UC Master Gardener
University of California
Agriculture & Natural Resources

Composting 101: Turn Green Waste into Gold

Compost is organic matter – plant trimmings, food scraps, leaves – recycled through biological decomposition into a rich soil amendment. It is the single most powerful thing a home gardener can do for their soil, and most of the raw material is generated right in your own home and yard.

California's SB 1383 mandates diverting organic waste from landfills – composting at home is one of the most direct and impactful ways to comply.

Compost vs. Mulch vs. Fertilizer – What's the Difference?

- **Compost** – a soil amendment mixed into the existing soil. It improves soil structure, water-holding capacity, and microbial activity, and slowly releases nutrients. Compost feeds the soil; the soil then feeds your plants.
- **Mulch** – any organic material placed on the surface of the soil as a layer. It stays on top – it is not mixed in. Benefits: conserves moisture, suppresses weeds, and gradually improves soil as it breaks down. Use leaves, wood chips, straw, shredded paper, or grass clippings.
- **Fertilizer** – provides a specific, targeted dose of nutrients (nitrogen, phosphorus, potassium) directly to the plant. Unlike compost, fertilizer does not improve soil structure. Use a general purpose (10-10-10) fertilizer; high nitrogen will increase leafy growth at the expense of fruit.

Why Make Compost?

- Reduces organic waste going to the landfill – supporting California's SB 1383 diversion goals.
- Improves soil structure, water-holding capacity, and texture.
- Feeds beneficial soil organisms – worms, bacteria, fungi – that make nutrients available to plants.
- Decreases dependence on chemical fertilizers, saving you money.
- Builds drought-resilient soil that holds moisture longer between waterings.

What is Your Compost Style?

Before choosing a method, consider these factors:

- How much **time and effort** do you want to invest? (Passive methods take longer; active methods take more work but finish faster.)
- What will you compost, and **how much** organic material do you generate?
- How much **space** do you have?
- Are there any **physical or mobility** considerations?
- Are you willing to invest in **basic equipment** (a bin, barrel, or thermometer)?

Types of Materials – Browns and Greens

Every compost system needs a balance of two types of material:

- **Carbon-rich "Browns"** – dry leaves, shredded cardboard, paper, straw (not hay), eggshells, sawdust (untreated), wood chips, corn stalks, bark, and hair. Browns add structure and prevent the pile from becoming a soggy, smelly mass.

- **Nitrogen-rich "Greens"** – fruit and vegetable scraps, grass clippings, fresh plant trimmings, coffee grounds, tea bags, green leaves, and animal manures (chicken, rabbit, horse, or cow – but not dogs or cats).
- **Ideal ratio:** 3 parts brown to 1 part green (by volume). Balance is more important than precision – if the pile smells, add more brown; if it won't heat up, add more green.
- **Do NOT** add: meat, fish, dairy, oils, grease, pet waste, diseased plants, weeds that have gone to seed, invasive plants, glossy paper, or sawdust from treated lumber.

Basic Composting Procedure

- **Chop –** smaller pieces decompose much faster. Aim for ½ to 1½ inches for browns; greens can be larger. Use pruning shears, a sharp shovel, or a chipper/shredder.
- **Layer –** start with a brown layer (8–10 inches), then alternate with green layers (about 4 inches). Always start and end with brown.
- **Water –** each layer should be about 50% moisture. Test by squeezing a handful – it should hold together and release just a drop or two of water. Too dry = won't decompose. Too wet = smells bad.
- **Turn –** turning aerates the pile and is the single most important step for speeding up decomposition. Turn the outside to the inside with a pitchfork.
- **Monitor temperature –** a compost thermometer is very helpful. The ideal range is 100–150°F. Above 160°F, bacteria die and decomposition stops – turn immediately. Below 100°F, add greens or water.
- **Sift –** screen finished compost to remove any large remaining pieces (optional, but produces a finer product). Return unfinished pieces to the active pile.

The Four Composting Methods

1. **Pit Composting** – the simplest method; ideal when space or time is limited.
   - Dig a hole about 12 inches deep (depth discourages pests).
   - Add kitchen scraps and cover completely with soil.
   - Place pits throughout the garden bed – this directly renews the soil where it is needed.
   - Decomposition takes up to 3 months depending on soil temperature.
   - Not practical for large quantities of organic material.

2. **Pile / Bin Composting** – the most common and versatile method; can be done in an open pile, wire enclosure, wooden bin, or commercial plastic bin.
   - Standard size: 3' x 3' x 3' – the minimum needed to generate sufficient heat for decomposition.
   - Bottomless bins with a lid hold heat better and deter animals. Barrel composters are easy to turn.
   - Bury food scraps 6 to 12 inches into the center of the pile to deter flies and rodents.
   - Speed options – choose based on your schedule:
     - Slow method: add continuously, little chopping, turn and water as desired – finished in 12 to 18 months.
     - Intermediate method: build pile all at once, chop materials to about 2 inches, turn weekly – finished in 3 to 8 months.

- Fast method: chop to ½ to 1½ inches, monitor temperature closely, turn when pile reaches 140°F to 150°F – finished in 6 to 8 weeks.

3. **Sheet Composting (Lasagna Composting)** – excellent for converting a lawn or bare area into a garden bed without digging.
   - Cut down plants and weeds; leave the clippings in place. Water the area well.
   - Cover the entire area with overlapping layers of cardboard or thick newspaper – the goal is to block all light to the existing vegetation.
   - Water well again.
   - Add 3 to 4 inches of weed-free mulch (wood chips, dry leaves, or straw – not hay). Water again.
   - Let it "cook" for 4 to 6 months or longer. Earthworms will do the work of mixing and breaking down the layers.

4. **Worm Bins (Vermicomposting)** – small, fast, and perfect for apartments, patios, or indoor use.
   - Use red wigglers (*Eisenia fetida*) – not regular garden earthworms. They live in confined spaces and process half their body weight in organic material per day.
   - Use a large plastic bin with a lid; keep in a cool, dry place away from predators.
   - Feed equal portions of greens and browns; keep moist but not wet.
   - Worms are quiet, essentially odorless, and low maintenance.
   - The finished product (worm castings) is one of the richest soil amendments available.

Troubleshooting

- **Pile not composting:** too wet, too dry, or too much brown. Solution – add greens or water to activate.
- **Pile smells rotten:** too wet or too much green material. Solution – add browns and turn thoroughly to add oxygen.
- **Pile attracting flies:** food scraps exposed on the surface. Solution – bury scraps 6 to 12 inches into the center; remove any meat, dairy, or grease.
- **Pile has rodents:** food scraps exposed, or bin holes larger than ½ inch. Solution – bury scraps, turn pile, use a rodent-proof bin with a solid bottom and fine mesh.
- **Pile won't heat up:** too small, too dry, or not enough nitrogen (greens). Solution – add more greens, water, and make sure the pile is at least 3' x 3' x 3'.

Finished Compost – How to Know It's Ready

- **Texture:** crumbly and smooth, without recognizable scraps.
- **Smell:** like a forest on a rainy day – rich, earthy. Traces of ammonia or sour odors mean it is not ready – let it cure longer.
- **Color:** dark brown to black and rich-looking.
- **Size:** approximately one-third of the original volume of your pile.
- **Temperature:** within 10°F of the outside air temperature, even in the center of the pile.

Using Your Compost

- **Amending Garden Beds:** spread a 2 to 3 inch layer of compost over the planting area and mix into the top 6–8 inches of soil. In heavy clay, add 3 to 4 inches and incorporate deeply. Water during mixing to keep the soil moist throughout.

- **Side Dressing:** apply a ring of compost around the base of growing plants during the season to provide a slow, steady nutrient boost.
- **Top Dressing:** spread a thin layer over an empty bed and let rain wash nutrients down to the roots – good for established plantings.
- **Container and Indoor Plants:** mix compost with potting soil to enrich it; typically, 20% to 25% compost by volume.
- **Seed Starting:** use as a component in seed-starting mixes for added nutrition.
- **Tree Planting:** add compost to the planting hole to improve soil conditions around new root growth.
- **Compost Tea:** soak finished compost in water for 24 to 48 hours, strain, and apply as a liquid fertilizer to soil or as a foliar spray.

Mulch – The Finishing Layer

- After amending with compost, top with 3 to 4 inches of organic mulch – wood chips, leaves, straw, grass clippings, or shredded paper.
- Keep mulch away from plant stems and tree trunks to prevent rot and pathogen exchange. Leave a 2 to 3 inch gap.
- Benefits: conserves moisture, suppresses weeds, regulates soil temperature, feeds soil organisms, and improves soil as it slowly breaks down.
- Compost is all you need. If you take care of the soil, the plants will take care of themselves.

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