



THE HOMEGROWN HANDBOOK

This Handbook belongs to:

Phipps Conservatory and Botanical Gardens
One Schenley Park, Pittsburgh PA 15213
412-622-6914



Watch our YouTube demonstration videos
for more gardening help and advice:
[phipps.conservatory.org/HomegrownHowTo](https://www.phippsconservatory.org/HomegrownHowTo)

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INTRODUCTION

About Homegrown

Homegrown is a program of Phipps Conservatory and Botanical Gardens, dedicated to increasing access to fresh produce, promoting better food choices and improving the overall health of families and children.

We fulfill our goals by installing raised bed vegetable gardens at households in underserved neighborhoods and by providing mentorship and resources.

Contact Info

If you have questions, concerns or just want to update us on your garden's progress, always feel free to contact us at:

Call | 412-441-4442

Text | 412-385-7282

Email | homegrown@phipps.conservatory.org

Visit | phipps.conservatory.org/homegrown

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Partnerships

Homegrown is supported by the contributions of our partners.



Homewood-Brushston YMCA

A wonderful community center, the YMCA helps promote Homegrown through its center and allows us to use its on-site garden and classrooms for educational instruction.



OPERATION BETTER BLOCK

Operation Better Block's Junior Green Corp. (OBB)

A stipend-based job readiness program for youth in the Homewood area, OBB helps promote Homegrown by collaborating on seedling sales and other urban agriculture education projects.



Hazelwood Initiative (HI)

A non-profit community development corporation committed to building a stronger Hazelwood. HI promotes Homegrown and we support their gardening initiatives.



Carnegie Library of Pittsburgh

Carnegie Library of Pittsburgh - Hazelwood

Carnegie Library of Pittsburgh is a destination space for information, technology, community building, social connection and fun. Homegrown collaborates with the Hazelwood Library branch on gardening programs.

RAISED BEDS

Why Raised Beds?

Using raised beds is a great way to harden and has many advantages, perhaps the biggest being their ability to correct soil. Good soil is essential for a successful garden, especially in the city where soil compaction and contamination are often issues. Raised beds allow you to bring in clean soil so you know exactly what you're growing in.

The many benefits of raised beds include:

- Correct compacted soil
- Added compost and nutrients
- Easier weed control
- Good drainage
- Easy to manage and reach
- Neat and tidy appearance
- Warmer soil = longer growing season



Lead in Urban Soil

Unfortunately, soil in urban environments is often contaminated with pollutants that make it unsafe for growing food. Lead and other heavy metals could have made their way into the soil from chipped lead paint, air pollution from vehicles or disposal of scrap materials like lead pipes, roof flashing and lead-acid batteries. Small levels of lead occur naturally in the soil, but elevated levels are poisonous to humans; lead can interfere with the nervous, renal (kidney) and hematopoietic (blood-forming) systems and is especially dangerous to small children.

Some vegetable plants will absorb lead from the soil and others will just have it on their surface from contact with the soil. Either way, you do not want to eat contaminated vegetables! Raised beds filled with clean soil are a great way to combat soil contamination. If you plan to start an in-ground garden it is very important to test your soil first.

A soil test can tell you if you have dangerous levels of lead and give you an assessment of other nutrients. Soil tests are available through UMass Amherst's Soil and Plant Testing Lab. The routine analysis costs around \$20 and tests for lead and heavy metals as well as soil nutrients. For details on sampling and sending your soil to be tested, visit soiltest.umass.edu.

Alternatively, the Allegheny County Conservation District frequently offers free screenings to test for lead in soils. Visit accdpa.org to learn more.

Raised Bed Construction

Homegrown builds raised beds from recycled plastic lumber. Made from old milk jugs, this hard plastic is durable, safe for gardens and will not leach any chemicals into the soil. This product, however, is not readily available to the homeowner, so another great option is untreated cedar, a naturally rot resistant wood that will last for many years and is available at local lumberyards. Other woods will also work just fine, but do not use treated wood as it can seep chemicals into your soil. Raised beds can also be constructed from logs, bricks, stone or other materials. While old tires and cracked swimming pools are creative uses for planters, we don't recommend using these for growing food, as they can leach chemicals into the soil.

We fill Homegrown raised beds with a 50 / 50 mixture of soil and compost, which makes a rich medium great for growing food. If you're interested in the specifics or want to expand your garden on your own, our blueprint appears on the next page.



How to Build a Raised Bed Vegetable Garden

BELOW IS A BLUEPRINT used by Homegrown, Phipps Conservatory and Botanical Gardens' edible garden program, to build a raised bed for vegetables.

When creating your own, you can change the dimensions to fit your space but be sure to use untreated wood; we use cedar because it is naturally rot-resistant and will last for many years. Learn more about Homegrown at phipps.conservatory.org/homegrown.

Tools

- Saw
- Drill
- Tape Measure
- Spade/shovel
- Staple gun

Materials

- Lumber
 - Three 12' long 2"x8" boards
 - One 6' long 2"x2" stake for corners
 - One 6' long 1"x4" board for side straps
- 2" and 3" galvanized wood screws
- Landscaping fabric
- 20 cubic ft. of soil and compost (we use a 50/50 blend)

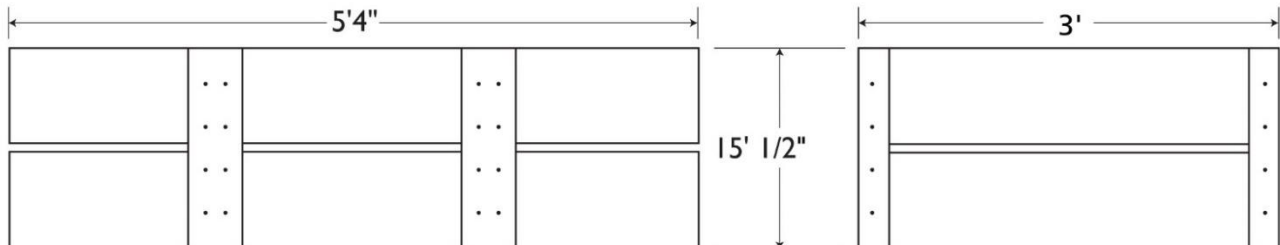
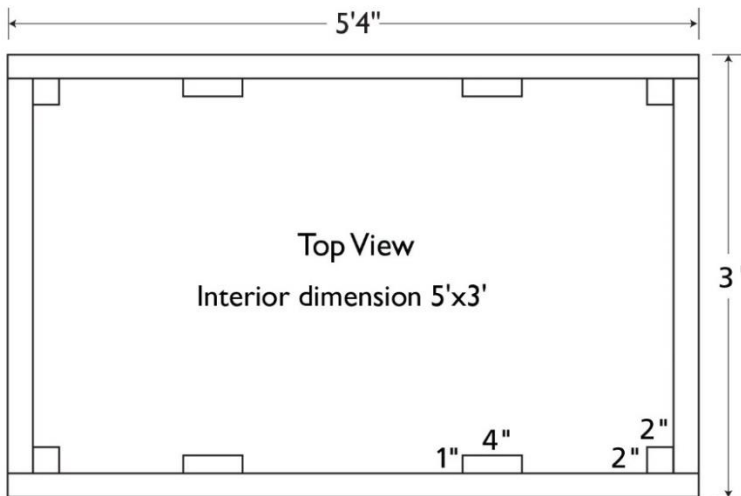


Photo © Adam Milliron



Directions

1. Cut two 12' boards into four 5'4" sections (or have your hardware store cut it for you). Cut the remaining 12' board into 3' sections.
2. Cut both the 2"x2" stake and 1"x4" board into four 15 1/2" sections
3. Join the long side boards using the 1"x4" straps and 2" screws (see left)
4. Join the short side boards by attaching the 2"x2" stakes to the ends with 3" screws (see left)
5. Assemble the bed by joining the long sides to the short sides, using 3" screws
6. Staple landscaping fabric to the bottom side of the beds
7. Put in place, fill with soil and compost, and plant



GARDEN BED CORNER REPAIR GUIDE

Getting Started

Tools: Tarp, Shovel and Drill

Materials:

- 1 5/8" exterior screws
- 3" exterior screws
- Fender washers
- Metal hardware cloth
- 4 1-foot 2" x 2" untreated wood straps per bed
- Additional untreated wood scraps as needed
- Optional, metal L framing angle



Low Rot Instructions

- Attach a metal L angle piece to the corner of the bed with your drill and 1 5/8" screws and then attach a replacement wooden strap to either side of the metal corner piece with 3" screws.

When done, it should look like this:

Rot Level

- **Low Rot:** Starting to fall apart.
- **Medium Rot:** Corner is rotted away.
- **High Rot:** Several inches of the corner are rotted away.

Directions

- Position your tarp next to your garden bed. This will be used to collect the dirt from your bed.
- Dig out all the dirt with a shovel. This allows you to see the rotting corners of the garden bed.
- Remove old wooden straps from the corners and sides of your bed.
- Look at the corners of your garden bed. Assess how rotted through they are. Each level of damaged wood has a different repair technique associated with it.



Medium Rot Instructions

- Fold a piece of hardware cloth to fit into the corner. Then put your washers on your 1 5/8" screws and use the screws to attach the metal cloth onto the corner. Try to screw in where the wood is the thickest.

It should look like this:



- Attach a new wooden strap right in the corner of the bed you just attached the metal cloth to with a 3" screw. This reinforces the corner of the bed.

Once completed, it should look like this:



High Rot Instructions

- Attach a small board of wood that is big enough to cover the rotting area.
- Fold hardware cloth to fit into the corner and attach it with washers on 1 5/8" screws to the new wooden board or any area that is not rotted through.

It should look like this:



- Finally, attach a new wooden strap with 3" screws to the corner to reinforce the bed.



- You may also need to replace the wooden straps that support the long sides in the middle thirds of the bedside before replacing the soil.

SQUARE FOOT GARDENING

There are many methods when it comes to designing and laying out a garden, but we have found that Square Foot Gardening works very well for raised beds. The Square Foot Gardening (SFG) method was developed in the late 1970's by Mel Bartholomew, who was looking for a way to produce more food in less space.

SFG is a simple method that uses blocks instead of the traditional rows when planting. The garden bed is divided up into a grid and a different type of plant can be put in each square foot block. The number of seeds or plants in each square depends on how big the plant gets and how much space it needs to develop properly.

This is an intensive method of planting, so the nutrients in the soil will be consumed more quickly. Keep the soil fertile with 1 - 2" of compost every year. (See page 51)

Making a Grid

A grid is what makes a Square Foot Garden. Mark off each foot along the four sides of your raised bed using a tape measure, then connect the marks to form a grid. How you connect them is a matter of preference; you could draw lines in the soil or use nails and string, sticks or old blinds.



Spacing Guidelines

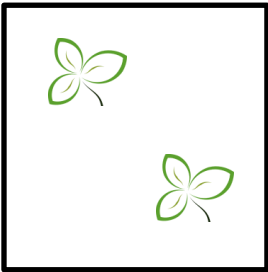
You can use the seed or plant spacing found on seed packets to determine appropriate SFG spacing for different types of plants. Imagine or draw a smaller grid to evenly space the seeds or plants within a block.

Here are general guidelines:

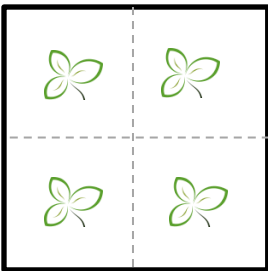
- 1 per square for 12" spacing



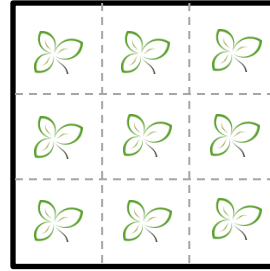
- 2 per square for 9" spacing



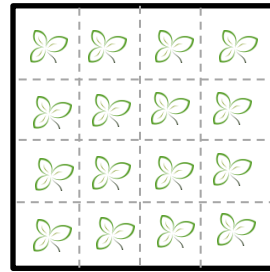
- 4 per square for 6" spacing



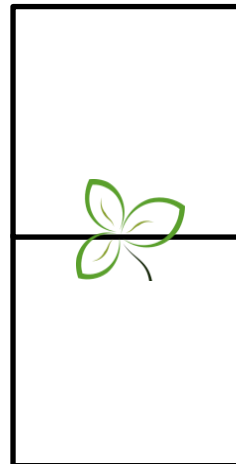
- 9 per square for 4" spacing



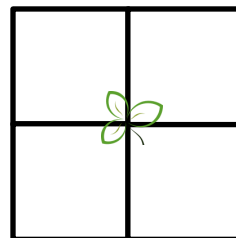
- 16 per square for 3" spacing



- 1 per 2 squares or 1 x 2 feet



- 1 per 4 squares 2 x 2 feet or for 24" spacing



SQUARE FOOT PLANTING CHART

Use this chart to determine plant spacing. You may choose to adjust the spacing based on your experiences. A few plants need more than one square foot for a single plant, as they grow quite large.

PLANT	PLANTS PER SQUARE FOOT	PLANT HEIGHT
Basil	2 (or plant alongside tomatoes)	Medium
Bean-Bush	9	Medium
Bean-Pole	8, with trellis	Tall
Beet	9	Short
Broccoli	1	Medium
Cabbage	1	Medium
Carrot	9	Short
Collards	1	Medium
Chives	2	Medium
Chamomile	4	Short
Cilantro	9	Short
Cucumber	2	Short (tall if trellised)
Dill	4	Medium
Eggplant	1	Medium
Garlic	9	Medium
Flowers, various	2 - 4	Medium to Tall
Kale	1	Medium
Lavender	1	Medium
Lettuce	4	Short
Lettuce Salad Mix	Scatter lightly	Short
Melon	1 per 1' x 2' block	Medium (tall if trellised)
Mustard Greens	9	Medium
Okra	1	Tall

PLANT	PLANTS PER SQUARE FOOT	PLANT HEIGHT
Onion	9	Short
Oregano	1	Short
Parsley	2	Short
Pea	8, with trellis	Tall
Pepper	1	Medium
Radish	16	Short
Scallions	4 bunches	Short
Spinach	9	Short
Summer Squash / Zucchini	1 per 3' x 3' block	Medium
Sweet Potato	1	Short (tall if trellised)
Swiss Chard	1	Medium
Tomatoes	1 per 2' x 2' block	Tall
Winter Squash / Butternut	1 per 1' x 2' block	Medium (tall if trellised)

Planning Your Garden

Before starting to plant, it's valuable to make a plan for your garden. Planning helps you use your garden space effectively, buy or grow only what you need and make sure you have space for everything.

Steps to Plan Your Square Foot Garden

1. Make a list of what you want to grow.
2. Determine how many plants of each type to plant per square foot and the plants' height (short, medium or tall). Use the Square Foot Planting Chart to find this information.
3. Mark the north side of your raised bed on your Raised Bed Grid. Use a compass or look at street on a map to determine which direction is north.
4. Fill in the squares on your grid, according to plant height. Write plants that are marked as short into the squares on the south side of your garden, plants that are of medium height into the center squares and tall plants into the squares on the north side. This planning keeps the taller plants from shading shorter plants.
5. If you're going to use a trellis, mark where it will go. A trellis should go on the north or west side of the bed. Put climbing plants, such as pole beans, cucumbers or peas, at the base of the trellis.
6. Write how many individual plants can be planted in each square on the garden plan, next to the name of the plant (example: 4 plants for lettuce, 16 for beets).
7. Determine planting dates. Do this by writing out the dates for when you can plant each crop (using the date ranges from the Planting Calendar on page 16). You may want to write the dates out sequentially after you're finished, so you have a schedule.

SAMPLE GARDEN PLAN

	1'	2'	3'	4'	5'	
1'	Tomato (1) Mid-May		Tomato (1)		Parsley (2) Late March or later	↑ North
2'					Basil (2) Mid-May	
3'	Pepper (1) Mid-May	Pepper (1)	Spinach (9) Mid-March	Spinach (9)	Basil (2) Mid-May	

----- Trellis -----

*		*	Cucumber (2) Mid-May	Cucumber (2)
Zucchini (1) Mid-May			Collards (1) Late March or later	Collards (1)
* * *	* * *	* * *	Kale (1) Late March or later	Kale (1)

*= flower, can put flowers or small herbs in corners or border of the zucchini space

Include flowers and herbs planted in pots or around your yard to attract beneficial insects. (See page 30 for a list)

PLANTING

When planting your garden, you can either start with seeds or seedlings (small plants, a.k.a. transplants). Some vegetables must be started indoors and transplanted to get a crop before the last frost. Others don't survive transplanting well and should be directly sown.



When to Plant

When to plant different vegetables is determined by local frost dates. Pittsburgh is USDA Plant Hardiness Zone 6, so the average last frost date in spring is around **May 15** and the first frost date in fall is around **October 15**.

The Crop Planting Calendar shows when to plant various crops in the ground and if seeds or seedlings should be planted. Many listed can also be planted or re-planted later in the season.



Transplanted Crops

- Broccoli
- Cabbage
- Eggplant
- Peppers
- Tomatoes

Direct Sown Crops

- Beans
- Beets
- Carrots
- Cucumbers
- Lettuce
- Melons
- Mustard greens
- Peas
- Spinach
- Squash

Transplanted / Direct Sown

- Collards
- Kale
- Okra
- Swiss Chard
- Flowers



Crop Planting Calendar

VEGETABLE	SEED, SEEDLING OR ROOT CUTTING	EARLY PLANTING DATES		LATE PLANTING DATES	
		FIRST	LAST	FIRST	LAST
Frost Tolerant Crops (not injured by light frost)					
Broccoli	Seedling	Late March	Late April	Early July	Mid August
Brussels Sprouts	Seedling	Late March	Late April	Early July	Mid August
Cabbage	Seed	Mid March	Mid April	Early July	Mid August
	Seedling	Late March	Late April	Early July	Mid August
Collards	Seed	Mid March	Late April	Early July	Early Sept.
	Seedling	Late March	Late April	Early July	Mid August
Garlic	Seed (clove)	Mid October	Mid November		
Horseradish	Root cutting	Late March	Late April	May 29	
Kale	Seed	Mid March	Late April	Early July	Early Sept.
	Seedling	Late March	Late April	Early July	Mid August
Mustard Greens	Seed	Mid March	Late April	Early July	Early Sept.
Leek	Seed	Mid March	Mid April		
	Seedling	Late March	Late April		
Onions	Seed	Mid March	Mid April		
	Seedling	Late March	Late April		
Parsley	Seedling	Late March	Mid May	Mid July	Mid Sept.
Pea	Seed	Mid March	Mid April	Early August	Early Sept.



Crop Planting Calendar

VEGETABLE	SEED, SEEDLING OR ROOT CUTTING	EARLY PLANTING DATES		LATE PLANTING DATES	
		FIRST	LAST	FIRST	LAST
Frost Tolerant Crops (continued)					
Radish	Seed	Late March	Mid May	Mid July	Sept.
Scallions/bunching onions	Seed	Mid March	Mid May	Early July	Mid August
	Seedling	Late March	Mid May	Mid July	Mid August
Spinach	Seed*	Late March	Late April	Mid July	Sept.
Cool Temperature Tolerant Crops (can be injured by frost, but intolerant of temperatures above 70 degrees Fahrenheit)					
Beet	Seed	Late March	Mid June	Early July	Mid August
Carrot	Seed*	Late March	Mid May	Early July	Mid August
Cauliflower	Seedling	Late March	Late April		
Celery	Seed	Mid April	Mid May	Mid June	Early July
Cilantro	Seed*	Late April	Mid June	Early July	Mid August
Dill	Seed*	Mid April	Mid June	Early July	Mid August
Lettuce	Seed*	Late March	Mid August		
Potato	Seed	Mid March	Mid April		
Swiss Chard	Seed	Early April	Mid June	Early July	August



Crop Planting Calendar

VEGETABLE	SEED, SEEDLING OR ROOT CUTTING	EARLY PLANTING DATES		LATE PLANTING DATES	
		FIRST	LAST	FIRST	LAST
Warm-Season Crops (Plant after danger of frost has passed)					
Basil	Seed	Mid May	Mid June		
	Seedling	Mid May	Early August		
Cantalope	Seed	Early May	Mid June		
Cucumber	Seed	Mid May	Mid June		
Eggplant	Seedling	Mid May	Late June		
Flowers	Seed	Early May	Mid June		
	Seedling	Mid May	Mid July		
Okra	Seedling	Early May	Mid June		
Pepper	Seedling	Mid May	Late June		
Pumpkin	Seed	Early May	Mid June		
Sweet potato	Seedling	Early May	Mid June		
Snap bean	Seed*	Mid May	Mid July		
Squash	Seed	Early May	Mid June		
Tomatoes	Seedling	Mid May	Late June		
Watermelon	Seed	Early May	Mid June		

* Plant every two weeks for a succession planting

Handling and Planting Seedlings / Transplants

1. Dig an appropriately sized hole (slightly larger than the pot), fill with water, let the water soak in.
2. Gently remove the seedling from its container. Squeeze the sides of the container to loosen it; then, gently tip the seedling out. Never pull on the stem as this can harm the tender plant. If the roots are very dense and tangled (root-bound), tickle or squeeze the roots so some of them loosen.



3. Set the seedling in the hole, level with the soil surface.
4. Fill in around the root ball with soil, lightly tamp (press on) the soil. Make a small well around the base of the plant, so water will pool at the base and direct to the roots.



5. Water gently, using a watering can with sprayer head. While the seedlings are getting established, keep the soil moist.

Direct Sowing Seeds

1. Use your finger to make holes in the soil at the appropriate Square Foot spacing. Refer to the seed packet for appropriate depth or a good rule of thumb is to plant seeds at a depth two times their size. Be careful not to make the holes too deep or seeds won't be able to grow.
2. Sow seeds. One to two seeds per hole.
3. Label what you planted where.
4. Cover the holes with soil.
5. Gently firm the ground over your seeds.
6. Water gently. Water seeds every day to keep the soil moist, until they sprout.



GARDEN CARE

Watering

Water is essential for good vegetable production. Rain is a good source, but often you will need to supplement during dry periods and it's important to water properly.

Tips for Watering

- Water at the base of your plants, to target the roots
- Water deeply, less often to encourage deep root growth
- A watering can with a sprinkler head works best for even saturation and to not disturb the soil too much.



When to Water

It's best to water in the early morning or late afternoon since lower temperatures reduce evaporation, allowing time for the plants to dry off before dark and reducing the risk for fungus or disease. Of course, these are *ideal* times; if they don't work with your schedule, water at any time is better than none!

How Often to Water

How often to water your garden will depend on the weather and the feel of the soil, but generally you should water your garden one to three times per week.

On very hot sunny days, large-leaved plants may look wilted and in need of water. Sometimes this is a defense response by the plant that helps it survive the heat. Remember to check the soil, the plant may not need water and will perk up when the sun sets.



A garden needs about 1" of water per week, so if it doesn't rain, you will need to water. A good rule of thumb is to feel the soil about 1" below the surface (just stick your finger in the soil up to your first knuckle). If it's moist you're okay, if it's dry, it's time to water. During extra hot times you may need to water more. If it has rained a lot, you may not need to water at all. It's better to water deeply less often, which promotes deep root growth.

Newly planted seed and young plants, however, need more attention than an established garden. After seeds are planted, the soil should stay moist until the seeds sprout, so they should be checked and watered every day if needed. For small seedlings and new transplants, water whenever the top" of the soil is slightly dry (check at least every other day).

Trellises

Vegetables that sprawl on the ground benefit greatly from using a trellis, a structure used to keep crops off the ground. Without a trellis of some sort, these crops can take up a lot of your space, lead to disease or be hindered in ripening. By supporting them vertically, you will save space on the ground, increase airflow, remove them from soil-borne diseases and make harvesting easier. You'll also be able to identify diseases and pests more easily.

Types of Trellises

Cages: Can be purchased at a store or made DIY. These are best to be placed over tomatoes and you can help it weave its way up. They are less useful for green beans and peas because they will want to outgrow the height of smaller cages.

Stakes: Metal t-posts or wooden stakes are the sturdiest, but you can also use other poles like bamboo, metal rebar, metal conduit. A 6-foot height will provide adequate room for your plants to grow up after hammering them in 6 - 12". Be careful to put these in early, to avoid damaging the roots of your plants.

Stakes can be arranged individually, tied together to make a tripod or in a row with string passing from one pole to the next in a horizontal zigzag. Pole beans, cucumbers and peas will vine their way up; others will need to be gently tied up.

Fencing or Trellis Netting: Use small sections of netting or string zigzagging between two stakes or just plant next to existing fencing. This works well for vining crops with multiple main vines.

Need a Trellis

- Tomatoes
- Cucumber
- Pole Bean
- Pea

Trellis to Save Space

- Winter Squash
- Melon
- Sweet potato



Tomato Maintenance

Tomatoes, a summer garden favorite, need extra care and attention to stay under control, especially in a small garden. They require staking and pruning throughout the growing season to prevent disease and produce the largest harvest.

Staking Tomatoes

Square foot gardening utilizes a small space to produce the largest and healthiest produce possible. Since tomatoes tend to grow very large, staking is extremely important to prevent overcrowding and to keep leaves off the ground, preventing diseases and shading of other crops. Staking also allows for earlier harvests of larger tomatoes. There are many ways to stake your tomatoes; this handout will outline two of the most common ways, but you can also get creative and find your own solution.

Wooden or Metal Posts: Should be at least 5 feet tall. Use soft ties (old t-shirts or rags ripped into strips is a great free option) to secure the main stem to the post, making sure to remove all but one or two suckers. Tie the stem to the post every 6 - 12" and tie loosely-tight enough to hold up the plant but leaving some wiggle room for it to grow (see photo below). As your plants grow, add more ties as needed.

If your post needs extra support, take another post and secure it at an angle next to the plant. Tie the posts together at the top to make a teepee structure and add more posts as needed to hold up your tomato plant.

Wire Cages: Can be purchased at most hardware stores or garden centers and can be placed directly over a small plant, pushing the wires into the soil. Be sure to place the cage as soon as you plant while your tomato is still small; doing this when your tomato is too large can break stems off your plant.

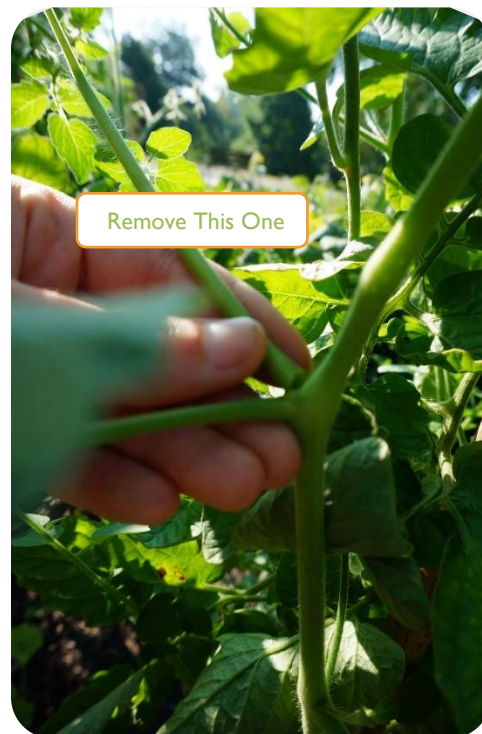
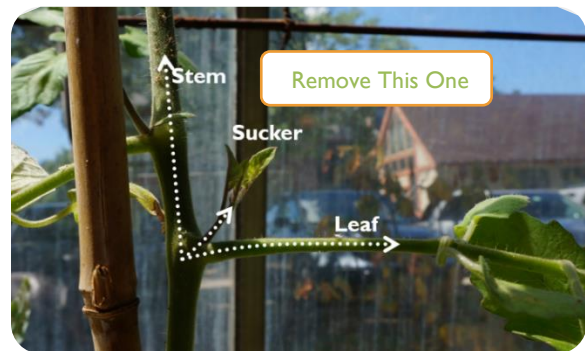
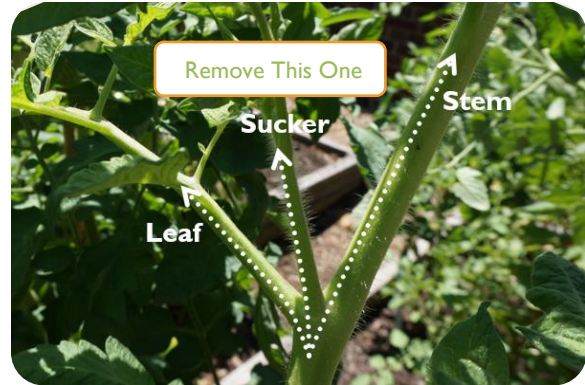


Pruning Tomato Suckers

Tomatoes produce extra branches in the junction of the main stem and a leaf branch called suckers.

These suckers can cause problems like overcrowding, which may lead to disease, poor stem strength and poor fruit quality. Removing them is a simple process of evaluating, identifying, pruning and keeping a watchful eye throughout the season to keep them in check.

- **Evaluate:** Towards the lower part of the plant choose 1 to 3 of the healthiest looking suckers to keep, the rest can be removed and sent to the compost bin!
- **Identify:** Suckers grow between the main stem and a branch, at a 45-degree angle to the main stem. They can be as thick as or thicker than the main stem or branch and have an upright appearance. They can become very large and can bear fruit so don't be fooled!
- **Prune:** Remove suckers by pinching or cutting as close to the stem as possible, disinfecting the cutting blade with 70% rubbing alcohol before moving onto the next plant.
- **Watch:** Suckers will continue to grow as your plants get bigger, so take a glance once a week or so to keep them in check. It's best to remove suckers when they're still small, so the earlier you catch them the better.



Managing Weeds

Weeds are the enemy of gardeners everywhere. They compete with your plants for water, nutrients, sunlight and space and can quickly overrun a garden if they're not controlled.

The good news is they're much easier to control in raised beds, where the soil is loose, free from grass seed and easy to reach.

Some tips for managing weeds are as follows:

- Check your garden for weeds weekly. If you pull a few every week, they won't get out of control.
- Dig or pull weeds out, just be careful not to disturb your nearby vegetables.
- Pull the whole weed, including the root, so it doesn't come back. Dandelion diggers or soil knives make this easier.
- It's easiest to weed after a rain when the soil is soft and moist.
- Mulching with chopped dry leaves or straw also helps keep weeds down.

How did they get in the garden?

There is a reason why weeds are so successful, they can reproduce and spread to unwanted locations in a wide variety of ways.

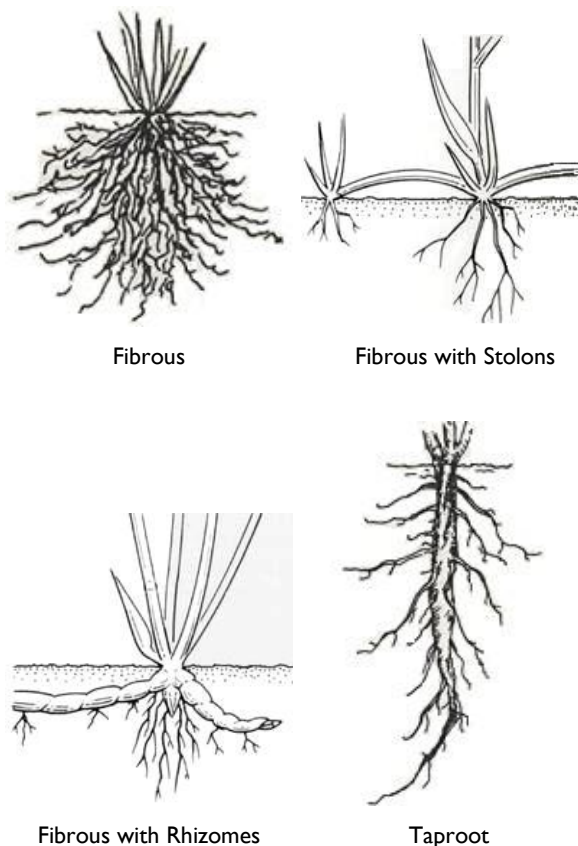
Some weeds release air-borne seeds that can be carried to other locations by the wind and deposited into soil. Pulling the weed early, before seeds can develop, is a great way to prevent them from spreading.

Seeds can also be carried from one location to another on people, animals and lawn equipment.

Weeds also spread through their roots or specialized above ground stems called stolons or runners.

Even if the original plant is killed, a new plant could come up from the old root system, another reason why keeping up on weeding will help you manage them before they mature and spread.

Types of Weed Root Systems



Credit: University of California, Integrated Pest Management Program

Identifying Weeds

The definition of a weed is a naturally growing plant that is not desired in a specific location.

Some great tips for identifying these pesky plants are below:

- Clearly mark where you planted seeds and seedlings. Sprouts that have a uniform look and placement are most likely seed that you planted, sprouts that stand out are probably weeds.
- Note the shape, color and size of the leaves. Look up a picture of the plant you are trying to grow.
- Getting familiar with common weeds, taking pictures and keeping a journal is a great way to keep track of friend or foe. You can also use online resources and plant identification apps, such as Picture This or iNaturalist along with the chart below.

COMMON GARDEN WEEDS		
LAMBS QUARTER 	CRABGRASS 	CHICKWEED 
DANDELION 	PURSLANE 	PLANTAIN 
PIGWEED / AMARANTH 	CANADIAN THISTLE 	JAPANESE KNOTWEED 
RAGWEED 	OXALIS 	BINDWEED / MORNING GLORY 
NUT SEDGE 	WHITE CLOVER 	CREeping CHARLIE 
VELVET LEAF 	WILD VIOLET 	SMARTWEED 
POKEWEED 	CHICORY 	TREE OF HEAVEN 

Mulching

After planting, it's a good idea to mulch the surface of your garden bed. Mulch provides many benefits: it prevents water evaporation, prevents and controls weeds, encourages earthworm activity and keeps soil from splashing on plants.

Wood chips and shredded bark are perhaps the most common types of mulch and they're great for mulching paths and landscaping, but not the best option for vegetable beds since they take a long time to break down.

Some great options for your raised bed are listed below:

- Dried leaves or leaf mulch (chopped up autumn leaves) can be applied in a thick layer about 2" deep.
- Fresh grass clippings (not treated with pesticides) can be applied in thin layers about 1/4". After a fresh layer dries out, you can apply another layer; several layers will discourage weeds.
- Mulch with seed-free straw. These materials will break down throughout the growing season and at the end of it can be mixed into the soil to provide added nutrients. Collect and store chopped leaves in the fall for spring convenience.



Preparing for Winter

When summer ends and the weather cools, it's important to properly prepare the garden for winter. Cleaning up the garden, amending the soil and mulching in the fall help make sure your garden is in the best shape for planting when spring comes around.

Garden cleanup is the first thing to do. Warm season crops like tomatoes, squash and beans usually start dying back on their own in late summer / early fall and won't survive after the first frost hits (first frost date in PA is around October 15).

These crops should be removed from the garden. Cut the stems off just above the ground and if they are disease free, compost them. If they are diseased, you'll want to dispose of them separately, so as not to harbor any diseases in your compost pile. Also, remove all weeds and dead plant material.

Cool weather crops can be left in the garden. Kale, collards and beets are a few of the crops that can survive colder temperatures, especially if they're protected. (See page 16 for a list of frost tolerant crops)

If they survive the winter, they will form a flower by April or May, which is when you should remove them and plant something new, unless you plan to collect the seeds or enjoy the flowers.

Protect cool weather crops in fall for an even longer harvest. A thick layer of mulch will help cool weather crops last longer into the fall. More advanced methods to extend harvests into winter include setting up low tunnels or mini hoop houses, over garden beds. Protecting plants with fabric or plastic will keep the soil warmer and protect from wind and frost. (See page 60 for more)



Mulch to amend and protect your soil. You can find great mulches right in your yard: fallen leaves, grass clippings and compost all make great mulches and will break down over the winter, enriching your soil.



DEALING WITH PESTS AND DISEASES

Every gardener must deal with pests and diseases that threaten our plants and crop yields. There's no magic potion to keep the garden free of trouble, but we can take steps to prevent and treat issues when they arise.

Go Organic

When you see pests destroying plants in your garden, don't be tempted to reach for a commercial pesticide to kill them, as many contain chemicals that are harmful to humans and anything you put on your edibles could end up on your plate. In fact, these chemical pesticides can build up in our bodies and, over time, may cause damage to our organs, nervous, endocrine and reproductive systems.

Chemical pesticides can be not only poisonous to humans but damaging to the environment. They linger in the air, ground and waterways long after their initial use, causing harm to wildlife and ecosystems. Typically, they are also indiscriminate and kill all insects, even those that benefit our garden.

Good Garden Practices

To keep plants healthy and avoid pest and disease outbreaks:

- Properly plan where plants will go and include a variety.
- Space, stake and prune plants to ensure good airflow.
- Keep the soil fertile with compost annually and rotate crop locations.
- Water appropriately.
- Add flowers and herbs in and around the garden to encourage beneficial insects.



Beneficial Insects

The most important ways to keep pests at bay, keep crops healthy and prevent infestations is to encourage diversity in your garden. It's important to understand that not every bug is bad; in fact, more than 90 percent of the insects you see in your garden are beneficial or neutral!

The garden depends on pollinators, worms and other soil-building insects and a variety of insect predators that feed on pests and protect our crops. The best method for attracting these beneficial insects to your garden is to plant diverse crops and incorporate various flowers and herbs into your landscape.

- Pollinators fertilize flowers, which can then mature into fruits such as cucumbers or zucchini.
- Predatory insects eat or harm larvae or adult pest insects.



Different sizes, shapes and fragrances of flowers attract different insects. Consider the flowers in your containers, raised beds, in-ground, trees and shrubs during their flowering season and crops after they start blooming. Allowing some herbs and winter crops to bloom is an easy way to add a diversity of flowers and therefore a diversity of insects.






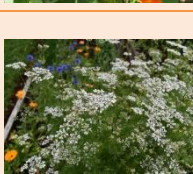

- Crops that flower after growing all winter include collards, kale, carrots and parsley; harvest most of them before they flower but leave a little to bloom.
- Herbs attracting beneficial insects are listed in the chart.

The following chart includes information on some common pests and their beneficial predators as well as details on what to plant to attract beneficial insects to your yard.

BENEFICIAL INSECTS AND THEIR PREY					
The chart below shows which pest is attacked by which beneficial insect		HARMFUL PESTS			
		Aphids	Cabbage Worm	Leaf Miner	Tomato Hornworm
BENEFICIAL INSECTS	Damsel bugs	X	X		
	Green lacewings	X	X	X	X
	Ground beetles	X	X		
	Hover flies	X			
	Lady beetles	X		X	X
	Spiders		X		
	Paper wasps*		X	X	
	Parasitic flies		X		
	Parasitic wasps (non-stinging)	X	X		X
	Praying mantis	X			

*Leave paper wasp nests alone if they are out of the way and unlikely to be disturbed. However, they should be removed from high-traffic areas such as doorways or children's play areas.



PLANTS TO ATTRACT BENEFICIAL INSECTS		
	PLANT	BENEFICIALS ATTRACTED
	Alyssum	Hover flies Parasitic wasps
	Borage	Bees and pollinators
	Daisy family (Black-eyed Susan, Bachelor's Button, Chamomile, Coreopsis, Cosmos, Marigolds, Sunflower, Tansy, Yarrow)	Lady beetles Green lacewings Hover flies Parasitic wasps Pollinators
	Mint family (all mints oregano, Thyme, Rosemary)	Spiders Parasitic flies Parasitic wasps
	Nasturtiums	Spiders Ground beetles Damsel bugs Pollinators
	Umbel (Parsley) family (Dill, Fennel, Caraway, Parsley, Lovage, Cilantro)	Parasitic wasps Hover flies Lady beetles
	Others: Lavender, Anise Hyssop, Fennel	Bees, butterflies, other pollinators

Common Pests and Diseases

The first step to treating a problem in the garden is proper identification.

- What vegetable is affected?
- What type of damage do you see?
- Where is the damage on the plant?
- Do you see eggs, larvae, insects or waste (ex. caterpillar poop or sticky secretions)?

Below is information on some common pests and diseases that you may encounter in your garden and how to prevent or treat them organically.

If you have a problem you can't identify, contact Homegrown or Ask Dr. Phipps anytime at 412-622-2364 or drphipps@phipps.conservatory.org.

General Pest Control Strategies

- Scout plants weekly and smash eggs, larvae and adults identified as pests.
- Prevent pest access to the crop by covering with netting or lightweight row cover fabric.
- Purchase OMRI listed certified products and use only as directed and on identified pests.

Sometimes household products can be used as insect control, but often they can end up hurting the plants, too. Detergents and alcohol can be damaging to some plants. Insecticidal soap is soap that is made for plants and is safer for them when treating soft-bodied insects. Horticultural oil can also work, but both products can hurt the plants if it's hot or sunny, the plant is stressed for water or it's a sensitive plant.

Aphids

Aphids are tiny soft bodied insects that come in a variety of colors and can have a waxy or woolly coating. They attack many plants by piercing the plant and sucking its juices. Check the underside of leaves for aphids.

Signs of an Infestation

- Misshapen, curling or yellow leaves.
- Leaves or stems covered with a sticky substance called honeydew is left behind by aphids when they feed.
- Sooty mold, a fungus that grows on the honeydew and makes stems and leaves appear black.

Prevention and Treatment

- Plant flowers to attract predators of aphids, such as lady beetles and parasitic wasps.
- Use a strong spray of cold water on leaves to dislodge aphids.
- Wipe or spray the leaves with horticultural oil or insecticidal soap as per package instructions. Do not apply in the middle of the day.



Cabbage Worms

Cabbage worms are the insect pest that has caused Homegrown gardeners the most trouble. Once they appear, without treatment they can quickly cause major damage to your plants. To combat cabbage worms, it's important to be able to identify them and know strategies to take quick action.

Identification

There are two common types of cabbage worms: Imported cabbageworms which are velvety green, 1 to 1 ¼" long caterpillars with faint yellow stripes and Cross-striped cabbageworms, which are bluish gray with numerous black and yellow stripes. They become small white butterflies and lay their eggs on brassicas, also known as cole crops, like collard greens, kale, cabbage and broccoli. These worms work quickly, so be sure to check the back and front side of your plants often and as soon as you spot one, take action.

You can also look for cabbage worm eggs before they hatch. Their eggs are clusters of tiny yellow or white dots, usually found on the underside of leaves.

Signs of an Infestation

- Ragged holes chewed in leaves.
- Dark green droppings on the plant called frass.
- Worms in the center of the plant, on the veins or on the undersides of leaves.



Prevention

- Incorporate flowers that attract cabbage worm predators, including green lacewings, paper wasps, yellow jackets, spiders and birds, into your garden. (See the beneficial insects chart on page 29)
- After planting, cover the plants to prevent cabbage moths from laying eggs on them.
 - You can use row cover otherwise known as garden fabric, available at garden centers and greenhouse supply stores, tulle or any other fine mesh or netted material.
 - Cover plants with the fabric the same day as planting. Either drape it directly over the plant or set up hoops or a cage around the plant to cover. Pin or weigh down the sides, so there are no openings.
 - Remove the cover to water and harvest but replace it immediately afterwards.



Treatment

- Handpick the worms and eggs off your crops and destroy them, either by crushing them or by dropping them into a mixture of liquid soap and water.
- Wet the plant leaves then sprinkle with cornmeal. Worms that eat it will bloat and die.
- Use the organic, biological pesticide “Bt” (*Bacillus thuringiensis*) as a last resort.
 - Bt is a natural bacteria that kills worms and caterpillars. Once caterpillars ingest Bt, they stop feeding on your plants within hours and die within a few days. It’s environmentally friendly and has no harmful effects on humans, wildlife, earthworms, pollinators or most other beneficial insects.
 - Bt comes in powder and concentrated liquid forms. Read the product information and directions thoroughly before use and follow directions to ensure proper application.
 - Bt should be used as soon as you see any signs of damage, or preventatively, when you see cabbage moths around your plants. It must be reapplied every 7 - 10 days or after rain as long as needed per instructions.



Cucumber Beetle / Bacterial Wilt

Cucumber beetles are yellow and black striped, sometimes spotted, insects slightly smaller than lady beetles.



Credit: Johnny Selected Seeds

They can cause double harm. They will eat young cucumber and melon seedlings and they also can carry bacterial wilt on their feet that will quickly kill plants of any age.

Signs of an Infestation

- Yellow and black striped beetles on plants.
- Young seedlings eaten.
- Leaves wilt and do not perk up with watering, eventually dying.



Prevention and Treatment

- Use row cover after planting to prevent eggs from being laid. Remove it when flowers bloom to allow for pollination.
- Monitor yellow sticky cards for the first adults. Apply neem oil if beetles are defoliating the plants.
- Remove any wilted and infected plant as soon as you identify it as diseased; do not compost.
- Clean up all cucumber and cantaloupe debris at the end of season.

Flea Beetle

Flea beetles are tiny, shiny black beetles the size of a chia seed that come out in May or when soil temperatures reach almost 60 degrees Fahrenheit. They eat equally tiny holes in certain crops. The damage is mostly cosmetic but still undesirable. Commonly affects arugula, kale, collards, other salad greens and eggplant.

Signs of an Infestation

- Tiny holes in leaves or on eggplant skin.
- Tiny black bugs jump and fly during the daytime.



Credit: Utah State University Extension IPM Program

Prevention and Treatment

- Use row cover after planting to prevent eggs from being laid.
- Plant mustard or radish as a trap crop near the garden bed to attract the flea beetles. Once the mustard or radish is mature, at sunset, spray the trap crop with Spinosad and remove the trap crop from the garden.

Harlequin Beetle

Harlequin beetles are orange, white and black beetles slightly larger than ladybugs and are unfortunately establishing themselves as regular pests in the area. They come out in May or when soil temperatures reach almost 60 degrees Fahrenheit. Harlequin beetles suck the sap out of the leaves in tiny circular spots and can eventually kill the plant. They attack all brassica crops, such as kale, collards, cabbage and radish.



Signs of an Infestation

- Small, circular discolorations will quickly damage most of the leaf.
- Round, black and white geometric egg arrangements on leaves.
- Orange and black beetles on the plant and the ground underneath.



Credit: Harry Rogers

Prevention and Treatment

Use row cover after planting to prevent eggs from being laid. Frequently check the leaves for egg masses and hatched beetle nymphs even if you have it under row cover. Destroy all eggs and beetles by smashing or drowning in soapy water.

Leaf Miner

Leaf miners are the larval stage of tiny flying insects that feed between the upper and lower surfaces of leaves, leaving tunnel-like patterns. Unless it's a leafy vegetable, leaf miner damage is mostly cosmetic. Commonly affects beets, chard, spinach and corn.



Signs of an Infestation

- A white, tunnel like pattern on leaves called mines.
- The areas mined dry out and die.

Prevention and Treatment

Pick off eggs on the leaf underside and destroy infested leaves. Use row cover after planting to prevent eggs from being laid.

Tomato Hornworms

The caterpillars are large and green with a horn-like tail. The adult moths are sometimes called hummingbird moths and are very large and gray-brown in color. They feed non-stop on leaves and fruit and commonly affect night shades, such as tomatoes, peppers, potatoes and eggplant.

Signs of Infestation

- Missing or wilted leaves, usually starting at the top of a plant.
- Dark green or black droppings on top of leaves. (Look under the leaf for the hornworm)
- Large open scars on the outside of fruit.



Credit: George Bredehoft

Prevention and Treatment

- Plant flowers to attract predators.
- Keep the garden as weed free as possible to discourage egg laying on weed hosts.
- Place worms in soapy water.
- If you see a hornworm with tiny white pupae attached, don't kill it. Put it where it can feed without damaging crops and when the pupae hatch, you'll have more natural predators.



Slugs

Slugs are not insects, they are soft bodied mollusks that have a slimy, soft body with no legs and two feelers on their head. They can range in size from a centimeter to several inches long and can be very damaging to the plants in your garden. Slugs are more present during a wet, rainy season.



Signs of an Infestation

- Large, irregular holes in between leaf veins as well as along the edges.
- Small seedlings can be eaten to the stub.
- Slimy trails left on stems and leaves, it's easiest to spot these trails in the morning.

Prevention and Treatment

- Clean up old leaves and debris.
- Keep the garden weeded.
- Avoid watering in late evening.
- Set out beer traps, a dish of beer dug in at ground level near the edge of the garden.



Credit: Tony Cyphert

- Sprinkle diatomaceous earth or crushed eggshells around the affected area.
- Sprinkle iron phosphate in spring or fall, it can kill other insects so use sparingly.
- Hand pick and destroy slugs in the morning or early evening.
- Encourage a toad habitat with a large rock or a toad home.

Squash Bugs

Squash bugs suck the sap out of leaves, stressing the plant and damaging nutrient flow. Young seedlings are most vulnerable, but mature plants can be affected as well. If you had problems last year, look for eggs early on and put a board out in the spring overnight to catch any squash bugs.



Credit: Dr. Jennifer Johnson

Signs of an Infestation

- Leaves wilt and plant begins to die.
- Fruit is covered by gray-blue or gray-brown bugs.
- Small, oval, brown eggs are laid in geometric pattern on the leaves or stem.



Prevention and Treatment

- Hand pick and destroy eggs, larvae and adults. Uncover the base of the plant to find bugs in hiding.
- Trap them by placing a wooden board out in the garden near your squash plants overnight. In the early morning, collect and crush or drown the bugs in soapy water.
- Thoroughly clean up the infected area after individual harvests and end of the season.

Squash Vine Borer

Squash vine borers can be devastating to your zucchini. The adult lays eggs at the base of the stem and the larvae hatch and burrow into the stem, disrupting nutrient flow and weakening the plant. Try to catch it early enough to dig out the larvae, so the plant won't die.

Signs of an Infestation

- Leaves wilt and plant begins to die.
- Burrowed hole is visible in the stem near the soil.



Credit: UMass Extension Vegetable Program

- Small copper eggs are laid on stem near the soil and underneath leaves.

Prevention and Treatment

- Hand pick and destroy eggs and adults. Uncover the base of the plant to find the hole and any bugs in hiding.
- If the plant is wilting, but otherwise healthy, carefully use a sterile knife to split the stem as little as possible to dig the white larvae grub out of the hole in the stem.
- Clean up all vines and plant debris at the end of the season.
- Till or disturb the soil at the end of the season to kill eggs.

Bottom Rot

Bottom rot, also known as blossom-end rot, is a physiological plant disorder caused by a calcium imbalance. Wide fluctuations in moisture, too much nitrogen in fertilizers or root damage from cultivation, can cause calcium deficiency.

Bottom rot most commonly affects tomatoes, but can also occur in squash, pepper and cucumber plants. It's most common when the fruit is green or ripening.



Signs of the Disorder

- A small, sunken, water-soaked area on the bottom of the fruit.
- The spot grows and sinks in while turning brown or black.
- Fruit rots on the vine.

Prevention and Treatment

- Maintain consistent levels of moisture in the soil. Use mulch to minimize evaporation.
- Avoid fertilizers too high in nitrogen and do not over fertilize during early fruiting.
- Add materials with high levels of calcium, such as bone meal or eggshells, to the soil when planting.
- Remove damaged fruit and discard it.
- If blossom rot has already occurred, it can be treated with a commercial calcium chloride product.

Early Tomato Blight

Early tomato blight is a fungal disease that affects all parts of the tomato plant. It can occur in any type of weather but prefers damp conditions and usually occurs in plants that are stressed, old or in poor health.

Signs of Early Tomato Blight

- Dark spots on stems or leaves.
- Concentric rings form around the dark spots.
- Yellow leaves



Credit: USDA Cooperative Extension

Prevention and Treatment

- Make sure seeds or seedlings are disease free.
- Provide enough space between plants for good air flow.
- Avoid wet conditions. Water the base of the stem, not the leaves, and water early in the day so plants dry before nightfall.
- Prune the bottom leaves to create a 1 to 2-foot space between the soil and the first leaves. This prevents water from splashing onto the leaves and transferring disease spores.
- Sterilize the knife or scissors with 70% rubbing alcohol in between plants.
- Practice good garden sanitation, clean out debris throughout the season so diseases don't spread.

- If you see signs of blight, remove the plant from the garden to prevent spreading.
- If you have an outbreak, rotate crops the next year.

Late Tomato Blight

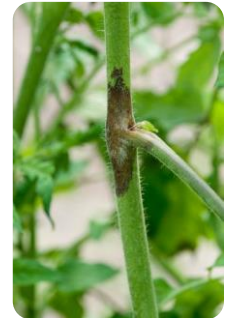
Late tomato blight is another fungal disease that affects tomato plants. It is more detrimental than early blight as it can travel easily via spores and is highly contagious. It can quickly ruin an entire crop.

Signs of Late Blight

- Sunken, dark green or brown lesions on leaves or stems.
- Leaves that are shriveled and dead.
- Circular, greasy, brown lesions on tomato fruits.
- White, fuzzy or cottony spores on stem lesions, under leaves or on sunken spots on the fruits.



Credit: Howard F. Shwartz



Credit: Dwight Sipler

Prevention and Treatment

- Plant disease-resistant hybrids.
- Rotate crops each year.
- Avoid wet conditions. Water the base of the stem, not the leaves, and water early in the day so plants dry before nightfall.
- Remove infected plants from the garden and seal them tightly in a trash bag to prevent the disease from spreading. Do not compost any infected plants.

Powdery Mildew

Powdery mildew is a fungal disease that creates powdery spots on the leaves and stems of plants, most commonly those of squash and cucumbers. It is unattractive, but rarely fatal.

Signs of the Disease

- Powdery white or gray splotches on leaves and stems.
- Leaves can curl or drop.

Prevention and Treatment

- Remove the infected parts of the plant and dispose, do not compost as most compost piles won't get hot enough to kill the spores.
- Trim and prune to improve air circulation.
- Water the stem at the base to keep the leaves dry.
- Try an organic fungicide: 1 tbsp. baking soda, ½ tsp. liquid soap and 1 gallon of water. Mix and apply to leaves, but do not apply in full sun.
- Leave bed bare and empty during winter to avoid harboring spores.



Credit: Wikimedia Commons User Pollinator

Animal Pests

Insects and diseases aren't the only threat to the garden. Animal pests like rabbits and groundhogs can also do a lot of damage and can be difficult to keep at bay.



Credit: Adam Harrison

To discourage rabbits from settling nearby, remove brush piles, weed patches, piles of stone or any other debris, where they could live and hide. The most effective way to deal with rabbits is to fence them out. It only requires about a 3-foot-high fence with holes no larger than 1" to prevent them from jumping over and you have a good start with raised beds. It's also a good idea to bury the fence several inches below the soil surface to keep them from digging under.

Groundhogs and deer on the other hand can be much trickier. There's not much a groundhog won't eat in the garden, so if you see one near your house or helping itself to your garden, it's best to act as soon as possible. The same goes for deer, how much damage they cause depends on the surroundings and what else they have available.

Groundhog Basics

In deciding the best way to manage groundhogs in your garden, it is important to understand their basic behaviors. Understanding groundhog behavior allows you to make the best management decisions based on your unique troubles and property.



Credit: Wikimedia Common User EIC

Groundhogs are rodents that live across North America. They are diurnal, which means they are most active during the day, particularly in early morning and late afternoon.

Groundhogs eat mostly plants, which is where the trouble comes for gardeners. In gardens, they tend to prefer plants that belong to the Brassica family, such as collard greens, cabbage, broccoli and kohlrabi, as well as parsley, peas and cilantro.

Groundhogs are accomplished swimmers, climbers and diggers. It is uncommon for groundhogs to contract diseases transferable to humans, such as rabies, and therefore are generally not considered to be a public health risk.

Groundhogs are territorial, usually staying within 5 yards of their den. They hibernate from October to around March or April. Babies are born between the months of March and May and leave their den by early July.

Deer Basics

Deer are most active at dusk. They eat many of the plants found in both vegetable and ornamental gardens. Greens, peas, tulips and hostas, are some of their favorites.



Credit: The New York Times

Deer usually leave plants in the onion family and hot peppers alone. They can jump or reach over short and medium height fences.

Deer can travel long distances, but they are ultimately creatures of habit and frequent the same routes and habitats, so you can assume they will find your garden a second time. They do not hibernate and their babies are born between May and June.

What Does Groundhog and Deer Damage Look Like?

There are a lot of critters that are interested in your garden, how can you tell if it is a groundhog? Groundhog and deer damage is usually severe, in comparison to chipmunk, mouse or insect damage. They will almost eat the entire plant, usually only leaving some stems. They will also take big chunks out of your fruits, particularly tomatoes. Look at the surrounding area for clues as well. Groundhogs may have a visible burrow near a building, rock or tree, and deer will leave piles of dark-colored, oval droppings.

<p>GROUNDHOG DAMAGE</p> 	<p>GROUNDHOG / DEER DAMAGE</p> 	<p>SLUG DAMAGE</p> 
<p>CHIPMUNK DAMAGE</p> 	<p>GROUNDHOG / DEER DAMAGE</p> 	<p>INSECT DAMAGE</p> 

Gardening Solutions

Tolerance or Co-operation

Plant a groundhog and deer garden also known as a trap crop. By planting other things in your yard for them to eat, they will become less interested in your garden. Clover and alfalfa are good crops to distract groundhogs and deer. Plant them around the perimeter of your yard or close to where you think they're entering, so they find the trap crop before your garden. This works better for groundhogs than for deer.

Trapping and removal are one option to get groundhogs off your property. Groundhogs are best baited with apples, carrots, cantaloupe or lettuce. It is best to trap between July and September. If groundhogs are causing structural damage to your house, you may be eligible for a trapping program with Pittsburgh Bureau of Animal Care & Control (412-255-2036). If you are considering trapping privately, be sure to become familiar with the laws about wildlife trapping & management in Pennsylvania before taking any action. It is illegal to trap, bait or hunt deer in the city.

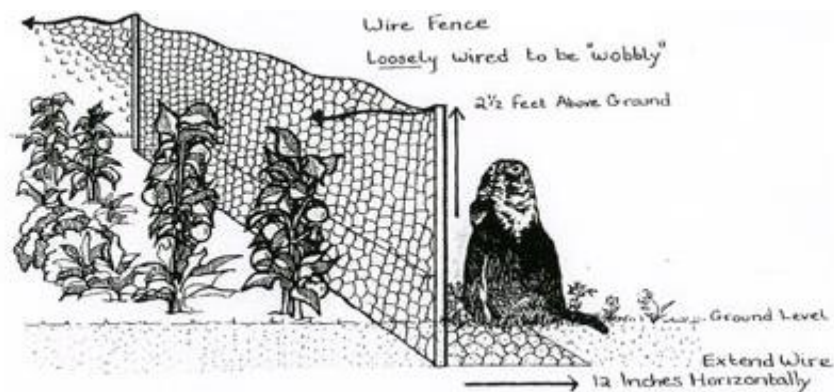
Close potential entry points by filling in existing holes and burrows, patching fences and removing hiding spots. This will help prevent other groundhogs from moving in.

Fencing

Fence the groundhogs and deer out of your garden for the most protection. Keep in mind that groundhogs can climb, dig and chew. To effectively keep groundhogs out, use flexible fencing options, such as chicken wire or plastic mesh fencing.

Fencing should be buried under the ground in an "L" shape, about 1 foot down and 1 - 2 feet out, to keep groundhogs from burrowing underneath. To prevent climbing, fences should be at least 4 feet tall and loose on top; that way, while the critters are trying to get over, the fencing will fall backwards and make it impossible for them. Plastic can be chewed through if it is at animal height, but metal cannot.

Deer can jump; however, they need enough space to land so you can get away with 5 - 6 feet tall fences if the fenced area is small. If the fenced area is large, fences need to be 10 feet.



The following page has blueprints for a groundhog / rabbit / deer fence design.



How to Build a Groundhog Fence for Your 5'4" Raised Bed

THIS FENCE BLUEPRINT has been designed by Phipps Homegrown staff specifically to keep groundhogs out of raised beds (it will keep the rabbits and deer out, too!). With 16" tall raised beds like Homegrown uses, groundhogs typically won't go through the trouble of digging under them. However, if your beds are shorter, line the bottom of your beds with chicken wire, or bury chicken wire under the ground in an "L" shape (about 1 foot down and 1-2 feet out).

The lower section is made of chicken wire so animals can't chew through it. The upper section is plastic fencing, so if groundhogs climb the chicken wire, the wobbly plastic will cause them to lose their balance and fall backwards. The fence is made of four separate sides. To access the beds, just lift a side out, then slide it back in place when you're done. One side can also be left in place and used as a trellis if desired.



Tools

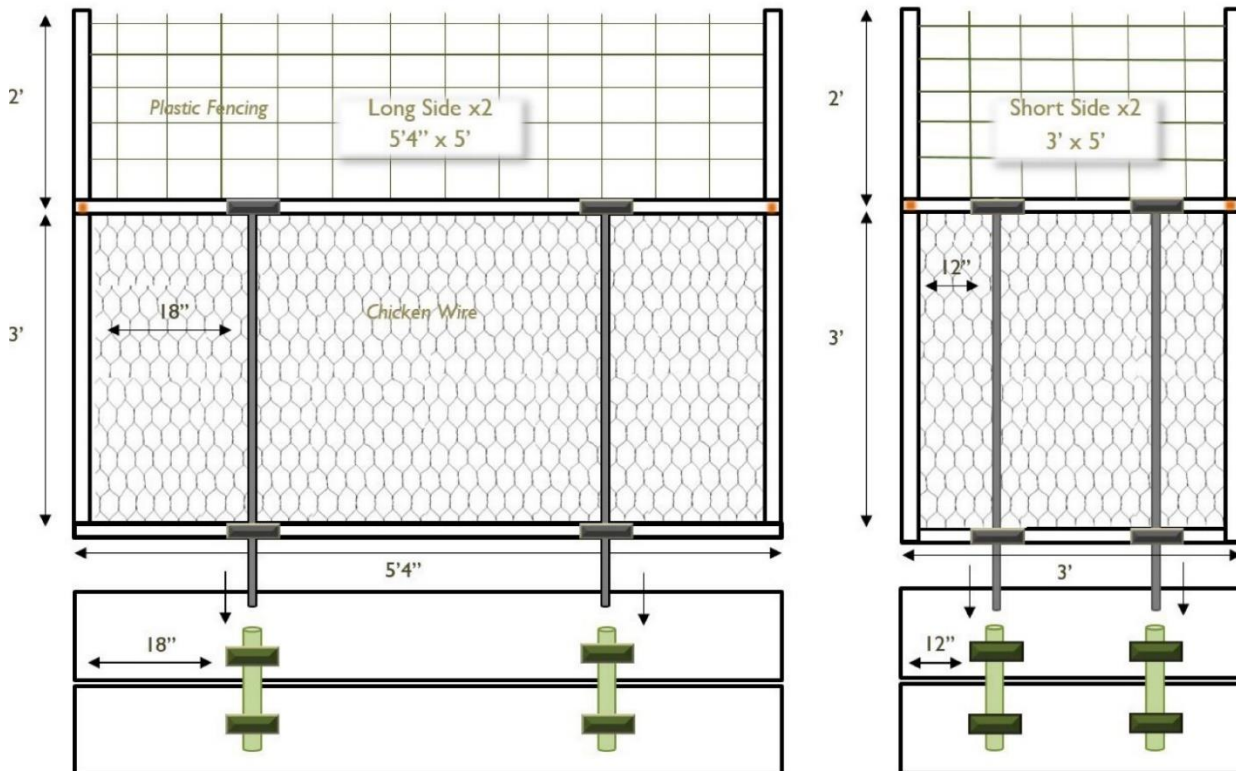
- Saw
- Drill
- 1/8" or 7/16" drill bit
- Tape measure
- Staple gun
- Wire cutter or diagonal pliers
- Carpenter square

Materials

- Lumber
 - Four 5'4" long 1"x2" boards
 - Four 3' long 1"x2" boards
 - Eight 5' long 1"x2" boards
- 17 feet of 3' wide chicken wire
- 17 feet of 2' plastic fencing
- Eight 4' sections of 3/4" EMT conduit
- Eight 1' sections of 1" EMT conduit
- (16) 3/4" two-hole conduit straps
- (16) 1" two-hole conduit straps
- (32) 1 1/4" #6 galvanized wood screws
- (32) 3/4" #6 wood screws
- About 650 staples
- (4) eye hook and latches, optional

Directions

1. Lay out two 5' boards parallel on a large table and place another 5'4" board perpendicularly across like a wide U (see below). Join a corner by squaring with the carpenter square, pre-drilling two holes in the overlap, and attaching two 1/4" screws. Repeat for the other corner.
2. On the 5' boards, mark 3 feet up from the corner.
3. Place a 5'4" board parallel to the first 5'4" board at the 3 foot marks (see below). Join to the other 5' boards like before, using the carpenter square and drilling pilot holes before attaching with screws.
4. Flip the frame over. Stretch chicken wire over the frame's enclosed rectangle using staples and cutting with wire cutters or diagonal pliers.
5. Loosely stretch the plastic fencing in the section above the chicken wire and secure with staples. This should be somewhat floppy to make it difficult for the groundhog to continue climbing.
6. On the 5'4" boards, mark 18" in from each side and attach a length of 3/4" conduit at each mark using conduit straps and 3/4" screws (see below).
7. Repeat steps to make a second 5' 4" fence panel and two 3' fence panels (see below).
8. To install onto your raised bed: Set a long fence panel on top of a corresponding side of your raised bed. Slide 1' sections of 1" conduit onto both of the 3/4" conduit legs. Attach the 1" conduit to the bedside with conduit straps and 1/4" screws, two straps per conduit section.
9. Repeat with a fence panel on each raised bed side.
10. Optional: Drill a hole for a latch in a panel midway up and edge, screw it in, then drill and attach an eyelet in the adjacent corner panel. Repeat for the other corners.



Additional Gardening Animal Pest Solutions

Scare Devices and Harassment

Tie objects in your garden that will scare them off. Because they are prey animals, groundhogs are generally very skittish. Things that move in the wind, such as balloons or a beach ball, work well to frighten them off. Pie tins also work well if tied up to a stake, so that when the wind blows, they bounce around and make noise.

Put motion-detecting noise makers in your garden; they go off when a groundhog approaches and should frighten them off. Some gardeners have also had success keeping groundhogs at bay by keeping a radio on in their garden.

Larger dogs that spend time outdoors can also discourage groundhogs.

Habitat Modification

Keeping your grass cut short and removing potential hiding spaces, such as brush piles or undergrowth, in your yard will make your property less appealing to groundhogs because they do not like to be out in the open.

Repellents

Spray a hot pepper spray on the leaves and fruits of your plants; deer and groundhogs won't like the spiciness and should leave your plants alone. Remember to wash your food before you eat it!

Hang strongly scented small soap bars near the garden to repel deer.

Sprinkle cayenne pepper or Epsom salts on or around your plants. Both will taste bad to them. Epsom salts will also help replenish your soils with magnesium, an important plant nutrient.

Soak rags or sponges in ammonia and place them around the perimeter of your yard or near groundhog holes. Ammonia is present in higher concentrations in predator urine and the scent of it should trick the groundhog into thinking that there is a predator around and indicate to leave.

Hot Pepper Spray Recipe – Reapply After Rain

Ingredients:

- 1 gallon of water
- 3 tablespoons hot pepper flakes or 10 fresh peppers chopped up, cayenne is best.
- Biodegradable dish soap

Instructions:

Add water and peppers to a pan and bring to a simmer for 15 minutes. Let the mixture sit for 24 hours, then strain and add a few drops of natural, biodegradable dish soap. Soap helps the mixture stick to the plants. Use a spray bottle to apply to your plants. Be careful and wash hands thoroughly; don't touch your eyes! If spray is used on vegetables, wash thoroughly before consuming.



Backyard Composting: A Beginner's Guide

Good soil is crucial for growing healthy plants. The best soil is full of organic material, carbon-rich matter formed from anything that once lived. Organic matter is important for making nutrients available to plants and encouraging beneficial microbial life in the soil.

COMPOSTING is a process that converts food scraps and yard waste — such as leaves and grass clippings — into useful, nutrient-rich soil amendment. A compost bin is the perfect complement to your backyard garden!

GETTING STARTED

Once you have your tools and ingredients composting is simply a matter of adding materials to your bin in the right quantities. Think of it as a green and brown lasagna! Follow the steps below to start.



What do I need?

- A standard plastic compost bin or a homemade bin made from timber, chicken wire, etc.
- Garden fork, compost turner or some kind of poking tool
- Green organic ingredients
- Brown organic ingredients

Scan the QR code for a composting demonstration:



Source: Nelson City Council

1

Position your bin somewhere where you will have easy access from your kitchen. Place in half sun, half shade for the best results. The warmer the location, the faster the compost will work. Make sure to line the bottom with hardware cloth to minimize pests.

2

Create your first layer with dry shredded leaves and twigs: Place the brown ingredients at the bottom and water thoroughly. The water encourages bacterial growth, which will allow your material to start breaking down.

3

Your second layer includes green ingredients: Add a layer of clippings, plant scraps or other green material so that it is roughly the same thickness as your first brown layer.

4

Additionally, you can add a thin layer of soil from your garden. Soil contains useful microorganisms to kick start your compost.

5

As you go, continue to add brown and green ingredients in equal volumes; see chart for what ingredients are considered brown and green. Mix the pile.

6

When your bin is full, you will want to stop adding materials, so the compost can finish. Producing finished compost generally takes three to six months. Your compost is ready when it looks like rich, dark soil. You can slide up the lower door or tilt the bin and scrape away the finished compost at the bottom, or lift off the bin and start a new pile.

Tips and Tricks

Break up ingredients

By breaking up your ingredients into smaller pieces, you'll allow your compost to decompose faster and speed up the pace of composting.

Keep the air flowing

Keeping it aerated helps to speed up the composting process. To achieve this, turn your pile over or poke holes in it every few weeks with garden fork, metal post or a compost turner. Dry shredded leaves or shredded newspaper also help to create space in your compost that holds air.

Store materials

Prepare a bucket of your brown material ahead of time. This way you will have the material handy when you go to add your new batch of green material from the kitchen or garden.

Ratio of Greens to Browns

Start with equal portions using half green and half brown materials at first. Then, as you gain confidence, alter your ratio based on the conditions of the pile.

NEVER COMPOST

Stay away from these materials as they will cause your compost pile to smell, attract animals and/or contaminate your finished compost with chemicals and weeds.

- Plastics
- Metals
- Chemicals (including clippings from treated grass)
- Weeds with seeds
- Diseased plants
- Meat
- Dairy
- Oily foods
- Human / dog / cat waste
- Glossy paper
- Treated lumber or sawdust

Trouble-shooting

Having problems with your compost? Check out the chart below to see what you can do!

Symptoms	Possible Cause	Solutions
Unpleasant odor from pile	Not enough oxygen/compaction	Aerate by stirring pile or put in big sticks to help with airflow
	Not enough oxygen/too wet	Mix in dry materials
Ammonia smell	Too much nitrogen	Mix in dry brown materials
Pile not heating up	Lack of nitrogen	Mix in some greens
	Not enough moisture	Water pile
	Pile needs to be turned	Use a pitchfork, turn outside to center
	Compost may be finished	Remove finished compost and start over
Pests are found in the bin	Gnats (these will not harm anything but can be annoying)	Try adding a layer of brown to the top
	Mammals	Line the bottom of the pile with hardware cloth or use plastic bin with locking lid



Composting Materials: Green vs. Brown

Green means **high in nitrogen** and brown means **high in carbon**.
 Shred larger items for faster composting.
 Do not compost diseased plants.

Greens

Mostly wet or recently growing/living materials



Grass Clippings



Coffee Grounds



Tea Bags



Fresh Yard Waste



Chopped Fruit and Vegetable Scraps



Egg Shells



Plant Trimmings



Weeds*

*Only compost weeds which have not gone to seed

Browns

Dry or woody plant material



Dry Leaves**



Paper Egg Cartons



Newspapers



Cardboard



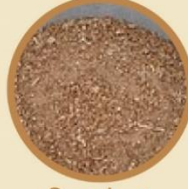
Straw



Paper Bags



Dry Yard Waste



Sawdust



Wood Ash

**Stockpile leaves in the fall, so you have a steady supply of browns all year

Purchasing Compost

If you need compost before you're able to produce your own or more than you can produce, bagged compost is also available for purchase at many garden centers and hardware stores.

Options include:

- **Composted Manure:** Can be made from cow, horse or poultry manures. It contains important nutrients and a little goes a long way. Note that fresh manure from farms will burn plants; it must first be fully composted.
- **Mushroom Compost:** The leftover medium used for growing mushrooms originally composted manure, straw or other materials, depending on the company. It contains high salt levels, so should be used with caution around young plants. For best results, thoroughly mix it with garden soil or allow it to sit over winter to cure.
- **Worm Castings or Vermicompost:** Manures, food wastes or other materials processed by red worms. Usually mixed with soil before being sold so potency can vary; follow the bag's instructions on application rates.

Using Compost

There are several ways compost can be used in the garden:



Credit: Kessner Photography

- **Amending Soil:** Add 1 to 3" of compost to the top of beds before planting. You can do this in the fall or spring.
- **Mulch or Side Dressing:** One to two months after planting, spread compost on top of soil as a mulch or side dress by digging a hole next to a plant and adding compost. It will slowly break down over the season to encourage soil life and release nutrients for plants.



HARVESTING / STORING FRESH VEGETABLES

Harvest time is always exciting, when you reap the reward of the effort you've put into your garden! It's important to know how to tell if vegetables are ripe and ready for picking, so you get the best yield, flavor and shelf-life.

Tips for Harvesting

- When harvesting vegetables, be careful not to break, nick or bruise them. The less vegetables are handled, the longer they will last in storage.
- Harvest vegetables in the morning, when they are likely to be at their coolest and will take handling better.



Storage Information

Once produce is harvested, if you don't eat it right away, it's good to know best storage practices so your hard-earned produce will last as long as possible.

Different vegetables need different storage conditions. Temperature and humidity are the main storage factors; there are three combinations for long-term storage:

- **Cool and Dry** (50 - 60°F and 60% relative humidity)
 - Basements are generally cool and dry. If you store vegetables in your basement, provide them with some ventilation (don't use plastic bags) and protection from rodents.
- **Cold and Dry** (32 - 40°F and 65% relative humidity)
 - Refrigerators are generally cold and dry, don't put veggies that require these conditions in plastic. Instead, leave them unbagged or use paper bags or boxes.
- **Cold and Moist** (32 - 40°F and 95% relative humidity)
 - Put vegetables in perforated plastic bags in the refrigerator or in the crisper drawer, for cold and moist conditions. Unperforated plastic bags often create too humid conditions, which lead to condensation and growth of mold or bacteria.



Harvest and Storage Chart

The following chart gives specific harvest and storage information for some commonly grown vegetables. Expected shelf-life times are estimates.

VEGETABLE	WHEN to harvest	HOW and how long to store	NOTES
Bean	When pods are firm, but the seeds are still immature.	cold and moist, 1 week	Don't wash before storing, they will toughen over time
Beet	When beets are 1.25 - 3" in diameter	cold and moist, 2 weeks	Remove green tops before storing (greens are also edible).
Cabbage	When the head is compact and firm.	cold and moist, 2 weeks	Make sure it is dry before storing.
Carrot	When tops are ½ - 1" in diameter.	cold and moist, 2 months	Before storing, remove green tops, scrub off dirt and let them dry.
Chard	When leaves are 6 - 8" tall. Harvest outer leaves first, the center will continue to grow.	cold and moist, 3 - 4 days	Wash before using, not before storing.
Collards	When leaves reach desired size, up to 10" long.	cold and moist, 4 - 5 days	Pick lower leaves first. Wrap leaves in moist paper towels, place in sealed bag. Wash thoroughly before using.
Corn, Sweet	When silks dry and brown; kernels should be milky when cut.	cold and moist, 5 days	Sweetest if eaten immediately.
Cucumber	For slicing, when about 4 - 6" long and uniformly green (don't let them get yellow).	cool spot in kitchen in perforated plastic bags; or in refrigerator for a few days, 7 - 10 days	Develops pitting and water-soaked areas if chilled below 40°F; do not store with apples or tomatoes.
Eggplant	When the skin is shiny, before color dulls.	like cucumbers, 1 week	When harvesting, leave 1" of stem attached. Don't store at temperatures below 50°F.
Herbs	When leaves are tender and fragrant.	cold and moist, varies	Store upright in a glass of water or in plastic bag with a paper towel.
Kale	For fresh eating, harvest leaves when small and tender. Otherwise, when leaves are 6 - 8" tall.	Cold and moist, 1 week	Harvest outer leaves first. Don't pick the center of the plant, as it will keep producing.
Lettuce	While leaves are tender, varies with variety.	cold and moist, 1 week	Put in a plastic bag with a dry paper towel, to remove moisture.

VEGETABLE	WHEN <i>to harvest</i>	HOW <i>and how long to store</i>	NOTES
Onion	When tops are brown.	cold and dry, 4 months	Allow to dry at room temperature for 2 - 4 weeks, then store.
Okra	When pods are 2 - 3" long.	cold and dry, 3 - 4 days	Don't wash before storing.
Pea	When pods are plump but still tender; be careful not to tear the vine.	cold and moist, 1 week	Keep peas well picked to encourage more production.
Pepper	When fruits reach desired size or color.	like cucumbers, 2 weeks	The longer they stay on the plant, the sweeter they get. Develop pitting when stored below 45°F.
Radish	Varies with variety, typically when roots are up to 1.25" in diameter.	cold and moist, 1 month	Remove tops, wash and dry completely before storing.
Spinach	While leaves are still small and tender.	cold and moist, 10 days	Leaves get bitter if allowed to grow too large.
Summer Squash	When fruit is 4 - 6" long and still tender.	like cucumbers, 1 week	Do not store in refrigerator for more than 4 days.
Sweet Potato	When leaves are yellowing, before frost.	cool and dry, 3 - 6 months	Cure before storage: wipe clean and leave in a warm, humid place with airflow 7 - 10 days, then store.
Tomatoes	When color is uniformly pink or red and flesh is slightly tender.	like cucumbers, 5 days	Loses color, firmness and flavor if stored below 40°F; do not refrigerate unless you need to store it for an extended time.
Watermelon	When underside turns yellow or it produces a hollow sound when knocked.	like cucumbers, 10 days	Will decay if stored below 50°F for more than a few days.
Winter Squash and Pumpkins	When shells are hard, before frost.	cool and dry, 3 - 6 months	Most benefit from curing before storage: wipe clean and leave in a warm, humid place with airflow 7 - 10 days, then store.



Advanced Gardening Topics

The longer you garden, the less intimidating some techniques feel, so you may be interested in learning more about topics that help you maximize your garden.

See the Resources Appendix for additional sources of reliable information on gardening beyond the basics.



INDOOR SEED STARTING

By starting seeds indoors on your own, you can get a head start on the growing season, choose from a wider selection of plant varieties than is offered as transplants at nurseries and even save some money if you have a large garden. However, it does require a modest investment in equipment and frequent attention to carefully watch the seedlings.

Not all seeds need to be started indoors; see page 15 for a list of crops that do better transplanted. The seed packet will also give planting information, including how deep to plant the seed or if it needs light to germinate and shouldn't be covered with soil, such as oregano, chamomile and alyssum. (See the Indoor Seed Starting Chart on page 58 to know when to start seeds inside)



Materials

Some materials can be reused each year, reducing your costs over time. Plan your set-up in the winter so you can be ready by the beginning of March.

Growing Medium: Should be a sterile mix with fine particles, often called seed starting mix. If possible, find a mix with compost to avoid needing to add fertilizer. Organic mediums are better than those with synthetic fertilizers mixed in.

Containers: Should have drainage holes and be able to be sterilized. Reuse greenhouse pots and trays or try other small plastic pots 1 1/2" - 3" in diameter. Wash off the previous year's soil and sterilize for 10 minutes in a mixture of 2 tablespoons bleach in 1 gallon water. Rinse well. Feel free to experiment with paper pots but know they will get soggy and possibly fall apart before you are ready to plant them.

Flat Bottom Solid Trays: Allow you to water from the bottom, where the soil wicks the water up and the top growing medium remains uncompacted. Greenhouse trays, lettuce clamshells and foil trays can all work if sterilized.

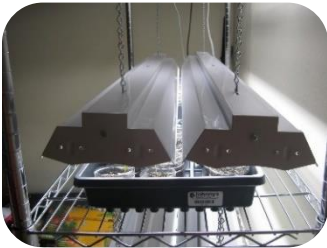
Clear Humidity Covers: Allow you to keep the surface of the growing medium moist while the seed is germinating. Clear plastic wrap and take out container lids can work.

A Strong Light Source: Will solve most of your seed starting troubles. Growers have been successfully using fluorescent shop lights for decades. Although they use more energy than LED systems, it is minimal on the scale a backyard grower uses it, one or two lights for three months of the year; T5 or T8 cool bulbs are sufficient.

Materials (cont)

LED grow lights continue to be more available and can be worth trying; look for lights that give a full spectrum (4000 - 6000K bright white color, 5000 lumens above each 10 x 20" tray)

- Set your lights on a timer to run for 16 - 18 hours a day; 6 - 8 hours darkness is important for the plants.
- Windows are an option, but you will not get as good of results. If you do use a window, frequently rotate the tray so the plants grow centered and not leaning.



Seed Starting

1. Pre moisten growing medium so that it clumps together when squeezed but is not dripping. Like a wrung-out sponge.



2. Fill cell packs or pots to the top, tap gently onto a flat surface to settle the potting mix, refill to the top with mix, leveling so that it is even with the top of your container. Do not pack the soil tightly, keep the mix light and loose.

3. Plant the seeds, according to package directions. Use a finger or pencil to make a small indentation in the soil, place a seed inside, then cover with soil and tamp lightly. Depth = about two times and width of the seed.



4. Label with the crop, variety and date. Craft sticks, old blinds and tape on the pot itself.



5. Mist the soil and place the clear dome on top, put in a warm place and keep evenly moist.



6. When the seed germinates remove the lid, turn on and position the light so that the bottom is about 1 - 2" away from the plant for T8 lightbulbs, 3 - 5" for T5 and as instructed for LED. Lights should be on for about 16 hours.
7. After the plants get their first set of true leaves thin if there is more than one plant growing in a cell or pot. Keep the strongest and cut the rest off where the stem meets the soil.
8. Put a gentle fan in front or frequently brush your fingers over the tops of the plants.

Bottom Watering

1. Check the mix for moisture by gently sticking a fingertip in the top, about a ¼ of an inch down.
2. If the mix is dry add about a half inch to an inch of water to the tray. Give the plants some time to soak up the water from the tray. If there is a lot of excess water after about 20 mins, empty it into the drain.



Hardening Off

Get the plants ready for the outdoors by exposing them gradually.

- **Day 1:** Move plants into a shady location outside for about 2 - 4 hours, bring back in under lights or on a windowsill.
- **Day 2:** Move plants into a sunny spot for 2 hours and bring back in, under lights or on a windowsill.
- **Days 3 - 6:** Gradually increase time in the sun.
- **Last Day:** Keep outside over-night unless temps dip below freezing.

Troubleshooting

SYMPTOMS	POSSIBLE CAUSE	SOLUTION
Seedlings wither and die quickly	Damping off, where soil organisms attack the seedlings	Sterilize your containers, do not reuse potting mix and give good air circulation
Fungus gnats flying around	Water is left in tray for too long; poor air circulation	Allow growing medium to dry out in between waterings, set up fan, use sterile potting mix
Stems are leggy and fall over	Light source is too far away	Lower the lights closer to the plants or try a better window



Indoor Seed Starting Calendar

THE APPROPRIATE DATES to start seeds are determined by the last frost date, which varies geographically. Pittsburgh is in Zone 6 of the USDA's Plant Hardiness Map, which means the average last frost date in spring is May 15, and first frost date in fall is around Oct. 15. The dates listed below are for earliest harvests, but many of the crops below can also be planted or re-planted later in the season.



VEGETABLE	WEEKS TO START SEEDS BEFORE SET-OUT DATE	WHEN TO START INSIDE	WHEN TO PLANT OUTSIDE
Alyssum	6	April 3	May 15
Bachelor's Button	4	April 17	May 15
Basil	3	April 24	May 15
Broccoli	4	April 3	May 1
Cabbage	4	March 18	April 15
Calendula	4	April 17	May 15
Chamomile	4	April 17	May 15
Chard	5	March 27	May 1
Chives	4	March 18	April 15
Collards	4	March 18	April 15
Eggplant	6	April 20	June 1
Kale	4	March 18	April 15
Marigold	3	April 24	May 15
Nasturtium	3	April 24	May 15
Okra	4	April 17	May 15
Onion	10	February 5	April 15
Oregano	8	March 6	May 1
Parsley	6	March 4	April 15
Peppers*	8	March 20	May 15
Scallions/Bunching Onions	4	March 18	April 15
Tomatoes*	5	April 10	May 15
Zinnia	4	April 17	May 15

*Includes time to up-pot

COLD SEASON GROWING

By choosing cold-tolerant crops and covering them in early spring or late fall, you can extend your growing season. The conditions are not the same as growing in the warm season, so you must make some adjustments beyond thinking about the cold. In general, leafy greens and root crops are the most successful.

Early Spring Planting: Is focused on fast-growing crops that can finish before you need your summer space and on crops that can survive snow and freezing events while they are young and tender.



Credit: Faba-Photography / Getty Images

Fall Planting: Is focused on fast-growing crops that can establish themselves before the days get short; plants in Pittsburgh will grow minimally between November 12 and January 30 no matter the weather because the nights are longer than 14 hours, triggering dormancy. Any crops that are not ready to eat by November will be ready early spring. Always leave cold-tolerant crops in your bed even after the frost so they can wake up and re-grow in the spring.

Some of these crops can be planted more than once because they grow so fast, making them ideal for planting before or after your main crop. (See the chart on page 16 for a detailed list of frost- and cool-tolerant crops)

Alternatively, you can plant that same fast crop multiple times, a method called succession planting. In this plan, you frequently plant small amounts for a continued harvest.

The chart below lists some suggestions you can try in your backyard garden. If there is no disease, you can plan these successions right next to the previous one.

Fast Crop Succession Planting Schedule

CROP	1st	2nd	3rd	4th	5th
Baby Salad Greens (Spinach, Arugula, Mesclun mix, Baby Kale)	Early April	Early May	Mid-August	Early September	Early October
Cilantro, Dill	Late April	Mid May	Early June	Early July	Early August
Lettuce	Early April	Early May	Early June	Mid-August	
Radish	Early April	Early May	Early September		

Cold Protection

There are several ways to protect your crops from a freeze, depending on the materials, time and money you want to put into it.

Mulch: Use on root crops like beets, carrots and scallions in the fall to protect the food underground. (See page 26)

Covers: Cover crops to trap heat, protect from wind and avoid excess moisture. Covering will also warm the soil faster in the spring and postpone soil freezing in the fall. Most coverings will need to be supported to prevent the cover from smothering the plants when there is a heavy snow.

Methods of Covering

Low Tunnels: Are supported by curved hoops and covered with row cover fabric or clear plastic secured at the soil. Hoops can be made from 9-gauge wire, curved or flexible pipe slid onto posts or even slender green branches, although branches will snag and make holes in your cover. Both fabric and plastic have their advantages.



Row Cover Fabric: Is sold at garden centers and online in 5' and 10' widths. The fabric keeps plants slightly warmer while allowing sunlight and rain, so the plants do not need much attention. Secure it tightly over the hoops with bricks, sandbags or clips. A bonus: light-duty row cover fabric can be used to protect greens from insects in the summer. (See page 33)

- **Greenhouse Plastic Film:** Will protect crops from heavy frosts. Sunlight can pass through, but rain and snow cannot, so you will have to uncover at times to water the plants. Remove the cover on sunny and warm days to avoid stressing the plants. Painters plastic will work for a short time but eventually degrade under sunlight. UV-tested plastic in 6 mil thickness such as is used for greenhouses is great if you can find it, whether new or taken off an old hoop house.

Cloches: Are covers for individual plants, traditionally made of glass but now more commonly plastic. Try making your own by cutting a clear, large soda bottle, milk jug or water jug in half and placing it over your plant. This method can be useful to protect young tomato seedlings that are put out before the risk of frost is over. Sunlight will quickly trap heat in a cloche, so they need to be vented, such as by removing the bottle cap or removed on sunny days to prevent overheating and developing fungal diseases.

Methods of Covering (cont)

Cold Frames: Are large boxes with a clear top that go over an entire bed or part of a bed. Sunlight will pass through, but snow and rain will not. These trap more heat than low tunnels; this also means they need to be vented or removed on a sunny day to prevent overheating and developing fungal diseases. Cold frames can often be built with materials you have around your house. There are many plans and ideas for building cold frames on the internet, but here are a few pointers:

- **Wood:** Is a good material to build the frame. Make it tall enough to fit your crops but short enough to keep the warmed air on the plants. A small downward angle will help trap sunlight. 12 to 18" tall at the back and 6 to 12" in the front fits these requirements for a 3 - 4' wide bed.



- **Glass Windows:** Can be used on top of your frame to trap sunlight. If you use an old window, make sure the frame was not painted with lead-based paint (very important!) and choose a window that is light enough to lift and carry. If using a window, build the frame after choosing the window.
- **Clear UV-tested Plastic:** Will also trap sunlight, instead of glass. Polycarbonate panels or greenhouse plastic will work. Consider how you will vent the cold frame and how you will access the plants inside. The top can sit on the edges of the frame or it can be attached with hinges.



RESOURCES

Phipps Resources

The Phipps resources below provide information on gardening, healthy eating and lifestyles.

Phipps Website provides links and resources to help you start and maintain your garden:



Homegrown page has this handbook in electronic form, including blueprints for raised beds and fences.

phipps.conservatory.org/homegrown



Vegetable Gardening Guide contains the planting charts and appendices in this handbook, in addition to shopping guides for garden materials and seeds and eco-friendly pest management.

phipps.conservatory.org/green-innovation/at-home/vegetable-gardening-guide



Greener Gardening Guide has a list of recommended nurseries and pollinator and sustainable plants.



Homegrown How-To is a YouTube channel with video demonstrations of gardening skills.

phipps.conservatory.org/HomegrownHowTo

Let's Move Pittsburgh is a program of Phipps Conservatory and a collaborative of organizations and individuals committed to raising awareness about the importance of nutritious eating habits, increased physical activity and reduced screen-time for children in our region. Visit letsmovepittsburgh.org for more information and resources.

Ask Dr. Phipps is a free service provided by Phipps Master Gardeners, to answer gardening questions. Contact Ask Dr. Phipps anytime at 412-622-2364 or drhipps@phipps.conservatory.org.

Garden Materials

There are many great resources in Pittsburgh for garden supplies. Homegrown sources its materials mostly from the places listed below. For a list of many more places to find garden resources, visit the Vegetable Gardening Guide at phipps.conservatory.org/green-innovation/at-home/vegetable-gardening-guide

Soil, Compost and Mulch

AgRecycle offers bulk quantities of compost and mulches. Products can be delivered or picked up in a truck. 335 Braddock Ave., Pittsburgh, PA 15208 | 412-242-7645 | agrecycle.com

Lumber

Paul Lumber and Supply is a locally owned, full-service lumber yard with any type of new lumber. 4072 Liberty Ave., Pittsburgh, PA 15224 | 412-681-9200

Seeds

East End Food Co-op in Point Breeze sells High Mowing, Hudson Valley and Renee's seeds. 7516 Meade St., Pittsburgh, PA 15208 | 412-242-3598 | eastendfood.coop

High Mowing Organic Seeds offer high quality organic seeds of well-tested varieties, both classics and new breeds. Find the catalog and grower resources at highmowingseeds.com

Seed Savers Exchange specializes in heirloom varieties and offer over 200 organic seed varieties. Find the catalog at seedsavers.org

Johnny's Selected Seeds is an employee-owned seed producer with a large selection of organic and heirloom seed. Find the catalog and grower resources at johnnyseeds.com

Seedlings / Transplants

Homegrown Seedling Sale is an annual event where participants and residents can purchase affordable seedlings grown by Phipps and Operation Better Block (OBB). All proceeds go back into supplies for the next year. Sales are organized by OBB, typically on a Saturday in May and are held in a convenient Homewood location. For more information, contact at 412-441-4442 or at homegrown@phipps.conservatory.org.

Soil Sisters Plant Nursery is a Black-owned and woman-owned business offering vegetable, herb and houseplant seedlings grown in Beltzhoover. For more information, contact at 412-728-1770 or on Instagram [@soilsisters412](https://www.instagram.com/soilsisters412).

Grow Pittsburgh offers many varieties of vegetable and herb seedlings, grown at the Frick Greenhouse in Point Breeze and Garden Dreams in Wilkinsburg. Seedlings are available for purchase through Grow Pittsburgh sales and the East End Food-Co-op. Find their catalog and sales information at growpittsburgh.org or contact seedlingsale@growpittsburgh.org.

Garden Materials (*cont.*)

Tools

Salik Hardware is a local store offering spades, watering cans and garden tools.

603 N. Homewood Ave. #7, Pittsburgh, PA 15208 | 412-731-2882 | saliks-hardware-pittsburgh-pennsylvania

Garden-Related Organizational Resources

Rain Barrels

Upstream Pittsburgh is focused on stormwater management and restoration and stewardship of Nine Mile Run and other local watersheds. upstreamphgh.org

Vacant Lots Projects

Lots to Love is a guide for community organizations and residents who are interested in transforming vacant lots into well-loved spaces. Developed of Grounded Strategies, it includes resources to determine ownership of vacant lots as well as to plan and implement projects. lotstolove.org

Pittsburgh Adopt-A-Lot Program, from the Department of City Planning, allows residents and groups to build temporary edible, flower and rain garden projects on vacant City-owned lots. Also includes the Vacant Lot Toolkit, to walk you through the process. For more information, call 412-255-2287 or to download the toolkit, visit pittsburghpa.gov/dcp/adoptalot.

Allegheny Cleanways is an organization that was formed to engage and empower people to eliminate illegal dumping and littering in Allegheny County. They clean up illegal dumpsites and through the Partner Against Littered Streets (PALS) program, provide kits of materials to community groups for litter cleanups. For more information, call 412-381-1301 or visit alleghenycleanways.org.

Grow Pittsburgh Resources

Grow Pittsburgh's Info Hub is an online library of techniques, tips and information about gardening. If a topic isn't covered in this handbook, try looking through their resources.

growpittsburgh.org/garden-and-farm-resources/info-hub

Grow Pittsburgh's Garden Resource Center is a tool lending library and materials depot. They offer a sliding scale membership which will give you access to garden tool rental and wood chip mulch, straw mulch, compost, seeds and organic amendments. They also occasionally partner with Allegheny County Conservation District for soil lead screenings.

147 Putnam St., Pittsburgh, PA 15206 | 412-362-4769 | growpittsburgh.org/garden-resource-center

Grow Pittsburgh's Community Garden Program partners with organized communities to start and maintain sustainable and productive community gardens. Applications open each year. For more information, call 412-362-4769 or visit growpittsburgh.org.

My Seeding Schedule

Year:

Transplants *(Optional, if starting at home)*

Date to Start Indoors	Actual Date Started	Date to Transplant Outside	Actual Date Transplanted	Crop	Variety	Number of Plants

Direct Seeding

Date to Plant Outside	Actual Date Planted	Crop	Variety	Square Feet or Row Feet	Number of Plants

My Garden Bed Layout Worksheet

Year: _____

(Indicate North with an "N" relative to bed)

Bed 1

Bed 2

Yard Layout – *Indicate how the garden is situated with landmarks (e.g. house, garage, shed etc) and direction of North*

GLOSSARY

Beneficial Insect: An insect that positively contributes to your garden or the environment. Can be pollinators, predators or soil builders.

Compost: Broken down, decomposed organic matter; an excellent soil amendment for gardens.

Insect Predators: Insects that prey on other insects. They are beneficial in the garden, as they can kill insect pests that feed on plants.

Lead: A heavy metal, sometimes found in urban soil, dangerous for human consumption and vegetable production.

Organic: A term used to describe gardening practices or produce grown without the use of synthetic chemicals.

Organic Matter: Any material that was once alive or comes from a living organism. In the garden context, this usually means plant material- leaves, weeds, plants, vegetable peelings, etc.

Pest: An insect or animal that does damage to vegetable crops.

Pesticide: A chemical designed to kill insects. Most are synthetic and not recommended when gardening organically.

Pollinators: Insects and animals that pollinate or move pollen between plants. This is necessary for plants to reproduce and produce fruit.

Raised Bed Gardening: A method of gardening where soil beds are raised higher than the surrounding soil. Raised beds are often enclosed with sides made of wood, stone or bricks.

Root Bound: A condition of plants grown in pots or containers when roots run out of space to grow and start wrapping around the inside of the pot.

Seedling: A young plant, often started in a container to be later transplanted outside into the ground.

Soil Amendment: Anything that's added to soil to enrich it or alter the nutrient make-up. Examples include compost, bone meal and mulch.

Tamp: To gently firm or press on the soil.

Transplant: 1) To replant a plant in a new location, i.e. planting a potted plant in the ground or moving a plant to a different part of the yard.
2) Seedling.

Trellis: An upright structure used to grow plants vertically