

Starting a Vegetable Garden

In Southeastern Pennsylvania, it is easy to grow fresh vegetables. With careful planning, even a very small garden can provide food all year round. Winter is the perfect time to start thinking about your garden.



Getting Started

The first step to get your garden ready is to draw out a plan on paper. Write down all of the vegetables you want to grow. Next write down the anticipated planting date for each vegetable and how many days it will take the vegetable to grow. You can then start to make a chart or a calendar that shows when you will plant each vegetable. It is also a good idea to draw a picture of your garden and indicate where you want to put each type of plant.

Planning for the Seasons

Most vegetables can be categorized as one of two types.

1. Cool season crops: These crops can be planted in early spring or early fall and grow throughout the cool months. In general, cool season crops can be planted directly into your garden.

2. Warm season crops: are planted in mid to late spring and grow throughout the summer. Most of the warm season crops (except those in the melon and bean family: cucumber, zucchini and squash, beans) should be planted into the garden as seedlings.

Long and Short Season Crops

Another helpful way to categorize plants is by the amount of time they will spend in your garden.

Short season crops occupy space in your garden for less than 2 months. Because they are finished so quickly, these are great vegetables to plant more than once or to plant in a location where you know you want a different crop later (for example, before you plant your Jalapeños in May, you could plant Cilantro in March which would be finished growing by May).

Long season crops occupy space in your garden for many months. Careful planning will help ensure that you have enough space for these items in your garden.

Some plants do not fit into these categories because they have long growing seasons. Garlic is planted in the fall to be harvested mid-summer. Potatoes are planted in late March through mid April and harvested in July. Asparagus and artichokes are both perennial vegetables

(meaning the same plants will grow for many years) that take about 3 years before they will produce a harvest.

Seed companies have great resources online for planting dates, and growing guides. Here are a few great sites to visit.

- www.burpee.com/growing-calendar
- www.highmowingseeds.com/resources
- www.johnnyseeds.com/growers-library

Garden Calendar Overview - Southeastern Pennsylvania

January/February	Plan the garden and order seeds
Late March	Turn under cover crops Prepare the soil
April	Plant cool season crops
May/June	Harvest cool season crops Plant warm season crops
July	Begin warm season harvest
August	Plant fall/cool season crops
September/October	End of summer harvest Plant cover crops Plant garlic Dig new beds
November/December	Harvest fall crops Care for tools Plan the garden

Building healthy soil

Healthy garden soil encourages healthy plant growth. Many problems in the home garden have nothing to do with disease or insects, but are the result of poor soil. You know the soil is poor if it is dried and cracked in summer, wet and puddled in winter, or hard to dig.

The ideal garden soil is described as loamy. Loamy soil forms into a ball and holds its shape when moist, but it crumbles easily when squeezed. It supports plant roots by providing them with both water and air. Loamy soil also drains well, which helps it warm up in spring so you can plant earlier.

Garden soil is made up of air, water, organic matter (decayed plant material), and particles of broken rock. Air and water sit in the empty spaces, or pore space, between the soil particles. Loamy soil is about 50% pore space. Water fills the small pores, and air fills the large pores. If the broken rock particles are mostly sand, the soil has large pores and holds lots of air but not much water. If the rock particles are mostly clay, the soil has small pores and holds lots of water but not much air. Plants and their roots need both water and air to grow.

Soil pores are the reason you should not step on the soil when you plant and take care of your garden. Compacted or flattened soil has small pores with little or no room for the air that plant roots need.

Organic matter makes up a very small part of healthy soil, but it is essential in a vegetable garden. Organic matter is anything that was once living and is now broken down in the soil. In nature, soil microorganisms and earthworms break down, or decompose, raw organic materials like fallen leaves, plant trimmings, and food scraps until they cannot be broken down any more. You can then add this decomposed organic matter to your garden beds as compost. Planting in raw organic material can harm your plants, so the material must first decompose, or turn into compost, before you add it to your garden beds.



Healthy, "loamy" garden soil is loose and crumbly, but will form into a ball and hold its shape when moist.

Compost

Good soil naturally contains a small amount of organic matter. Adding compost to your garden beds every year will increase the amount of organic matter in the soil and make it better for growing vegetables.

You can make compost yourself or you can buy it already made. If you make compost yourself, you can make it in bins or piles and then move the finished compost into your garden beds. You can also make compost directly in your garden beds and wait until it has decomposed before planting.

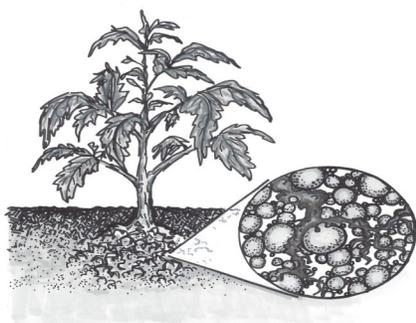
There are many good reasons to add compost to your garden beds. When you work compost into the beds, the soil can absorb moisture better and hold onto it longer. Moisture evaporates from bare soil, so spreading a layer of compost as *mulch* on top of the soil during the dry season helps the soil hold onto moisture. That means you do not have to water the garden as often.

Soil that has been improved with compost contains earthworms and many types of soil microorganisms such as beneficial bacteria and fungi. The earthworms tunnel through the soil, forming air passages. The earthworms and microorganisms also break down organic matter into nutrients that plants use. As you add compost over time, these microorganisms supply more of the nutrients your plants need so you can use less fertilizer.

Compost also helps to protect the environment. Soil improved with compost acts like a sponge, so more water stays in the soil and less water runs off the surface. When water runs off, nutrients from fertilizer are carried away into the ground water and nearby rivers and lakes, where they can be harmful. With less runoff, the soil holds onto nutrients right where plants can use them.

Garden soil is made up of rock fragments, air, water and organic matter.

The empty spaces between soil particles hold air and water.



Making compost

When you make your own compost, you save money and recycle nutrients back into your garden. You can build your own compost system or buy pre-made bins.

Starting at the bottom of the pile, add brown and green materials in alternating 6-inch layers. “Brown” materials are dry and high in carbon. “Green” materials are wet and high in nitrogen. Compost piles that have both brown and green materials decompose faster. The materials also break down faster if they are chopped into small pieces. You can add 1 cup of high-nitrogen fertilizer like linseed meal or blood meal every few layers to speed up decomposition.

Continue to add layers until your bin is full (about 3 feet tall for a free-standing pile) or until you run out of material. If it is dry outside, water your pile occasionally to keep it damp, like a wrung-out sponge. If it is raining, cover your pile with a plastic sheet.

Let your compost pile sit for a week or two, then fork the materials from the first bin into the second bin. If you created a free-standing pile, fork the materials into an empty spot on the ground. Mix up the materials as you go, then water the pile. Turn the pile once a month until you cannot recognize the original materials anymore. Total time may vary because decomposition happens faster in summer than in winter. When your pile looks like garden soil, it is ready to use.

What to put in your compost pile	
Brown layers <i>(high in carbon)</i>	Green layers <i>(high in nitrogen)</i>
Dry leaves	Garden waste
Straw	Kitchen scraps
Sawdust	Coffee grounds
Torn paper bags	Grass clippings
Dry corn husks	Pet hair
Shredded newspaper	Composted manure
<p>NO: Meat, dairy, bones, diseased plants, weeds, or poop from people or meat-eating animals like dogs or cats.</p>	

General Garden Care

- Keep your garden well weeded. Weeds compete with your plants for water and nutrients.
- Use about 4-6” of mulch (straw, compost, dried leaves) around plants to help conserve moisture and keep weeds from growing.
- Water deeply and infrequently. Let water really soak into the garden about 2 times a week. This will allow the plants to develop healthy roots. About 15 minutes after you water, dig a small hole to see if it is wet 6” down. If it is still dry at that depth you have not watered enough.
- Water early in the morning or late in the evening.
- Do not step in your garden. Stepping around the plants compacts the soil and doesn’t allow your plants to grow.
- Do not overcrowd your plants. You will get more food from your garden if you give your plants enough room to grow. The following table lists common plant spacing:

Plant	Square Feet of Space Needed	Plant	Square Feet of Space Needed
Tomato	1.5 feet per plant	Pumpkin	4 feet per plant
Pepper	1.5 foot per plant	Kale	1 foot per plant
Cucumber	1 foot per plant	Corn	1 foot per plant
Lettuce	10 inches per plant	Squash	2-4 feet per plant

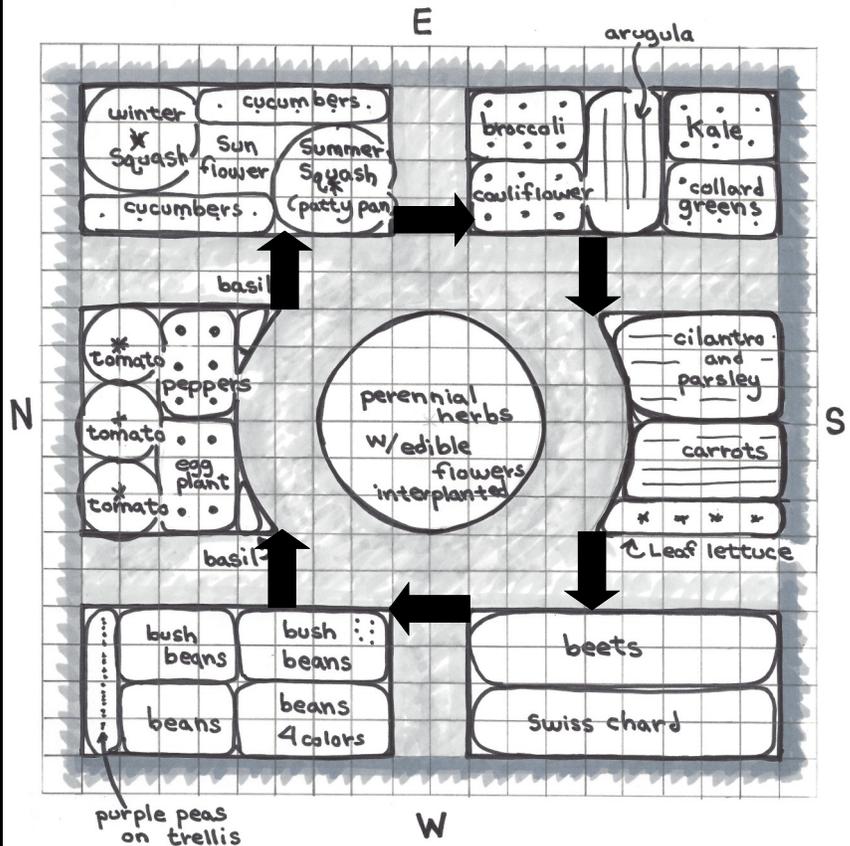
Crop W= Warm Season C= Cool Season	Planting Window for Chester County	Footprint	Planting method	Height	Days until harvest	Some shade ok?	Single or 2-week succession
Basil- W	May-July	12" x 12"	Transplant or row	Medium	60-90	Full sun only	Succession
Beans, snap (bush)- W	May-July	12" x 12"	Row	Medium	50-60	Some shade ok	Succession
Beans, snap (pole)- W	May-June	4" x 4" trellised	Row	Tall	60-70	Full sun only	Succession
Beets- C & W	April-Sept	4" x 4"	Transplant or row	Short	36-50	Some shade ok	Succession
Broccoli- C	April and Aug	18" x 18"	Transplant	Medium	55-90	Full sun only	Single
Cabbage- C	April and Aug	18" x 18"	Transplant	Medium	70-90	Full sun only	Single
Carrots- C	April-May and Aug	3" x 3"	Row	Short	56-70	Some shade ok	Succession
Cauliflower- C	April and Aug	18" x 18"	Transplant	Medium	50-90	Full sun only	Single
Chard- C	April and Aug	12" x 12"	Transplant or row	Medium	40-60	Some shade ok	Single
Cilantro- C & W	April-Sept	8" x 8"	Transplant or row	Short	30-60	Some shade ok	Succession
Collard greens- C	April and Aug	12" x 12"	Transplant	Medium	40-60	Some shade ok	Single
Corn (sweet)- W	May-Aug	12" x 12"	Row	Tall	70-110	Full sun only	Single
Cucumbers- W	May-June	12" x 12" trellised	Transplant or hill	Tall	50-75	Full sun only	Single
Eggplant- W	May-June	18" x 18"	Transplant	Medium	55-75	Full sun only	Single
Garlic- C	Oct-Nov	6" x 6"	Row	Medium	270-300	Full sun only	Single
Herbs (perennial)	Fall or spring	24" x 24"	Transplant or hill	Medium	Perennial	Some shade ok	Single
Kale- C	April and Aug	12" x 12"	Transplant	Medium	40-60	Some shade ok	Single
Leeks- C	April and Aug	6" x 6"	Transplant or row	Medium	110	Some shade ok	Single
Lettuce- C & W	April-Sept	8" x 8"	Row or banded	Short	40-65	Some shade ok	Succession
Onions- C	April-May	6" x 6"	Transplant	Short	100-120	Some shade ok	Single
Parsley- C & W	April-Sept	8" x 8"	Transplant or row	Short	40-75	Some shade ok	Succession
Parsnips- C	April-May	3" x 3"	Row	Short	110-120	Some shade ok	Single
Peas- C	April and July	6" x 6" trellised	Row	Medium	52	Some shade ok	Succession
Peppers- W	May-June	18" x 18"	Transplant or hill	Medium	65 Green, 85 Red	Full sun only	Single
Potatoes- C	April-May	12" x 12"	Hill	Medium	70-120	Some shade ok	Single
Radishes- C	April-May Aug-Sept	3" x 3"	Row or banded	Short	25-35	Some shade ok	Succession
Spinach- C	April & Sept	4" x 4"	Row or banded	Short	40-50	Some shade ok	Succession
Squash, summer- W	May-July	36" x 36"	Transplant or hill	Medium	50-70	Full sun only	Single
Squash, winter- W	May	6' x 6' vine	Transplant or hill	Medium	90-150	Full sun only	Single
Tomatoes- W	May	36" x 36"	Transplant	Tall	60-85	Full sun only	Single
Watermelon- W	June-July	12" x 12"	Transplant or hill	Medium	75-85	Full sun only	Single

KEY	Planting method		Height		Sources: Edited for Southeastern PA using Johnny's Selected Seeds, and CCFB garden records	
	Transplant	Transplant into garden as a seedling		Short		Under 12"
	Row	Planted in long single rows (see seed packet instructions)		Medium		12"-35"
	Banded	Seeds sown in wide rows		Tall		36" or taller
	Hill	A grouping of seeds planted close together in a small cluster				

Plant families	
Plant family	Crops
Beet family (Amaranthaceae)	Beets Chard
Cabbage family (Brassicaceae)	Broccoli Cabbage Cauliflower Collard greens Kale Radishes Turnips
Carrot family (Apiaceae)	Carrots Cilantro Parsnips Parsley
Grass family (Poaceae)	Corn
Legume family (Fabaceae)	Beans Peas
Nightshade family (Solanaceae)	Eggplant Peppers Potatoes Tomatillos Tomatoes
Onion family (Liliaceae)	Garlic Leeks
Squash family (Cucurbitaceae)	Cucumbers Summer squash Zucchini Winter squash Pumpkins Watermelon
Sunflower family (Asteraceae)	Lettuce Sunflowers Artichoke

Common Plant Families

When planning (or planting) a vegetable garden, put plants that belong to the same family together. Generally plants in the same family have the same needs, the same pest problems and the same diseases. Crop rotation by plant family—or changing the location of plant families from season to season—can help prevent disease, pest problems, and loss of nutrients from the soil.



This map shows crops grouped by plant family. Each family rotates into a new space every year.

Seeds or Transplants?

Before planting your garden, you must decide which crops to seed directly into the soil and which crops to transplant into the garden as plant starts.

Seeds can be less expensive than plant starts, so direct seeding can give you more plants for less money. Seeds also give you a bigger choice of plant varieties, because most stores have space for only a few varieties of plant starts.

Transplanting has its advantages too. Many favorite summer crops need a longer growing season. Seedlings for these crops are grown in a warm greenhouse, so they get a jump on the growing season. When you transplant them into your garden, you give them plenty of time to produce a crop before the first frost kills them. Also, weeds can crowd out young plants, but transplants are already big enough to get a head start on weeds.

Choosing seeds or transplants		
Direct seed		
Large seeds	Deep taproots	Others
Corn	Radishes	Garlic (cloves)
Beans	Beets	Leaf lettuce
Peas	Turnips	Arugula
Squash / Pumpkins	Carrots	Mustard
Melons	Rutabaga	Potatoes (called "seed" potatoes)
Cucumbers	Parsnips	
Transplant only		
Cabbage family	Long-season crops	
Broccoli	Tomatillos	Eggplant
Cauliflower	Bell peppers	Hot peppers
Cabbage	Tomatoes	Basil
Direct seed or transplant		
Cabbage family	Beet family	Onion family
Kale	Chard	Onions
Collard greens	Spinach	Leeks
Kohlrabi		Chives
Bok choy	Herbs	Others
	Parsley	Lettuce
	Cilantro	

Planting Dates—Southeastern Pennsylvania

	Plant	Date to Plant Inside	Date to Plant Outside
Must be Transplanted	Tomatoes	3/15-3/30	5/10-6/10
	Peppers	3/15-3/30	5/10-6/10
	Eggplant	3/15-3/30	5/10-6/10
Can be Transplanted	Lettuce	3/15-3/30	4/15-9/15
	Cabbage	2/1-2/15	4/15-4/30, 7/25-8/15
	Broccoli	2/1-2/15	4/15-4/30, 7/25-8/15
	Cauliflower	2/1-2/15	4/15-4/30, 7/25-8/15
	Kale	2/1-2/15	4/15-4/30, 7/25-8/15
	Collard Greens	2/1-2/15	4/15-4/30, 7/25-8/15
	Leeks	1/15-2/15	4/15
	Onions	1/15-2/15	4/15

Starting a Vegetable Garden from Seeds

Step One: Prepare the Soil

- Wait until the soil has been dry for a couple of days.
- Loosen the soil with a digging fork or shovel.
- Create paths in the garden so you can avoid compacting the soil near your plants.
- Break apart any large clods of soil to prepare a fine seed bed. Seeds have a hard time growing up through clumps or rocks.
- Put down some complete organic fertilizer over the area to be planted (about 1 cup per each 4'x4' of soil or one gallon per each 10'x10'). Rake the fertilizer into the top 2-4" of soil.

Step Two: Planting the Seeds

For Small Seeds

- Create a tiny trench for your seeds (remember each seed will be planted twice as deep as it is big). You can use your finger, a trowel or a small stick.
- Put the seeds in the trench. Rolling the seeds between your thumb and forefinger helps to keep the seeds uniformly spaced. You can also lay down seed tape.
- Sprinkle a small amount of soil on top of the trench.
- Gently pat down the row of seeds with your hand.

For Larger Seeds

- Lay out the seeds on top of the ground about twice as close as you want the plants to be.
- Poke each seed in with your finger about up to your first knuckle.
- Pat the soil down gently at each place where there was a seed.

Step Three: Watering

- The seeds need to stay moist while they are germinating. Check them each day until they sprout to make sure that the ground is damp.
- Water the seeds carefully to avoid washing them away. A mister on a hose, a spray bottle or a cup with a very steady hand work well.
- You can put down a board or cardboard to help keep the soil damp for the first couple of days, but be sure to take it off before the seeds actually sprout.
- After the plants are about 1-2" tall, water when the top of the soil is dry. It is best to water in the early morning.
- When the plants grow to be about 4" tall, water less frequently, but give more water each time. Watering twice per week should be enough.

Step Four: Thinning

- Your plants will grow closer together than they should ideally be spaced.
- When plants have two sets of leaves, remove some of the plants so that no plants in the row are touching any other plants.
- After the plants have three sets of leaves, check the seed packet for ideal spacing and thin out the weakest looking plants.

Seed Storage

Under the right conditions, most seeds can last 2-5 or more years. For best results, keep seeds cool, dry and dark in a glass jar, plastic container with a lid or a Ziploc bag. Make sure to label the container. Place a silica packet (or a small amount of powdered milk wrapped up in a napkin) in each container to absorb any moisture that remains. The refrigerator is a great place to store seeds.

Testing Seeds for Germination

If you want to test your seeds to see if they are still good, use the following method:

- Moisten a paper towel
- Place several seeds on the paper towel and roll it up loosely like a burrito
- Put the rolled up paper towel in a plastic bag and keep it in a warm area (on top of the fridge, water heater or a kitchen counter would work)
- Observe the seeds every two days or so to see if they have germinated (sprouted). Note that some seeds take up to 14 days.

Number of Years Seeds Can be Saved

Seed	Years	Seed	Years
Asparagus	3	Leek	1
Beans	3	Lettuce	5
Beets	4	Muskmelon	5
Broccoli	5	Mustard	4
Brussels Sprout	5	Okra	2
Cabbage	5	Onion	1
Carrot	3	Parsley	2
Cauliflower	5	Parsnip	1
Celery	5	Pea	3
Chinese Cabbage	5	Pepper	4
Collard Greens	5	Pumpkin	4
Corn	1	Radish	5
Cucumber	5	Rutabaga	5
Eggplant	5	Spinach	5
Kale	5	Tomato	4

Starting Your Own Transplants

Long season crops like tomatoes, tomatillos, peppers and eggplant need to be transplanted into your garden. They need an early start to ripen fruit in our short summers. Starting your own transplants from seeds can be much more economical than buying them from stores.

Materials needed to start seeds indoors:

- Containers (anything with a hole in the bottom)- yogurt containers, egg cartons, etc.
- Bleach or hydrogen peroxide to sanitize containers (1 capful of bleach to one gallon of water)
- Light– a sunny south facing window or shop/grow lights
- Warmth– a heating pad or the top of your refrigerator
- Plastic bags or plastic wrap
- Fertilizer– water soluble fertilizer, fish fertilizer, compost tea or worm casting tea

Starting Seeds:

1. Poke holes in bottom of the containers you are going to use.
2. Fill containers with seed starting mix. It should be as damp as a wrung-out sponge.
3. Poke a small hole in the surface of the soil and drop your seed into it. Since seeds should be planted about twice as deep as they are wide, most seeds will only be buried about 1/4" deep.
4. Cover the seed with soil and gently cover with dirt.
5. Water the containers and cover them with plastic bags or plastic wrap.
6. Place containers in warm spot (on a heating pad or on top of your refrigerator).
7. Check on them twice a day. The soil should stay damp. Water only when the soil is dry to the touch.
8. When the seeds have germinated (sprouted), take off the plastic and move them to a location with a lot of light (under a grow light or in a sunny south-facing window).
9. As the plants grow, lightly rub your hands over them to stimulate wind or use a fan on a low setting. This will make them grow stronger.
10. Fertilize the seedlings once a week.

Planting

- Harden off plants by bringing them outdoors for morning sun and afternoon shade. You may need to bring them indoors at night if temperatures are too cold. Young seedlings for cold weather crops should be brought indoors if there is chance of frost (32 degrees). Warm weather crops will suffer if left out at temperatures in the mid 40s. After a few days of hardening off you can transplant your plants outdoors. Plant early in the morning on a cloudy day if possible.
- Loosen the soil about 12" deep where you are going to plant. If you can, add some compost to the planting area.
- Next, dig a hole deep enough to accommodate the root ball of the plant (the part that's in the pot). Add some fertilizer to that hole if possible.
- Take the plant out of the pot, being careful not to break or bruise the stem. Using your thumb and fingers, gently break up the roots to encourage them to spread out.
- Set the plant into the hole and fill in dirt around it. Most plants will be healthier if planted all the way up to their 1st set of leaves. Tomatoes will be healthiest if you bury them about half way up the plant.
- Gently, refill the hole with dirt.
- Water your new plant very well to give it a good start.

Home-made Organic Pest Control Sprays

Use caution with all of these sprays – most will kill beneficial insects as well as the pests. Spray early in the morning to avoid burning the leaves. Test a small amount on each plant first to ensure there aren't any negative effects.

Pest	Remedy
Leaf-eating pests	All-Purpose Insect Spray
Slugs	Slug traps
Aphids	Tomato-Leaf Spray
Powdery Mildew	Baking Soda spray
Corn earworms	Tomato-Leaf Spray
Soft-bodied insects (aphids, mealy bugs, whiteflies)	Soap Sprays
Chiggers, earwigs, fleas, mites, scales, thrips	Soap Sprays

All-Purpose Insect Spray*

- 1 garlic bulb
- 1 small onion
- 1 tsp. powdered cayenne
- 1 quart water
- 1 Tb. mild dish-soap (no colors or scents added)

Chop the garlic and onion into very small pieces. Add the cayenne and water and let steep for at least 1 hour. Strain the mixture through cheesecloth and add the dish soap to the strained liquid. Mix well. Store in the refrigerator (well labeled) for up to one week.

Precautions: The cayenne in this mixture could cause skin irritation. Wear rubber gloves and keep the mixture away from your eyes and nose.

Soap Spray*

- 1 Tb. mild dish-soap (no colors or scents added)
- 1 cup oil (peanut, safflower, corn, soybean or sunflower oil)

Mix the soap into the oil. When you are ready to spray, mix 2 tsp. of the mixture into 1 cup of water.

Precautions: Beans, Chinese cabbage, cucumbers, ferns, gardenias, Japanese maples, nasturtiums and young peas are easily damaged by soap sprays.

Tomato Leaf Spray*

- 1-2 cups of tomato leaves (make this spray on the same day you prune your tomatoes)
- 4 cups of water

Finely chop the tomato leaves and soak them overnight in 2 cups of water. Strain the mixture and add 2 more cups of water to the strained liquid.

Precautions: Avoid getting the liquid on your skin. The alkaloids could cause discomfort. Do not use this spray on any members of the tomato family (peppers, potatoes, eggplant) because it could spread a virus to the other plants.

Baking Soda Spray*

- 1 tsp. baking soda
- 1 quart warm water
- 1 tsp mild dish soap (no added colors or scents)

Mix the baking soda and dish soap into the water until well dissolved. Spray infected plants thoroughly.



Slug Traps*

Beer or a mixture of yeast, sugar and water (not as effective)

Small Containers (e.g.. yogurt containers)

Sink the containers into the soil so that the top of the container is level with the soil (like an in-ground swimming pool). Fill the container ¼ - ½ full with beer. Remove dead slugs and add more beer every couple of days.

Plant Controls

Insect Pest	Plant Controls
Ants	Tansy, pennyroyal
Aphids	Nasturtium, stinging nettle, southernwood, garlic
Mexican Bean Beetle	Potatoes
Black Fly	Stinging nettle
Cabbage worm butterfly	Sage, rosemary, hyssop, thyme, wormwood, southernwood
Striped cucumber beetle	Radish
Cutworm	Oak leaf mulch, tanbark
Black flea beetle	Wormwood
Flies	Nut trees, rue, tansy
June bug grub	Oak leaf mulch, tanbark
Japanese Beetle	White geranium, datura
Plant lice	Castor bean, sassafras, pennyroyal
Mosquito	Legumes
Moths	Sage, santolina, lavender, stinging nettle, herbs
Colorado Potato Beetle	Eggplant, flax, green beans
Potato bugs	Flax, eggplant
Slugs	Oak leaf mulch, tanbark
Squash bugs	Nasturtiums
Weevils	Garlic
Woolly Aphids	Nasturtium

Table adapted from *How to Grow More Vegetables*, by John Jeavons

* Pest recipes adapted from *The Organic Gardener's Handbook of Insects & Disease Control*, by Barbara Ellis & Fern Marshall Bradley

Protecting Beneficial Insects

Provide habitat for beneficial insects:

- Plant flowers and herbs throughout the garden
- Allow some garden plants to go to seed at the end of the season
- Plant an insect attracting 'hedgerow' around the garden area

Use sprays with caution. Even organic pest control products will kill beneficial insects as well the pests you are trying to control.

- Spray early in the day when many insects are less active
- Spot spray only infested plants
- Do not spray plants in bloom

Beneficial Insects and Pests Controlled

Information taken from OSU Extension Master Gardeners Handbook

Beneficial Insects	Pests Controlled
Big-eyed bug	Aphids, leafhoppers, lygus bugs (nymphs), spider mites
Green lacewings	Aphids, leafhoppers, plant bugs (immature), spider mites, thrips
Hover flies (syriphid flies)	Aphids
Lady beetles	Aphids, mealybugs, scales, spider mites
Minute pirate bugs	Aphids, spider mites, thrips, immature stages of many insects
Ichneumonids	Aphids (larvae), cutworms, loopers, omnivorous leaftiers, oriental fruit moths, tortrix moths
Braconids	Aphids (larvae), cutworms, loopers, omnivorous leaftiers, oriental fruit moths, tortrix moths
Chalcids	Aphids (larvae), cutworms, loopers, omnivorous leaftiers, oriental fruit moths, tortrix moths
Tachinids	Codling moths, Colorado potato beetles, corn earworms, cutworms, grasshoppers, hornworms, imported cabbage worms, plant bugs, tussock moths

Nutrient Content of Organic Fertilizers

From: Oregon State University Master Gardener's Handbook

	% Nitrogen (N)	% Phosphorus (P)	% Potassium (K)
Cottonseed meal	6-7	2	1
Blood meal	12-15	1	1
Bat Guano	10	3	1
Fish meal	10	4	0
Fish emulsion	3-5	1	1
Bone meal	1-4	12-24	0
Rock Phosphate	0	25-30	0
Greensand	0	0	3-7
Kelp meal	1	0.1	2-5

Gardening Resources

Penn State Extension **Gardening Hotline** - a free service to help Pennsylvania residents with gardening questions and concerns. During the off season leave a message and someone will get back to you. You may also contact them via email with photos and a description of your issue or questions.

Chester County: 610-696-3500, April—November, chestermg@psu.edu

Delaware County: 610-690-2671, 9 am-Noon, Tuesday and Thursday, delawaremg@psu.edu

Montgomery County: 610-489-4315, 10 am-3 pm, Mon–Fri, April—October, montgomerymg@psu.edu

Philadelphia County: 267-314-8711, PhiladelphiaMG@psu.edu

For additional counties visit: <https://extension.psu.edu/programs/master-gardener/counties>

Books

How to grow more vegetables, by Jay Jeavons - Using bio-intensive gardening techniques, this text shows how to raise enough organic vegetables for a family of four on a parcel of land as small as 800 square feet.

Four-Season Harvest, by Eliot Coleman – This book will have you feasting on produce from *your* garden all through the winter.

The Organic Gardener's Handbook of Natural Insect and Disease Control, by Barbara Ellis and Fern Bradley – This is a very clear, helpful book covering all types of insect and disease problems.

Online Resources for Gardeners

Penn State Extension vegetable planting guide <https://extension.psu.edu/vegetable-planting-and-transplanting-guide>

Cornell University's Gardening Resources for Vegetables: <http://www.gardening.cornell.edu/vegetables/index.html>

Cornell's home gardening Growing Guides (and more): <http://www.gardening.cornell.edu/homegardening>

The National Gardening Association: <http://www.garden.org/pestlibrary/>

Burpee www.burpee.com/growingcalendar

Johnny's Selected Seeds www.johnnyseeds.com/growers-library/growing-center.html

Mother Earth News: <http://www.motherearthnews.com/organic-gardening.aspx>

"What to Plant Now" guide from Mother Earth News: <http://www.motherearthnews.com/organic-gardening/mid-atlantic-gardening-region.aspx>

Composting info from the Chester County Solid Waste Authority: <http://www.chestercountyswa.org/index.aspx?NID=114>

Organic Gardening Magazine: <http://www.organicgardening.com>

The National Gardening Association: <http://www.garden.org/pestlibrary/>

Storing Seeds – 10/1/12 Issue: http://www.organicgardening.com/print/7514?cm_mmc=LivingLightlyNL_-_1055826_-_10012012_-_top_10_tips_for_storing_seeds

Soil Analysis/Testing Penn State College of Agricultural Sciences <https://agsci.psu.edu/aasl/soil-testing>

Supplies Special Note for **SNAP card** users: You can use your SNAP card to buy seeds and plant starts anywhere that food is sold.



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