Composting

Its Recycling…

Naturally

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What is composting?

Using the natural process of decay to change organic wastes into a valuable humus-like material called compost

No meat or dairy that cause odors & attract pests!

Composting -

Speeding up the natural decay process

A compost bin allows you to control

- **Air** (oxygen)
- **Water** (like wrung out sponge)
- **Food** (compostable items)
- **Temperature**

By managing these factors you can speed up the otherwise slow natural decay process

Why compost food scraps, soiled paper and yard waste?

- National Composting Council estimates the average U.S. household generates 650 lb of compostables each year.
- Backyard Composting uses a more conservative estimate of 500 pounds will be composted per resident bin.


• Limited landfill space should be reserved for materials that cannot be recycled or composted
• Garbage handling is the 4th largest expense for many cities.
• Backyard composting reduces those costs.
• Each household composting 500 pounds of waste saves $14.75 a year in tipping fees (at $59 per ton rate).

What do you need to make compost?

- Decomposers – Your composting work crew — bacteria, fungi, actinomycetes, mold, nematodes, protozoa, rotifers & worms — do all the work for you.
- Food for the decomposers Organic materials — food scraps, soiled paper & yard waste — to be composted.
- The right amount of air, water, and warmth to keep the work crew happy.

Where do the decomposers come from?

If you add it, they will come…

- Soil
- Leaves
- Compostables
- Active Finished Compost
- Starters and/or Additives

Each of these will add microorganisms to the compost pile

One teaspoon of good garden soil, especially when compost has been added, contains:

- **100 million bacteria**
- **800 feet of fungal threads**

Which is why soil can activate your new compost pile

Food for Your Decomposers

Your compost workers will thrive if you give them a balanced diet: 25-30 part carbon to 1 part nitrogen.

- Composting is effective if decomposers are fed a mix of higher & lower carbon materials.
- High carbon organic wastes are known as "browns" 30-200 parts carbon to 1 part nitrogen
- Low carbon organic wastes are known as "greens" 10 - 30 parts carbon to 1 part nitrogen
- Mix of food scraps, soiled paper & some leaves or yard waste provide a food balance and aeration.

Food for Your Decomposers

All organic materials will compost, but not all should be added to a backyard compost pile

Organic wastes that <u>should</u> be composted include:

Browns

- Paper towels
- Napkins, tissues
- Leaves, branches
- Egg, nut shells
- Wood chips, sawdust

Greens

- Kitchen Scraps
- Garden Trimmings
- Coffee grounds, tea
- Manure, Hair (any)
- Used potting soil

Materials to avoid…

Avoid organic materials that could cause problems during or after composting

- **Meat, fish, dairy products, cooking oil, fat, grease (create odors, attract pests, potential pathogens)**
- **Hard to kill weeds (bindweed, quackgrass) and weeds that have gone to seed (could infest garden area when compost is used).**
- **Inorganic waste: plastic, metals, chemicals, paints, etc. Unsure? Don't compost it!**

Materials to avoid…

Cat, dog or human waste
(attracts pests, could spread disease)

Diseased or insect ridden plants
(could infect or attack garden plants when compost is used)

Materials to avoid…

- Lime - Increases compost pH and reduces nitrogen in the form of ammonia.
- Wood Ash - Add sparingly to the pile. It will add some potash to compost but will increase pH and nitrogen loss.

Is shredding necessary?

Have greater surface area per unit volume

Allows microbes to get at more of the compostables

Chipping or shredding coarse materials (twigs, stems) will speed up the rate at which they decompose

Is shredding necessary?

but…

Smaller particles will also decrease airflow into the pile

- **May lead to anaerobic conditions**
- **Pile may need to be turned more often**

Bin is Aerobic Composting

- Bins compost using decomposers that need air (oxygen)
- It's the fastest way to make high-quality compost
- Produces no foul odors
- Aerobic decomposers can produce heat
- But adding materials a little at a time doesn't (slow composting)

Large Pile Aerobic Composting and Temperature

- Active composting occurs in the temperature range of 55°F to 155°F
- Pile temperature may increase above 140°F but this is too hot for most bacteria and decomposition will slow until temperature decreases again.

- Need 1 yard+ compostables
  - A thermometer is a nice tool but is not essential for hot composting

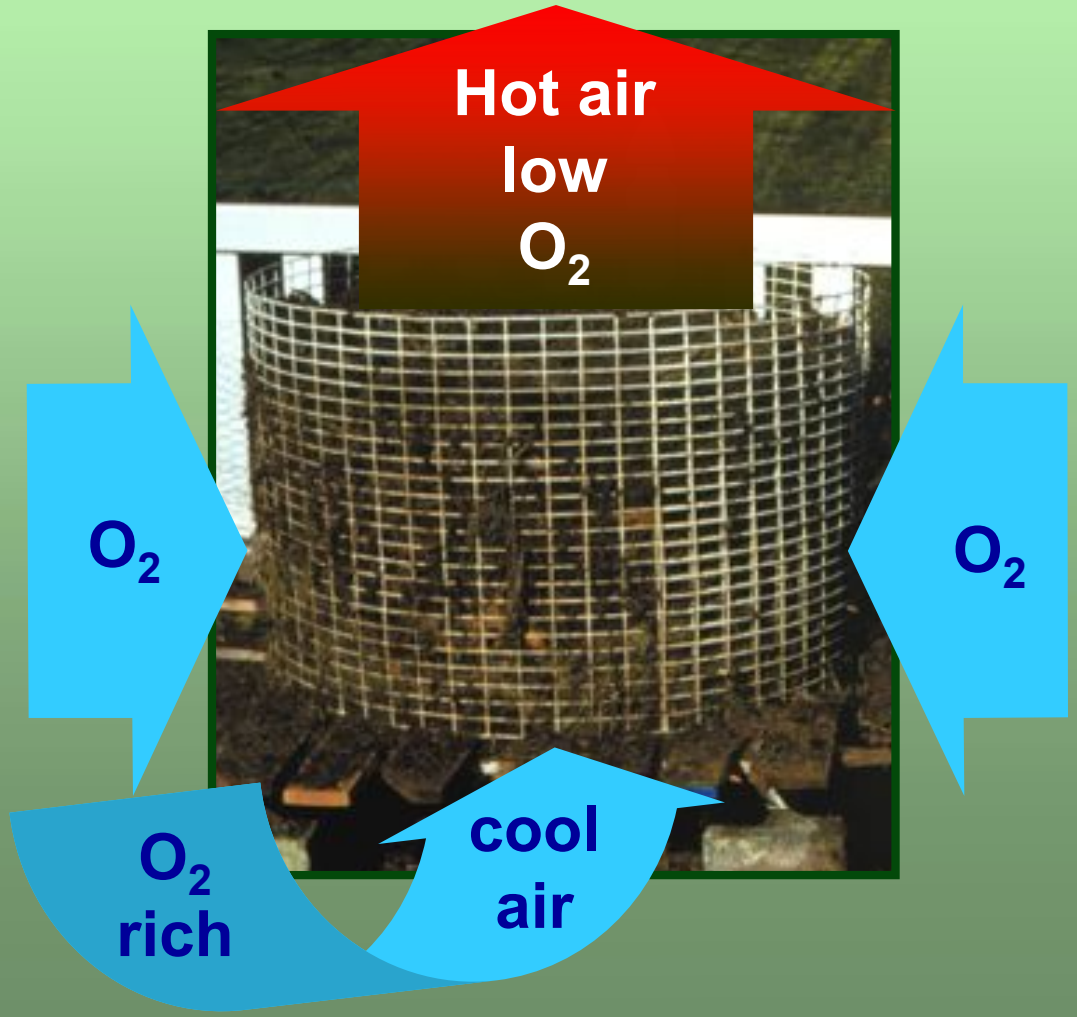
Does my compost pile have to get hot?

- Good compost can be made in a pile that never gets hot, but…
  - Decay will be slower and it will take longer to make compost
  - Not enough air, to little or too much water, or too many browns in the mix could all keep a pile from heating.
- High pile temperature provides the benefits of
  - The most rapid composting
  - Killing pathogenic (disease causing) organisms
  - Killing weed seeds

Getting air to your decomposers

Warm air rising through the pile draws fresh air in from bottom and sides

Wind can stimulate aeration



Pile aeration

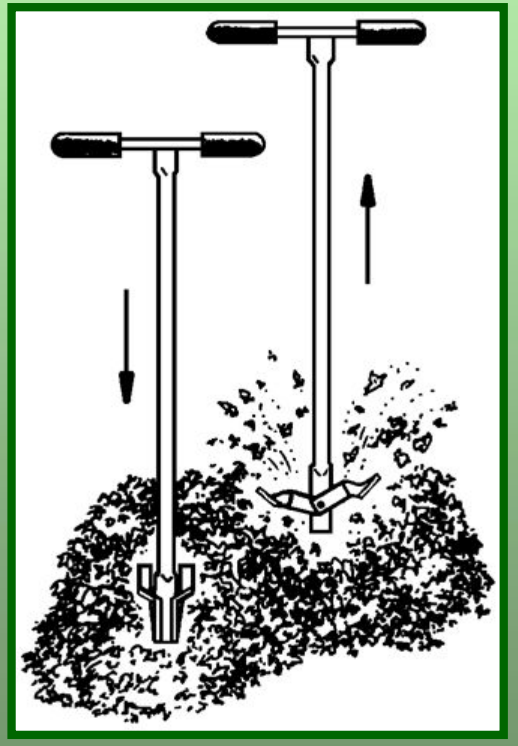
Depends upon adequate porosity

- Porosity is the air filled space between particles
- "Browns" help to maintain good porosity in the pile
- A compacted pile has lost porosity. Aeration can be increased by turning
- Aeration can be increased by inserting sticks, cornstalks, or perforated pipes into or under the bin or pile

Pile aeration

Getting air to your work force by lifting bin off & forking pile back in bin

- Turning the pile mixes fresh air into the pile



- Turning tools can make the job easier

Water

- Rapid decomposition requires optimum water content
  - If too dry, bacterial activity will slow or cease
  - If too wet, loss of air in the pile will lead to anaerobic conditions

- As wet as a squeezed out sponge
- Pile water content should be at 40-60%
- If too dry, add water as you turn the pile
- If too wet, add browns and/or turn the pile

When is compost finished?

Compost is mature when

- The color is dark brown
- It is crumbly, loose, and humus-like
- It has an earthy smell
- It contains no readily recognizable feedstock
- The pile has shrunk to about 1/3 or less of its original volume

Simple tests for finished compost

Bag test: sealing compost in a plastic bag for several days should produce no condensation or foul odor

Germination test: will seeds germinate in the compost? (good test to use if compost will be part of a potting mix)

Where should I put my compost bin?

- Sunny area will help keep the bin warm year-round, but you may need to add water in the summer
- Water available
- Good drainage
- Be a good neighbor - keep bin out of view, no odors
- Adequate work area around the pile
- Area for storing compost

Manufactured bins from Earth Machine & EnviroWorld

Compost Troubleshooting
Odors

Odors are the most frequent, but easily avoidable composting problems.

- **Rotten odor**
  - Putrid smell or rotten egg smell
  - Usually results from anaerobic conditions
  - Excess moisture, compaction
  - Aerate pile, add dry porous material — browns like leaves or cardboard & mix in to absorb moisture of food scraps
- **Ammonia odor**
  - Too much nitrogen (wet greens)
  - Add high carbon material (browns), aerate pile

Compost Troubleshooting
Temperature

Low pile temperature

- Pile too small, cold weather, too dry, poor aeration, or lacks nitrogen (composting stops in bin in the winter)
- Make pile bigger or insulate sides, add water, turn the pile, add greens or manure

High pile temperature

- Pile too large, insufficient ventilation
- Reduce pile size, turn

Compost Troubleshooting

Pests: raccoons, rats, moles

- Presence of meat, fish, dairy or fatty food waste cause rotten odors attracting pests
- Remove meats and fatty foods, cover with sawdust or leaves, turn the pile
- Earth Machine & EnviroWorld bins are animal-proof. To help further:
  - Dig down a few inches below ground level
  - Turn door toward wall, tree or other object
- Only issue we've heard of was a raccoon that figured out how to open the door

Benefits of compost
Promotes soil health

- Supplies organic matter to soil
- Attracts earthworms
- Stimulates beneficial soil microorganisms
- Increases soil water retention capacity
- Increases soil nutrient retention

Benefits of compost
Promotes soil health

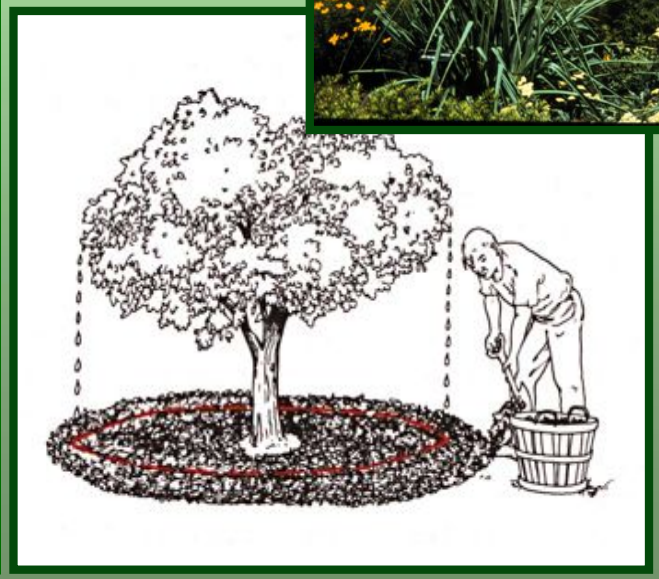
- Improves soil tilth and friability
- Improves soil drainage
- Amends heavy clay soils
- Suppresses soil-borne plant pathogens (diseases)
- Compost is considered a soil amendment, but provides nitrogen & 40 trace nutrients

Using finished compost

- **Soil amendment for flower & veggie gardens**
  - **Be sure that compost is mature, has an earthy smell (no ammonia or rotten smell), looks dark and crumbly with no recognizable feedstock**
  - **Compost improves soil health when mixed in the top 4 to 12 inches**
  - **Will improve water and nutrient retention of sandy soils**
  - **Will loosen compacted clay soils making them more friable and water absorbent.**

Using finished compost

- **Surface mulch in the garden/landscape**
  - Maximum 3” depth
  - Start 3-4” from trunk
  - Extend out to dripline
- **Mulch provides**
  - Protection from temp extremes
  - Slows moisture loss from soil
  - Provides some slow release nutrients



Using finished compost

- **Lawn topdressing**
  - Be sure compost is very mature to avoid harming the lawn
  - Use fine (screened) compost, ¼" depth raked over lawn
  - Best if lawn is cored before applying compost
  - Retains moisture, supplies slow release nutrients, prevents soil compaction
- **Potting mix**
  - Compost must be very mature to avoid injury to plants
  - Use fine textured compost (screened through ¼ inch hardware cloth)
  - Mix no more than 1/2 compost by volume