Composting 101

written by Willi Evans

The Compost Equation
Nature creates compost all the time without human intervention. But gardeners can step in and speed up the composting process by creating the optimal conditions for decomposition:
Air + Water + Carbon + Nitrogen = Compost

Air. Like most living things, the bacteria that decompose organic matter, and the other creatures that make up the compost ecosystem, need air. Compost scientists say compost piles need porosity—the ability for air to move into the pile. I like to think of porosity in terms of fluffiness. A fluffy pile has plenty of spaces—or pores—for air to move about. A flat, matted pile of, say, grass clippings does not. Even fluffy piles compress during the composting process. Occasionally turning your pile refluffs the material, moves new material into the center, and helps improve air flow into the pile, says Craig Cogger, PhD., extension soil scientist at Washington State University.

Water. Compost microbes also need the right amount of water. Too much moisture reduces airflow, causes temperatures to fall, and can make the pile smell; too little water slows decomposition and prevents the pile from heating. Conventional wisdom says that compost should feel like a wrung-out sponge, says Abigail Maynard, Ph.D., agricultural scientist at the Connecticut Agriculture Experiment Station.

Carbon ingredients. The microbes that break down organic matter use carbon as an energy source. Ingredients with a high percentage of carbon are usually dry and brown or yellow in color. The most common high-carbon ingredients are leaves, straw, and corn stalks. Sometimes people call these ingredients browns.

Nitrogen ingredients. Microbes need nitrogen for the proteins that build their tiny bodies. Ingredients high in nitrogen are generally green, moist plant matter, such as leaves, or an animal by-product, such as manure. These ingredients are called greens, but in reality they can be green, brown, and all colors in between.

C/N ratio. In order for a compost pile to decompose efficiently, you need to create the right ratio of carbon (C) to nitrogen (N) (C/N). Piles with too much nitrogen tend to smell, because the excess nitrogen converts into an ammonia gas. Carbon-rich piles break down slowly because there's not enough nitrogen for the microbe population to expand. An ideal compost pile should have a 30:1 C/N ratio. Grass clippings alone have about a 20:1 C/N ratio. Adding one part grass clippings, or other green, to two parts dead leaves, or other brown, will give you the right mix.

Building a Compost Pile
There are two main ways to make compost: cold compost (minimum effort) and hot compost (maximum effort).

Cold Black Gold
Nearly every expert I talked with admitted (sometimes sheepishly) that they do this type of composting in their own backyards because it's easy. Here's how to make cold compost:
Mix together yard wastes, such as grass clippings, leaves, and weeds, place them in a pile, and wait 6 to 24 months for the microorganisms, earthworms, and insects to break down the material. Add new materials to the top of the pile. You can reduce the waiting period by occasionally turning the pile and monitoring and adjusting the pile's moisture level. The compost will be ready when the original ingredients are unrecognizable. Generally, compost on the bottom of the pile "finishes" first. You may not want to include woody material, because it breaks down too slowly.

Pros: Takes little effort to build and maintain; can be built over time.
Cons: Takes up to two years to produce finished compost; doesn't kill pathogens and weed seeds; undecomposed pieces may need to be screened out.

Some Like It Hot
Hot, or fast, composting takes more work and the right combination of ingredients, but you can get high-quality compost in under two months. Here's how:
Wait until you have enough material to create compost critical mass (27 cubic feet), which is the minimum volume for a pile to hold heat. Then mix one part green matter with two parts brown matter. Bury any vegetative food scraps in the center to avoid attracting animals. Check to make sure the mixture has the ideal moisture level. Continue adding mixed greens and browns and checking the moisture until you've built a pile that is 3 feet x 3 feet x 3 feet, or 5 feet wide at the base and 3 feet wide at the top. The microorganisms will immediately start decomposing, and their bodies will release heat. The pile will insulate the heat, and the temperature of the pile's interior will reach 120 to 150 degrees F. Turn the pile weekly and regulate moisture levels. After about a month, the hot phase will be done, and the pile will finish decomposing at temperatures between 80 degrees F and 110 degrees F. The compost will be ready to use when it no longer heats and all of the original ingredients are unrecognizable.

Pros: Produces high-quality compost within 2 months (and sometimes as soon as a few weeks); can kill weed seeds and pathogens. (Organic Gardening does not recommend adding weed seeds or manures that contain human pathogens to compost—hot or cold—because uniform heating is difficult to achieve in home compost piles.)
Cons: Time-consuming; requires careful management of moisture, air, and C/N ratio.

Composting

Mix different organic material together & let it decompose.

Microorganisms, also called decomposers, do the hard work of making the compost pile and they need carbon for energy and nitrogen for growth.

Carbon materials (the browns) are yellow, brown, dry coarse, bulky.
They are plant materials: straw, cornstalks, sawdust, leaves.

Nitrogen materials (the greens) are green, succulent, gooey, dense. Also called the activators.
Animal by-products, manure, grass, weeds, garbage, rich soil, dried blood.

A compost pile decomposes well when the carbon to nitrogen ration is at least 20:1.

Manure mixed with bedding has good Carbon/Nitrogen Ratio.

Aid in decomposing:
Air: by turning or pipes in pile
Moisture: wet as a wrung-out sponge; if too wet add newspaper or leaves

Build in piles, bins either wire or wooden, on the garden bed.

Decomposes in 6-12 months.

Easy compost pile:
Brush on bottom
Put in 5' PVC pipe for air
6" leaves (& 2" of grass clippings if you have them)
2" of kitchen scraps & coffee grounds
weeds & plants with soil
3" of manure.

Repeat until all materials are used, up to 5' tall

Cover up with tarp.

Other ingredients:
Wood ashes (helps neutralize pine needles)
Pet & human hair
Newspaper
Twigs & wood chips (break down slowly)
Hay.