



The Homegrown Handbook

This Handbook Belongs to:

Phipps Conservatory and Botanical Gardens
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phipps.conservatory.org/homegrown

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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 actually 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 \$15 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.

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 also 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)

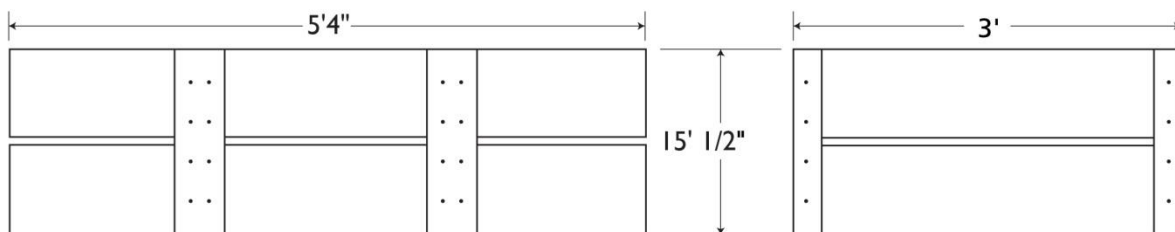
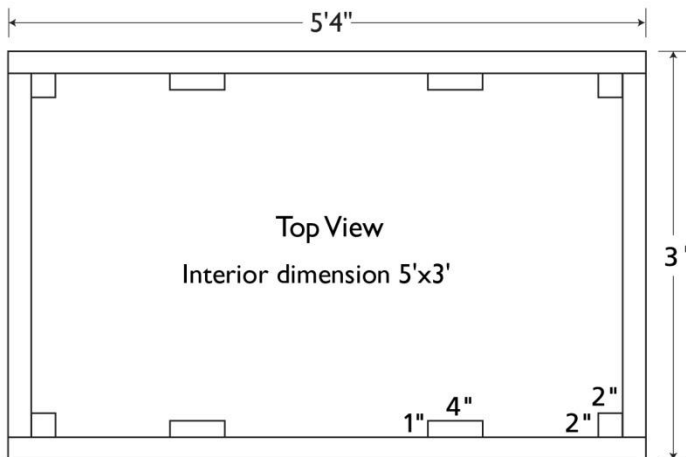


Photo © Adam Milliron



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



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.

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 use nails and string, sticks, old blinds, or simply draw lines in the soil.



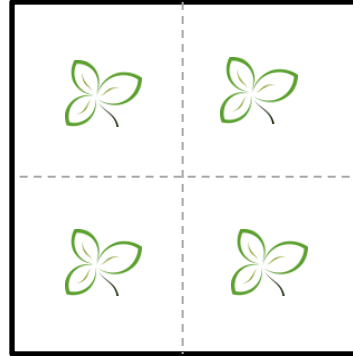
Spacing Guidelines

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 four general guidelines:

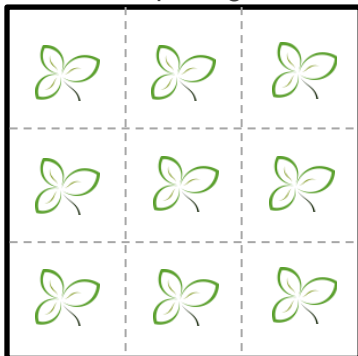
Extra Large: One per square for 12-inch spacing



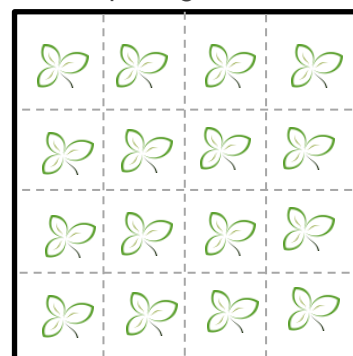
Large: 4 per square for 6-inch spacing



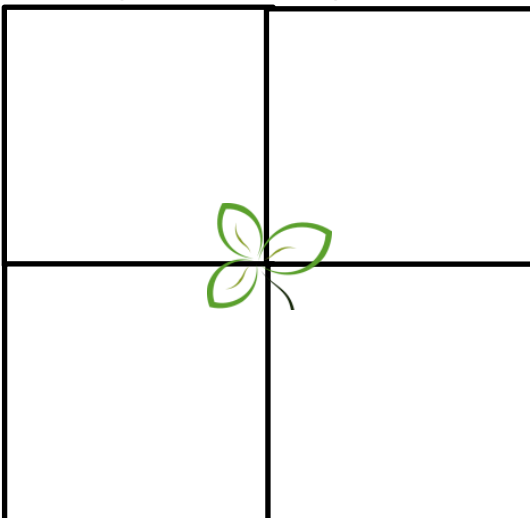
Medium: Nine per square for 4-inch spacing



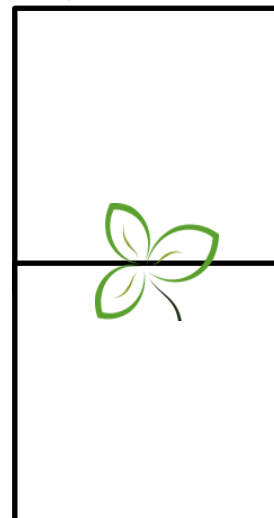
Small: 16 per square for 3-inch spacing



Oversize: One per 2x2 ft or 4 squares for 24-inch spacing



One per 1x2 ft or 2 squares



Square Foot Planting Chart

For quick reference, use this chart to determine plant spacing.

Plant	Number per square foot	Plant Height
Basil	2 (or plant alongside tomatoes)	Medium
Beans- Bush	9	Medium
Beans- Pole	8, with trellis	Tall
Beets	16	Short
Broccoli	1	Medium
Butternut Squash	1 per 2 square feet	Medium (tall if trellised)
Cabbage	1	Medium
Carrots	16	Short
Collards	1	Medium
Chives	2	Medium
Chamomile	4	Short
Cilantro	9	Short
Cucumbers	2	Short (tall if trellised)
Dill	4	Medium
Eggplant	1	Medium
Garlic	16	Medium
Flowers, various	2-4	Medium to Tall
Kale	1	Medium
Lavender	1	Medium
Lettuce	4	Short
Lettuce salad mix	Scatter lightly	Short
Melons	1 per 2 square feet	Medium (tall if trellised)
Mustard Greens	9	Medium
Okra	1	Tall
Onions	9	Short

Oregano	2	Short
Parsley	2	Short
Peas	8, with trellis	Tall
Peppers	1	Medium
Radishes	16	Short
Scallions	4 bunches	Short
Spinach	9	Short
Summer squash, zucchini	1 per 3'x3' block	Medium
Sweet Potatoes	1	Short (tall if trellised)
Swiss chard	2	Medium
Tomatoes	1 per 2'x2' block	Tall

Planning Your Garden

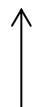
Before starting to plant, it's valuable to make a plan for your garden. Planning helps you use your garden space effectively, buy or grow only what you need, and make sure you have space for everything.

Steps to Plan Your Square Food Garden

1. **Make a list of all the things 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 (12)). You may want to write the dates out sequentially after you're finished, so you have a schedule.

Sample Garden Plan

----- T r e l l i s -----

	1'	2'	3'	4'	5'	
1'	Peas (8) Mid-March	Peas (8)	Pole Beans (8) Mid-May	Pole Beans (8)	Pole Beans (8)	 North
2					Dill (4) Mid-May	
3'	Tomato (1) Mid-May		Tomato (1)		Basil (2) Mid-May	

Kale (1) Mid-March	Kale (1)	Kale (1)	Collards (1) Mid-March	Collards (1)
Pepper (1) Mid-May	Pepper (1)	Pepper (1)	Spinach (9) Mid-March	Spinach (9)
Cucumber (2) Early-May	Cucumber (2)	Radishes (16) Late-March	Beets (16) Late-March	Parsley (2) Early-March

**Also include border plantings of flowers, and/or nearby pots of herbs. See pg. 30 for a list of plants that attract beneficial insects.*

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. You can reference the Planting Calendar on page 18 to determine when to put seeds or seedlings in the ground.



Typically Transplanted Crops

- Broccoli
- Cabbage
- Eggplant
- Peppers
- Tomatoes

Typically Direct Sown Crops

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

Can be Transplanted or Direct Sown

- Collard greens
- Kale
- Okra
- Swiss chard
- Flowers

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 the seeds.** Place one or two seeds in each 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.



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 following calendar shows when to plant various crops in southwestern Pennsylvania, and if seeds or seedlings should be planted. Many crops listed can also be planted or re-planted later in the season.

If you live outside of southwestern Pennsylvania, consult your local or state extension website for the best dates for your area:

<http://pickyourown.org/countyextensionagentoffices.htm>

Planting Calendar

Vegetable	Seeds or Transplants?	Spring Planting Dates	Fall Planting Dates
Frost Tolerant Crops (not injured by light frost)			
Broccoli	Transplant	Late March- Late April	Early July - Mid August
Cabbage	Either	Mid-March- Late April	Mid-June - Mid August
Collards	Either	Mid-March-Late April	Early July - Early Sept.
Garlic	Seeds (cloves)	Mid-March- Mid April	Early Sept.- Early Oct.
Kale	Either	Mid-March- Late April	Early July- Early Sept.
Mustard greens	Either	Mid-March- Late April	Early July- Early Sept.
Onions	Either	Mid-March- Late April	-
Peas	Seeds	Mid-March- Mid April	Early Aug.- Early Sept.
Radishes	Seeds	Late March- Mid May	Mid-July - Sept.
Spinach	Seeds	Late March- Late April	Mid-July - Sept.
Swiss chard	Either	Early April- Mid June	Early July - Mid August
Cool Temperature Tolerant Crops (can be injured by frost, but intolerant of temperatures above 70 degrees Fahrenheit)			
Beets	Seeds	Late March- Mid June	Early July - Mid August
Carrots	Seeds	Late March- Mid May	Early July - Mid August
Lettuce	Seeds	Late March- Mid August	-
Warm-Season Crops (Plant after danger of frost has passed)			

Basil	Either	Mid-May- Mid-June	-
Beans	Seeds	Mid-May- Mid-July	-
Cilantro	Either	Mid-May- Mid-June	-
Cucumber	Seeds	Early May- Mid-July	-
Dill	Either	Mid-May- Late July	-
Eggplant	Transplant	Mid-May- Late June	-
Flowers	Either	Mid-May- Late June	-
Melons	Seeds	Early May- Mid-June	-
Okra	Either	Early May- Mid June	-
Parsley	Transplant	Early March- Late July	-
Peppers	Transplant	Mid-May- Late June	-
Squash	Seeds	Early May- Early July	-
Sweet Potato	Transplant	Early May- Mid-June	-
Tomatoes	Transplant	Early May- Mid-June	-

Tomato Maintenance

Tomatoes, a summer garden favorite, need some extra care and attention than most other vegetables 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 post**

Make sure your post is 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 2 suckers. Tie the stem to the post every 6-12 inches, 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 tee pee structure, and add more posts as needed to hold up your tomato plant.

- **Wire Cage**

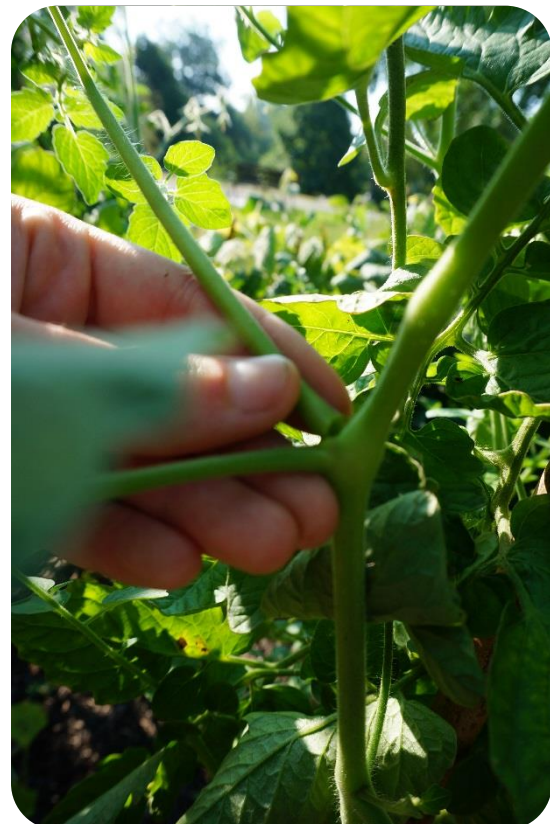
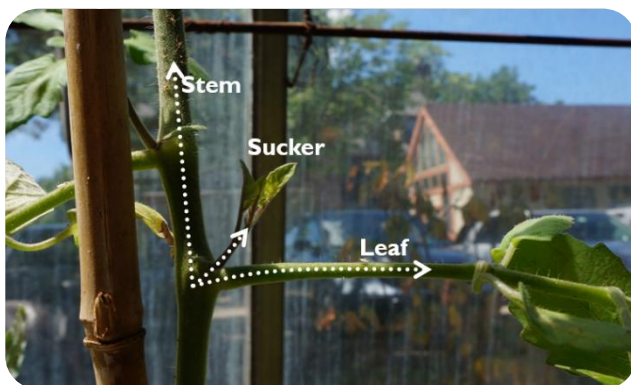
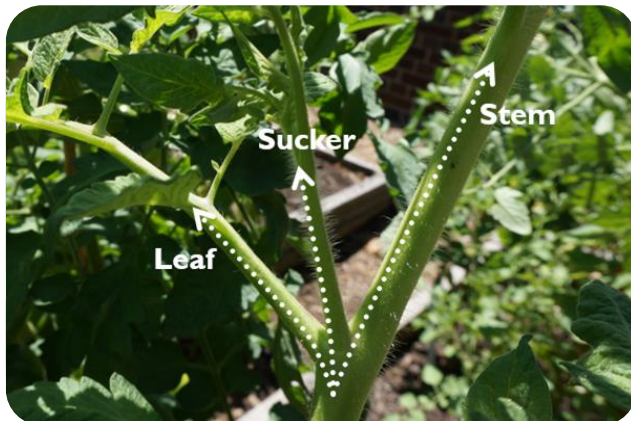
Pre-made wire cages can be purchased at most hardware stores or garden centers, and can be placed directly over a small plant, pushing the wires into the soil. Be sure to place the cage as soon as you plant while your tomato is still small; doing this when your tomato is too large can break stems off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



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 or 2 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 45o 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.
- **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.



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.

A garden needs about one inch 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 one inch 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.

* If it is a very hot sunny day, large leafed 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 starts to go down.

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 inch of the soil is slightly dry (check at least every other day).

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:

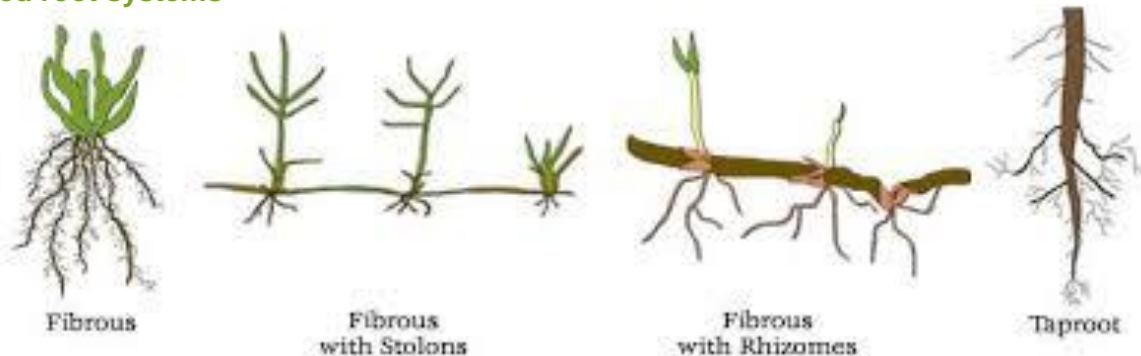
- Check your garden for weeds weekly. If you pull a few every week, they won't get out of control.
- Dig or pull weeds out, just be careful not to disturb your nearby vegetables.
- Pull the whole weed, including the root, so it doesn't come back.
- It's easiest to weed after a rain, when the soil is soft and moist.
- Mulching 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.

Weed root systems



Identifying Weeds

The definition of a weed is simply a naturally growing plant that is not desired in a particular 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 the quick common weeds reference below.

21 Common Garden Weeds

Lambs Quarters



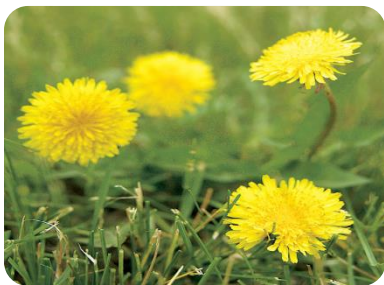
Crabgrass



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 vegetables beds since they take a long time to break down. Some great options for your raised bed are listed below:

1. Used dried leaves or leaf mulch (chopped up autumn leaves), applying a thick layer, about two inches deep.
2. Try fresh grass clippings (as long as they're not treated with pesticides), applying them in thin layers (about $\frac{1}{4}$ inch). After a fresh layer dries out, you can apply another layer; several layers will discourage weeds.
3. 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.



Preparing for Winter

When summer ends and the weather starts to cool, 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.

1. **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. Dig or pull them up, 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.

2. **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 18 for a list of frost tolerant crops.



3. **Mulching** to amend your soil is also a good thing to do in the fall. 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. See page ___ for more information about mulching.



4. **Protecting cool weather crops in fall** is also an option 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.

Dealing with Pests and Diseases

Every gardener has to 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:

- Water the soil around the roots of plants, not the leaves
- Properly space, stake, and prune plants to ensure good airflow
- Add compost every year to keep the soil fertile
- 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 actually beneficial! 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.

The following charts include 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 Insect Chart					
X= The beneficial insect is a predator to the corresponding pest		Harmful Pests			
		Aphids	Cabbage worm	Leaf Miner	Tomato Hornworm
Beneficial Insects	Bees and pollinators				
	Braconid wasp	X			X
	Damsel bugs	X	X		
	Green Lacewings	X	X	X	X
	Lady beetles	X		X	X
	Spiders		X		
	Paper wasps	X	X	X	
	Praying mantis	X			

Top Plants to Attract Beneficial Insects	
Plant	Beneficials they Attract
Borage	Bees and pollinators
Daisy family (Black-eyed Susan, Chamomile, Coreopsis, Cornflower, Cosmos, Marigolds, Sunflower, Tansy, Yarrow,)	Lady beetles Green lacewings Paper wasps Pollinators
Mint family (all mints, Oregano, Thyme, Rosemary)	Spiders Desired flies Predatory wasps
Nasturtiums	Spiders Ground beetles Damsel bugs Pollinators
Umbel (Parsley) family (Dill, Fennel, Caraway, Parsley, Lovage, Cilantro)	Parasitic wasps
Others: Lavender, Anise Hyssop, Fennel, Alyssum	Bees, butterflies, other pollinators

Common Pests and Diseases

The first step to treating a problem in the garden is proper identification. 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, feel free to call Dr. Phipps Greenline 412/665-2364 or your local extension office for advice.

Aphids

Aphids are tiny soft bodied insects that come in a variety of colors, and can have a waxy or wooly 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-aphids leave this behind when they feed)
- Sooty mold, a fungus that grows on the honeydew, and makes stems and leaves appear black

Prevention and Treatment:

- Predators of aphids include lady beetles and parasitic wasps
- Use a strong spray of cold water on leaves, to dislodge aphids
- Wipe or spray the leaves with a solution of water and dishwashing detergent (1 quart water:1 tsp detergent) or rubbing alcohol (straight or diluted), every two to three days for two weeks

Cabbage Worms

Cabbage worms are the insect pest that has caused Pittsburgh 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- 1 ¼-inch-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 check your plants often and, as soon as you spot one, take action.



Imported cabbage worms on a damaged collard leaf.



Cross-striped cabbage worms and their damage.

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 on the undersides of leaves



Cabbage worm eggs.

Prevention

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



Left to right: row cover protecting one container plant, tulle over a hoop frame, row cover directly on plants.

Treatment

- Handpick the worms off of your crops and destroy them (one way to do this is to drop them into a mixture of liquid soap and water). You can also remove or crush eggs if you see them.
- Wet plants leaves, then sprinkle with cornmeal. Worms that eat it will bloat and die.
- Use the organic, biological pesticide BT (*Bacillus thuringiensis*).
 - 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 use as soon as you see any signs of damage, and/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.

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 (“mines”)
- The areas mined dry out and die

Prevention and treatment:

- Pick off and destroy infested leaves
- Use row cover to prevent eggs from being laid
- As a last resort, Neem oil, a plant based oil, can be used

Tomato Hornworms

Large, green caterpillars 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: tomatoes, peppers, potatoes, and eggplant.



Photo © George Bredehoft

Signs of infestation:

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



Photo © Max Wahrhaftig
Tomato hornworm covered in beneficial wasp cocoons

Prevention and treatment:

- Predators include lady beetles, green lacewing, paper wasps, and braconid wasps
- Keep the garden as weed free as possible, to discourage egg laying on weed hosts
- Handpick worms, and drown them in soapy water
- If you see a hornworm with pupae attached, don't kill it. Put it somewhere it can feed without damaging crops, and when the pupae hatch you'll have more natural predators.

Slugs

Slugs are not insects but 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 down to the stub
- Slimy trails left on stems and leaves, it's easiest to spot these trails first thing in the morning.

Prevention and Treatment:

- Clean up old leaves
- Set out beer traps (a small dish of beer placed near the garden)
- Sprinkle diatomaceous earth around the affected area (available at garden stores)
- Sprinkle crushed egg shells or coffee grounds
- Spraying slugs with cold coffee
- Hand picking



Slug Damage on Collard

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 effects 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 egg shells 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



Photo © USDA Cooperative Extension

Prevention and Treatment:

- Make sure seeds or seedlings are disease free
- Provide enough space between plants for good air flow
- Prune the bottom leaves to create a 1-2 foot space between the soil and the first leaves. This prevents water from splashing onto the leaves and transferring disease spores.
- 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



Photo © Dwight Sipler

Prevention and Treatment:

- Plant disease-resistant hybrids
- Rotate crops each year
- Avoid wet conditions: don't water from above, 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.



Photo © Howard F. Schwartz

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



Photo © Wikimedia Commons User Pollinator

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
- Avoid watering from above to keep the leaves dry
- Try an organic fungicide: 1 Tbsp. baking soda, ½ t. liquid soap and 1 gallon water; Mix, and apply to leaves (do not apply in full sun).

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.

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 takes about a 3



Photo © Adam Harrison



Photo © Wikimedia Common User EIC

foot high fence (with holes no larger than 1 inch) 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 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 take action as soon as possible.

How to Deal with Groundhogs in Your Garden

Groundhog Basics

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

Groundhogs are rodents which live all 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 (e.g. collard greens, cabbage, broccoli, kohlrabi, etc.). Groundhogs are accomplished swimmers, climbers, and diggers. It is uncommon for groundhogs to contract diseased transferable to humans, such as rabies, and therefore are generally not considered to be 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 they leave the den by early July.

What Does Groundhog 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 damage is usually pretty severe, in comparison to chipmunk, mouse, or insect damage. Groundhogs will eat almost all of a plant, usually only leaving some stems. They will also take big chunks out of your fruits, particularly tomatoes.

Groundhog Damage:



Insect Damage:



Groundhog Damage:



Chipmunk Damage:



Gardening Solutions

- **Tolerance or co-operation**

Plant a groundhog garden, AKA trap crop. By planting other things in your yard for groundhogs to eat, they will become less interested in your garden. Clover and alfalfa are good crops to distract the groundhogs; 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.

- **Eviction**

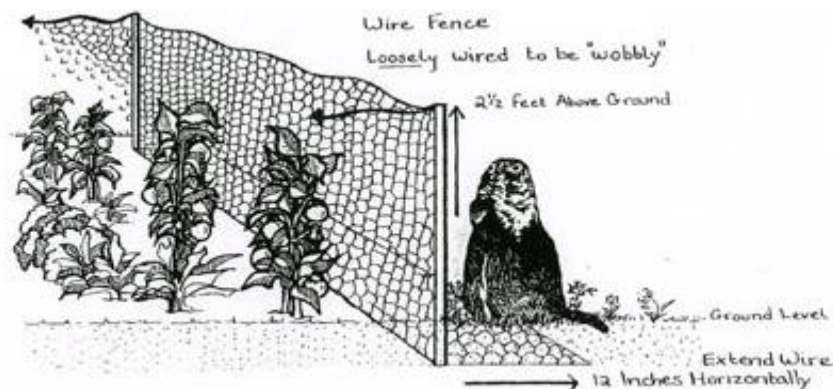
Trapping* and removal is one option to get groundhogs off your property. Groundhogs are best baited with apples, carrots, cantaloupe or lettuce. It is best to trap between July and September. If groundhogs are causing structural damage to your house, you may be eligible for a trapping program with Pittsburgh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

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 out of your garden. keep in mind that groundhogs can climb and dig; to effectively keep groundhogs out, using flexible fencing options is best (e.g. chicken wire, plastic mesh fencing, etc.). 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.

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

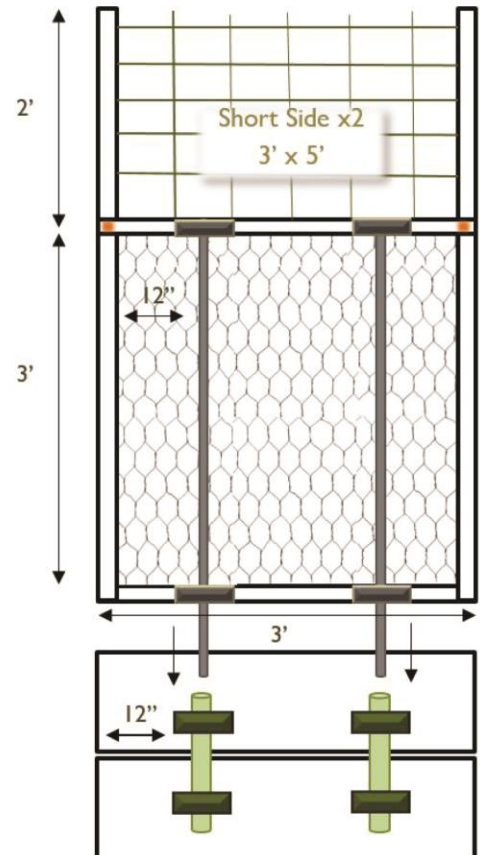
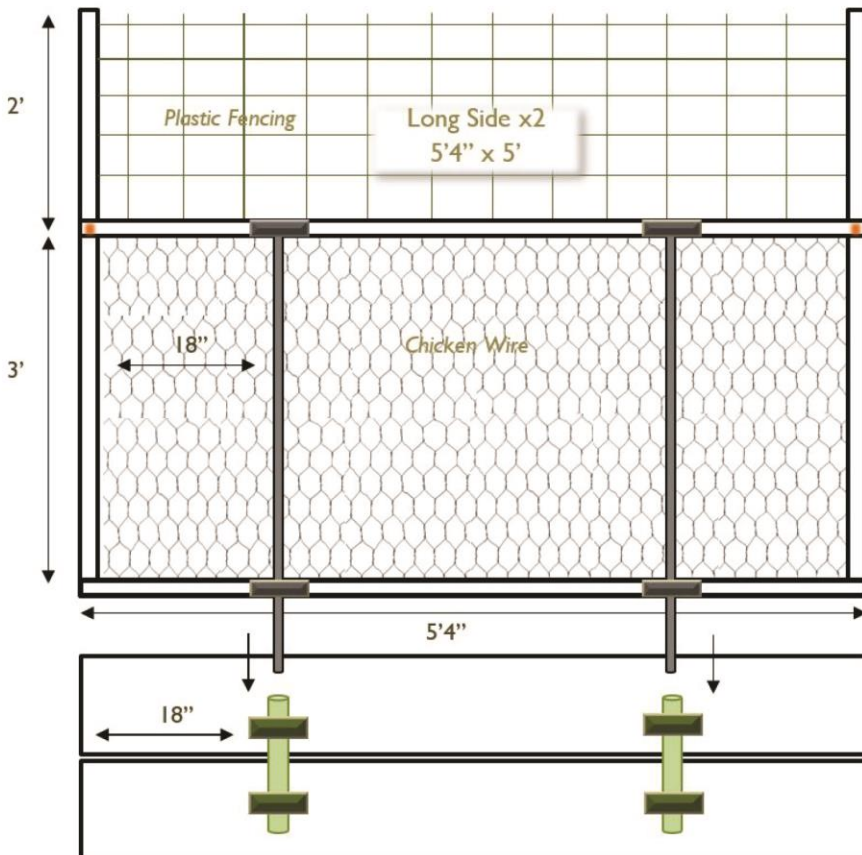
- Saw
- Drill
- 1/8" or 7/16" drill bit
- Tape measure
- Staple gun
- Wire cutter or diagonal pliers
- Carpenter square

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) 1/4" #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 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 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 Groundhog 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.

- **Habitat Modification**

Keeping your grass cut short and removing potential hiding spaces (e.g. brush piles, 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; groundhogs won't like the spiciness and should leave your plants alone. Remember to wash your food before you eat it though!

Sprinkle **cayenne pepper or Epsom salts** on or around your plants. Both will taste bad to the groundhog. 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 that they should leave.

Hot Pepper Spray Recipe

Ingredients:

- 1 gallon 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.

Composting

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.

The best way to increase organic matter is to add compost to your garden. You can compost at home, recycling food and yard waste into valuable, organic fertilizer for your garden. Compost adds numerous benefits to the garden, and doesn't cost a thing to make.

How to Compost

1. **Set up a compost bin.** Using a bin keeps compost piles neater, and keeps animals out. You can build a bin from wood or wire, or purchase a plastic bin. Whatever you use, the bin should be at least 3'x3'x3', and make sure there are holes for good air circulation.
2. **Fill your bin with yard and food waste.** Virtually any plant material can be composted. For the best results, a balance of brown (carbon rich) and green (nitrogen rich) material is needed. The ratio should be at least 1:1, but more brown than green is better.

Browns Dry, carbon-rich materials	Greens Wet or fresh nitrogen-rich materials
Autumn leaves	Fruits
Twigs	Vegetables
Cardboard	Food scraps: banana peels, apple cores, kale stems, etc.
Newspaper	
Woodchips and sawdust	Tea and coffee grounds
Pine needles	Grass clippings
Straw	Plants and weeds
Dry, dead plants	Other (calcium): Crushed eggshells

Troubleshooting:

- If your pile is getting smelly, you probably have too many greens. Mix in more browns, turn the pile, and make sure it has good drainage.
- If your pile is not decomposing or heating up, add more greens, and make sure the pile is moist and aerated.

Know what **NOT** to compost.

The following things should never be added to your compost pile, as they will either compromise your health, harm your garden, attract animals, or won't break down:

- Meat and meat scraps
- Bones
- Oil or fat, or vegetables cooked in oil or fat
- Pet waste
- Weeds that have gone to seed
- Diseased plants
- Plants or clippings that were treated with chemicals
- Glossy paper or magazines

3. **Make sure your pile gets enough air and moisture.**

To ensure good air circulation, turn or stir your pile, or simply use a pitchfork or stick to loosen up the contents. The more you do this, ideally every week or two in warm months, the faster things will break down.

In order for materials to break down, the compost pile also needs to stay moist like a wrung-out sponge, not wet/soaked. If your pile has a lid, you will likely need to add water every so often.

4. **Allow time for finishing.**

Producing finished compost generally takes three to six months. When your bin is full you will want to stop adding materials, so the compost can finish. Compost is ready when it looks dark brown, is crumbly, and smells like rich earth. When the pile stops heating up and looks finished, let it sit for at least a few weeks to cure, then it can be used.



Photo © Kessner Photography

Other composting tips:

- Keep a small covered container in your kitchen to collect food scraps that you can easily transport to your bin when it gets full.
- If possible, layering is very effective- every time you add greens, cover them with a layer of browns.
- Smaller pieces compost faster, so to speed things up, shred newspaper and leaves, and chop up garden debris and kitchen scraps before adding them.
- Stockpile leaves in the falls, 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:

1. **Amending soil:** Add up to 3 inches of compost to the top of beds before planting, and mix it into the first several inches of soil. You can do this in the fall or spring.
2. **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 and 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:

1. **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.
2. **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- leave them unbagged, or use paper bags or boxes.
3. **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
Beans	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
Beets	When beets are 1.25-3 inches 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.
Carrots	When tops are ½- 1 inch 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.
Cucumbers	For slicing, when about 4-6 inches 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.
Onions	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.
Peas	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.
Peppers	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.
Radishes	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 inches long and still tender.	like cucumbers, 1 week	Do not store in refrigerator for more than 4 days.
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!
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 at room temperature for 10-20 days, then store.

Resources

Phipps Resources

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

1. **Phipps Homegrown Website**
2. The Homegrown website provides links and resources to help you start and maintain your backyard vegetable gardening. Just visit phipps.conservatory.org/homegrown to get growing!
3. **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.
4. **Dr. Phipps Greenline** is a free service provided by Phipps Master Gardeners, to answer gardening questions. Contact Dr. Phipps anytime at **412/622-2364** or drhipps@phipps.conservatory.org.

Garden Resources

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 Phipps.conservatory.org/homegrown

Soil, Compost, and Mulch in Pittsburgh

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

Lumber in Pittsburgh

Paul Lumber and Supply is a locally owned, full service lumber yard. Good source for any type of new lumber.

4072 Liberty Ave.

Pittsburgh, PA 15224

412/681-9200

<http://paullumber.doitbest.com>

Seeds

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

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

Seedlings/Transplants

Check out your local co-op grocery or Whole Foods who often buys seedlings locally, in addition to your local garden nursery.

Garden Dreams Urban Farm and Nursery in Pittsburgh offers many varieties of Certified Naturally Grown vegetable and herb seedlings. Garden Dreams seedlings are available for purchase directly from the farm, or from Construction Junction and the East End Food-Co-op, among other local vendors.

806 Holland Ave.

Wilkinsburg (Pittsburgh), PA 15221

412/638-3333

mygardendreams.com

Tools in Pittsburgh

Salik's Hardware is a local store offering spades, watering cans, garden tools, and some seeds.

6037 N. Homewood Ave.

Pittsburgh, PA 15208

412/731-2882

Garden Related Organizational Resources in Pittsburgh

Rain Barrels

StormWorks, in partnership with Nine Mile Run Watershed Association, is giving away 200 free Hydra rain containers to Homewood and East Hills residents as part of the Rosedale Runoff Reduction Project. To sign-up for a free rain barrel, call 412/243-7680 or email info@stormworkspgh.com. More info at www.rosedalerain.com.

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. Visit www.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 and to download the toolkit, visit www.pittsburghpa.gov/dcp/adoptalot. For questions, call 412/255-2287.

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, visit www.alleghenycleanways.org, or call 412/381-1301.

Garden Resources

Grow Pittsburgh’s Garden Resource Center is a tool lending library and materials depot. With a membership, you will have access to garden tool rental, unlimited wood chip mulch and certain quantities of straw mulch, compost, seed and organic amendments.

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

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

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 used 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.