

Montgomery County Department of Environment web site on composting

<http://www.montgomerycountymd.gov/deptmpl.asp?url=/content/dep/Composting/home.asp>

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Get them at the following location:

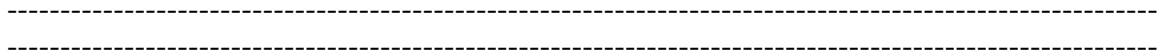
Please call or email ahead to the site of your choice to confirm availability and hours of operation.

Bethesda: [Bethesda-Chevy Chase Services Center](#)

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4805 Edgemoor Lane, Bethesda

240-777-8200, 240-777-8212 (TDD)



Composting is a simple, natural process. There is no need to purchase special activators or fertilizers to make the materials in your composter break down. Compost just happens!

Here are some basic strategies for making compost "happen" for you:

Slow and Easy Composting

1. Build your compost pile anytime of year.
2. Create a simple, freestanding pile no more than 5 feet high (preferably 3 feet long on each side), or build or buy an inexpensive bin to keep your pile tidy.
3. Locate on level, well-drained ground in either sun or shade -- stay away from wooden fences and buildings, and avoid placing on your neighbor's property line. Don't set up over shallow tree roots.
4. Build a six inch base of branches, twigs or brush for drainage and aeration (old wooden pallets work extremely well).

5. Use leaves by themselves -- or mix in grass and other "green" garden trimmings for quicker compost. When adding new materials to an existing pile, be sure to mix them in thoroughly -- especially green materials like grass. Don't create layers.
6. Don't build your pile with grass alone -- mix in dry leaves, straw or wood chips to avoid odors.
7. Moisten materials as you add them and leave a concave depression at the top of the pile to capture rainwater.
8. Keep materials moist throughout the year -- but not wet. It is often best not to cover your pile to let water in. A dry pile will not compost.
9. Never add meat, bones, fat, oils, dairy products or processed foods to avoid odors and pests. Never add diseased plants, weeds with seeds, or cat or dog wastes.
10. Try to turn, fluff, or aerate on occasion -- whether every week, every month or just once or twice a year.
11. Wait a while (6-12 months) and get ready to use your compost as a top-dressing for your lawn, a mulch for trees and shrubs, or a side-dressing for annuals, herbs, and vegetables.
12. Compost is ready to use when it is dark brown-black, crumbly, and sweet-smelling. Enjoy!

Vintage Composting (Even Easier Composting)

1. Use two bins: one bin for each alternate year (e.g. 1996, 1997).
2. Add compostable materials only to one bin in the first year (1996).
3. In the following year, leave the first bin alone and only add materials to the second bin. As the yard trimmings in the first bin decompose, the amount of materials in the bin will appear to shrink. Resist the temptation to "top off" the 1996 bin.
4. With the next year (1998), harvest compost from 1996 bin and start filling with 1998 materials. Do not top off 1997 bin.
5. Keep alternating, year after year, going from one bin to another with each year. Never add fresh materials to last year's bin.
6. Materials in a vintage bin system will compost for at least 12-24 months; enough time to produce excellent mulch with almost no maintenance.
7. To ensure high quality compost, use some of the basic steps (watering, turning) from the Slow and Easy method.

Active Composting (Fast, "Hot" Compost)

1. Use a two- or three-bin system.
2. Try to obtain a mixture of two parts (by volume) high nitrogen materials like grass and fresh-pulled weeds and one-part high-carbon materials like dried leaves and woodchips.
3. Try to shred leaves (use lawnmower or mechanical shredder) and, especially, woody materials. Keep particle sizes small.
4. Mix materials thoroughly together.
5. Follow basic instructions for Slow and Easy method.
6. Keep moisture level at 50% (consistency of a wrung-out sponge).
7. Turn or "aerate" pile by moving materials from bin to bin (back and forth for 2-bin system, serially for 3-bin system) every 2-4 weeks.
8. Compost should be ready in 6-12 weeks.

Common Myths:

Additives and Boactivators: **YOU DO NOT NEED THESE.**

Lime: **YOU DO NOT NEED TO ADD LIME.**

RATS and insect pests like compost piles: If you have a concern about rats do not add vegetable food waste; OR make sure it is buried into the pile (about 1 foot deep and from the edge).

Oak leaves are not good compost material. Not true. Hickory and walnut leaves are known to impede the growth of tomatoes. Waxy leaves (e.g., magnolia and rhododendron just take longer to compost).

When is compost done?

Compost is done and ready to use when it is dark brown-black, crumbly, and sweet-smelling. The only large pieces remaining may be sticks, stones, and slower composting leaves; the consistency is like loamy rich topsoil. **HOWEVER**, it should be set aside for about a month to ensure that it is "stable;" that is still not composting as it may "rob" nutrients from the soil and may damage fresh plantings.

Compost can be sifted to remove sticks, etc. or these can be left in depending on the intended use of the compost.

Compost Chemistry

C/N Ratio

Of the many elements required for microbial decomposition, carbon and nitrogen are the most important. Carbon provides both an energy source and the basic building block making up about 50 percent of the mass of microbial cells. Nitrogen is a crucial component of the proteins, nucleic acids, amino acids, enzymes and co-enzymes necessary for cell growth and function.

To provide optimal amounts of these two crucial elements, you can use the carbon-to-nitrogen (C/N) ratio for each of your compost ingredients. The ideal C/N ratio for composting is generally considered to be around 30:1, or 30 parts carbon for each part nitrogen by weight. Why 30:1? At lower ratios, nitrogen will be supplied in excess and will be lost as ammonia gas, causing undesirable odors. Higher ratios mean that there is not sufficient nitrogen for optimal growth of the microbial populations, so the compost will remain relatively cool and degradation will proceed at a slow rate.

Typical C/N ratios for common compost materials can be looked up in published tables such as [Appendix A, On-Farm Composting Handbook](#). In general, materials that are green and moist tend to be high in nitrogen, and those that are brown and dry are high in carbon. High nitrogen materials include grass clippings, plant cuttings, and fruit and vegetable scraps. Brown or woody materials such as autumn leaves, wood chips, sawdust, and shredded paper are high in carbon. You can [calculate](#) the C/N ratio of your compost mixture, or you can estimate optimal conditions simply by using a combination of materials that are high in carbon and others that are high in nitrogen.

Materials High in Carbon	C/N*
autumn leaves	30-80:1
straw	40-100:1
wood chips or sawdust	100-500:1
bark	100-130:1
mixed paper	150-200:1
newspaper or corrugated cardboard	560:1
Materials High in Nitrogen	C:N*
vegetable scraps	15-20:1
coffee grounds	20:1
grass clippings	15-25:1
manure	5-25:1

* Source: Dickson, N., T. Richard, and R. Kozłowski. 1991. *Composting to Reduce the Waste Stream: A Guide to Small Scale Food and Yard Waste Composting*. Available from the Northeast Regional Agricultural Engineering Service, Cornell University, 152 Riley-Robb Hall, Ithaca, NY 14853; 607-255-7654.

As composting proceeds, the C/N ratio gradually decreases from 30:1 to 10-15:1 for the finished product. This occurs because each time that organic compounds are consumed by microorganisms, two-thirds of the carbon is given off as carbon dioxide. The remaining third is incorporated along with nitrogen into microbial cells, then later released for further use once those cells die.

Although attaining a C/N ratio of roughly 30:1 is a useful goal in planning composting operations, this ratio may need to be adjusted according to the bioavailability of the materials in question. Most of the nitrogen in compostable materials is readily available. Some of the carbon, however, may be bound up in compounds that are highly resistant to biological degradation. Newspaper, for example, is slower than other types of paper to break down because it is made up of cellulose fibers sheathed in lignin, a highly resistant compound found in wood. Corn stalks and straw are similarly slow to break down because they are made up of a resistant form of cellulose. Although all of these materials can still be composted, their relatively slow rates of decomposition mean that not all of their carbon will be readily available to microorganisms, so a higher initial C/N ratio can be planned. Particle size also is a relevant consideration; although the same amount of carbon is contained in comparable masses of wood chips and sawdust, the larger surface area in the sawdust makes its carbon more readily available for microbial use.

Oxygen

Another essential ingredient for successful composting is oxygen. As microorganisms oxidize carbon for energy, oxygen is used up and carbon dioxide is produced. Without sufficient oxygen, the process will become anaerobic and produce undesirable odors, including the rotten-egg smell of hydrogen sulfide gas.

So, how much oxygen is sufficient to maintain aerobic conditions? Although the atmosphere is 21% oxygen, aerobic microbes can survive at concentrations as low as 5%. Oxygen concentrations greater than 10% are considered optimal for maintaining aerobic composting. Some compost systems are able to maintain adequate oxygen passively, through natural diffusion and convection. Other systems require active aeration, provided by blowers or through turning or mixing the compost ingredients.

Nutrient Balance

Adequate phosphorus, potassium, and trace minerals (calcium, iron, boron, copper, etc.) are essential to microbial metabolism. Normally these nutrients are not limiting because they are present in ample concentration in the compost source materials.

pH

A pH between 5.5 and 8.5 is optimal for compost microorganisms. As bacteria and fungi digest organic matter, they release organic acids. In the early stages of composting, these acids often accumulate. The resulting drop in pH encourages the growth of fungi and the breakdown of lignin and cellulose. Usually the organic acids become further broken down during the composting process. If the system becomes anaerobic, however, acid accumulation can lower the pH to 4.5, severely limiting microbial activity. In such cases, aeration usually is sufficient to return the compost pH to acceptable ranges.

Troubleshooting Composting Problems

Problems	Possible Causes	Solution
Damp and warm only in the middle of the pile.	Pile could be too small, or cold weather might have slowed composting	If you are only composting in piles, make sure your pile is at least 3 feet high and 3 feet wide. With a bin, the pile doesn't need to be so large.
Nothing is happening. Pile doesn't seem to be heating up at all.	<ol style="list-style-type: none"> 1. Not enough nitrogen 2. Not enough oxygen 3. Not enough moisture 4. Cold weather? 5. Compost is finished. 	<ol style="list-style-type: none"> 1. Make sure you have enough nitrogen rich sources like manure, grass clippings or food scraps. 2. Mix up the pile so it can breathe. 3. Mix up the pile and water it with the hose so that there is some moisture in the pile. A completely dry pile doesn't compost. 4. Wait for spring, cover the pile, or use a bin.
Matted leaves or grass clippings aren't decomposing.	Poor aeration, or lack of moisture.	Avoid thick layers of just one material. Too much of something like leaves, paper or grass clippings don't break down well. Break up the layers and mix up the pile so that there is a good mix of materials. Shred any big material that isn't breaking down well.
Stinks like rancid butter, vinegar or rotten eggs.	Not enough oxygen, or the pile is too wet, or compacted.	Mix up the pile so that it gets some aeration and can breathe. Add coarse dry materials like straw, hay or leaves to soak up excess moisture. If smell is too bad, add dry materials on top and

Odor like ammonia.	Not enough carbon.	wait until it dries out a bit before you mix the pile. Add brown materials like leaves, straw, hay, shredded newspaper, etc.
Attracts rodents, flies, or other animals.	Inappropriate materials (like meat, oil, bones), or the food-like material is too close to the surface of the pile.	Bury kitchen scraps near the center of the pile. Don't add inappropriate materials to compost. Switch to a rodent-proof closed bin.
Attracts insects, millipedes, slugs, etc.	This is normal composting, and part of the natural process.	Not a problem.
Fire ant problems.	Pile could be too dry, not hot enough, or has kitchen scraps too close to the surface.	Make sure your pile has a good mix of materials to heat up, and keep it moist enough.

Using Compost

Finished compost is dark brown, crumbly, and is earthy-smelling. Small pieces of leaves or other ingredients may be visible. If the compost contains many materials which are not broken down, it is only partly decomposed. This product can be used as a mulch, but adding partly decomposed compost to the soil can reduce the amount of nitrogen available to the plants. The microorganisms will continue to do the work of decomposing, but will use soil nitrogen for their own growth, restricting the nitrogen's availability to plants growing nearby. Allow partly decomposed compost particles to break down further or separate them out before using compost on growing plants. Or add extra nitrogen such as manure, to ensure that growing plants will not suffer from a nitrogen deficiency.

Compost serves primarily as a soil conditioner, whether it's spread in a layer on the soil surface or is dug in. A garden soil regularly amended with compost is better able to hold air and water, drains more efficiently, and contains a nutrient reserve that plants can draw on. The amended soil also tends to

produce plants with fewer insect and disease problems. The compost encourages a larger population of beneficial soil microorganisms, which control harmful microorganisms. It also fosters healthy plant growth, and healthy plants are better able to resist pests.

You don't need large flower beds or a vegetable garden to use compost. Here are the most common applications:

- **Mulch.** Apply compost up to 3" deep around trees and shrubs and in planting areas to suppress weed growth, provide a long-term supply of nutrients, conserve moisture, prevent soil erosion and compaction, and moderate soil temperature changes. Especially effective in fall and spring.
- **Topdressing.** Spread compost 1/8"-1/4" deep on top of existing lawns with a spreader or rake. Finished compost should be sifted or "screened" to remove clumps and twigs. Build a simple, inexpensive sifter using hardware cloth and a frame of two-by-four lumber.
- **Sidedressing.** A 1"-2" layer of compost can be spread around vegetables (especially tomatoes, peppers, eggplant), shrubs and flowers during active growing season to replace nutrients and protect root systems.
- **Soil Amendment.** Mix 2"-3" of compost into the top 6"-8" of heavy clay or sandy soil with a mechanical tiller, garden spade, or shovel. Compost will improve drainage and moisture retention, prevent compaction, supply nutrients and make existing nutrients more available to plants.

One inch thick is enough to spread on your garden beds. Compost continues to decompose, so eventually the percentage of organic matter in the soil begins to decline. In northern climates, compost is mostly decomposed after two years in the soil. In southern climates, it disappears even faster and should be replenished every year.

To bolster poor soil with little organic matter, spread 2 to 3 inches of compost over a newly dug surface. Then work the compost into the top 6 inches of earth.

A garden soil that has been well mulched and amended periodically requires only about a 1/2 inch layer of compost yearly to maintain its quality.

Some people recommend late fall as a good time to spread compost over a garden bed, and cover it with a winter mulch, such as chopped leaves. By spring, soil organisms will have worked the compost into the soil. Others recommend spreading compost two weeks before planting time in the spring. There is really no wrong time to spread it. The benefits remain the same.

If your supply of compost is really limited, consider side-dressing, a way to use compost sparingly by strategically placing it around certain plants or along certain rows. This is best done in late spring and early summer so that the rapidly growing plants can derive the maximum benefit from the compost. To side-dress a plant, work the compost into the soil around the plant, starting about an inch from the stem,

out to the drip line, taking care not to disturb the roots. For shallow rooted plants, leave the compost on the soil surface. A 2" layer works best when left on top.

For new lawns, a 2 to 3" layer of compost is best when planting. Once the new lawn is established, a ¼ to ½" layer yearly will maintain the quality of the soil.

An existing lawn top-dressed with a ½" layer of compost every year or two will be healthier than an unamended lawn. Fall is the best time to apply the compost, although an application in early spring is almost as effective.

A compost mulch can benefit trees and shrubs just as it does other plants. Spread a ½" to 1" layer of compost on the bare soil under the tree as far as the drip line. Then cover with a 2-3" layer of some other kind of organic mulch, such as chopped leaves or pine needles. The mulch will hold the compost in place and keep it from drying out.

Adding compost to the planting hole of small perennial plants is valuable, particularly perennial food plants. Annuals will also benefit from a dose of compost at planting time.

Compost is the ultimate garden fertilizer. It contains virtually all the nutrients a living plant needs and delivers them in a slow-release manner over a period of years. Compost made with a wide variety of ingredients will provide an even more nutritious meal to your growing plants.

Compost is the best material available to enliven your soil no matter where you live. Farmers around the world will testify that healthier soil grows healthier plants that naturally resist disease, insects, and other environmental pressures. Adding compost to your garden is a long-term investment - it becomes a permanent part of the soil structure, helping to feed future plantings in years to come.

