

WALNUT CREEK SUPPLY

THE COMPLETE CARE GUIDE

Homestead Food Garden

Plan, protect and enrich: a family guide to growing your own food



Family-owned in Christiana, Lancaster County, Pennsylvania

10% of every purchase supports no-kill animal shelters nationwide

13 sections · walnutcreeksupply.com

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New owner? Go straight to Section 1. It is written so you can set up a safe, correct home and get through the first 48 hours without reading anything else first.

There is a particular kind of quiet that settles over a family the first time they sit down to a supper where most of what is on the table came out of their own yard. The potatoes are a little lumpy, the beans were picked an hour ago, and somebody has already asked whether there is more of that tomato sauce in the pantry. That quiet is what this guide is about. Here at Walnut Creek Supply in Christiana, Lancaster County, Pennsylvania, our family grows its own food: a vegetable garden that feeds the kitchen from spring to frost and well past it, and a fruit orchard that gets a little more generous every year. We keep animals too, and we have learned that a garden and a flock or herd are far happier working together than apart. Growing food is not a hobby for us. It is a conviction that a family should know where its meals come from and be able to put some of them by for a rainy day.

This is a different kind of guide from our beginner vegetable garden guide, which walks you through your first raised bed, basic compost and easy crops. Think of this one as the next step: how to plan a whole family food system rather than a patch of tomatoes, how to time your plantings so something is always coming in, how to protect a harvest from frost, drought and heat, how to let chickens, rabbits, goats and other livestock earn their keep in the garden, how to feed your soil without a bag of anything from a store (and what to do when you have no animals at all), and how to bring your kids along so they grow up knowing how to feed themselves. It is long, because a food garden is a big subject, so use the Quick Start to get going this weekend and come back to the other sections as the seasons turn. "Clean Fuel, No Junk" applies to people and plants alike.

SECTION 1

Quick Start: Your First Weekend

You do not need acres, a tractor or a degree to begin. You need a sunny spot, a few hours and the willingness to start smaller than your enthusiasm suggests. Here is how to spend your first weekend.

1. **Find your last spring frost date and your first fall frost date.** Call your local Cooperative Extension office or search for its frost-date chart for your county. Write both dates on a card and put it on the refrigerator. Every planting decision in this guide is counted from these two dates. (Lancaster County, PA, is roughly mid-April to early May for the last spring frost and mid-to-late October for the first fall frost, but your yard may differ.)
2. **Walk your yard at three different times of day and note where the sun falls.** Morning, midday and late afternoon. Mark every spot that gets six to eight hours of direct sun. That is where your vegetables go. Shady corners are for compost bins and leafy greens, not tomatoes.
3. **Check your water.** Find the closest hose bib or rain barrel to your sunniest spot. If you have to carry watering cans more than a short walk, the garden will suffer in the first dry July. Move the garden closer to the water, or bring the water closer to the garden.
4. **Send off a soil test.** Your Extension office can tell you how to collect a sample and where to mail it. It is inexpensive and tells you your soil's pH and which nutrients are low, so you add only what you need. Results take a week or two, so do this first.
5. **Pick a modest first footprint.** Two or three beds about 4 feet wide and 8 to 10 feet long is plenty for a first year. A bed you can reach across from either side without stepping on the soil never gets compacted.
6. **Build or mark your first beds.** Raised beds, mounded rows or simple in-ground beds all work. Lay cardboard over grass, soak it, and pile 4 to 6 inches of compost or aged manure and leaves on top. Walk away for a week if you can.
7. **Plant what is in season.** Use your frost date and the offsets chart in the Seasons section. Early in spring that might be peas, lettuce, spinach, radishes and onion sets. In late spring it is beans, squash, tomatoes and peppers. In late summer, it is carrots, kale and garlic for next year.

8. **Mulch everything you plant.** Two to three inches of straw, shredded leaves or untreated grass clippings keep weeds down and soil moist. This single step cuts your summer workload nearly in half.
9. **Start a compost pile.** Pick a shady corner and start layering kitchen scraps (greens) and dry leaves or straw (browns). You will use this next season.
10. **Write it all down.** A simple notebook on a nail by the door: what you planted, when, where, and how it did. Your own records beat any book, this one included.

First-Time Starter Bundle

What to have on hand before the first seed goes in, and what to look for in each category.

Essentials

- **A sturdy garden fork and a flat-bladed spade** with comfortable handles that suit your height. Good forged steel heads last a lifetime.
- **A hand trowel and a hand fork** with strong one-piece construction that will not bend in clay soil.
- **A stirrup or collinear hoe** for slicing weeds off just below the soil surface, plus a good rake for smoothing beds.
- **A soil test kit or mail-in soil test submission materials** so you know your pH and nutrient levels before you add anything.
- **A rain gauge and a soil thermometer.** One tells you if you need to water, the other tells you when seeds will actually sprout.
- **Garden hose with a gentle shower nozzle, or a soaker hose or drip irrigation kit,** so you can water deeply at the base of plants instead of splashing leaves.
- **Bulk mulch material:** straw, shredded leaves or untreated grass clippings, in generous supply. Weed-free straw is key.
- **Finished compost or a source of aged manure** from a supplier you trust, to build your first beds.
- **Seed-starting supplies:** trays or cells with drainage, a bag of sterile seed-starting mix, and a spray bottle for gentle watering.
- **Weatherproof plant labels and a marker** that does not fade. You will not remember which row is which.
- **A bound notebook or garden journal** for dates, varieties and results.

Ready to set up? Browse the essentials in our collections: Raised Bed Gardening, Gardening tools and supplies and Greenhouses, Aviaries, Conservatories,.

Enrichment

- **A grow light on an adjustable stand or chain** for starting seedlings indoors, with a simple timer.
- **Floating row cover** in a lightweight and a heavier weight, plus hoops or wire to hold it up, for frost protection and insect barriers.
- **A collapsible cold frame or low tunnel kit** to start earlier and finish later.
- **A heirloom and open-pollinated seed collection** suited to your zone, from a regional seed company.
- **A sturdy trellis, cattle panel or bean netting** for climbing crops.
- **A rain barrel with a spigot and a screen** to capture roof water for the garden.
- **A compost thermometer and a covered bin or tumbler** for monitoring hot compost.
- **A drying screen or dehydrator and wide-mouth jars** for putting food by.
- **Canning supplies and a current tested canning guide from your Extension service,** when you are ready to preserve.

Enrichment, one click away. Shop Heirloom Seeds, Seed Starting Supplies and Cover Crop Seeds.

SECTION 2

Plan Your Family Food Garden

A garden that is planned feeds a family. A garden that just happens feeds the groundhogs. Planning does not have to be fancy, but it does need to answer a few questions before you dig: how much food do you want, what crops give the most return, where do they go, and how will you move through the space day to day?

How much should you grow?

Every family eats differently, so treat the numbers below as rough ranges and adjust them after a season or two of keeping notes. How much you need depends on whether you want fresh vegetables in season, enough to preserve for winter, or true staple crops that replace store-bought calories.

Goal	Rough garden space per person	What it means	Notes
Fresh eating in season	100 to 200 square feet	Salads, tomatoes, beans, squash and herbs from June to October	Perfect for beginners and smaller yards
Fresh plus serious preserving	400 to 700 square feet	Enough extra to can, freeze and dry for winter	Plan on weekly harvest and processing days
Staple crops for much of the diet	1,000 to 4,000 square feet or more	Potatoes, dry beans, grain corn, winter squash, onions and garlic in quantity	Varies hugely with soil, climate, and diet; usually needs more than a backyard

Yields swing widely with soil fertility, weather, variety and your own experience. A first-year gardener might get half what a seasoned grower does from the same bed, and that is normal. Start at the low end, keep records and expand into whatever your family clearly uses.

Calorie-dense and high-value crops

Not all crops earn their space equally. Lettuce is lovely, but a bed of potatoes will feed more people for longer. A balanced homestead garden mixes quick-and-tasty crops with the ones that carry you through winter.

Crop	Why it earns its space	Storage potential	Notes
Potatoes	Dense calories, high yield per square foot, easy to grow	4 to 8 months in a cool, dark place	Plant certified seed potatoes; hill as they grow
Sweet potatoes	Heavy yield, vitamin-rich, loves summer heat	4 to 6 months after curing	Needs warm soil and a long season; start from slips
Winter squash	Stores for months without any processing	3 to 6 months, varies with type	Needs room; can climb a sturdy trellis
Dry beans	Protein-rich, shelf-stable, nitrogen-fixing	A year or more when dry and sealed	Let pods dry on the plant, then shell
Field or flint corn	Grain for cornmeal, popcorn and animal feed	A year or more when fully dry	Needs a block (not a single row) for pollination
Garlic	Flavor, kitchen value and almost no care	6 to 9 months, varies with type	Plant in fall for next summer's harvest
Onions	Used daily, keep well	3 to 8 months by variety	Choose storage varieties and cure fully

Crop	Why it earns its space	Storage potential	Notes
Tomatoes	Highest value per square foot when preserved as sauce, salsa and paste	Canned or frozen for a year or more	Staked or caged for tidy harvests

Zones by how often you visit

The best gardens are arranged by how often you need to be in them. This is sometimes called zone planning, and it saves enormous amounts of walking.

- **Zone 1: the kitchen door.** Herbs, salad greens, cut-and-come-again lettuce, scallions, radishes, cherry tomatoes and anything you pick daily. If you have to put on boots to get there, you will skip it on a busy night.
- **Zone 2: a short walk.** The main vegetable beds: beans, peppers, cucumbers, summer squash, carrots, cabbage family crops. These need weekly or twice-weekly attention.
- **Zone 3: farther out.** Staple crops that need little attention until harvest: potatoes, winter squash, dry beans, field corn, onions and garlic. Walking out once a week to check is plenty.
- **Zone 4: the edges.** Orchard, berry patches, nut trees, bee yard, compost area and pasture. Visited for tasks, not daily.

Animals fit into these zones too. A coop near Zone 2 means egg collecting and compost hauling take no time. A rabbit hutch near the compost area makes manure easy to move.

Sun, water, paths and permanent beds

Sun mapping. Vegetables that produce fruit (tomatoes, peppers, squash, beans, corn) want six to eight hours or more of direct sun. Leafy crops and roots tolerate four to six hours. Mark sun patterns in spring *and* midsummer, since trees leaf out and shadows lengthen. Remember that a fence or building may shade a bed in April but not June.

Water access. Place beds within easy reach of a spigot or rain barrel, and plan where drip lines will run before you plant.

Paths. Make them wider than you think. Two feet is the minimum; three feet lets a wheelbarrow pass. Cover paths with wood chips, straw or cardboard to keep weeds down and mud off your boots. Never walk in the beds.

Permanent beds. Decide where your beds are and leave them there. Permanent beds, 3 to 4 feet wide, build soil structure year after year because they are never compacted. They also make rotation, mulching and irrigation easier, and they let kids know exactly where they are allowed to step. Raised beds warm earlier in spring and drain better in wet years; in-ground beds hold moisture better in dry ones. Many families use both.

A labeled plan-view layout

Here is one workable layout for a family yard of roughly a quarter acre, drawn in plain text. Scale it up or down to fit your land.

Position (north at top)	Zone	What goes there
Top (north edge)	Orchard and perennials	Apples, pears, plums and cherries staggered 12 to 15 feet apart; bee hives; blueberries and raspberries; rhubarb and asparagus
Upper middle	Zone 3: staples	Potatoes, winter squash, dry beans, corn, onions and garlic
Middle	Zone 2: main beds	Three raised beds, a trellis for pole beans and cucumbers, a cold frame on the south-facing side
Middle, with the beds	Livestock and compost	Coop and run, rabbit hutch, two compost bins (short hauling distance to the beds)

Position (north at top)	Zone	What goes there
Bottom (south edge, by the kitchen door)	Zone 1: kitchen garden	Herb bed, salad bed, cherry tomatoes, and a rain barrel at the corner

Notice where things sit. The orchard and trees are on the north side so they do not shade the vegetables. The coop, hutch and compost are in the middle where hauling is short. The rain barrel is by the kitchen door and the herb bed. The cold frame sits on the south-facing side of the main beds to catch the sun.

Perennial food: plant once, harvest for years

Perennials are the backbone of a low-effort food system. They take a year or three to get established, then feed you every year with little more than mulch and pruning.

- **Asparagus.** Plant crowns in a dedicated bed and resist harvesting heavily for the first two years. A well-kept bed produces for 15 to 20 years or longer.
- **Rhubarb.** Hardy, productive and nearly carefree. Eat the stalks only; the leaves are poisonous.
- **Berries.** Blueberries (which need acidic soil), raspberries, blackberries, strawberries and currants. Check which are suited to your zone and soil.
- **Fruit trees.** Apples, pears, plums, peaches and cherries, chosen for your zone, chill hours and disease resistance. Plant at least two compatible varieties of those that need cross-pollination, and ask your local nursery or Extension office about regional favorites.
- **Herbs.** Chives, thyme, sage, oregano, mint (in a pot, because it spreads), lemon balm and others return every year.

A note on the family orchard. Our own orchard started with a handful of small trees and a lot of patience. The best advice we can give is to plant earlier than you think you should, choose disease-resistant varieties, mulch wide around each trunk (keeping the mulch a few inches off the bark), and accept that the first useful harvest takes a few years. Fruit trees reward the patient, and the orchard also becomes habitat for pollinators, birds and the beneficial insects that help the rest of the garden.

Pollinator plantings

Squash, cucumbers, melons, tomatoes, berries and every fruit tree depend on pollinators. Tuck flowers throughout the garden and orchard: zinnias, sunflowers, calendula, borage, cosmos, dill, cilantro left to flower, native milkweed, bee balm and coneflower. Aim for something blooming from early spring to frost. Leave a patch of bare ground and some hollow stems standing over winter for native bees. If you keep honeybees, they will thank you for it too.

Frost dates and hardiness zones

Your **USDA hardiness zone** describes the average coldest winter temperature, and it tells you which perennials, trees and shrubs will survive the winter. Your **frost dates** tell you when annual vegetables can safely go out. They are different numbers that answer different questions.

Place	Typical hardiness zone	Average last spring frost	Average first fall frost	Approximate frost-free season
Lancaster County, PA	Mostly 7a (2023 USDA map)	Median last freeze about April 11; light frost possible into early May	Light frost possible from mid-October; median first freeze about November 1	About 200 days between median freezes

Place	Typical hardiness zone	Average last spring frost	Average first fall frost	Approximate frost-free season
Northern New England and upper Midwest	3 to 5	Late May to early June	Mid-September	About 90 to 120 days
Mid-Atlantic and lower Midwest	6 to 7	Mid-April to early May	Mid-October to early November	About 170 to 200 days
Upper South	7 to 8	Late March to mid-April	Early to mid-November	About 200 to 225 days
Deep South and Gulf Coast	8 to 10	February to early March	Late November to December	About 250 to 300 days

These are broad generalities. Microclimates, elevation, nearby water and city heat all shift real dates by a week or more.

How to find your own dates. Call or visit your county Cooperative Extension office, or search for its frost-date chart. Ask for the *average* last spring frost and first fall frost, and ask what the local gardeners treat as the safe date. An average date means roughly half of years see a frost after it, so many gardeners add a week or two of cushion for tender crops.

How the offsets work. Instead of memorizing dates for every crop, count weeks from your frost date. If a seed packet says "sow 6 weeks before last frost," find your average last frost date on the calendar and count back six weeks. If it says "plant 2 weeks after last frost," count forward two. For fall crops, the packet usually says "sow X weeks before first frost," so count back from your first fall frost. The next section turns this into a working chart.

SECTION 3

Seasons, Timing & Efficiency

Good timing is the quiet secret of a productive garden. A seed planted two weeks too early rots in cold ground; two weeks too late, it runs out of season. The good news is that timing is just arithmetic once you know your frost dates.

The planting calendar by frost-date offsets

Crops fall into three groups. **Cool-season crops** germinate in cold soil and tolerate light frost, so they go out early in spring or late in summer. **Warm-season crops** are killed by frost and sulk in cold soil, so they wait until after the last frost. **Fall crops** are sown in mid-to-late summer to mature in cooler weather. The numbers below are typical starting points; always check the seed packet and adjust for your variety.

Crop	Start indoors	Plant or sow outdoors	Season group	Notes
Peas	Not needed	4 to 6 weeks before last frost	Cool	Sow as soon as soil can be worked
Spinach and lettuce	4 to 6 weeks before last frost, optional	3 to 5 weeks before last frost	Cool	Bolts in heat; sow again in late summer
Broccoli, cabbage, kale	6 to 8 weeks before last frost	2 to 4 weeks before last frost	Cool	Transplants handle light frost when hardened off
Onions from seed or sets	8 to 10 weeks before last frost for seed	3 to 4 weeks before last frost	Cool	Choose storage varieties
Potatoes	Not needed	2 to 4 weeks before last frost	Cool	Soil should be workable and not soggy
Carrots, beets, radishes	Not needed	2 to 4 weeks before last frost	Cool	Keep seedbed evenly moist
Tomatoes	6 to 8 weeks before last frost	1 to 2 weeks after last frost	Warm	Wait for warm nights
Peppers and eggplant	8 to 10 weeks before last frost	2 to 3 weeks after last frost	Warm	Love heat; slow in cold soil
Beans (bush and pole)	Not needed	1 to 2 weeks after last frost	Warm	Soil at least 60 degrees F
Corn	Not needed	1 to 2 weeks after last frost	Warm	Plant in blocks
Cucumbers, summer and winter squash, melons	3 to 4 weeks before last frost, optional	1 to 2 weeks after last frost	Warm	Do not disturb roots when transplanting
Sweet potatoes	Slips arrive in late spring	2 to 3 weeks after last frost	Warm	Needs warm soil
Fall broccoli, cabbage, kale	10 to 12 weeks before first frost	6 to 8 weeks before first frost	Fall	Shade seedlings from midsummer sun
Fall carrots, beets, turnips	Not needed	8 to 10 weeks before first frost	Fall	Keep soil moist for germination
Fall lettuce, spinach, arugula	Not needed	6 to 8 weeks before first frost	Fall	Cover with shade cloth if still hot

Crop	Start indoors	Plant or sow outdoors	Season group	Notes
Garlic	Not needed	2 to 4 weeks after first frost	Fall	Plant cloves; mulch heavily

Every crop on your list can be converted to a calendar date by counting from your own frost dates. Write them on a wall calendar once and the whole year is mapped out.

Month-by-month in Lancaster County

This calendar fits zone 7a, much of south-central Pennsylvania, where the National Weather Service puts Lancaster County's median last freeze around April 11 and median first freeze around November 1. Light frosts can still come a few weeks either side of those dates. Shift it earlier or later to match your own dates.

Month	Sow or plant	Harvest	Chores	Notes
January	Order seeds; start onions indoors late in month	Stored crops, cold-frame greens	Plan beds, clean and sharpen tools	Good month for soil-test results and records
February	Start leeks, onions and early brassicas indoors	Stored crops	Prune fruit trees on mild days	Set up lights; check stored produce
March	Peas, spinach, lettuce and radishes outdoors when soil can be worked; start tomatoes and peppers indoors late in month	Overwintered greens	Spread compost, repair beds	Do not work wet soil
April	Potatoes, onions, carrots, beets, brassica transplants, more peas and greens	Asparagus, rhubarb, early greens	Set up trellises, mulch, harden off seedlings	Watch for late frost; keep row cover handy
May	Warm-season crops after the last frost: tomatoes, peppers, beans, corn, squash, cucumbers, sweet potato slips	Asparagus, lettuce, radishes, peas	Mulch, stake, thin	Succession sow salad every two weeks
June	Succession beans, carrots, basil; start fall brassicas indoors	Peas, lettuce, strawberries, garlic scapes, early squash	Water, weed, pest patrol	Shade lettuce; harvest before heat
July	Fall carrots, beets, bush beans; plant fall brassicas late in month	Garlic, onions, beans, tomatoes, cucumbers, summer squash, blueberries	Water deeply, harvest daily, can and freeze	Heat month; mulch and shade
August	Fall lettuce, spinach, kale, turnips, radishes; cover crop on spent beds	Tomatoes, peppers, corn, melons, sweet corn	Preserve, save seeds, order garlic	Peak preserving month
September	Spinach, lettuce, radishes, cover crops; plant perennials	Winter squash, potatoes, beans, apples, peppers	Cure and store; start fall cleanup	Watch for first frost forecasts in October
October	Garlic after first frost; cover crops; plant spring bulbs and fruit trees	Sweet potatoes before frost, winter squash, apples, root crops, kale	Mulch, cover, clean beds, move livestock bedding to compost	Cover tender crops on frost nights
November	Last cold-frame sowings; garlic mulch	Kale, collards, carrots, leeks, cabbage	Mulch beds, compost, drain hoses	Store tools and clean equipment
December	Nothing outdoors	Cold-frame greens, stored crops	Review notes, plan next year, order catalogs	Rest, then dream

Succession, intercropping and relay planting

- **Succession planting.** Instead of sowing a whole packet of lettuce at once, sow a short row every two weeks. You get a steady supply instead of a glut. The same works for bush beans, carrots, radishes and beets.
- **Intercropping.** Grow fast crops between slow ones. Radishes sown between slow carrots mark the row and are harvested before the carrots need the room. Lettuce under tall tomatoes enjoys the afternoon shade.
- **Interplanting fast with slow crops.** Fill the early space around young broccoli, peppers or winter squash with spinach or radishes that finish in a few weeks, then step aside.
- **Relay planting.** Follow one crop with the next in the same spot: peas in April, followed by beans in June, followed by fall spinach in September. Nothing sits empty.
- **Vertical growing.** Pole beans, cucumbers, small melons, peas and indeterminate tomatoes grow up a trellis, saving ground and keeping fruit clean and easy to pick. Make trellises sturdy enough for a heavy, wind-blown crop in August.

Stretching the harvest toward 12 months

Fresh food all year is not an impossible dream in zone 7a, but it does take a plan.

1. **Start early** with row covers and low tunnels over spring crops.
2. **Finish late** with fall crops in cold frames or under hoops. Kale, spinach, carrots, leeks and mache can produce through much of winter with a little cover.
3. **Store the long keepers:** potatoes, winter squash, onions, garlic, cabbage, beets, carrots and apples.
4. **Preserve the rest:** freeze, dry, ferment and can the summer surplus.

With these habits in play, there is something fresh or home-preserved on the table every month.

A realistic weekly time budget

How much time does a food garden take? It depends on size and season, but these ranges are common for a family garden of a few hundred square feet.

Season	Typical weekly time	Biggest jobs	Notes
Late winter and early spring	2 to 4 hours	Seed starting, bed prep, pruning	Front-loaded planning pays off
Late spring	4 to 8 hours	Planting, mulching, staking	The busiest planting weeks
Summer	4 to 8 hours	Watering, weeding, harvesting, preserving	Short daily visits beat marathon weekends
Fall	3 to 6 hours	Harvest, storage, fall planting, cleanup	Preserving can add many hours
Winter	1 to 2 hours	Cold-frame care, planning, seed orders	Mostly quiet

Add time for animals, and for putting food by. Small daily habits work better than occasional big efforts.

Efficiency habits that save hours

- **Mulch everything.** A thick layer of mulch suppresses weeds and holds water.
- **Use drip or soaker lines** on a timer. Watering at the base saves time and water and keeps leaves dry, which reduces disease.

- **Keep tools where you use them.** A bucket with trowel, pruners and twine at the garden gate beats walking to the shed ten times a day.
- **Harvest as you go.** Carry a basket or pail on every garden visit and pick whatever is ready, plus pull one weed or pinch one pest for every trip.
- **Do small jobs at the right time.** Pull weeds when they are small and soil is damp; thin seedlings when they are an inch tall.

Fall and winter tasks

The garden year does not end at frost. Fall is when next year's harvest is made.

- Plant garlic and spring bulbs after the first frost.
- Sow cover crops on empty beds and mulch perennials.
- Pull spent plants (compost healthy ones; bag or burn diseased ones).
- Spread compost or aged manure on empty beds.
- Clean, sharpen and oil tools. Drain hoses and bring in anything that freezes.
- Check stored crops weekly and use up anything soft.
- In winter, order seeds, review your notes and plan rotation for the new year.
- Start onions and leeks indoors in January and February.

SECTION 4

Seeds, Starting & Growing

Seeds are the cheapest part of the garden and the most powerful. A single packet can feed a family, and a single saved seed can be the start of a variety that thrives in your own soil.

Heirloom, open-pollinated and hybrid

Type	What it means	Seed saving	Strengths	Cautions
Heirloom	An older open-pollinated variety passed down, usually for 50 years or more	Yes, comes true	Flavor, history, diversity	Some are less disease resistant or less uniform
Open-pollinated	Pollinated naturally by insects, wind or itself; offspring resemble the parents	Yes, comes true if isolated from other varieties	Adaptable; saved seed improves with your conditions	Cross-pollination can occur between varieties of the same species
Hybrid (F1)	A deliberate cross of two parent lines	Not reliable, offspring vary	Vigor, uniformity, disease resistance	Seed must be bought each year

Each type has a place. Many gardeners mix them: hybrids where disease pressure is high, heirlooms and open-pollinated varieties for flavor and for saving.

Seed saving basics

Seed saving is satisfying, thrifty and surprisingly easy once you start with the right crops.

- **Easy savers:** beans, peas, tomatoes and lettuce. Beans and peas self-pollinate, so let a few pods dry fully on the plant, then shell and store. Tomatoes need seeds scooped, fermented in a little water for a few days, rinsed and dried. Lettuce needs a plant to bolt, flower and form fluffy seed heads.
- **Pick the best plants.** Save from the healthiest, tastiest, earliest plants, never the sickly ones.
- **Isolate varieties** of cross-pollinating crops (squash, cucumbers, corn, brassicas) by distance or timing if you want them to come true. For beginners, stick to self-pollinators.
- **Dry thoroughly.** Seeds that are not fully dry mold in storage. Spread them on a plate or screen in an airy place away from direct sun for a week or two.
- **Label everything:** crop, variety, year.

Storing seeds

Cool, dark and dry is the rule. Use paper envelopes inside a sealed jar or tin, with a desiccant packet or a spoonful of dry powdered milk wrapped in tissue. A cool closet or the refrigerator works well. Most seeds stay viable for several years; onion, parsnip and parsley seed lose viability quickly, while many beans, tomatoes and squash last five years or more.

Starting seeds indoors

- **Light.** A sunny windowsill is usually not enough, and seedlings grow leggy. Use a full-spectrum LED or fluorescent grow light held 2 to 4 inches above the seedlings, on for 14 to 16 hours a day, and raise it as plants grow.
- **Containers.** Cell trays, small pots or soil blocks. Soil blocks are pressed from a damp mix without a container, which gives roots room and reduces transplant shock. Cells are easier to find and reuse.
- **Mix.** Use a sterile, fine seed-starting mix, not garden soil, which can carry disease and drains poorly.

- **Moisture.** Keep evenly moist but never soggy. Bottom watering from a tray prevents damping off. A small fan on low gives sturdy stems.
- **Warmth.** Many seeds sprout best at 70 to 80 degrees F. A heat mat helps tomatoes, peppers and eggplant.
- **Feeding.** After the first true leaves appear, feed with a diluted liquid organic fertilizer weekly.

Hardening off

Indoor seedlings are tender. Over 7 to 10 days, move them outside for a few hours in a sheltered spot, a little longer each day, and gradually expose them to sun and wind. Bring them in on cold nights. Skip this step and the transplants often sunburn or stall.

Direct sowing

Root crops (carrots, beets, radishes, parsnips), beans, peas, corn and squash do best sown right where they will grow. Rake the bed smooth, make a shallow furrow or hole at the depth on the packet (a general rule is two to three times the seed's width), drop in seed, cover and firm gently. Keep the seedbed moist until sprouting; a board or burlap over the row helps, but remove it at the first sign of green. Thin to the spacing on the packet; crowded plants produce poorly.

Germination and soil-temperature table

Seeds germinate fastest in a particular range of soil temperature. A cheap soil thermometer pushed 2 inches into the bed saves guessing. Figures below are approximate; seed packets are the final word.

Crop	Minimum soil temperature	Best soil temperature range	Typical days to sprout	Notes
Peas	40 degrees F	55 to 75 degrees F	7 to 14	Slow in cold wet soil
Spinach	35 degrees F	45 to 75 degrees F	7 to 14	Poor germination above about 85 degrees F
Lettuce	35 degrees F	55 to 75 degrees F	4 to 10	Often stalls in hot soil
Carrots	40 degrees F	60 to 80 degrees F	10 to 21	Keep moist; slow starters
Beets	40 degrees F	60 to 80 degrees F	5 to 10	Seed clusters; thin carefully
Onions	35 degrees F	60 to 75 degrees F	7 to 14	Fresh seed is key
Tomatoes	50 degrees F	70 to 85 degrees F	5 to 10	Benefit from a heat mat
Peppers	60 degrees F	75 to 85 degrees F	7 to 21	Slow and warmth-hungry
Beans	55 degrees F	65 to 85 degrees F	5 to 10	Rot in cold wet soil
Corn	50 degrees F	60 to 95 degrees F	5 to 10	Wait for warm soil
Cucumbers and squash	60 degrees F	70 to 95 degrees F	4 to 10	Frost kills seedlings
Melons	65 degrees F	75 to 95 degrees F	4 to 10	Need real heat

SECTION 5

Feeding Your Garden: Manure, Compost & Natural Fertility



Everything on this plate is garden fertility: aged manure, rabbit and sheep pellets, finished compost, worm castings, and even aquarium water. Match the input to what you have, test your soil, and apply less than you think you need.

Healthy plants grow in healthy soil, and healthy soil is alive. Feed the soil, and the soil feeds the plants. That is the whole philosophy of natural fertility, and it is cheaper and gentler than it sounds. This section covers soil tests, compost, leaf mold, cover crops, a full manure guide, worm castings and fish water. The next section shows how to get these inputs from your own animals, and what to use if you have none.

Start with a soil test

Before you add anything, test. A soil test from your Extension office or a reputable lab reports your pH (acidity), organic matter and levels of key nutrients, with recommendations. Most vegetables want a pH around 6.0 to 7.0; blueberries want it much lower. Adding manure, lime or fertilizer blind can overshoot. Retest every two to three years.

Compost: the foundation

Compost is decomposed organic matter, and it improves nearly every soil, sandy or clay.

- **Greens** are wet, nitrogen-rich materials: kitchen scraps, fresh grass clippings, plant trimmings and manure.

- **Browns** are dry, carbon-rich materials: dry leaves, straw, shredded cardboard, sawdust and wood chips.
- **The mix.** A rough rule is about two to three parts browns to one part greens by volume. Too wet and smelly means add browns; too dry and slow means add greens and water.
- **Cold composting.** Pile materials up and wait. It takes six months to two years, needs little work, and may not kill weed seeds or pathogens.
- **Hot composting.** Build a pile at least 3 feet by 3 feet by 3 feet, balance greens and browns, keep it damp like a wrung-out sponge and turn it. A well-made pile heats to 130 to 160 degrees F and finishes in a few months. A compost thermometer helps. This heat is the safest route for any manure.
- **What stays out:** meat, dairy, oily food, diseased plants, pet waste and anything treated with herbicides.

Finished compost smells like forest soil, is dark and crumbly, and has no recognizable scraps.

Leaf mold

Pile shredded autumn leaves in a wire cage or bag and leave them for one to two years. The result, leaf mold, is a wonderful moisture-holding soil conditioner and mulch. It is not rich in nutrients, but it costs almost nothing and improves soil structure beautifully.

Cover crops and green manures

A cover crop is a plant grown to feed the soil rather than people. Sown on empty beds, it prevents erosion, smothers weeds, holds nutrients and adds organic matter when cut and turned under or left as mulch. These are called green manures.

- **Crimson clover and hairy vetch** are legumes (they host bacteria that capture nitrogen from the air). They suit fall sowing and spring incorporation.
- **Buckwheat** grows in a few weeks in summer, shades out weeds, and its flowers feed pollinators.

Cut cover crops before they set seed and give residue a couple of weeks to break down before planting.

The manure guide

Manure from your own animals, or from a trusted neighbor, is among the best garden resources there is. It also demands respect: it can carry pathogens, burn plants or carry herbicide residue. The table below is a working guide. The nutrient numbers are approximate ideas of nitrogen, phosphorus and potassium (the N-P-K on a fertilizer bag), and they vary widely with the animal's feed, the bedding used and how the manure is stored.

Manure	"Temperature" and strength	Approximate nutrient idea	How to use it	Cautions
Poultry (chicken, turkey)	Hot; the strongest common manure	Highest in nitrogen, often followed by good phosphorus	Compost 3 to 6 months or more before using	Fresh manure burns plants; do not apply fresh to growing crops
Rabbit	Cold; gentle and pelleted	Moderate nitrogen, good phosphorus and potassium	Widely used fresh on most beds; compost still recommended for crops eaten raw	Mix into soil or use as mulch; keep away from leafy crops eaten raw unless composted
Sheep and goat	Mild; dry pellets that are easy to handle	Comparable to or somewhat richer than aged cow or horse manure, gentler than poultry	Compost or age, then spread; pellets break down slowly	Check bedding and any hay for herbicide residue

Manure	"Temperature" and strength	Approximate nutrient idea	How to use it	Cautions
Cow	Cool; moist and moderate	Lower nutrient concentration, high in organic matter	Age 6 to 12 months or compost before use	Fresh manure carries pathogens; may include weed seed
Horse	Warm; fibrous and bulky	Lower nutrient concentration, lots of fiber	Age 6 to 12 months or compost	Can carry many weed seeds; ask about bedding and hay herbicides
Llama and alpaca	Cool; low-odor pellets from communal dung piles	Moderate nitrogen and potassium	Often used directly; compost for crops eaten raw	Easy to collect from the dung pile; still follow timing rules
Duck	Warm to hot; wet and sloppy	Moderate to high nitrogen, high moisture	Compost with plenty of dry browns	Wet manure smells; good with straw or wood shavings

Never use dog, cat, pig or human waste on food gardens. These can carry parasites and diseases that survive composting at home, and they have no place near vegetables.

Food-safety timing

Raw manure can carry harmful bacteria. The timing rules that organic growers follow are simple:

- Apply raw manure **at least 90 days before harvest** when the edible part does not touch the soil (corn, tree fruit, staked tomatoes, most beans on trellises).
- Apply it **at least 120 days before harvest** when the edible part touches the soil (lettuce, carrots, potatoes, radishes, strawberries and other low-growing crops).
- **Composting properly is the safer route.** The organic standard treats manure as composted only when the pile holds 131 to 170 degrees F for at least 3 days in a static or enclosed pile, or for 15 days with at least five turnings in a windrow, and is then cured; that compost may be used closer to harvest.
- **Aged is not the same as composted.** Penn State Extension points out that home and unmanaged piles rarely get hot enough, evenly enough, for long enough, so do not assume pathogens are gone just because a pile is old. A pile that reaches 140 degrees F does kill weed seeds. If in doubt, compost it longer and spread it in fall, which is also the most common time to add manure to a vegetable garden.

Always wash produce, wash hands after handling manure, and keep manure off the parts of plants you eat. Local rules and your own comfort level matter; when in doubt, wait.

Persistent herbicides: the hidden danger

Some pasture and hay herbicides (aminopyralid, clopyralid and picloram) pass through animals and survive composting, sometimes for years. **Manure from animals fed hay or pasture treated with these persistent herbicides can damage vegetables**, especially tomatoes, beans, peas, potatoes and many other broadleaf crops. Signs are cupped, curled, twisted or distorted leaves.

- **Ask your supplier.** Where does the hay come from? Has the pasture been sprayed? If they do not know, test first.
- **Do a simple bioassay.** Fill a few pots with a mix of your compost or manure and potting soil, and another with plain potting soil as a control. Sow bean or pea seeds in each, grow them for two to three weeks, and compare. Curled, stunted or twisted leaves in the manure pots mean you have a problem. Do not use that batch on food beds.
- **Buy from sources you trust**, and keep notes on where each load came from.

Over-application and "burn"

More is not better. Too much nitrogen gives lush, floppy leaves, weak stems, few flowers and fruit, and attracts aphids. Fresh, hot manure can scorch roots and leaf edges ("nutrient burn," shown as brown, crispy leaf tips and margins). To avoid it:

- Compost or age hot manures before use.
- Apply a modest layer, about one to two inches of compost or well-aged manure per season, and work it into the top few inches.
- Go lighter on beans and peas, which make their own nitrogen, and on root crops, which fork when overfed.
- Water in well, and if you see burn, flush with deep watering and stop feeding.
- Let the soil test guide you, because many gardens already have plenty of phosphorus.

Worm castings

Worm castings (worm manure) are one of the gentlest, most plant-friendly amendments. Red wigglers in a bin turn kitchen scraps into dark, crumbly castings in a few months. They can be worked into planting holes, mixed into seed-starting mix at a modest share or brewed into a mild tea. They are not strong in nutrients, but they are safe, and they add beneficial microbes. A worm bin under the sink or in a garage is a wonderful classroom project, too.

Fish water

If you keep a freshwater aquarium or a backyard pond, your water changes are a free, mild fertilizer rich in dissolved nutrients from fish waste.

- **Use** water from freshwater tanks and ponds only, with **no salt, no copper and no medications** in it.
- **Do not use** water from marine tanks, from tanks that have been treated for illness, or from tanks where algaecides or water treatments contain copper.
- **Dilute** if it is a heavily stocked, dirty tank. Tank water straight from a weekly change is usually mild enough for most plants, and you can go half-and-half with plain water for seedlings or if the tank was overdue for a clean.
- **Apply** to the soil around plants rather than over leaves, and use within a day or so before it turns stagnant.
- **Purchased fish emulsion or hydrolysate** is a ready-made version. Follow the label and dilute as directed. It has a strong smell for a day or two.

Feed your soil. Browse Composting Supplies and Gardening Supplements, Nutrients, and Treatments.

SECTION 6

Livestock & Garden Working Together

This is the heart of a homestead. A garden produces vegetable scraps, weeds, spent plants and gleanings. Animals turn them into eggs, milk, meat, fiber and manure, and the manure feeds the next crop. Each part feeds the other. When it works well, almost nothing leaves the property as waste. But it works well only if you manage it: animals are also happy to eat your seedlings, trample your beds and spread bacteria. The rule of thumb is simple: *animals near the garden, but not in the beds when food is growing.*

Chickens and ducks

Coop bedding and deep litter. Straw, wood shavings or dry leaves in the coop absorb droppings. Under the deep-litter method you keep adding a few inches of dry bedding and let it compost in place, then clean out once or twice a year and move it to a compost pile. Never put fresh coop cleanout directly on beds with growing crops. Compost it for several months first.

Chicken tractors. A bottomless, movable pen (a chicken tractor) lets hens scratch, eat weeds and bugs, and fertilize a bed in place. Park it on a spent bed in fall, and by spring the bed is cleaned, loosened and fertilized. Move it daily or every few days so the soil is not stripped.

Keeping birds out of beds with seedlings. Chickens love tender seedlings and will dust-bathe in your mulch. Fence beds with low hardware cloth or netting, or keep birds in a run while crops are young. Let them in after harvest.

Ducks and slugs. Ducks are excellent slug and snail patrol, and they gobble many insects. They are wetter and messier than chickens and trample plants, so use them in the garden before planting or in fall, and keep them out of young crops.

Rabbits

Rabbit manure is among the most convenient fertilizers there is, small dry pellets that can go on the garden with little fuss. A hutch raised over a worm bin drops pellets into the bin, where red wigglers eat the manure and produce castings. Garden weeds, carrot tops, pea vines and other trimmings, plus lawn clippings, are good rabbit feed, when untreated, free of herbicide and not toxic. Check a trusted list of rabbit-safe greens, and avoid anything wilted or moldy.

Goats and sheep

Their pelleted manure is easy to handle and gentle on plants. Goats are brush-clearing champions and can reclaim an overgrown field edge, but they will climb, nibble and eat nearly anything in the garden. Keep both goats and sheep behind secure fencing and out of the vegetable beds, orchards (they strip bark) and berry patches. Use their bedding and manure in compost, and graze them on cover crops and cleanup areas after harvest if your fences allow.

Cows and horses

Their manure and soiled bedding are bulky and carbon-rich, excellent for building soil and bulk compost, but lower in nutrients per pound. Let it age 6 to 12 months or compost it. Watch for weed seeds from horse manure, and ask about hay and bedding sources. Keep large animals away from garden soil, as their weight compacts it.

Llamas and alpacas

These animals use communal dung piles, so collecting manure is simple and neat, and the pellets have little odor. It is often used directly on gardens, though composting remains smart for crops eaten raw.

Bees

Honeybees and native bees pollinate fruit, squash, berries and beans. Plant flowers in succession, provide shallow water, and avoid spraying when plants are in bloom. Check your local rules and talk to a local beekeeping club before getting hives.

The big table: what each animal gives, and what to use instead

Animal	What it gives the garden	How to use it	Safe timing and cautions	If you don't keep this animal: natural alternatives
Chickens	Strong nitrogen manure, bedding for compost, pest and weed patrol	Compost manure and litter; use a tractor for bed prep	Compost 3 to 6 months or more; follow 90 and 120 day rules; keep out of beds with seedlings	Composted poultry pellets, feather meal or blood meal, used per label
Ducks	Wet nitrogen manure, slug and snail control	Compost with plenty of browns; use for pre-planting cleanup	Keep out of young crops; compost before use	Composted poultry pellets, plus hand-picked slugs
Rabbits	Cold pelleted manure, bedding, a worm-bin partner	Apply to beds, mix into soil or compost; drop pellets into a worm bin	Widely used fresh on most beds; composting still recommended for crops eaten raw	Composted bagged manure, alfalfa meal or alfalfa pellets
Sheep and goats	Mild pelleted manure, brush clearing, bedding	Compost or age, then spread	Check hay and bedding for herbicide residue; keep animals out of beds and orchards	Aged manure from a local farm or stable (ask about herbicides), worm castings
Cows and horses	Bulky manure and soiled bedding for compost	Age 6 to 12 months or compost; use as mulch once aged	Horse manure can carry weed seeds; ask about hay and bedding; avoid fresh manure	Cover crops, leaf mold, grass clippings, finished bagged compost
Llamas and alpacas	Low-odor pellets from dung piles	Collect from piles; often used directly or composted	Compost for crops eaten raw; follow timing rules	Aged manure from a trusted source, worm castings
Bees	Pollination of fruit, squash and berries	Plant flowers and avoid spraying in bloom	Check local rules; watch for allergies	Native pollinator flowers and bee houses; hand-pollinate squash if needed
Fish	Mild nutrient-rich water	Dilute and water around plants	Freshwater only; no salt, copper or medications	Fish emulsion or hydrolysate, kelp and seaweed extracts
No animals at all	Nothing yet, and that is fine	Build fertility from plants and scraps	Wood ash only sparingly; test your soil	Cover crops, comfrey and nettle plant teas, leaf mold, grass clippings, wood ash used sparingly, coffee grounds in compost, eggshells for slow calcium

Where to find free or cheap inputs

- **Neighbors and friends** with horses, chickens, rabbits, goats or a compost pile.
- **Stables and farms** that are often glad to have manure hauled away. Ask about herbicides and bedding.
- **Feed stores**, which may sell bagged composted manure, alfalfa pellets and kelp meal, or know local farms that will share.
- **Municipal compost and leaf programs**, often free or low-cost to residents. Ask what is tested for and whether it is screened.
- **Fall leaf pickup**. Neighbors rake and bag leaves. Take them.

Barn and coop hygiene near food crops

Animals and gardens can share a yard if you take a few simple precautions.

- **Wash produce** thoroughly in clean water before eating, and peel root crops grown in amended soil when appropriate.
- **Wash hands** with soap after handling animals, manure, coops and soil, and before eating.

- **Keep animals out of beds** that have food growing, and out of the area where produce is washed.
- **Use compost heat.** A pile that holds at least 131 degrees F for several days and is turned so every part gets hot kills most pathogens, and 140 degrees F kills weed seeds. Home piles often run cooler, so check with a long compost thermometer.

Keeping animals too? Shop Hen Houses, Coops & Poultry Housing, Backyard Chicken Supplies and Goat Feed & Livestock.

SECTION 7

Protecting Your Harvest: Frost, Drought & Heat

Weather is the one partner in the garden you cannot negotiate with. You can, however, prepare for it.

Frost tolerance

Hardiness group	Examples	Approximate lowest temperature tolerated	Action
Tender	Tomatoes, peppers, basil, cucumbers, squash, beans, corn	Damaged near 32 degrees F	Cover at any frost forecast
Half-hardy	Potatoes, beets, chard, cauliflower, lettuce	About 28 to 32 degrees F	Cover on a hard-frost night
Hardy	Broccoli, cabbage, carrots, peas, spinach	About 24 to 28 degrees F	Cover below the mid-20s
Very hardy	Kale, collards, leeks, garlic, Brussels sprouts, mache	About 15 to 20 degrees F or lower	Mulch or tunnel in deep cold

Thresholds vary with variety, plant size and how long the cold lasts.

Forecast thresholds. Act when the forecast low is 36 degrees F or below for tender crops on a clear, calm night, since cold air pools near the ground and your yard may run colder than the official reading.

Covering. Cover at dusk, while the soil still holds the day's warmth, and uncover in the morning once the frost has melted so plants do not overheat. Use sheets, blankets, buckets or row cover, never plastic touching leaves.

Protection tools:

- **Floating row cover** adds roughly 2 to 4 degrees F with a light weight, 4 to 6 degrees with a medium weight and up to 8 degrees or more with a heavy weight.
- **Low tunnels** are hoops over a bed, wrapped in row cover or clear film.
- **Cold frames** are bottomless boxes with a clear lid, which extend the season by weeks. Vent on sunny days.
- **Hoop houses** are larger walk-in tunnels, adding several degrees and allowing winter greens.
- **Water-filled containers** (dark jugs placed among plants) soak up heat by day and release it by night.
- **Water the soil** before a frost. Moist soil holds more heat than dry.
- **Mulch** around plants, but keep it off the stems.
- **Microclimates:** a south wall, a slope with good air drainage or a spot near a pond can sit a few degrees warmer than the rest of the yard. Avoid low spots where cold air settles.

After an unexpected frost. Do not panic or prune right away. Wait a day or two to see what recovers, water gently, and cut away only clearly dead tissue. Replant quickly if a crop is lost; it is early enough most of the time.

Drought and heat

- **Water.** Vegetables typically want about 1 inch of water per week from rain and irrigation combined. Water deeply and infrequently, in the morning, at the base of the plants.
- **Mulch** 2 to 4 inches thick, keeping it off stems.
- **Drip and soaker lines** deliver water to roots with little waste.

- **Rain barrels.** A rough rule is about 600 gallons from each inch of rain on 1,000 square feet of roof. Check local rules on collection and use the water on soil, not edible leaves.
- **Ollas,** unglazed clay pots buried in the bed and filled with water, seep moisture slowly to nearby roots.
- **Wicking beds** have a water reservoir below the soil that draws up moisture.
- **Shade cloth** (30 to 50 percent) over lettuce, spinach and seedlings cools the bed in summer heat.
- **Drought-tolerant crops:** okra, sweet potatoes, cowpeas, peppers, tomatoes once established, and many herbs.
- **Hugelkultur,** burying logs and woody debris under a mound, is popular. Honestly, it can hold moisture and use up woody waste, but it can also tie up nitrogen at first, settle and dry out in a drought and make a home for voles. It works best as a modest, long-term project, not a miracle.

Wind, hail and flood

Stake tall crops, set up windbreaks of shrubs or fencing and fold row cover firmly. Hail cloth or netting over a bed helps in storm-prone areas. In wet seasons, raised beds and good drainage matter; move mulch back from stems and avoid working soggy ground.

Protection checklist

Season	Threat	Action	Check
Early spring	Late frost	Keep row cover handy; delay tender planting	Forecast nightly
Late spring	Wind, cold nights	Harden off; stake transplants	After storms
Summer	Heat and drought	Mulch, water deeply, shade cloth	Soil 2 inches down
Late summer	Storms and hail	Secure trellises; cover vulnerable beds	Before storm forecast
Early fall	First frost	Pick tender crops; cover the rest	Forecast nightly
Winter	Hard freeze	Mulch roots; vent cold frames	Weekly

SECTION 8

Pests, Weeds & Wildlife

The IPM ladder

Integrated pest management (IPM) means starting with the gentlest steps.

1. **Prevention:** healthy soil, crop rotation, proper spacing, resistant varieties.
2. **Barriers:** row cover, netting, fences, collars.
3. **Hand-picking:** a bucket of soapy water and a quick walk each morning.
4. **Beneficials:** ladybugs, lacewings, parasitic wasps, ground beetles, toads and birds.
5. **Targeted organic controls last,** used on the affected plants only.

Pest table

What you see	Usual culprits	Response	Prevention
Holes in leaves, green droppings	Caterpillars, hornworms, cabbage worms	Hand-pick; row cover on brassicas	Rotate; cover early
Sticky curled leaves, clusters of insects	Aphids	Blast with water; encourage ladybugs	Avoid heavy nitrogen
Ragged holes, slime trails	Slugs and snails	Hand-pick at dusk; let ducks help	Water in the morning; clear debris
Wilting vine, sawdust-like frass at the base	Squash vine borer	Slit and remove larva; mound soil on vine	Row cover until flowering
Tiny holes in leaves, seedlings struggling	Flea beetles	Row cover; keep soil moist	Delay planting; trap crop
Yellow-striped beetles on cucurbits	Cucumber beetles	Hand-pick; cover early	Rotate; use resistant varieties

Wildlife

- **Deer:** a fence 8 feet tall is the reliable answer. Lower fences work only against light pressure; double fences or angled outriggers help.
- **Rabbits:** a 2-foot fence of small-mesh hardware cloth, buried a few inches deep.
- **Groundhogs:** a 3-foot fence with the bottom buried 10 to 12 inches and the top left floppy, or a bent-out apron.
- **Birds:** netting over berries and fruit trees; reflective tape is a short-term deterrent.
- **Voies:** keep mulch back from tree trunks, use hardware cloth cylinders around young trees, and mow close around the orchard.

Habitat, rotation and disease

Welcome beneficial insects with flowers, a shallow water dish and undisturbed corners. **Crop rotation** means moving each plant family to a new bed every year (nightshades, brassicas, legumes, cucurbits, roots), ideally a three-to-four-year cycle, which breaks pest and disease cycles. For disease: space plants, water at the base, remove infected leaves, clean tools and never compost badly

diseased material.

Weeds

Mulch is first. Hoe small weeds on a dry day. Smother large areas with cardboard and mulch. Pull weeds before they set seed.

Chickens and ducks as pest patrol

Birds eat beetles, grubs, slugs and weed seeds. Use them before planting and after harvest. Keep them away from seedlings and ripening fruit near the ground.

Food-safe homemade sprays

A simple soap spray (a teaspoon or two of mild liquid soap per quart of water) can knock back aphids and mites. Test on a few leaves first, spray in the evening, and never on plants in heat or full sun. Even natural sprays can harm beneficial insects and bees; use sparingly and read labels on any purchased product.

SECTION 9

Harvest, Storage & Putting Food By

Harvest timing

Pick often. Beans, zucchini and cucumbers produce more when picked young. Tomatoes ripen best off the vine in a warm room when they are just starting to blush. Harvest in the cool of the morning, and wash and chill leafy crops quickly.

Curing

- **Onions and garlic:** pull when tops fall over, dry in an airy shade for 2 to 3 weeks.
- **Winter squash:** leave stems attached; cure at about 80 degrees F for 10 days.
- **Sweet potatoes:** cure warm (80 to 85 degrees F) and humid for about a week.
- **Potatoes:** let skins toughen a couple of weeks in the dark.

Root cellar and cool storage

Aim for 32 to 40 degrees F and high humidity (85 to 95 percent) for roots and cabbage, and 50 to 60 degrees F and dry air for squash. Garlic and onions like cool, dry and dark. Use a basement corner, unheated garage or insulated cooler. Keep apples away from potatoes.

Crop	Storage method	Approximate shelf life	Notes
Potatoes	Cool, dark, humid	4 to 8 months	Do not wash before storing
Sweet potatoes	Warm, dry, after curing	4 to 6 months	Not the refrigerator
Winter squash	Cool, dry	3 to 6 months	Check often
Onions	Cool, dry, airy	3 to 8 months	Choose storage types
Garlic	Cool, dry	6 to 9 months	Hang or braid
Carrots and beets	Cold and humid in sand or sawdust	3 to 5 months	Remove tops
Cabbage	Cold and humid	2 to 4 months	Wrap loosely
Apples	Cold and humid	2 to 6 months, varies with type	Late varieties keep longest

Preserving

- **Freezing:** blanch most vegetables briefly, cool, dry and pack in freezer bags.
- **Drying:** herbs, tomatoes, apples and beans dry well on screens or in a dehydrator.
- **Fermenting:** sauerkraut and pickles keep cabbage and cucumbers through winter.
- **Canning:** always follow current tested USDA or Extension recipes and processing times, and use a pressure canner for low-acid foods. Never invent or adjust canning times, jar sizes or ingredients. Your local Extension office can supply current instructions.

SECTION 10

Raising Young Gardeners

A child who grows a carrot will eat a carrot. More than that, a child who plants, waters and waits learns patience, responsibility and where food comes from.

Age-appropriate jobs

Age	Good jobs	Tools	Notes
About 2 to 4	Watering, planting big seeds, digging, picking cherry tomatoes	Small watering can, scoop	Keep jobs short and fun
About 5 to 8	Sowing rows, mulching, collecting eggs, picking beans	Kid-sized trowel, rake, gloves	Give them their own bed
About 9 to 12	Transplanting, weeding, composting, keeping a journal	Hand tools, pruners with supervision	Add real responsibility
Teens	Planning beds, irrigation, preserving, selling at a stand	Full tools, wheelbarrow	Let them lead a crop

Projects and experiments

1. **Sunflower house:** sow giant sunflowers in a square or circle for a leafy hideout.
2. **Bean tipi:** pole beans climbing a ring of poles.
3. **Three sisters planting:** corn, beans and squash grown together, a method developed by Native American peoples; tell its story with respect and credit.
4. **Pizza or salsa garden:** tomatoes, peppers, basil and onions in one bed.
5. **Rainbow carrots:** sow several colors and compare.
6. **Soil-jar test:** shake soil and water in a jar and watch sand, silt and clay settle.
7. **Red-cabbage pH test:** juice from boiled red cabbage changes color with acids and bases.
8. **Germination race:** sprout different seeds in damp paper towels.
9. **Worm bin:** watch red wigglers turn scraps into castings.
10. **Butterfly or pollinator patch:** count visitors.
11. **Weather and garden journal:** record temperature, rain and growth.
12. **Plant a row for the food pantry:** share extra food with neighbors in need.
13. **Farm-stand business:** price, pick, sell and count the money.

What the garden teaches

Math in measuring and spacing, science in soil, seeds and insects, reading in seed catalogs and labels, and history in heirloom varieties and family recipes. Cook what you grow, and let children help shell, wash, stir and can under supervision.

Safety and hygiene

- **Tools:** teach safe carrying and storing; choose tools sized for small hands.
- **Sun:** hats, sunscreen, shade and water breaks.

- **Ticks:** Lyme disease is a real concern in Pennsylvania. Check everyone, including children and pets, after time in tall grass, brush and woods, and talk to your doctor about any rash or fever.
- **Hands and animals:** wash hands with soap after soil, manure or animal contact and before eating.

Picky eaters, programs and the cold months

Kids often try what they grew. Offer a taste without pressure. Look into 4-H and Extension youth programs, which generally offer gardening, animal and food projects; check your local offering. In fall and winter, keep interest alive with seed catalogs, sprouts on the windowsill, a cold frame, and a seed-sorting evening.

SECTION 11

Common Challenges & Solutions

Blossom end rot

What you see: dark, sunken, leathery patches on the bottom of tomatoes, peppers or squash. **Why it happens:** uneven watering that limits calcium uptake, not usually a lack of calcium in the soil. **What to do:** water evenly, mulch, avoid heavy nitrogen and pick off affected fruit. **When to ask for help:** if it persists, send a soil test through your Extension office.

Powdery mildew

What you see: white powder on leaves of squash, cucumbers and melons. **Why it happens:** humid, crowded plantings with dry roots. **What to do:** space plants, water at the base and remove badly affected leaves. **When to ask for help:** if it appears early and spreads quickly, ask a Master Gardener about resistant varieties.

Blight

What you see: brown spots with yellow rings, then rapidly collapsing tomato or potato foliage. **Why it happens:** fungal-like organisms thriving in warm, wet weather. **What to do:** remove infected leaves, mulch to prevent soil splash, rotate crops and discard (do not compost) badly infected plants. **When to ask for help:** immediately if late blight is suspected, since it spreads widely; contact your Extension office.

Bolting

What you see: lettuce, spinach or cilantro shooting up a tall stem and turning bitter. **Why it happens:** heat and long days. **What to do:** shade, sow earlier or later and choose slow-bolting varieties. **When to ask for help:** rarely needed.

Poor germination

What you see: sparse or no seedlings. **Why it happens:** old seed, cold or hot soil, dryness, or crusting. **What to do:** test seed, check soil temperature and keep the bed moist. **When to ask for help:** if seed from several sources fails, check your soil and compost.

Leggy seedlings

What you see: tall, pale, floppy seedlings. **Why it happens:** too little light or too much warmth. **What to do:** lower the light to 2 to 4 inches, cool the room and add a gentle fan. **When to ask for help:** not usually.

Tomato hornworm

What you see: large green caterpillars, stripped leaves. **Why it happens:** adult moths lay eggs on tomato plants. **What to do:** hand-pick; leave any caterpillar covered in small white cocoons, as wasps are controlling it. **When to ask for help:** rarely.

Squash vine borer

What you see: sudden wilting of a vine, with a hole and sawdust-like frass near the base. **Why it happens:** a moth larva tunneling inside the stem. **What to do:** slit the stem, remove the larva and bury the wound in moist soil; use row cover early. **When to ask for help:** ask for local timing for your area.

Slugs

What you see: ragged holes, shiny trails. **Why it happens:** damp, shady conditions. **What to do:** hand-pick, clear debris, water in the morning. **When to ask for help:** if damage is severe, ask your Extension office about control options.

Damping off

What you see: seedlings collapsing at the soil line. **Why it happens:** fungal organisms in cool, soggy conditions. **What to do:** use sterile mix, bottom water, add airflow and avoid overwatering. **When to ask for help:** if it repeats, replace the mix and clean trays.

Herbicide-damaged plants

What you see: cupped, twisted leaves and stunted growth on tomatoes, beans or peas. **Why it happens:** persistent herbicide in manure, hay or compost. **What to do:** stop using that source, run a bean or pea bioassay and replace affected soil if needed. **When to ask for help:** contact your Extension office promptly.

Nutrient burn

What you see: brown, crispy leaf edges. **Why it happens:** too much fresh manure or fertilizer. **What to do:** water deeply and stop feeding. **When to ask for help:** if the plant continues to decline, test the soil.

Crop failure from a late frost

What you see: blackened, limp leaves after a cold night. **Why it happens:** tender plants exposed below freezing. **What to do:** wait a few days, trim dead tissue and replant if needed. **When to ask for help:** ask local gardeners about safe planting dates.

SECTION 12

FAQ

When should I plant my vegetable garden?

It depends on your last spring frost date and the crop. Cool-season crops like peas, spinach and lettuce go in several weeks before the last frost, while tender crops like tomatoes, beans and squash wait until a week or two after it. In Lancaster County that means cool crops from March into April and tender ones from early to mid May, but your local Extension office can give your own dates.

How big should a family vegetable garden be?

It varies. A rough range is 100 to 200 square feet per person for fresh eating, 400 to 700 square feet per person if you want to preserve a good amount, and far more for staple crops. Start with a few beds you can keep up with, keep notes and expand into what your family actually eats.

Can I use rabbit manure directly on my garden?

Rabbit manure is a cold manure, so it is widely used fresh on most beds without burning plants. Composting it is still recommended for crops eaten raw, and food-safety timing still applies: apply raw manure at least 90 days before harvest where the edible part stays off the soil and at least 120 days where it touches. Never use it if the rabbits ate hay or feed treated with persistent herbicides.

Is sheep manure as good as cow or horse manure?

Sheep manure is generally comparable to or somewhat richer than aged cow or horse manure, and gentler than poultry. The pellets are easy to handle and break down slowly. Nutrient levels vary with feed and bedding, and the same safety timing and herbicide cautions apply.

How do I protect plants from a late frost?

Watch the forecast, water the soil, and cover plants at dusk with row cover, sheets or buckets, removing the covers in the morning once the frost has melted. Low tunnels, cold frames and jugs of water add more protection. If frost does hit, wait a day or two before cutting back, and replant if you must.

How long should manure age before using it in a vegetable garden?

Cow and horse manure should age about 6 to 12 months, and poultry manure needs 3 to 6 months of composting or more. Raw manure applied directly should go on at least 90 days before harvest for crops whose edible part does not touch the soil and 120 days for crops that do. Proper hot composting is the safer route.

Can I use aquarium water on my plants?

Yes, if it comes from a freshwater tank with no salt, no copper and no medications. It makes a mild fertilizer, best diluted for seedlings or very dirty tanks and applied to the soil rather than leaves. Do not use marine or medicated tank water.

How can kids help in the garden?

Kids can do real work at every age, from watering and planting big seeds at about 2 to 4, to sowing, mulching and egg-collecting at 5 to 8, to journaling and transplanting at 9 to 12, and running their own crop as teens. Give them their own bed, a few safe tools, and projects like a sunflower house, and do tick checks and hand-washing afterward.

What can I use for fertilizer if I don't have livestock?

Plenty. Use compost, leaf mold, cover crops, comfrey and nettle plant teas, grass clippings, worm castings and finished bagged compost. You can buy composted poultry pellets, alfalfa meal, fish emulsion and kelp. Use wood ash sparingly and test your soil first.

How do I keep deer and rabbits out of my garden?

For deer, a fence about 8 feet tall is the reliable answer. For rabbits, use a 2-foot fence of small-mesh hardware cloth with the bottom buried a few inches. Row cover protects young plants while the fence goes up.

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SECTION 13

Every Purchase Gives Back

Before we earn a dime, **10% of every purchase at Walnut Creek Supply goes to no-kill animal shelters across the country.** Not at checkout, not as an option, but off the top of every order. A garden, a flock and a family are all part of a bigger community, and we believe caring for the land, the animals and the neighbors is one commitment.

We are a family business in Christiana, Lancaster County, Pennsylvania. We grow our own food, tend an orchard and keep animals, and we stock goods we would use ourselves, with **no mystery ingredients** and nothing we would not put on our own table. Questions about your soil, your seeds or your first bed? Call us at (717) 983-8069 or visit walnutcreeksupply.com.

Here is to full baskets, muddy boots and kids who know where supper comes from.

With gratitude from our family to yours, **Walnut Creek Supply**, Christiana, Lancaster County, Pennsylvania