

Home Composting

1. What is composting?

Composting is a natural process that turns organic material into a dark rich substance. This substance, called compost or humus, is a wonderful conditioner for your soil.

2. Why should I compost?

- Healthier Plants

Organic matter is known as the “soul of a healthy soil.” Adding compost to your yard or garden will help your plants grow bigger and better. The organic matter in compost helps soil hold on to nutrients and water, benefiting your plants while reducing the risk of pollution.

- Composting Saves You Money

Using compost as a soil conditioner or mulch reduces your need to purchase these lawn and garden products.

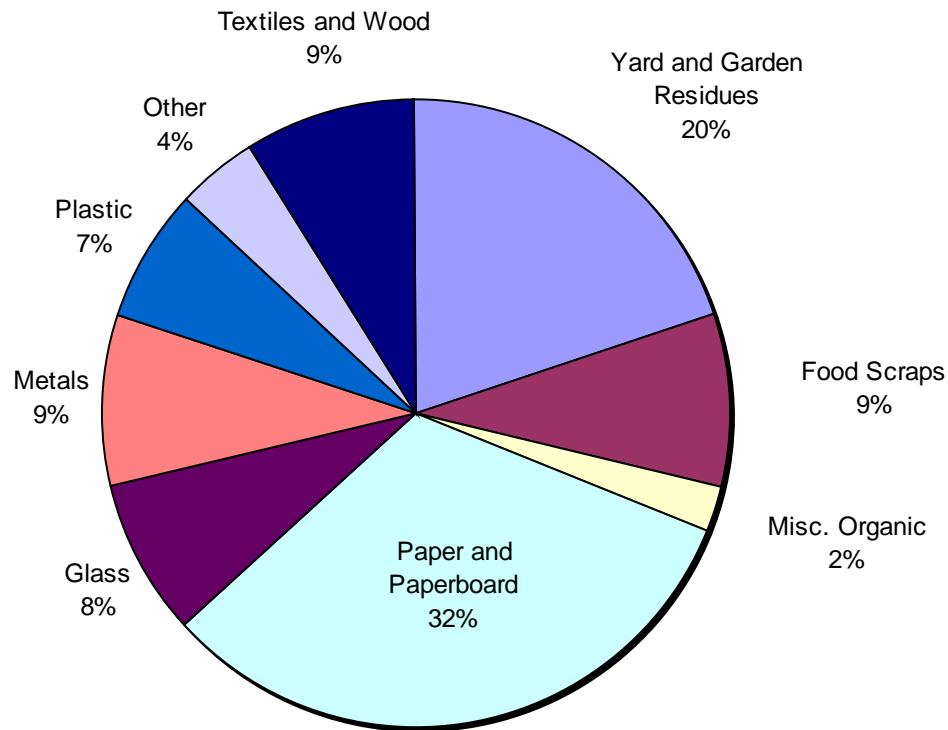
Composting in your backyard may reduce your trash removal costs. Many sanitation companies charge customers by the bag. Your compost bin could decrease the number of bags your household generates.

- Composting is practical and convenient

No need to bother bagging leaves and other garden/yard wastes. Simply add them to your backyard pile or bin and watch these items turn into rich dark humus.

- Composting is a good alternative to landfilling or incinerating convenient

Our yard and garden wastes account for almost 20% of the total amount of trash thrown away each year. Your choice to compost reduces the need to burn or bury organic material and increases the quality of our precious topsoil.



3. What should I compost?

While anything that was once alive can be composted, certain items are best left to professionals and kept out of the home composting system.

When selecting materials for your compost pile, AVOID:

- Wastes that attract pests
- Diseased/Insect ridden plants

Fatty food items, such as meat or cheese, should be avoided since they can attract rodents, raccoons, dogs, cats, flies and other pests. Cat and dog wastes should not be added because they can spread certain diseases. You may also want to leave out plants that are heavily diseased or pest-infested unless you are confident they will be composted hot enough and long enough to thoroughly break them down. This is also true for the reproductive parts of troublesome weeds (e.g., seed heads, rhizomes).

Refer to the following table for a quick reference to what should and should not go into your pile.

Table 1. What goes in your compost pile.

WHAT'S IN



WHAT'S OUT



GREENS (high in nitrogen)	BROWNS (high in carbon)	DO NOT USE
grass clippings	leaves	bones
prunings	bark	dog/cat feces
fruits and vegetables	straw	oil
houseplants	woodchips	grease
manure: e.g., cow, horse, pig, chicken or rabbit	sawdust	fat
kitchen scraps: e.g., stale bread, egg shells, coffee grounds (filters too), tea bags, citrus rinds fruit and vegetable peels	newspaper (<i>shredded</i>)	wood ash
	brush (<i>chopped</i>)	meat /fish scraps
	corn stalks	dairy products
		weed seeds
		diseased plants

4. How much space will it take?

Your compost pile needs to be large enough to hold heat, but small enough to allow for proper aeration. The pile should be about 3' wide by 3' long by 3' tall (1 cubic yard). Piles larger than 5' wide or 5' tall are not recommended because they are difficult to aerate. Allow for enough space to work around the pile. An area for storing organic materials, such as leaves, may also be desired.

Choose a convenient place for your compost pile. You are more likely to use a pile that is close by and easily accessible. A level, partially shaded spot is ideal. However, you may build your pile or bin in full sun and get excellent results. Easy access to a water supply is also desirable. Do not build compost piles against wooden buildings or trees because the wood will eventually decay.

5. Is a bin necessary?

Unless required by local ordinances, bins are not necessary for successful composting. Composting bins may save space and look neater, but good quality

compost can be produced using either bins or open piles. Many types of plastic, metal and wooden bins are commercially available and many other types can be made at home. If you decide to use a bin or enclosure check for the following:

- Is the bin size adequate for your needs?
- Does the bin allow for adequate aeration?
- Is the bin easy to load and unload?
- Does the bin allow for easy mixing of items?
- Do you need a bin that is rodent-proof?
- Is the bin well made? Will it hold up?

6. How much time and energy will it take? What types and quantity of organic materials will I be able to compost?

The method you choose will be influenced by how much organic material you have for composting, your need for finished compost and the time you have available for your project.

If you only have grass clippings allow them to stay on the lawn. The clippings will decompose naturally and nourish your lawn.

Three methods of composting are outlined below: Standard, Slow and Fast. Each method requires varying amounts of time and materials. One of these is sure to meet your needs.

- **Standard method**

The Standard Method is recommended if you have a variety of organic materials such as leaves, grass clippings, kitchen scraps and yard/garden waste. You will spend time building and mixing the pile each week. A small area will be needed for the compost pile and the temporary storage of organic materials. This method produces compost in six to eight weeks in spring and summer; longer if done in fall and winter.

In the Standard Method, the pile can be made by combining stored materials, or by placing items in the pile as they become available. When gathering and storing organic materials, keep browns and greens in separate piles. Remember that most greens cannot be stored very long without starting to cause foul odors or attract pests. It is best to incorporate greens as soon as possible into a compost pile.

Follow these steps:

1. Start the compost pile with a layer of browns. If you have a lot of coarse organic materials, you may want to chop or shred them into smaller pieces. Smaller pieces decay faster.
2. Add a layer of green materials. Try to maintain a ratio of 1 part greens to 3 parts browns.
3. Add a shovelful or two of soil or finished compost. This will add extra bacteria and fungi to get your pile off to a fast start.
4. Mix the materials together with a pitchfork or shovel.
5. Check for proper moisture. Use the squeeze test (refer to page 7) to be sure that your pile has the right amount of water for the composting process. Add water or additional dry material when necessary.
6. Continue to build layers until the bin is full.
7. Mix the pile after one week. Check for proper moisture and aerate the pile. Move coarse or less decayed material from the outside to the center. Adjust the moisture by sprinkling with water or adding dry material. Steam may be seen when you mix the pile. (If the pile is not warm or if foul odors are noticed, consult the Trouble Shooting Guide below.)
8. Continue mixing the pile every week or two. Check for proper moisture. During this time the compost will begin to look uniform and dark brown in color. The pile will shrink as the composting process takes place. If the pile does not heat up after turning, is neither too wet nor too dry, and most of the original materials are no longer recognizable, it is now ready for curing.
9. Allow the pile to cure for at least a few weeks, until it looks mostly dark and crumbly and has a pleasant earthy order. It is now ready to use as a soil amendment.

- Slow Method

The slow method is recommended if you do not have a steady supply of organic materials. This method takes very little of your time, but it requires from six months to two years to complete. Storage space is not needed since organic materials are added to the pile as they become available.

With the Slow Method, time is not spent checking for the proper mix or moisture. Since composting is a natural process, it will occur with little or no attention.

Because the proper mix and moisture are not checked, little heat is produced, and the process takes longer to complete.

*If recycling and waste source reduction
are your main goals, the Slow Method will
recycle your organic waste and take
very little of your time.*

The Slow Method is similar to the Standard Method with the following modifications:

1. No need to check for the proper mix or moisture! You build the pile with green or brown materials as they become available.
2. If you add kitchen waste, it must be buried deep in the pile. Dig a hole in the top or side of the pile and cover the scraps with several inches of brown material or active compost. Foods left on the surface may attract pests or cause odors.
3. After six months or more, finished compost will be found at the bottom or oldest sections of the pile. It may be collected and used as it is produced.

- Fast method

If you want a lot of compost to add to your soil, or if you generate an enormous amount of organic matter, you may wish to use the Fast Method to compost your yard, garden and kitchen materials.

The Fast Method requires MUCH MORE of your time and energy, but you will get a finished product very quickly. In this method, the composting process is closely watched to guarantee ideal conditions at all times.

The Fast Method is different from the Standard Method in the following ways:

1. Extra space for gathering and storing organic materials will be needed.
2. All organic materials are chopped or shredded before they are added to the pile. Both electric and gasoline powered chippers and shredders are available. Lawn mowers, prunes or hatchets can also be used to chop items.
3. Check the temperature often with a compost or soil thermometer. In summer months, it may be necessary to check the pile daily. With the Fast Method, very high temperatures (>140°F) can be reached quickly. These temperatures are

high enough to kill most weed seeds and disease causing organisms. However, some composting microbes may also be killed. If the temperature goes above 150°F, cool the pile by turning or adding coarse, brown materials.

(Refer to Troubleshooting Guide).

4. Mix the pile every three days and check for proper moisture.

7. Will my compost pile attract mice, rats and other animals?

If you follow the guidelines above regarding what to include in your backyard compost pile you should have little problem with pests. Pests are attracted by high fat and protein foods such as meat, oils, cheese, fish, and chicken, but should not be a problem if you only include vegetable scraps, fruit peels, and garden clippings.

Occasionally mix the pile's contents to maintain proper levels of heat and oxygen. Be aware of the moisture in the pile. The wetness should be similar to that of a damp sponge - not too wet, not too dry. If you live in an area that receives an inordinate amount of rainfall, try covering your pile so as not to over-saturate it.

8. Will the pile smell bad?

There should be no odor if the pile is properly maintained. The same rules about attracting pests should also be followed to avoid odors. In addition, you can improve your compost pile's performance by turning the pile with a shovel or other turning device. Microorganisms that thrive in environments with no oxygen (anaerobic) tend to generate bad odors, while those that exist in oxygen rich environments (aerobic) do not smell bad. Composters who turn their piles regularly maintain high levels of oxygen throughout the pile. Regular turning will also accelerate decomposition and transform your kitchen and garden scraps into humus-rich compost that much sooner.

9. Can I compost during the winter in cold climates?

Yes. Because microorganisms generate heat and must have oxygen to survive, cold climates should not affect the pile too dramatically if the pile is properly maintained. Decomposition may slow down, but the process will continue. Carbon rich materials such as leaves, twigs, and sawdust, must be mixed in the pile with nitrogen rich materials such as grass clippings, fruit and vegetable peels. Along with regular turning and good air circulation, the microorganisms responsible for decomposition will generate heat while they break down the materials into compost. With the proper carbon/nitrogen ratio and regular turning, heat will be generated

and decomposition will occur regardless of climate. During the winter months, cover finished compost with a piece of plastic to keep it dry.

10. How does composting work? How do I control it?

Bacteria, fungi and other microbes are the workhorses of composting. These are assisted by many other larger organisms. During composting, these microbes produce carbon dioxide, heat and water while they break down the materials in your pile. The final result is - *Compost—rich, dark, crumbly and odor free. The perfect addition to your garden!*

Efficient composting requires:

- *the proper mix of materials (balancing greens and browns)*
- *adequate aeration*
- *proper moisture*

The proper mix

Composting microbes use nitrogen for growth and carbon for energy. Most individual organic materials do not have the right mix of carbon and nitrogen for ideal composting. Using a variety of fresh green and dried brown items ensures an adequate supply of carbon and nitrogen.

Proper blending of brown and green materials allows the microbes to work well.

Generally, fresh "green" materials are high in nitrogen and dried "brown" materials are high in carbon. Both carbon and nitrogen are necessary for the composting process. Proper blending of green and brown materials allows the microbes to work well and will keep your pile odor free. A general rule of thumb to follow is: 1 part green material to 3 parts brown. (A "part" is what ever you are using to measure your materials. It could be one shovel full, one bucket or one wheelbarrow—whatever makes sense for your situation.)

Brown materials such as leaves, straw or wood chips are high in carbon, contain very little nitrogen, and are slow to decompose.

Green materials such as grass clippings, fresh weeds, kitchen scraps and manure are high in nitrogen, relatively low in carbon, and will quickly decompose.

Green materials are called "hot" because they supply the compost pile with the nitrogen necessary for the pile to produce heat. High temperatures mean that the composting process is working most effectively.

Keeping the proper mix throughout the year is part of the art of composting.

In autumn, brown leaves are abundant and green materials may be hard to find. If brown leaves are not mixed with green materials they may take a year or more to decompose. On the other hand, in the spring and summer fresh grass clippings and other greens may be plentiful without sufficient browns to mix with them. Since leaves break down so slowly by themselves they can be stockpiled and mixed with greens as needed. Greens, however, can NOT be stockpiled by themselves, because they have a strong tendency to give off foul odors and/or attract flies and other pests. Grass clippings, food scraps, wet manures, and other high moisture materials must be mixed with browns as soon as possible.

With experience, you will develop your own procedures that result in the proper mixture for the items you are composting.

Aeration

Decomposition can occur with oxygen (aerobic) or without oxygen (anaerobic).

Microbes that use oxygen are preferred in home composting because they decompose materials quickly and effectively.

Aerobic composting occurs when the pile has enough oxygen. During composting, the microbes will use the oxygen in the pile and aeration will be needed. The best way to do this is to include coarse materials in the pile. These materials, such as twigs, sticks, wood chips, and straw, give the pile a porous structure so air can flow through the pile.

Compaction or excessive moisture can limit air flow through the pile. Compaction can occur when only small particles or finely shredded materials are used in the pile, when bins are over filled, or if piles become too big. If the pores in the pile become filled with water (in other words, if the pile is too wet) then air cannot flow through the pile and anaerobic decomposition takes over.

Anaerobic microbes decompose by fermentation. This type of decomposition produces foul odors. It also produces acids and alcohols that are harmful to plants.

Regular mixing or stirring the pile loosens the material and maintains proper aeration.

Moisture

Moisture in the compost pile is important. Microbes can only use moist materials for food. If the materials are too dry, the microbes may become dormant and the composting process will slow down. If the materials are too wet, nutrients are lost, aeration is reduced, odors are produced, and the process is slowed.

The material in the pile should feel damp. The “squeeze test” is an easy way to judge the moisture content of compost.

Tightly squeeze a handful of materials - a drop or two of liquid should be produced.

If squeezing the handful is like wringing out a sponge, it is too wet. Stirring or mixing the pile loosens the materials and allows air to circulate. Adding drier items, such as leaves, straw or sawdust, can also help dry a wet pile.

If the handful falls apart or feels dusty, it is too dry. Water with a hose or sprinkling can to increase the moisture. Check after 24 hours to see if additional water is needed.

Proper Mix
 Proper Aeration
 + Proper Moisture

 = An Active Compost Pile

When the proper mix, moisture and aeration have been achieved you will observe the following process:

As the microbes begin to work, they will produce heat. Sometimes steam may be seen escaping from the top of the pile. Actively working microbes can raise the pile's temperature as high as 140°. Temperatures higher than 150° may be harmful since very high temperatures reduce the activity of many microbes. You may try checking your pile's temperature with a candy thermometer or heat probe. You can also purchase a special long-stemmed compost thermometer. Mixing the pile can cool it.

During the process, you will notice several changes.

- The pile will shrink as the microbes decompose the organic materials.
- You will see evidence of different organisms. These may include a white coating on particles in the pile, mushrooms growing out of the pile, and sowbugs, centipedes and earthworms. These are all natural and important parts of the “decomposer food web”.
- As the process completes, the temperature will drop.
- Most of the original materials will no longer be recognizable.
- After aging for a month or more after the temperature drops, the compost is ready to use. Your finished compost will be dark and crumbly and have a

pleasant earthy odor. Refer to Section 5 for information about when and where to use your finished compost.

Turning or mixing

Turning an active compost pile from one bin to another, or mixing it in place, is an important step in the composting process. Mixing accomplishes several things:

- Breaks up clumps of materials, such as leaves, grass or food scraps
- Exposes fresh surfaces for the bacteria and fungi to work on
- Large pieces can be broken up
- Evens out the composting process. Usually material at the edges (top, sides and bottom) composts slower than the middle. One of the main reasons to mix the pile is to get material from the edges to the middle and vice versa.
- Maintain airflow. If compaction has occurred, mixing will loosen up the pile
- Presents an opportunity for corrective action. If the pile is too dry, material can be wet down while turning. If it is too wet, drier material can be added. If decomposition is too slow, greens can be added while turning the pile.

Table 2. TROUBLE SHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
foul odor	excess moisture	turn pile or add dry material such as straw
	compaction	turn the pile or decrease its size
ammonia odor	too much nitrogen	add high-carbon (brown) items
low temp	pile too small	enlarge pile
	too little moisture	add water and turn
	poor aeration	turn pile
	cold weather	increase pile size or insulate pile with a layer of material such as straw
high temp	pile too large	reduce pile size or turn more frequently
	too much nitrogen	add high-carbon (brown) items
pests such as rats, raccoons and insects	presence of meat scraps or fatty food wastes	remove meat and fatty foods from pile and cover with a layer of soil or saw dust; or switch to an animal proof compost bin

11. How Do I Use Compost?

Compost can be used for:

- *soil conditioning*
- *lawn dressing*
- *a potting soil component*
- *mulching*

For general soil enrichment, the ideal time for applying compost is 2-4 weeks before planting. To improve structure and fertility of poor soil, give it a thorough compost treatment in fall. Spade 6"-12" deep and mix in compost. Leave the surface rough and cloddy for the winter.

When the composting process has been completed, screen and allow compost to age for an additional two weeks if you plan to use in and around established plants.

Flower Gardens

In spring, loosen the top few inches of soil in your annual and perennial beds and work in an equal amount of compost into the bed. If you apply a layer of compost to your flowerbeds in the fall, it will provide winter protection for perennials and will build better soil for annuals in the spring. Use finely screened compost in your flowerbed.

Lawns

Use compost when planting new lawns and maintaining existing lawns. Your goal is to produce a thick sod with roots that go down six inches. In building a new lawn, work in generous amounts of compost 4"-6" deep. If your soil is made of clay, you will need at least a two-inch depth of compost, mixed in thoroughly to build it up. To renovate an old, patchy lawn, dig up the bare spots about two inches deep, work in plenty of finished compost and rake well. Sow your seed after soaking the patches well.

Trees and Shrubs

When planting trees and shrubs, make the planting hole twice the size of the root ball. Blend enough compost into the removed soil so that the mix is about 25% compost. Rough up the sides of the hole and backfill with the compost amended soil. Water the ground well, then spread an inch or two of compost on top. Established shrubs should be fed yearly by working compost into the soil, then mulching. The

"ring" method works best for feeding trees. Start about two feet from the trunk and cultivate the soil shallowly to a foot beyond the drip line of the branches. Rake an inch or two of compost into the top two inches of soil.

Vegetable Gardens

Dig compost in during the fall or spring, up to a week before planting. When the plants begin to grow rapidly, use compost as a top dressing. In addition, nutritious compost "tea" can be made. Place 2-3" of cured, finished compost at the bottom of a five-gallon pail, cover with a foot of water, stir well and allow to soak for three days. Strain through burlap or cheesecloth and sprinkle on and around plants.

House Plants

Add compost to potting mixture to provide an enriched soil for your plants. To rejuvenate soil in indoor plant boxes, add an inch of compost into the surface twice a year.

Table 3. HOW MUCH COMPOST TO APPLY

Plant/Soil Application	Compost Application Rate
General Soil Enrichment	1/2" to 3" into top 4" of soil
New Lawns	1" - 2" mixed into top 4" - 6" of soil
Topdressing for existing lawns	1/8" - 1/4" screened compost spread uniformly
Topdressing for vegetables, flowers, & shrubs	1" - 2" spread uniformly
Ground cover for annual beds	3" mixed into top 6" of soil
Garden soil	1" - 3" mixed into top 6" of soil
Incorporation around shrubs	3" mixed into top 6" of soil
Potting mix	25% to 30% by volume
Mulch for deciduous trees, & rose beds	3" - 4" spread uniformly
Mulch for vegetables, annual perennial planting beds	2" to 3" spread uniformly

Reference: This FAQ was adapted from Home Composting: Recycling In Your Own Backyard, produced in 1999 by the Lehigh County Office of Solid Waste Planning, with funding from county tax dollars and the Pennsylvania Department of Environmental Protection.