. I will share what I cannot use myself and share the idea of gardening with my family and community.

ABOUT US:

This garden has been brought to you by Grow It Forward, a non-profit organization on a mission to improve access to local, healthy food.

Grow It Forward's Garden Blitz fundraiser supports community garden programming. The community garden is located at 2344 S 14th St in Manitowoc. Here, the garden beds are used as an educational tool impacting over 800 youth since 2015. Specifically, this fundraiser is allowing us to host a garden camp for children this summer, teaching them the importance of nutritious food. Additionally, these funds allow us to increase the number of garden beds we plant. All produce grown in our community garden is donated to local food pantries.

The goals of the Garden Blitz are to:

- increase local food production in Manitowoc
- help residents grow their own food
- build capacity and community among urban residents

CONTACT US:

If you have advice, recipes, questions, or gardening experiences that you would like to share, we would love to hear them. Send us your input:

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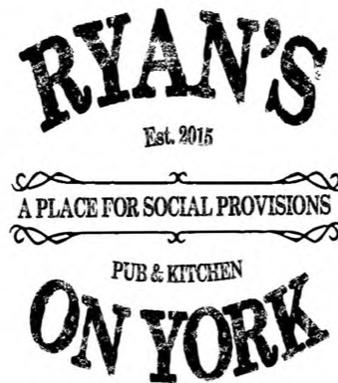
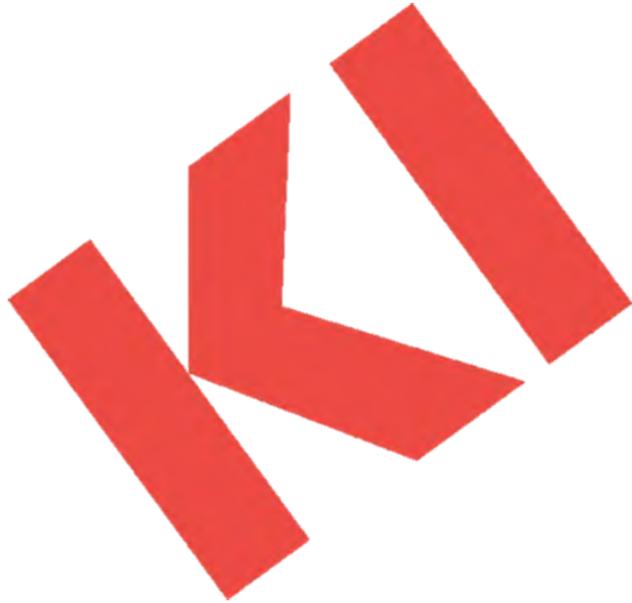
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ACKNOWLEDGEMENTS:



We would like to thank The Food Project in Massachusetts for the content of this garden guide. Without them this would not be possible.

We also thank our sponsors of the Garden Blitz:



Thank you for your support of Grow It Forward's community garden programming!

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Raised Bed Gardens

Welcome to your new 4'x8' or 4'x4' raised bed garden. Raised bed gardens can be constructed out of many materials. The volunteers for Grow It Forward have built this one for you out of untreated wood purchased from Braun Building Center. The frame is filled with clean, nutrient-rich soil and compost mixture. Whether you are a seasoned gardener or a first timer, we hope you will enjoy growing healthy, fresh food for yourself, your family and friends for many years in your new raised bed garden.

Why raised beds? There are many advantages to growing food in raised beds. Here are a few:

- The soil warms up faster in the spring, allowing for earlier planting.
- Water is able to drain easily.
- The garden can be tended from the edges, so the soil does not become compacted by people walking in the garden and remains loose.
- Loose soil makes seeding, transplanting and weeding easier;
- Plants like the loose soil because it gives them plenty of space for their roots to grow.
- Raised beds can be planted more intensively than a traditional backyard garden. This means you can grow more vegetables in smaller spaces.
- Raised beds make it possible to grow safely even on land that is contaminated with lead and other heavy metals.
- Depending upon the severity of the winter and your own inventiveness, the garden can be used year-round, although most people grow their vegetables from mid-April through late October.
- Fewer tools are needed to help you plant and care for your garden.

USEFUL TOOLS: The good news is that you will need very few tools to be successful in a raised bed! A *pitchfork* or *shovel* might help loosen the soil at the start of each season. During the season, *scissors* and a *hand trowel* are quite handy. Other useful things you might find around the house are *spray bottles* for pest control; *plastic knives* or *popsicle sticks* for labeling; and a *bucket* to fill with weeds.

This guide contains specific information on how to plant and grow a variety of vegetables that are well adapted to our climate. We have included information on where to place the raised beds, planning which crops to plant and when to plant them, watering, caring for the soil and getting rid of pests. There are many ways to plant a garden, so feel free to experiment and try other methods. Talk to other gardeners in your neighborhood and see what is working for them. Read gardening books, magazines, and seed catalogues. We have included a list of them as well as other helpful resources in the back of this guide. Of course, the best teacher is “trial and error”—so roll up your sleeves and have fun!

Where to Put a Raised Bed Garden

Most crops require at least *six hours of direct sun in the summer*, so it is important to site your garden in a sunny area. Observe your yard during different times of the day to determine which spot gets the best sun. If you are doing this in the spring, remember to account for trees that may block light once the foliage appears. It is helpful to have a source of water nearby or you may find yourself having to carry water, which can get tiring in a dry summer. Some afternoon shade may benefit the garden by helping to conserve soil moisture. However, it is advised to place gardens away from the drip line of buildings or structures that have lead paint on them, as the lead can contaminate the soil in the garden.

Square Foot Gardening

Grow It Forward recommends using the square foot method to plan your garden. Mel Bartholomew, who developed this type of gardening in the late 1970s, discovered that this method could produce a greater harvest in less space with less work. In square foot gardening, the plants are arranged in blocks instead of rows. Each block contains a different vegetable, herb or flower. The number of seeds or plants that are placed in each square depends on how large the plant grows and how much space it needs to develop properly. The quality of the compost and soil in the raised bed also impacts how intensely you can grow. (See “Feeding the Soil” section, page 17) By using this technique, you can easily maintain and replant squares throughout the season without disturbing other areas of the garden. **This growing method is also easy to learn, which is especially encouraging for first timers!**

Garden Planning

TIPS TO CONSIDER:

- The best time to plan a garden is during the winter.
- You may want to choose to grow only the crops that are particularly well suited to growing in small spaces (small plants, quick growing plants, things that can be grown on trellises or vertically save space; plants with a high yield: kale and collards continue producing leaves for harvesting while cabbage only produces one head per plant).
- For vegetables that take up a lot of space in your bed, such as cabbage, corn, winter squash, and melons, consider buying this produce at your local farmers’ market.
- If you have a favorite vegetable, consider planting two or three squares of it.

- If you plan to grow more than one square of something that matures quickly (carrots, radishes, lettuce, beans), consider planting each square 2-3 weeks apart (succession planting) to spread out the harvest.
- Plan to continue to use squares after something is finished producing and has been harvested. For example, after four weeks, you will harvest your radishes and have an empty square. Plant another square of radishes, or perhaps a fall crop of greens.

STEP-BY-STEP:

1. Using the Planning Chart (page 29), make a list of all the fruits, vegetables, herbs, and flowers that you want to grow and eat.
2. Use the Square Foot Planting Guide (pages 10-18) to determine how many squares each type of plant requires and its height. Then write this into your chart accordingly.
3. Using the Raised Bed Grid on page (page 30-31), mark off the North side of your raised bed. (This can be along either the short or long side of the bed, depending on the setup of your space. Use a compass or look at your street on a map to determine which direction is North.)
4. To determine what goes in each square on the Raised Bed Grid, you will use the plants' height. Write all plants that are marked as "short" in the height column on your Planning Chart into the squares on the south side of your garden so that they will not be shaded by the taller plants.
5. Write the plants that are of medium height into the center squares.
6. The tallest plants should go in the squares on the north side. Make sure to block out several squares for large plants, such as tomatoes or summer squash.
7. If you are going to add a trellis, it should be built onto the north (most preferable) or west side. Mark off where it will be built on your Raised Bed Grid. Make sure to place the climbing plants, such as pole beans, cucumbers, or peas at the base of the trellis.
8. Now determine how many individual plants can be planted in each square. This information is contained in the Square Foot Planting Guide. Write the number (Example: 4 plants for lettuce, 16 for carrots) on the map next to the name of the plant.
9. Next, fill in the "planting schedule" column on your Planning Chart. Do this by writing out the dates for when you can and will plant each crop (using the date ranges from the Square Foot Planting Guide). This will ensure that you start everything on time and prevent you from forgetting to plant something! You may want to write the dates out sequentially after you're finished.
10. Finally, fill in the "estimated harvest time" column on your Planning Chart. This will help you figure out when it's time to harvest something, and get you thinking about what to replant a square with once it's empty. Using the date when you plan to plant each crop, write in the estimated date for when the crop will be ready to harvest. You can find this information on individual seed packages. The length of time a crop needs to mature varies depending on each specific variety. Some plants take a long time to mature that they use their squares throughout the entire growing season. In other words, nothing else can be planted in these squares. This includes most fruiting plants, such as peppers, eggplant, and tomatoes.

Planting Your Garden

MARKING OFF SQUARES:

Before planting, we recommend that you use a measuring tape to mark off each foot along the four sides of the raised bed. For some, it is helpful to hammer nails into the frame at each mark, and then string the bed in order to form a grid.



Alternatively, take a stick or handle of a garden tool and lay it across the bed from a mark to the one directly opposite on the other side of the bed. Push it lightly into the soil until it leaves an indentation in the soil. Continue marking the soil around the bed until you have formed a grid pattern on the soil. Now you are ready to plant.

PLANTING METHODS:

There are two ways to get plants in your garden – by putting in seeds (direct seed method) or by putting in small plants that you have grown indoors or purchased (transplant method). See the Square Foot Planting Guide (pages 10-18) for more information about specific plants' needs. When you plant your garden, try to stay outside the raised bed so that you do not compact the soil by walking or stepping on it. If you need to get to the center of the beds and can't reach from the side, lay a plank across the frame and kneel on it.

Direct Seeding: First, look at the seed package to determine how old the seeds are. If they are new, then the germination rate should be accurate. For new seeds that are below 90%, it is best to plant two seeds per hole to ensure that they germinate. Older seeds will generally continue to sprout if they are kept dry and well preserved. However, older seeds have lower germination rates so it is recommended to seed heavier (2-3 seeds per hole, for instance) to ensure that enough will come up. If you don't see a seedling after the suggested germination time, replant more seeds. Seeds that are more than four years old are probably worth tossing. (See "Seed Information Chart" for crop-specific seed storage, page 25)

To determine how deep to plant the seeds, refer to the seed packet, Seed Information Chart (page 25), or the Square Foot Planting Guide (pages 10-18). Planting depths usually range from 1/8 inch to 1 inch. If you find yourself in the garden without access to this information, you can follow these general rules: in cool weather, plant a seed deep enough so that 3 more of the same seed could lie on top of it. In hot weather, 4 seeds should be able to lie on top of it – this will

help protect the seed from drying out as it starts to grow. In other words, smaller seeds are planted less deep than larger seeds. Before starting, dampening the soil will make it easier to poke holes. Cover all seeds lightly with soil and pat the soil gently to bring seeds into contact with soil.

Since you are rarely equipped with a ruler when you go out to the garden, it's helpful to know that the length of your index finger from the first knuckle to the tip is approximately one inch. So just use your own finger as a guide.



Be sure to water the seeds gently right after you plant them. This is best done with a spray bottle or mist nozzle on a hose. Some of the seeds are so small and so close to the top of the soil that a stream of water can wash them away. **Keep soil moist – not soaking – as seeds germinate.** The compost mix that is in the raised bed dries out fairly quickly. For this reason, it is important to water the seeds gently each morning until they germinate. Try to avoid watering in the middle of the day when soil moisture evaporates the quickest.



Transplanting: To transplant, dig a hole in the soil slightly larger than the container in which the seedling is growing. Carefully pry the entire plant and the surrounding soil out of the pot. Generally, it helps to turn the plant upside down and apply gentle pressure to the bottom—the root ball should slide out.

If you see a clump of tangled roots at the bottom of the root ball, gently tickle those roots loose. Set the root ball, roots down, into the hole, and fill it with soil. With vegetable transplants you can bury the plant up to the first set of leaves; this will keep the seedling from drying out too quickly. Pat down the soil firmly around the plant so that the roots are in contact with the soil. Smooth the soil out around the stem so that the surface of the soil drains slightly toward the plant. This will help the plant collect moisture.



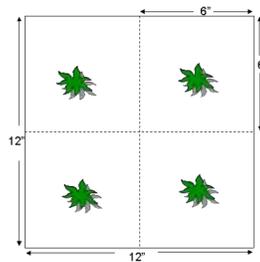
Example of a root-bound transplant. Gently pry the roots loose before planting.

Water the base (not the leaves) of each seedling immediately after transplanting and for the next few days until they are established, especially if transplanting in mid-summer. Newly

transplanted seedlings often suffer from shock and look sad for a few days but perk up after that. To lessen the shock, transplant on cloudy days or early in the morning.

LABELING: Label what you have planted in each square so you will remember the location of plants. Including the planting date on the label will let you know how long ago you planted and when you should expect to see the first sprouts as well as an estimation of when you can expect a plant to be ready for harvesting. Plastic knives work well as cheap labels!

SPACING: When using the Square Foot Gardening technique, plants are spaced differently than they are in traditional row methods. Look at the diagram below to see how this works. If you are planting lettuce, turn to the Planting Guide to see how many heads of lettuce can fit in a square – 4. In your lettuce square (represented by the solid lines) draw a grid in the soil with your finger that divides your square into 4 equal blocks (represented by the dashed lines). Plant your seeds or transplants in the center of these smaller blocks as in the picture below.

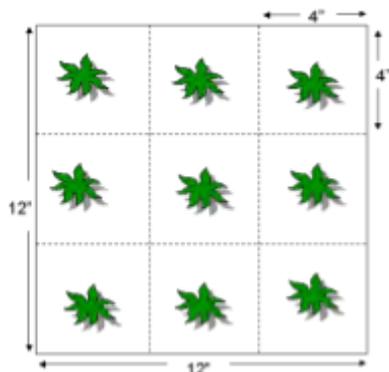


CLIMBING PLANTS: “Vertical crops” such as peas, pole beans, and cucumbers, like to climb, so plant their seeds in a line underneath the trellis, near the edge of the bed. Train the plants to climb up the trellis by twisting the main stem through the trellis once a week. Alternatively, you can plant cucumbers along an edge or corner square (towards the front since they are short when not growing vertically) and train the vine to grow out of the box in order to save space.

Square Foot Planting Guide

Now that you understand what a raised bed is and have some idea how to plan your garden, here is specific information on how to grow different types of vegetables.

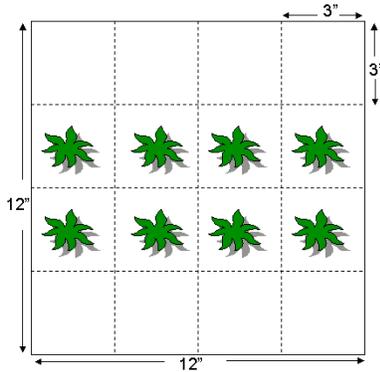
Beans – Bush:



Bush bean varieties mature earlier than pole beans. Direct seed in late May after soil has warmed and then every 3 weeks through July for a season-long supply. When watering beans, be careful not to wet the foliage; diseases and fungus love to grow on wet leaves. Harvest beans when the foliage is dry.

Square Foot Planting: *9 bush beans per square foot*
Seed depth: 1" *Direct seed*
Germination: 7-10 days *Height: Medium*

Beans – Pole:



The most effective use of space is to grow pole beans (climbing varieties) on a trellis. A single planting will supply you throughout the season. Sow the seeds along the bottom of a trellis. As they grow, help plants wrap up and around the trellis. The taller the trellis the better!

Square Foot Planting: *4 pole beans per square foot of trellis*

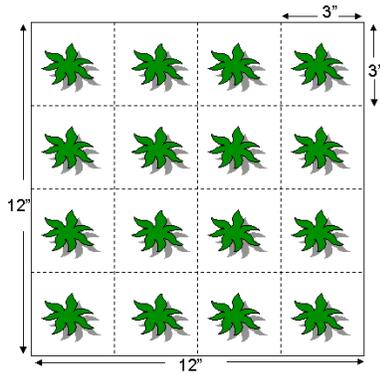
Seed depth: 1”

Direct seed

Germination: 7-10 days

Height: Tall

Beets:



Grown for both the greens as well as the beet root. Earliest plantings can fail if it is too cold and wet. Sow every 3 weeks from mid-April through mid-August for a continual supply.

Square Foot Planting: *16 beets per square foot*

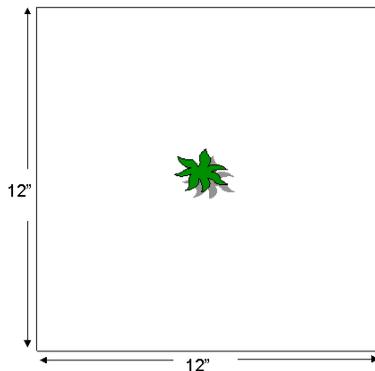
Seed depth: 1/2 inch

Direct seed

Germination: 5 days

Height: Short

Broccoli:



Transplant in late April for early crop. Direct seed May-June for fall crop. Harvest the central head before yellow flower buds open. Then enjoy the tasty side shoots, which the plant produces all summer long. Water regularly throughout the season.

Square Foot Planting: *1 broccoli per square foot*

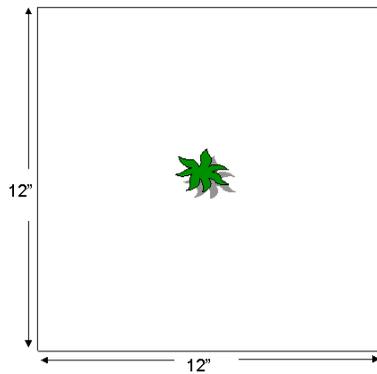
Seed depth: 1/2 inch

Direct seed or Transplant

Germination: 4-7 days

Height: Medium

Cabbage:



Transplant in late April for early crop. Direct seed May-June for fall crop. Water regularly throughout the season.

Square Foot Planting:

Seed depth: 1/2 inch

Germination: 5 days

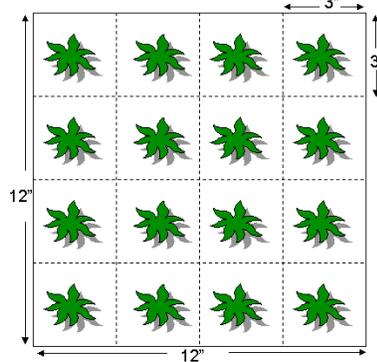
1 cabbage per square foot

Direct seed or Transplant

Height: Medium

Carrots:

Carrots can be sown at 3-week intervals from late April to



early August. Draw 4 evenly spaced, shallow lines (1/4" deep) using fingers. Broadcast (sprinkle) seed evenly over each line (about 8-12 seeds per line). Lightly pack down soil so seeds are in contact with it. Thin to 2-3 inches apart after germination. Keep soil moist and weed-free after planting.

Square Foot Planting:

Seed depth: 1/4-1/2 inch

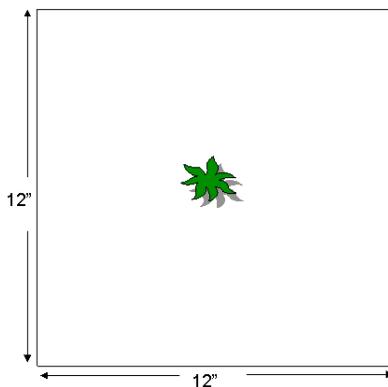
**Germination: 6-17 days
(depending on temperature)**

16 carrots per square foot

Direct seed

Height: Short

Cauliflower:



Transplant 4-5 week old seedlings in late April/early May after danger of hard frost has passed. Water regularly throughout the season. To keep the head white, leaves must be tied up around the head as soon as the heads become visible through the leaves.

Square Foot Planting:

Seed depth: 1/2 inch

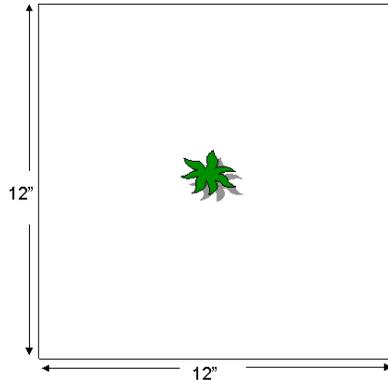
Germination: 6 days

1 cauliflower per square foot

Transplant

Height: Medium

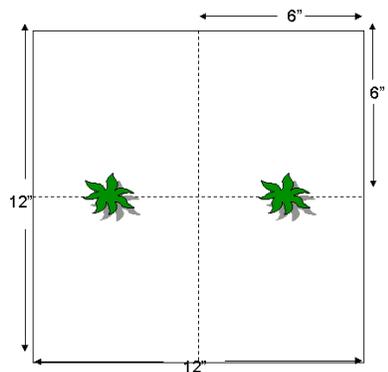
Collards:



Can be planted in spring but it is best as a fall crop. Eating quality improves as the weather gets colder. To harvest greens well into the winter, plant once in early June and again in July as space becomes available in your garden. Harvest the outer leaves as they mature and leave the rest of the plant to keep producing. Use row covers or cayenne pepper to discourage flea beetles and aphids.

Square Foot Planting: *1 collard per square foot*
Seed depth: *1/4 – 1/2 inch* **Directs seed or transplant**
Germination: *6 days* **Height: Medium**

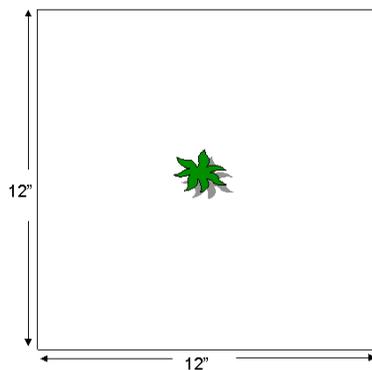
Cucumbers:



Grow on a trellis, or plant close to edge in a side or corner square and train vine to grow outside of box, to conserve space. Plant seeds or starts in mid-late May when the soil has warmed up and danger of frost is past. Be careful not to disturb the roots of these seedlings.

Square Foot Planting: *2 cucumbers per foot*
Seed depth: *1/2 inch* **Direct seed or Transplant**
Germination: *3-4 days* **Height: Short (Tall if trellised)**

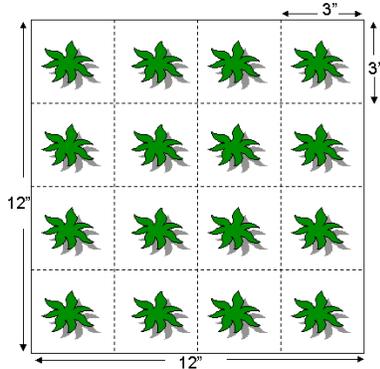
Eggplant:



Must be transplanted to develop mature fruit in Wisconsin. They need plenty of sun and heat. Plant transplants when the weather has warmed up, in late May or early June.

Square Foot Planting: *1 eggplant per square foot*
Seed depth: *1/4 inch* **Transplant**
Germination: *7-14 days* **Height: Medium**

Garlic:



Break up bulb into individual cloves. Plant the cloves (root side down) in October after other crops are harvested. Cover with mulch for the winter. The garlic will be ready to harvest next July. For an early garlic treat, be sure to snip off the curlicue flower buds that appear in May and June. The buds (called scapes) are delicious when grilled, stir-fried or sautéed. Cutting them will also enable the plant to put energy into the bulb.

Square Foot Planting: **9-16 garlic cloves per square foot**
Clove depth: 2 inches **Height: Medium**
(pointed end up)

Herbs, annual:



Basil- can be planted alongside of tomatoes (make sure to leave enough so they don't get shaded by tomatoes). Otherwise, plant 2 per square. Cutting back regularly will provide a good harvest and encourage more (bushier) growth. Transplant or direct seed.

Cilantro- draw 4 lines in a square, sprinkle about 10 seeds along each line. Or, plant a smaller amount within another square, such as with spinach. Seed every 3 weeks for continuous crop. Direct seed only.

Dill- Direct seed 4 per square.

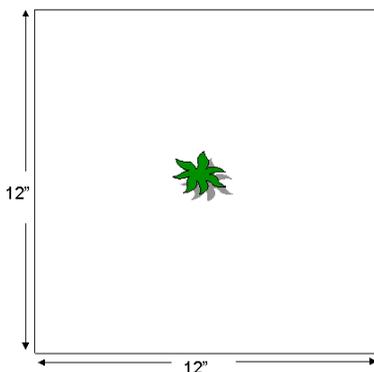
Parsley- Difficult to direct seed so best-off buying transplants. 2 per square.

Herbs, perennial:



Common perennial herbs include **sage, oregano, mint, and thyme**. **Rosemary** is a tender perennial, so it needs to be brought inside over the winter. These herbs spread, so cut back regularly, or dig up in spring or fall, divide, and give half to a friend; then replant. Plant 1 per square; or planting in containers works well and saves space.

Kale:



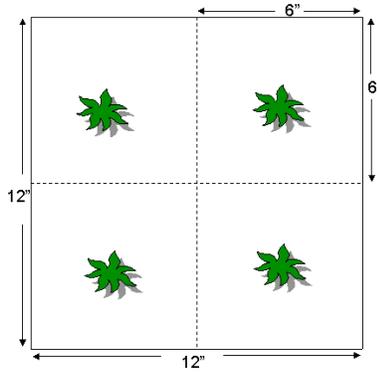
Enjoy fresh kale from early summer through fall by planting seeds from late April through July. Harvest outer leaves as they mature, leaving the rest of the plant to keep producing. If the winter is not too severe, kale sometimes produces into the following spring.

Square Foot Planting:
Seed depth: 1/4 inch
Height: Medium

1 kale per square foot
Direct seed or Transplant

Germination: 5-7 days

Lettuce:



Seed or transplant at ten-day intervals starting in early April. When it gets hot, lettuce tends to “bolt” or send up its seed stalks before the plant is fully mature. Try to use “slow bolt” varieties since they will not become bitter as quickly. During the hottest part of the summer, plant lettuce where it will get some shade.

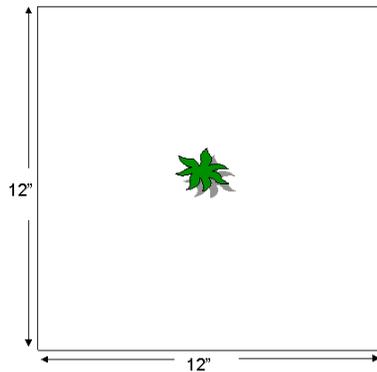
Square Foot Planting:
Seed depth: 1/8 inch

4 lettuce per square foot
Direct seed or Transplant

Germination: 7-14 days

Height: Short-Medium

Melons:

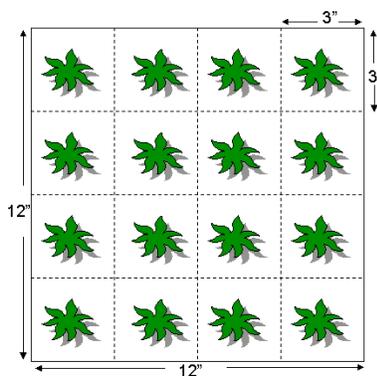


Transplant or direct seed only after the soil has warmed up, late May to early June. When transplanting, be very careful not to disturb the roots. Melon vines take up a lot of space so grow them up a sturdy trellis or train the vines to grow over the edge of the raised bed and across your yard. Water regularly till fruits are set, then decrease water. Hope for a hot summer.

Square Foot Planting:
Seed depth: 1/2 inch
Germination: 3-5 days

1 melon per two square feet
Direct seed or Transplant
Height: Medium (Tall if trellised)

Onions:



Onions can be started from sets (small bulbs that can be purchased at nurseries or ordered from seed catalogs) or transplanted starting in mid-April. If you start with a flat of seedlings, separate them into individual plants. Keep onions well weeded and give them an inch of water each week. The bigger the plants get before the Summer Solstice (June 21), the bigger the onions you’ll grow.

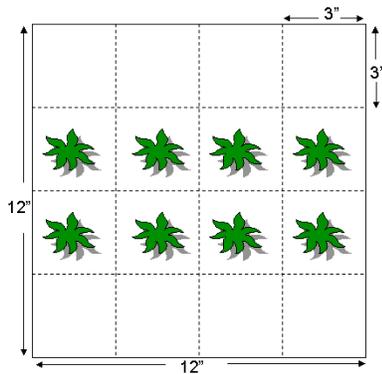
Square Foot Planting:
Seed depth: 1/4 inch

9-16 onions per square foot

Set depth: 1 inch

Germination: 4-5 days

Peas:



Height: Tall

Transplant or Sets

Height: short

Peas grow best in cool weather so plant from early April to mid-May, or plant in August for fall crop. Snow peas seem to do especially well in the fall. Climbing varieties save space and don't require successive plantings. Plant them along the base of a trellis and twist the main stem through the trellis once a week. Try snap pea varieties—fat peas with an edible pod. They are productive and delicious.

Square Foot Planting:

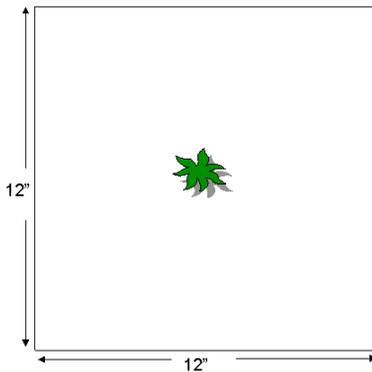
Seed depth: 1 inch

8-12 plants per ft of trellis

Direct seed

Germination: 14 days

Peppers:



Peppers need lots of sun and heat to grow well. They must be transplanted here in Wisconsin. Set transplants out in late May or early June. Early maturing varieties will do the best.

Square Foot Planting:

Seed depth: 1/4 inch

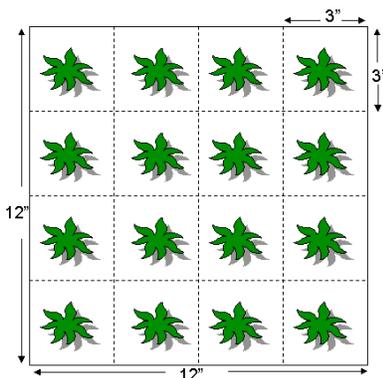
Germination: 10-15 days

1 pepper per square foot

Transplant

Height: Medium

Radishes:



A very gratifying crop because it grows quickly. Radishes can be sown every three weeks from early April to early August. For mild and tender radishes, give them plenty of moisture. Begin to harvest in 3-4 weeks when the root is the size of a marble. They will split and get very spicy if you let them grow too big.

Square Foot Planting:

Seed depth: 1/2 inch

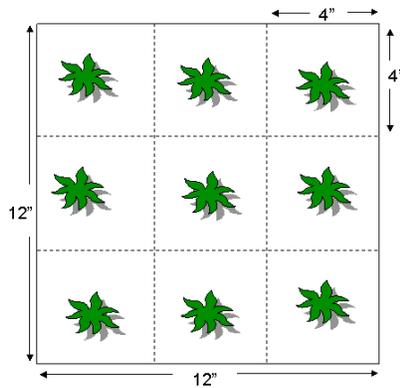
Germination: 4-12 days

16 radishes per square foot

Direct seed

Height: Short

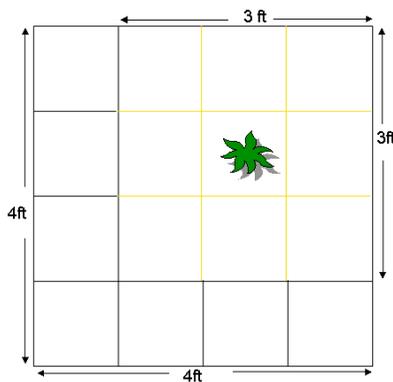
Spinach:



Spinach germinates best in cool, moist soil so plant every 1-2 weeks from late March through mid-May. Sow in August for a fall harvest. Spinach will tend to “bolt” (make flowers and seeds) during the summer heat.

Square Foot Planting: **9 spinach per square foot**
Seed depth: 1/2 inch **Direct seed**
Germination: 7-14 days **Height: Short**

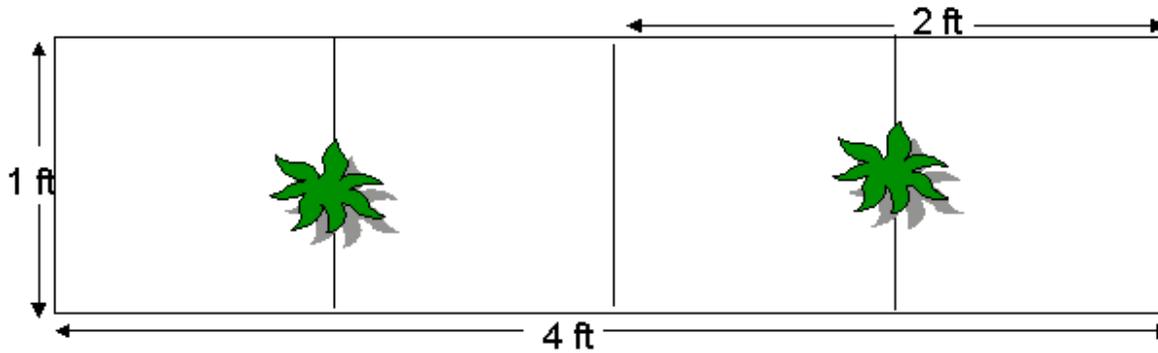
Summer Squash (zucchini, yellow squash):



Seed or transplant after the soil has warmed up, late May to early June. Mound soil in the center of 3 foot by 3-foot space about 4 inches high and plant 1-2 seeds in center of mound. One or two mounds usually provide more than enough squash for most families. Harvest several times a week so fruits don’t grow too big and lose flavor.

Square Foot Planting: **1 squash plant in a 3 ft x 3 ft block**
Seed depth: 1/2-1 inch **Direct seed or Transplant**
Germination: 6-10 days **Height: Medium**

Squash, Winter (acorn, pumpkins, butternut):

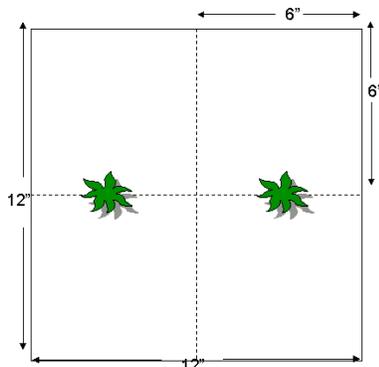


If you just love winter squash and have to have some from your garden, you need to plan ahead. Winter squash really sprawls out and needs lots of room. Plant near the edges of your raised bed and train the vines to sprawl across your yard. Winter squashes with smaller fruits (such as sugar pumpkins) and gourds can be grown on a trellis. Set out transplants or direct seed after the soil has warmed up (late May to mid-June).

Square Foot Planting:
Seed depth: 1 inch
Germination: 6-10 days

2 winter squash vines in a 1 ft by 4 ft row or under trellis
Direct seed or Transplant
Height: Medium - Tall

Swiss Chard:

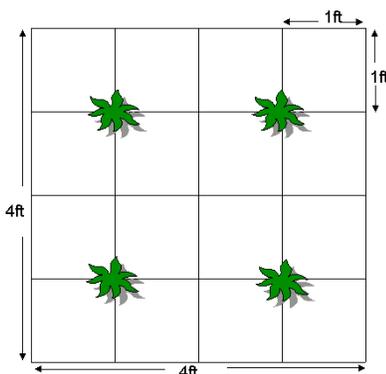


A good green for the whole growing season. Plant from early April until mid-July. Harvest outer leaves as they mature and leave the rest of the plant to keep producing. A few plantings spaced every two months will supply you for most of the season. Red chard is more resistant to pests than green.

Square Foot Planting:
Seed depth: 1/2 inch
Germination: 5-7 days

2 per square foot
Direct seed or Transplant
Height: Short - Medium

Tomatoes:



Must be transplanted to develop mature fruit in Wisconsin. Transplant outside in late May to early June. "Indeterminate varieties" need to be trellised or staked and should be pruned back to the best 2-4 leaders (main stalks) on each plant. "Determinate varieties" don't need to be pruned and will sprawl a little more.

Withholding water after mid-August will force the vines to ripen more fruit. Removing all young flower clusters after mid-September will help the remaining fruit ripen as well.

ing: 1 tomato in a 2 foot by 2 foot block

or 2 tomatoes under 4 feet of trellis

Seed depth: 1/4 inch

Transplant

Germination: 6-14 days

Height: Tall

Caring for Your Garden

WATERING: When seeds or seedlings are first planted in the garden, they will need frequent watering to keep their root systems (but not leaves) moist. **Check the moisture level in the top 2” of soil by sticking your finger into the soil; if it is dry, it is time to water.** If you have a “soaker hose”, lay it down in the middle of the beds and turn it on low for twenty minutes every other day. Water the soil deeply to encourage the plants to develop deep roots. Be careful not to give too much water, as the soil we use is highly organic and it can become waterlogged. If you do not own a hose, use a bucket and a cup as a scoop to water the individual squares, which

works especially well for plants that have just been transplanted.

The frequency and amount of watering will depend on the weather and the size of the plants. If it has been rainy, it is not necessary to water as frequently as when it has been sunny and dry. After seedlings are established and growing well, you can water less frequently.

When watering by hand, be sure to pour close to the ground so you do not “rupture” the soil or create large puddles. This also prevents the leaves from getting wet, which can lead to blight and other fungus problems. Water and harvest your garden during the cooler hours of the day – preferably in the morning. If the plants look yellow, they are getting too much water; if they look wilted, they are not getting enough. During the midsummer when the weather is usually drier, it might be necessary to water every day. If leafy plants look wilted at midday, but perky again at night and early morning, they are doing fine.

THINNING: To be sure to have the maximum number of strong plants growing per square, gardeners often plant extra seeds (perhaps instead of one seed per hole, you put two.) After the seeds germinate, you therefore might have more than one plant in a single spot. Decide which one seems the strongest and “thin out” the others. Yes, you must find the courage to do this—plants need the right amount of space to continue growing! Thin your seedlings by gently pulling out the shoots you don’t want or carefully use small scissors to clip off the unwanted sprouts at the base of the shoot.

WEEDING: Between the time you plant your garden and the time you harvest the last tomato, most of your time will be spent pulling weeds. Weeding is an important part of caring for any garden because without control, weeds can easily over grow and crowd out slower growing

vegetables and fruits. **The best way to keep up with the weeds is to spend a few minutes pulling weeds every day or every few days so that the task will always be manageable.** If you neglect your garden for several weeks, you may have trouble finding your crops when you return, and it will take you longer than a few minutes to make the garden free of weeds again. The most important thing to remember is to remove the weeds before they go to seed and spread more weeds around your garden. (Think of a dandelion.) Another good way to beat the weeds is to use mulch in the garden. (See the section below for more information on mulching.)

Removing weeds from a raised bed garden is often easier than from traditional gardens since the soil in a raised bed does not get compacted so roots come loose easily. It is easiest to pull weeds when they are small as long as you can distinguish the tiny weed leaves from those of the crops you have planted. (Labeling what you plant will help you identify the wanted from the unwanted.) Weeding is also easier when the soil is moist, such as after watering or a rainstorm. You can remove weeds by hand or use a tool such as a claw, a co-linear hoe, or a hula hoe. Just make sure you get all the roots out, so they don't grow back. If you use a tool for weeding, be careful not to work too close to the base of the vegetables or flowers so that you do not damage the roots. When hand weeding around plants, hold the plants in place as you pull the weeds so that you do not inadvertently pull out the plants you want along with the weeds. When you are finished, you can collect all the discarded weeds and add them to your compost pile.

MULCHING: One advantage of raised beds is that the soil warms sooner, so the beds can be planted earlier in the season. However, this also means that the beds are more susceptible to drying out. To help conserve moisture, we recommend that you mulch your garden if you can. Straw (preferred), shredded leaves, compost, and dried grass cuttings can all be used as mulch. Spread the mulch several inches thick over the surface of the bed after the plants have established themselves or put down a layer of newspaper first and then cover it with mulch. At the end of the season, this mulch can be turned under to add organic matter to the soil. A layer of mulch will also help keep weeds in check.

FEEDING THE SOIL: The most important part of a healthy garden is healthy soil. The soil provides nutrients that are necessary for plant growth. The square foot garden method that we advocate for in this guide is particularly dependent on nutrient-rich soil. Healthy, fertile soil can support more plants: plants that are stronger, bear more fruit and will provide more nutrient-dense food for your family. Feed the soil and it will feed you!

Organic matter is an essential component of healthy soil. It helps dry soils to hold moisture and wet soils to drain, it adds nutrients to the soil, it creates air spaces so the roots can penetrate the soil, and it binds up toxic materials in the soil so that the plants can't absorb them. Adding compost is a good way to incorporate organic matter into your soil.



A rich compost high in organic matter will be made of a variety of sources: food waste, manures, coffee grinds, and garden waste. Starting your own compost pile is an easy way to feed your garden!

Not All Compost is the Same: Grow It Forward filled your raised bed with clean compost when we constructed it. **We recommend that you add more compost to your bed each year** in order to replenish the nutrients and bind up any particulates of heavy metals that may have blown into the bed during the winter.

Ideally, a rich compost high in organic matter will be made of a variety of sources—food waste, manures, coffee grinds and garden waste are some examples. While diversity of inputs is not the only factor in making a good product, it is a substantial component. For that reason, we encourage you to make your own compost.

If you can't make your own but are still interested in building up the fertility of your soil beyond the compost that we provide, consider looking for commercially available worm castings, which are a particularly nutrient-dense form of compost. While these can be hard to find locally, many companies sell them online: a 3 lb. bag would be enough for 1 raised bed.

You could always purchase additional compost from the City of Manitowoc for \$13 per cubic yard from the Recycling Center.

PEST CONTROL: The best way to keep pests away from your garden is to grow healthy plants since strong, healthy plants tend to fight off invading pests. In addition, certain vegetables, such as onions, will help to repel insects if planted around the edge or throughout the garden. Flowers and herbs, such as nasturtiums and marigolds, can also provide protection from pests.



Many common household items, such as newspaper, spray bottles, dish soap, and beer, work well to fight off pests in your garden!

If pests do find their way to your garden, try these remedies:

- For *aphids*, mix one teaspoon of dish soap with one quart of water. Spray the aphids with it once a week, over a two to three-week period.
- For *flea beetles*, try sprinkling the leaves with ground cayenne pepper. You can purchase a large jar of this at a pharmacy for a couple dollars.
- To prevent *cutworms* from chewing through the stems of your newly transplanted peppers, eggplant and tomatoes, loosely wrap the stems of the transplants at the base with 2-inch-wide strips of newspaper and bury the bottom edge 1/2 " deep in the soil. The paper will discourage the cutworms when the transplants are young and dissolve as the plants get larger.
- *Slugs* can be a problem for gardeners. They tend to hide under surfaces and around wood. There are several ways to dispose of them. You can pick them off, trap them under a board or melon rind at night, or you can put out traps made of jar lids filled with beer. The slugs will drink the beer and drown in it. Spreading a gritty material, such as sand, around the base of the plants will also deter them.

- For *Japanese beetles*, *Mexican bean beetles*, *Colorado potato beetles*, and *cucumber beetles*, hand pick the adults and the larva and squish or drop into a jar of water. Be sure to scrape any egg masses off the leaves as well. It is easiest to capture these pests in the early morning when the temperatures are still cool.
- Try putting a short piece of a board between your squash plants to trap the *squash beetles*. They will hide under the board at night and can be easily captured in the morning.
- If you notice that the leaves on your tomato plants are looking like skeletons, you probably have *tomato hornworms* in your garden. You will need to look carefully to find the caterpillars hiding among the leaves as they are green and well camouflaged. When you find them, pick them off and dispose of them. They look scary, but they will not bite.

Removing weeds and diseased plants from your garden will also help to keep your plants healthier and pest free.

Not all insects you will see in your garden are there to eat your plants. A number of them are helpful to gardeners because they prey on other insects or they help to pollinate your crops. Without insects such as bumblebees, honeybees, and butterflies we would not have tomatoes, squash, or peppers. Ladybug beetles, trichogramma wasps, soldier beetles and lacewings are among the insect predators that feed on pests in your garden. You can attract these friendly insects by planting nectar-producing flowers and herbs, such as parsley and dill, around and throughout your garden.

LEAD: Lead is a heavy metal that naturally occurs at low levels in the soil. However, soil with higher lead levels can be harmful to people, especially for gardeners and their families who have direct contact with the soil and vegetables being grown. Urban soil was contaminated in the past by lead paint on houses and leaded gasoline. Today, it is illegal to use lead in paint or gasoline, but its remnants from past use pose a problem to urban gardeners.

What does this mean for your garden? Since you will be gardening in a newly built raised bed filled with healthy soil, your vegetables will have a healthy environment for growing. However, lead contamination can occur over time if contaminated soil exists nearby.

What is a “safe” lead level? The Environmental Protection Agency declares soil lead levels under 400 parts per million (ppm) to be safe for growing crops. Learn how to get your soil tested in the “Soil Testing” section on page 23.

We suggest that you follow these simple gardening practices:

- Wear gloves while gardening.
- Wash vegetables thoroughly before eating or cooking.
- Add compost at the start of each growing season. (Compost dilutes contamination and binds the lead so that it is not available to you or the plants you are growing.)
- Wash hands after gardening.
- Mulch any areas of bare soil in your yard to prevent contaminated soil from blowing into the garden bed.

Resources

SEED CATALOGS AND LOCAL GARDENING STORES:

Seed catalogs are a great place to find good quality seeds, and they are full of helpful information. If you need to utilize the transplant method, we also have included local gardening shops and greenhouses.

Hartman’s Towne & Country Greenhouse	(920) 683-2123	https://www.hartmansgreenhouse.com/
Roorbach Flowers	(920) 682-6331	https://www.roorbachflowers.com/
Silver Lake Country Store	(920) 682-3388	http://silverlakecountrystore.com/
Baker Creek Seeds	(417) 924-8917	https://www.rareseeds.com/
Garden Supply Guys	(800) 620-7388	https://www.gardensupplyguys.com/collections/heirloom-organic-seed-packets

HELPFUL BOOKS:

Crockett’s Victory Garden by James U. Crockett

How to Grow More Vegetables by John Jeavons

Square Foot Gardening by Mel Bartholomew

The Vegetable Gardener’s Bible by Edward C. Smith

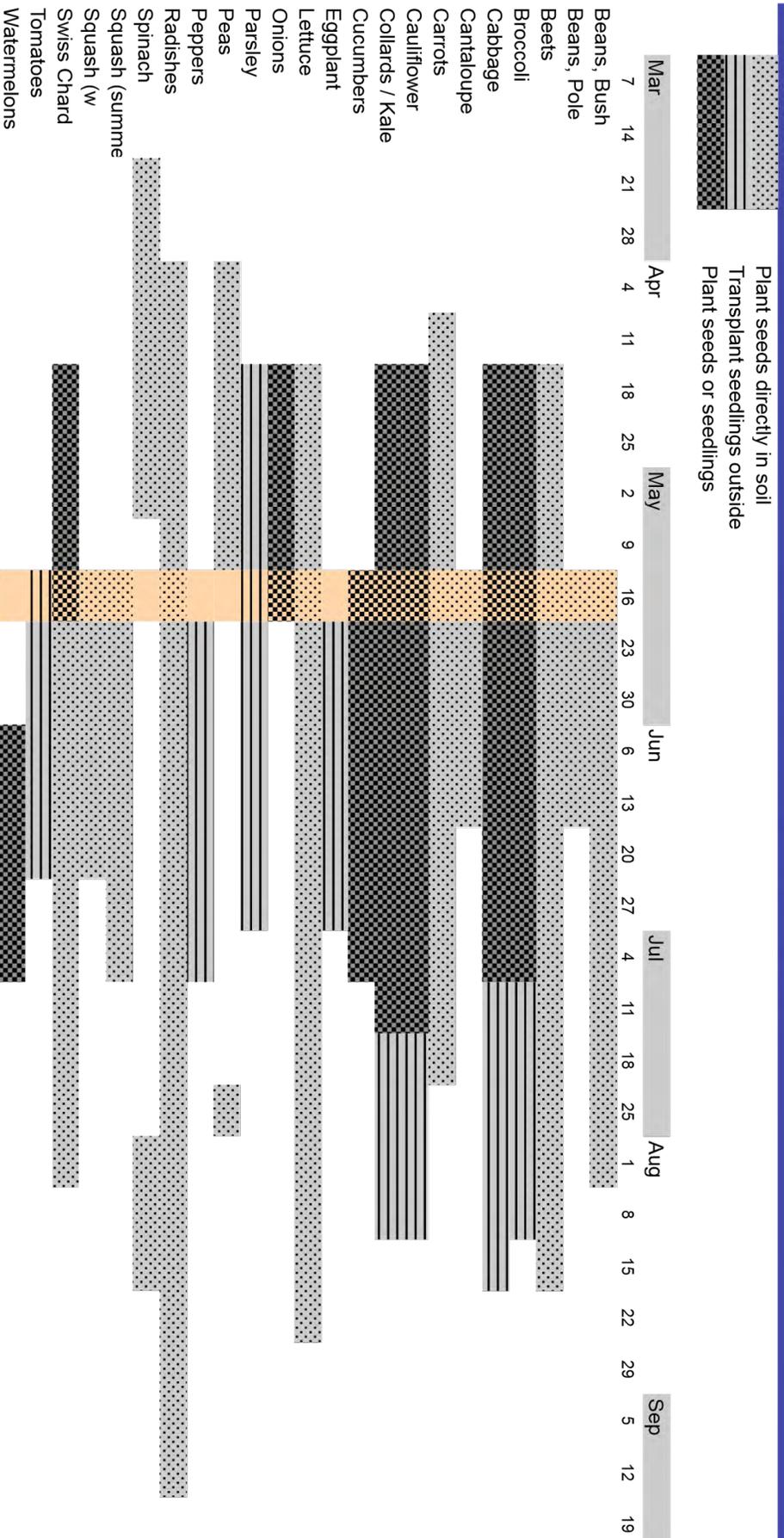
COMPOST BINS:

Compost bins are available at a price of \$60 from the City of Manitowoc. You can purchase one at the Recycling Center, 3000 Basswood Road, (920) 683-4333. Plans are also available online to make inexpensive versions with recycled materials.

SOIL TESTING:

Send samples to the UW Soil and Forage Lab. There are easy-to-follow online instructions. Cost is about \$15 per sample. Visit <https://uwlabs.soils.wisc.edu/soil-samples/lawn-garden/>

**Planting Schedule with a May 16 last frost date
(when you can start planting your warm crops)**



Seed Information Chart

Crop	Seed Depth (inches)	Spacing (plants/square)	Hardiness	Ideal Soil Temperature	Number weeks Seed to Harvest	Number of Years seeds store	Full Sun (6+ hours) or Partial Sun (4-6 hours)
Beans, bush	1	9	T	70-85	8	2-3	Full
Beans, pole	1	8	T	70-85	8	2-3	Full
Beets	1/2	9-16	H	65-85	8	3-5	Partial
Broccoli	1/4	1	MH	65-85	16	3-5	Full
Cabbage	1/4	1	MH	65-85	16	3-5	Full
Carrots	1/2	16	H	65-85	10	2-3	Partial
Cauliflower	1/4	1	MH	65-85	14	3-5	Partial
Swiss Chard	1/2	4	H	65-85	8	3-5	Partial
Corn	1	1	T	70-90	9-13	2-3	Full
Cucumbers	1/2	2	VT	75-95	9	5-10	Partial
Eggplant	1/4	1	VT	75-85	19	2-3	Full
Kale/Collards	1/4	1	VH	65-85	8	3-5	Partial
Lettuce	1/8	4	H	50-75	7	2-3	Partial
Melons	1/2	1	VT	80-95	12	5-10	Full
Onions	1/2	9-16	MH	60-85	20	1	Partial
Parsley	1/4	4	VH	50-85	14	2-3	Partial
Peas, Bush	3/4	8	H	65-85	10	2-3	Partial
Peas, Climbing	3/4	12	H	65-85	10	2-3	Partial
Peppers	1/4	1	VT	75-85	19	2-3	Full
Radishes	1/2	16	H	60-85	4	3-5	Partial
Spinach	1/2	9	VH	60-80	7	2-3	Partial
Summer Squash, vine	1	3 per 1'x4' block	T	70-90	8	2-5	Full
Summer Squash, bush	1	1 per 3'x3' block	T	70-90	8	2-5	Full
Winter Squash	1	1 per 1'x4' block	T	70-90	12	2-5	Partial
Tomatoes, Bush	1/2	4 per 4'x4' block	T	68-80	17	5-10	Full
Tomatoes, Vine	1/2	1	T	68-80	17	5-10	Full

KEY

VT	Very Tender can be damaged by temperatures under 40 degrees
T	Tender will not survive frost
MH	Moderately Hardy survives light frost
H	Hardy survives frost, generally to low 20s
VH	Very Hardy will 'winter over' if protected

Companion Planting Charts

Companion planting means that certain vegetables, herbs, and flowers **like** to grow together. They often help each other grow better, yield more, or taste better. Some plants can also repel pests or attract pollinators. These plants can be planted in squares next to each other or even in the same square if there is enough space.

Vegetable	Compatible With	Compatible With	Not
Beans	Cabbage family, carrot, corn, cucumber, eggplant, peas, potato, Swiss chard, marigold, nasturtium, oregano	Chive, garlic, leek, onion	
Beets	Bush beans, cabbage family, lettuce, onion, garlic	Pole beans	
Cabbage family*	Beets, cucumber, lettuce, onion, potato, spinach, Swiss chard, chamomile, dill, garlic, nasturtium, sage, thyme	Pole beans, tomato	
Carrot	Beans, lettuce, onion, peas, peppers, tomato, chives, rosemary, sage, thyme	Dill	
Corn	Beans, cucumber, melon, peas, potato, squash, marigold, parsley	Tomato	
Cucumber	Beans, cabbage family, corn, lettuce, tomato, marigold, parsley	Potato, sage	
Eggplant	Beans, peppers, marigold, thyme		
Lettuce	Beet, cabbage family, carrot, onion, chive, dill, garlic, onion		
Melon	Corn, pumpkin, squash, marigold, nasturtium, oregano		
Peas	Beans, carrot, corn, cucumber, turnip, parsley	Onion family**, squash, tomato	
Peppers	Carrot, eggplant, onion, tomato, basil		
Spinach	Cabbage family, lettuce, pea, radish, onion		
Squash	Corn, melon, pumpkin, radish, marigold, nasturtium, oregano, onion		
Tomato	Asparagus, beans, carrot, cucumber, onion, peppers, eggplant, basil, chive, parsley, sage, thyme	Corn, dill, cabbage family, potato	

*Family members include broccoli, Brussel sprouts, cabbage, cauliflower, collards, kale, kohlrabi, turnips

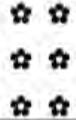
** Onion family includes asparagus, chive, garlic, leek, onion, scallion

Examples of plants that can help deter pests include:

- Nasturtiums, marigolds, cosmos
- Members of the mint family
- Members of the onion family

Sample Easy-to-Grow Garden Plan: Gardeners



 T R E	 L L I S	 E D	 P E A S
		 3 RD TOMATO	
 1 ST TOMATO		 2 ND TOMATO	
			
			
			
			
			

When the pea harvest slows down, you can plant a combination of greens, such as salad mix, lettuce, or a fall crop of kale or collards. (These will enjoy the shade during the hottest summer months.)

Tomatoes: Fit 3 tomatoes by using the extra space from the front part of the pea squares.

In this row, plant a combination of:
Peppers **Broccoli**
Collards
Eggplant **Kale** **Cabbage**

In this row, plant a combination of:
Bush beans **Arugula**
Large onions **Spinach**

In this row, plant a combination of:
Lettuce **Herbs** **Swiss Chard**
 *Consult Square Foot Planting Guide for varied spacing

In this row, plant a combination of:
Carrots **Radishes**
Beets **Small Onions**

In this row, plant a combination of:
Cucumbers **Perennial Herbs**

Sample Easy-to-Grow Garden Plan: Preschools



☆☆☆☆ ☆☆☆☆	☆☆☆☆ ☆☆☆☆	☆☆☆☆ ☆☆☆☆	☆☆☆☆ ☆☆☆☆
T R E	L L I S	E D	P E A S
			
1 ST CHERRY TOMATO		2 ND CHERRY TOMATO	
BROCCOLI	BROCCOLI	PEPPERS	COLLARDS
			
B	E	A	N S
☆☆☆	☆☆☆	☆☆☆	☆☆☆
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L E	T T	U C	E
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C U	C U M	B E	R S
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Raised Bed Grid

	1'	2'	3'	4'	5'	6'	7'	8'
1'	1	5	9	13	17	21	25	29
2'	2	6	10	14	18	22	26	30
3'	3	7	11	15	19	23	27	31
4'	4	8	12	16	20	24	28	32

Planting Dates

1	5	9	13	17	21	25	29
2	6	10	14	18	22	26	30
3	7	11	15	19	23	27	31
4	8	12	16	20	24	28	32

Raised Bed Grid

	1'	2'	3'	4'	5'	6'	7'	8'
1'	1	5	9	13	17	21	25	29
	2	6	10	14	18	22	26	30
2'	3	7	11	15	19	23	27	31
	4	8	12	16	20	24	28	32
3'								
4'								

Planting Dates

1	5	9	13	17	21	25	29
2	6	10	14	18	22	26	30
3	7	11	15	19	23	27	31
4	8	12	16	20	24	28	32

Notes and Questions

(Scratch space for notes, questions, your own garden designs, other)

Notes and Questions

(Scratch space for notes, questions, your own garden designs, other)

Stay In Touch!

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