

Institutional Composting Step-by-Step Guide

1) Why should you compost?

Organic materials make up a large part of an institutions waste stream. Composting provides you with an alternative to incineration or landfilling organics, which can be quite dense and have a high per ton disposal cost. Compost improves soils water retention, aeration, and adds lost nutrients. Composting can save your grounds department money on buying mulch, fertilizer, and pesticides.

2) What is compost?

Composting is nature's way of recycling. Composting is controlled biological reduction of organic wastes to humus. The end product, compost, is used as a soil amendment that provides plant nutrients, supports beneficial soil life, reduces soil diseases, increases water retention in sandy soil and adds drainage to clay soils, and promotes weed and erosion control.

3) What can be composted?

Compostable materials include organics such as grass, leaves, tree limbs, shrub waste, food waste, animal lab waste, hand towels, paper plates, napkins, wax cups, wax cardboard, etc.

Non-compostable materials include oils, weeds, diseased plants, meat, bones, dairy products, cat, dog, or human waste, hazardous materials, plastic, glass, metal, treated wood, and very large items like large tree limbs or stumps.

4) Can you get someone else to do it?

Maybe. Farms may accept yardwaste for composting. Hog farms have been know to accept food waste as feedstock. Call your City or County; they often have composting programs set up especially for yardwaste. Your local food bank may accept donations of food for the hungry. In any of these cases the most important thing for you to do is make sure the organic material is separated correctly and meets the specifications of the accepting entity.

5) How to compost?

You will need to control the following parameters of your compost pile: carbon and nitrogen inputs, size and surface area exposed of inputs, moisture, air, volume and temperature. The compost pile is full of microbes such as bacteria, actinomycetes, protozoa, and fungi. Microbes need food, air and water for survival. The optimum carbon: nitrogen ration is 30:1 by weight. Examples of materials with high carbon ratios are leaves, straw, bark, paper, wood chips and sawdust. Examples of materials with high nitrogen ratios are food waste, grass clippings and manures. The later could create odor and vector(rodent) issues. If you shred the material before you place it in your compost pile it will speed up the process by increasing the amount of surface area the microbes have to work on. The material should be moist but not soaked. Too much water will eliminate space needed for air. You should be able to squeeze a few drops of water from a

handful. The optimum moisture level is approximately 40-60%. Water should be mixed into the pile. Composting is an aerobic process. If you don't turn your pile you will create an anaerobic (without oxygen) pile. Anaerobic conditions will cause odors and create chemicals toxic to plants. Piles should be between 27 and 125 cubic feet. If your pile is too small it will not hold heat and if it is too large it will not get enough oxygen. Optimum temperatures are between 90-140 F (32-60 C). Most microbes die when temperatures rise above 160 F. Pathogens are usually destroyed around 131F (55 C).

6) What method of composting should you use?

What and how you choose to compost depends on many factors including regulations, space, funding, town and gown issues, and available labor. Composting can take up anywhere from several acres to one parking space. Methods used most often are grasscycling, piles, long rows (windrows), in-vessel, and vermicomposting.

When you cut the grass and leave the grass clippings on the lawn you are **grasscycling**. The cut material simply decomposes on site adding beneficial organic matter to the soil reducing the need for fertilizer and reducing water evaporation. This will not create a thatch problem. Thatch is a mixture of roots, dead leaves and rhizomes that decompose slowly. Grass is a rapid decomposer. Keep the mower blades sharp, mow more often cutting less than 1" of the leaf surface, mow dry grass, and do not over-fertilize.

Piles can be any size in a container or not. It will take a longer time for a smaller pile to decompose. Try not to make your pile taller than you unless you have heavy equipment. You will notice your pile shrinking and spreading out. To contain the pile you may want to build or buy a compost bin. There is no one way to make a compost bin. A circle of chicken wire will work, you can build an elaborate wood bin or you can buy a plastic bin.

Aerated Piles are made the same way regular piles are made except these piles have a system to let more air in. The system can be as simple as a pallet under the bin or as elaborate as PVC tubing with forced air inserted into the pile.

Tumblers are units that allow a person to place yardwaste into a container to turn it. These units work by allowing the contents to heat up rapidly and retain moisture. Air is limited but present. This method is fast.

Windrows can handle tons of organic matter. This pile is usually long, narrow, and at least 4-ft high. When done on a large scale this method requires heavy machinery such as a front-end loader and/or windrow turner. Windrows can be covered or not. This method is often used for large institutions or for cities and counties.

In-vessel composters can compost anywhere from a few hundred pounds to over

60 tons a day. Organic waste including meats, oils, fish, and dairy products are placed in the container and mixed, shredded, and fluffed by the composter. Some composters are fully automated with sensors to monitor temperature, oxygen and moisture. They use biofilters to reduce or eliminate odors. This is another good method for institutions with large amounts of organics.

Vermicomposting uses red wiggler (*Eisenia foetida*) worms to do the work of composting. Vermicomposting requires air, water and food the same way aerobic composting does but in this case you are not using the microbes, which produce heat to do the bulk of the composting work. The worms eat the organics and leave behind castings. These systems are also available in a variety of sizes. You can have a 10-gallon container that might handle a small department's food waste or you can have a continuous flow system that could handle all of the institution's food waste.

7) What should you do with the compost?

Finished compost should be fine, dark, sweet smelling, have a pH that is 7.0-9.0, and is no longer heating up. Depending on what and how you compost you may have to screen your compost to take out larger unfinished pieces. How you intend to use the compost will also determine how fine you want your end product. You can use compost as mulch around shrubs, trees, flowers and on paths, as soil amendment to break up clay type soils or add substance and water retention to sandy soils, as a lawn top-dressing or use it in houseplants. Many people use compost in their gardens instead of chemical fertilizers to provide nutrients to their plants. It is also commonly thought that using compost can reduce or eliminate the need for chemical pesticides because healthy plants resist pests better. Placing finished compost in a cloth bag and letting that sit in a bucket of water for 3-5 days makes compost tea, a nutrient rich liquid.

8) What special Issues should you consider?

Funding is usually the first concern for any project. How much you spend will depend on how high tech your compost method is. **Site** concerns are important mostly in urban areas. You will want to **educate** your staff **over and over again**. You may have to educate your **neighbors**. Controlling **odors** and **pests** is very important. If you are composting correctly you will not create unpleasant smells or invite unwanted guests. Find out if there are any **regulations** that may prevent you from composting on site. The regulations may allow composting but they may call for only certain methods of composting. If you are composting for a specific reason you may want to have the **compost tested** to make sure it has the nutrients you were looking for.

9) Resources:

<http://www.mastercomposter.com/>

<http://compostingcouncil.org/index.cfm>

<http://aggie-horticulture.tamu.edu/sustainable/slidesets/kidscompost/cover.html>

http://www.cfe.cornell.edu/compost/Composting_Homepage.html

<http://www.epa.gov/msw/compost.htm>

<http://www.earth911.org/master.asp?s=lib&a=organics/organics.asp>

<http://www.musc.edu/recycle/vermicompost.htm>

http://www.fac.unc.edu/WasteReduction/Recyclables/animal_bedding.asp

<http://darkwing.uoregon.edu/~recycle/Composting.htm>