

## COMPOSTING FOR THE HOME GARDENER

**What Is Compost:** Compost is well-decomposed organic plant and/or animal materials transformed by soil microorganisms into their original components. The process of composting allows one to enhance and accelerate this natural process to produce a regular supply of "black gold" for your landscape.

### **Why Should A Gardener Make Compost:**

1. It is a valuable soil amendment that costs little and avoids purchased materials like peat moss or bagged cow manure.
2. It improves a soil's structure, aeration, and moisture and nutrient holding capacity.
3. It contains a wide range of plant nutrients including many trace elements.
4. It may modify a soil's pH without additional limestone applications.
5. Some composts can reduce the incidence of plant diseases, especially soil-borne ones.
6. It reduces the amount of material entering our waste stream. Yard waste amounts to nearly 230 lbs per person per year! (see pie chart)
7. The increased moisture holding capacity of compost enriched soil can reduce the amount of irrigation water used.
8. Composting is both satisfying and educational.

**How Is Compost Made:** Composting can be done in open piles or within an enclosure usually called a composting bin.

There are six important requirements for effective composting:

1. A Carbon-containing material
2. A Nitrogen-containing material
3. Oxygen
4. Water
5. Soil microbes that digest organic matter
6. Warm temperatures

**The Digesters:** Bacteria, fungi, and other microbes are the key players in the decomposition process, "feeding" on organic matter and using carbon and nitrogen they contains to grow and reproduce. The heat generated by a compost pile is a result of their microbial activity. Microbes are active in small numbers at temperatures just above freezing but are most efficient at 130 to 140 degrees F. They are assisted by many larger organisms like earthworms, slugs, snails, millipedes, sow bugs and insect larvae that feed on plant and animal matter in soil.

**The Ingredients: Carbon/Nitrogen:** Composting microbes use carbon for energy and nitrogen for growth. When you mix various forms of organic material in your compost bin, it is important to achieve a proper balance of carbon to nitrogen. Optimum composting occurs when the mixture of materials contains approximately **30 parts of carbon to 1 part of nitrogen**. Most organic materials do not fit the 30:1 ratio exactly, so different materials are mixed together to

come close to achieving this ratio. With the proper mix, the soil microbes begin to decompose organic material quickly.

Organic matter for composting comes in two broad forms:

**1. Green Materials** — fresh grass clippings and weeds, kitchen waste. — low in carbon and high in nitrogen and moisture. These materials are also high in readily digested sugars and starches.

**2. Brown Materials** — mature woody materials like fallen leaves, straw, wood chips, sawdust, hay — high in carbon, low in moisture and slow to break down on their own. They contain large amounts of cellulose and lignin.

*A blend of about **one-third green materials to two-thirds brown materials** gives microbes an ideal diet.*

Here are C/N ratios for some readily available, compostable material:

High N levels (green):		High C levels (brown):	
Vegetable waste	12-20:1	Dead (mature) leaves	30-80:1
Grass clippings	20:1	Corn stalks	60:1
Cow manure	12-25:1	Straw	40-100:1
Horse manure	25:1	Tree bark	100-130:1
Poultry manure	10:1	Paper	150-200:1
		Wood chips/sawdust	100-500:1

**Water And Oxygen:** The microorganisms that produce compost need an acceptable measure of oxygen and water. As the composting occurs, microbes consume oxygen in the pile and additional oxygen is needed. Although some aeration occurs naturally, stirring or turning the compost pile will replace the inner oxygen-poor air with fresh air. Piles can be set on large branches or wood pallets to facilitate air circulation from the bottom. Alternatively, a perforated plastic pipe can be the centerpiece of a compost pile.

Microbes function best when composting materials are about as damp as a wrung-out sponge and have numerous air passages. Moisture is important because microbes can only break down moist materials. You can dry down wet compost by mixing the pile or incorporating coarse materials like leaves, straw or sawdust. To adequately wet a dry pile, turn the material and add water gradually.

**Particle Size:** The microorganisms responsible for decomposition work on surface of the organic material. You can increase the surface area by shredding or chopping the material to be composted into smaller pieces. Although this is not essential, it does speed up the process.

**Pile Volume:** A compost pile should be at least 4' x 4' x 4' for optimum critical mass or buffering ability against New England's cold winter weather. A smaller pile may not have sufficient critical

mass to heat up and stay warm; a larger pile and depth may be difficult to manage and may not allow sufficient aeration in the center.

**When To Turn:** Compost piles may heat up to 160 to 180 degrees F three to four days after being fully charged (loaded to capacity). The temperature quickly drops as microbes use up nitrogen, oxygen and water to digest the sugars and starched. Turning the pile is necessary at this point to oxygenate the plie

**What Can Be Composted:** Ideally, your composting system should begin with a large supply of organic materials. Tree leaves are a great starting material because you generally have a large quantity of brown material in a relatively short period of time. Other organic materials can be added with time.

Practically any plant material can be composted including sod, grass clippings, hay, straw, chopped vegetable or flower garden debris, sawdust, shredded newspaper or cardboard, hedge clippings, kitchen wastes including egg shells, tea bags and coffee grounds, and herbaceous pet wastes. Avoid large woody materials such as logs unless finely shredded or chopped as they decompose very slowly.

**What Should Not Be Composted:**

- Don't compost plants or flowers that are infected with diseases.
- Don't compost weeds that have seed heads or that are easily spread by rhizomes or stolons. Often temperatures may reach 140 degrees in the center of the pile killing many weed seeds and disease organisms but in the cooler, outer layers of the pile such sterilization may be incomplete.
- Don't add dog, cat or other carnivore/omnivore manure to the compost pile. This practice may spread certain human diseases and attract animal pests to the pile.
- Don't add coated or treated paper products, although most non-glossy paper like newsprint and tablet paper, as well as cardboard boxes and items like paper egg cartoons will decompose and can be added
- While most kitchen wastes may be added to the compost pile Don't add grease, fat, meat or other materials in the following list.

**YES**

APPLES - APPLE PEELS  
CABBAGE  
CARDBOARD — CUT UP  
CARROT PEELS  
CELERY  
CITRUS PEELS  
COFFEE GROUNDS

**NO**

Butter  
Bones  
Cheese  
Chicken Scraps  
Fish Scraps  
Glossy Newspaper Inserts  
Lard

**EGG SHELLS**

**FRUIT** (*Incl Pears, Pineapple*)

**LETTUCE**

**NUT SHELLS**

**ONION PEELS** (*But might deter worms*)

**PAPER - SHREDDED**

**POTATO PEELS**

**PUMPKIN SHELLS AND SEEDS**

**SAW DUST**

**TEA BAGS**

**TOMATOES**

**TURNIP, BEET OR CARROT LEAVES**

Mayonnaise

Meat Scraps

Milk

Peanut Butter

Pressure Treated Wood

Salad Dressing

Sour Cream

Vegetable Oil

Yogurt

**Getting Started: Locating Your Compost Pile:** Compost piles should be on a level spot close to the garden or where the raw materials for the pile are generated. Level areas reduce the chances of nutrient-rich, compost water runoff from your property or into other areas of the yard. Do not place the pile next to wooden buildings, Do place it way from large trees and shrubs, if possible, to avoid roots growing into the compost pile. Compost piles do not need to be placed in direct sun and a shady site offers some benefits during the hot weather.

**Steps For Making 'Fast' Compost:** Rapid composting is labor intensive. Having several turning bins simplifies management because you can transfer materials to an adjacent bin at each turning.

- Chop or shred the organic matter before adding it to the pile. Paper should be shredded before it is incorporated into a compost pile.
- Completely fill your bin at one time; this will contribute to rapid heating.
- Thoroughly mix about one-third 'green' material and two-thirds 'brown' material adding extra nitrogen if you are short on 'green' material. A cup of bloodmeal, cottonseed meal, or alfalfa meal or one-third cup of urea can be used for every 6 to 8 inch layer of 'brown' material if a source of nitrogen is needed.
- If the organic materials are dry, lightly sprinkle them after adding to the pile.
- Turn the pile after three days. Considerable amounts of steam should arise in the summer. If the pile is not heating, check the section "Troubleshooting" for a possible cause and cure. Also, check for proper moisture content and adjust if necessary.
- The 'fast' method generates very high temperatures of 140 to 160 degrees F. This is high enough to kill most weed seeds and disease organisms, but temperatures around 160 degrees F kill composting microbes as well.

- Use a compost thermometer to monitor temperature. Whenever the pile temperature drops to about 100 degrees F, turn the pile. After three or four weeks, the temperature will have dropped as the composting process slows and it cannot be raised by turning. The compost should be brown and crumbly and have an earthy smell. Some larger pieces of organic matter may still be recognizable and can be screen from the final product. Age the compost for an additional two
- weeks before using it around plants.

**Important Composting Tip:** The composting process is a mixture of science, art, mystery (and the occasional misery). No two compost piles are exactly the same and there is no single 'correct' set of composting techniques that all gardeners should follow. Select your particular methods based on your own unique circumstances.

Adapted from piece by Dawn Pettinelli, University of Connecticut Home & Garden Education Center, 2008