Home Composting
What is Composting?

The process of “composting” is the decomposition of plant remains and other once-living materials into an end product known as compost. Final compost is a dark, crumbly substance with an earthy odor.
Why Compost?

• Compost is an inexpensive soil amendment that
  ✓ supplies nutrients and organic matter
  ✓ Improves soil structure and water holding capacity

• According to the EPA, home composting can divert 700 lb. of waste per household per year from municipal waste. This includes both yard waste (nearly 17% of municipal solid waste is yard waste) and food scraps (approx. 6.7% of solid waste is from food scraps).
Create Your Own Compost Pile

• Locate a site
• Determine compost structure
• Prepare and maintain the compost pile
  ✓ Materials for composting
  ✓ Proper carbon-to-nitrogen ratio C/N (“brown” to “green” ratio)
  ✓ Particle size
  ✓ Aeration (involves turning and mixing)
  ✓ Moisture
• Troubleshooting your compost pile
Overall concept..........  

• Think of composting as the process of growing microbes; they need air, water, and food!
Locating a compost site

• Compost site should be convenient and not interfere with activities or neighbors
  ✔ Often near garden or kitchen or between garage and house are good options

• Compost site will perform best if protected from wind but receive partial sunlight
Choosing a Compost Structure

- Unenclosed usually not allowed in Urban settings because they can become unsightly

- Choose bin approx 3-5’ in each direction (square or round)
  - Smaller than this tend not to develop enough heat
  - Larger than this and air and water are not as able to penetrate
  - Need approximately 1 cubic yard of waste to generate proper temp (130-150 F)
Common compost structures

• Compost pile (simplest but not as neat and may not be allowed)
• Barrel or drum composter
• Bin-type structure
• Three-chambered bin
Examples of barrel or drum structures
Horizontal rotating drum

Easy turning!
Make your own barrel composter

• 55 gal container with secure lid (no chemical storage)

• Drill ½” holes; 6-9 rows for aeration and moisture drainage

• Situate barrel upright on blocks

• Aeration through rolling drum on its

• Great choice for small space
Bin-type structures

• Made with small spaced woven wire fencing- fasten together with chain snaps

• 4-5’ diameter and height

• Stake may be driven into center to maintain shape and aid water addition

• Aeration can be done by unsnapping wire, moving fence and turning compost back into it.

• Practical for larger quantities of waste
Three chambered bin structure
Three chambered bin structure

• Use rot resistant wood (cedar or redwood) but avoid chemically treated wood

• Each bin should be ~5 ft. x 3 ft. and about 4-5 ft. high

  ✓ Ideal volume for maintaining heat but is still manageable for turning

• Removable slats in front allow for complete access to contents for turning
Three chambered bin structure

• Compost ‘assembly line’; three portions of compost at varying stages of decomposition

• Use first bin for initial materials and allow to compost for 3-5 weeks

• Move first compost to second bin for 4-7 weeks and start another batch in the first

• Third bin is for finished or nearly finished (can age here)
Other Structures......
Preparing your Compost Pile

What can be composted?

• Clean paper and paperboard (cereal boxes, paper plates, etc), newspaper
  ✓ Shred or break into small pieces

• Cotton rags, dryer lint

• Coffee grounds and filter, tea bags

• Hay, straw, wood chips, sawdust
  ✓ Cut to less than 2 inches
  ✓ High in carbon

✓ Do not use products from treated wood
Preparing your Compost Pile

What can be composted?

- Leaves
- Garden debris (old plants)
  - Reduce to less than 2 inches
- Grass clippings
  - Pack well, mix with coarse materials
  - Avoid use of clippings from treated lawns
Preparing your Compost Pile

What can be composted?

• Egg shells
  ✓ Adds calcium

• Fruit and vegetable waste
  ✓ Again, reduce in particle size
  ✓ May compact since wet, add dry, coarse materials with

• Nut shells
Preparing your Compost Pile

What shouldn’t be composted?

• Black walnut tree leaves or debris
  ✔ Release substances that may be harmful to plants

• Coal or charcoal ash

• Diseased or insect infested plants

• Weeds with seeds
Preparing your Compost Pile

What shouldn’t be composted?

- Dairy products; Fats, grease, lard, oils; Meat or fish scraps
  - Create odors and attract rodents and flies
- Pet or human wastes
  - May contain parasites, pathogens, harmful viruses
- Yard trimmings with chemical pesticides
- Plastic wrap and aluminum foil
  - Will not break down
Mixing the materials in the right ratio (i.e. carbon to nitrogen ratio)

• Remember, we’re growing microbes.
  ✓ Microbes need carbon for energy and nitrogen for protein

• All materials contain both carbon and nitrogen, but in different amounts.
  ✓ Most compostable material has more C than N.

• Based on the ratio of carbon to nitrogen, the rate at which the microbes grow is different.
Mixing the materials in the right ratio (i.e. carbon to nitrogen ratio)

• The ideal ratio is 20-30 parts carbon (brown) to 1 part nitrogen (green) for the most rapid growth.

• For high C/N material, may need to supplement with nitrogen sources

  ✓ For example: straw, leaves, and paperboard is very high in carbon. In order to achieve the appropriate C/N, a high nitrogen fertilizer or animal manure should be added.

  ✓ Generally, ½ c 27-0-3- or 1-2” animal manure for each 8-9” layer in a pile area of 25 square ft.

  ✓ DO NOT ADD FERTILIZER WITH HERBICIDE
Carbon to Nitrogen ratios

- Pig manure 5 to 7:1
- Poultry manure (fresh) 10:1, (with litter) 13 to 18:1
- Vegetable wastes 12 to 20:1
- Coffee grounds 20:1
- Cow manure 20:1
- Grass clippings 12 to 25:1
- Horse manure (fresh) 25:1, with litter 30 to 60:1
- Tree leaves (and misc. foliage) 30 to 80:1
- Corn stalks 60:1
- Straw 40 to 100:1
- Bark 100 to 130:1
- Paper 150 to 200:1
- Wood chips, sawdust 200 to 500:1
Carbon to nitrogen ratio

- If you have the same amount of grass clipping and leaves, the overall carbon to nitrogen ratio is $20 + 50 = 70/2 = 35:1$ GREAT!

- If calculating isn’t for you, then estimate!

  ✓ You’ll see this in a few slides.
Create the compost pile

• Chop or shred compost materials to ensure fast decomposition

✓ Remember, size of thumb or postage stamp is best. Larger will decompose, just slower (don’t want larger than 2 inches). Tree leaves mow before raking

✓ Also, larger coarser materials will decompose faster if placed on the bottom

• Carbon or brown layer should be the top and bottom (to moderate odors)
Create the compost pile

• Easiest is to create a pile in layers
  ✓ Layer approx. 6-10 inches of organic matter and then add approx. 1-2 inches of a high nitrogen matter. This can be manure, high nitrogen fertilizer, blood or cottonseed meal or green grass clippings. A small amount of soil can also be added.
  ✓ Water each layer until moist. Should be as wet as a well wrung sponge.
  ✓ Continue to layer ending with a brown layer.
Compost pile layering

Layering makes it easy to ensure proper nutrient ratio
Compost pile layering: Is soil and ‘compost starter’ necessary?

- Soil can be added as a source of microbes, but is not essential
  - Surfaces of compostable materials generally have adequate microbes.
- Commercial compost ‘starter’ is not necessary
Create the compost pile:  
How to check for proper air space

‘The Five Gallon Bucket Test’

Equipment/Supplies Necessary:  
-five gallon pail  
one-gallon plastic milk jug  
typical mix of the materials you add to your compost pile

1. Fill the 5 gallon pail with water by filling and emptying the 1 gallon milk jug five times into the pail. Mark this level as the ‘full line’.

2. Empty the water from the five gallon pail.

3. Fill the 5 gallon pail 1/3 full with typical compost mix and drop the pail 10 times from a height of 6 inches onto hard surface.
Create the compost pile:
How to check for proper air space

‘The Five Gallon Bucket Test’

4. Fill the 5 gallon pail to 2/3 full and drop 10 times. Fill the pail to 3/3 full and drop 10 times.

5. Now add water and track the amount of water you can add to the 5 gallon pail.
   a. If you add 2.75 - 3.25 gallons you have adequate free space.
   b. If you can’t add at least 2.75 gallons you have inadequate free space. Add more bulking materials such as straw or coarse wood chips.
Create the compost pile:
How to check for proper air space

‘The Five Gallon Bucket Test’

c. If you can add more than 3.25 gallons, then you have too much air space. Reduce particle size in the mixture (grind, shred or add finer materials to the mixture).

4. Retest if necessary.
Lime and composting

- Limestone can be added to reduce acidity in the compost pile.

- Limestone addition is not necessary in most conditions because acidity will drop over time.

  ✓ Can be used for pine needles, fruit wastes, and anaerobic decomposition to neutralize acids.
  ✓ Apply 1 cup limestone per 25 sq ft for every 8-9” layer.
Maintaining your compost pile

• Check periodically and add water.
  ✓ Should be as wet as a well wrung sponge.
  ✓ Need to check more during hot, dry weather.

• Turn or mix your pile once or twice a month to hasten decomposition.
  ✓ Well-mixed will help pile reach higher temps for longer time periods.
  ✓ Heat is from microbial growth: 130-150°F in middle (mixing moves outer part of pile to the inside and it heats again.....why turning is necessary)
Maintaining your compost pile

- Turning more will not overcome compost material that does not have enough free air space.

- New materials should be dug into pile (not left on surface).
Maintaining your compost pile: Temperature

A minimum pile temperature of 130-150°F for at least 3 days is necessary to destroy weed seeds and plant pathogens (15 days is more effective).
When is your compost ready?

• Varies quite a bit!

• Well-managed and correctly prepared pile
  ✓ 4-9 months (doesn’t include winter)

• Unattended and poorly prepared
  ✓ May take 1-3 years (doesn’t include winter)

• Outdoor piles prepared in fall will not be ready in the spring
When is your compost ready?

• In general, when the compost is finished the pile is half the original size and has an earthy aroma

✓ Looks like soil, and you won’t see much original material

• Also, finished compost will not heat up again when the pile is mixed
What can you do with compost?

Soil amendment

• Add 1-2” to soil surface and incorporate 6-8” deep

  ✓ Improve the moisture holding capacity of sandy soils (slightly lower rate of addition)

  ✓ Add to heavy clay soils to improve drainage and aeration (slightly higher rate of addition)

  ✓ Increases the ability of the soil to hold and release essential nutrients.
What can you do with compost?

Soil amendment

- Promotes activity of earthworms and soil microorganisms.
- Improves seed emergence and water infiltration due to reduction in soil crusting.
What can you do with compost?

Mulch

• Use and maintain 2-4” around base of plant:
  ✓ Weed suppression
  ✓ Modified soil temperature
    □ Less fluctuation in winter and cooler in summer
  ✓ Reduced water evaporation
  ✓ Reduced soil erosion
References

http://extension.missouri.edu/explore/agguides/hort/go6956.htm

http://www.extension.umn.edu/distribution/horticulture/components/3296-03.html#02

Master Gardener Core Course 2008. Composting. Prof. Carl Rosen