Composting

It’s Recycling…

Solid Waste District
Darke County

Naturally

What is composting?

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

Composting -

Speeding up the natural decay process

A compost pile or bin allows you to control

- Air (oxygen)
- Water
- Food
- Temperature

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

Why compost yard and kitchen wastes?

- To save money and reuse resources!
- The National Composting Council estimates the average U.S. household generates 650 lb of compostables every year.

Reduce, Reuse & Recycle Yard Materials at Home

The most economical way to manage yard materials is "On Site," where they are generated by:

- ✓**Composting**
- ✓**Mulching**
- ✓**Grass-cycling**
- ✓**Smart landscape choices**

Benefits of Compost

Promotes soil health

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

Benefits of Compost

Promotes soil health

- Improves soil tilth and friability
- Improves soil drainage
- Loosens heavy clay soils
- Suppresses some soil-borne plant pathogens (diseases)

Benefits of Compost

Saves You $ & Tax dollars

Saves Money on:

- **Soil amendments, like peat moss**
- **Fertilizers & pesticides reducing need**

Saves Tax Dollars on:

- **Municipal costs for curb side pick up & drop-off sites for yard materials**

Benefits of Compost

Plant nutrients

Compost is not a fertilizer, but does contain plant nutrients

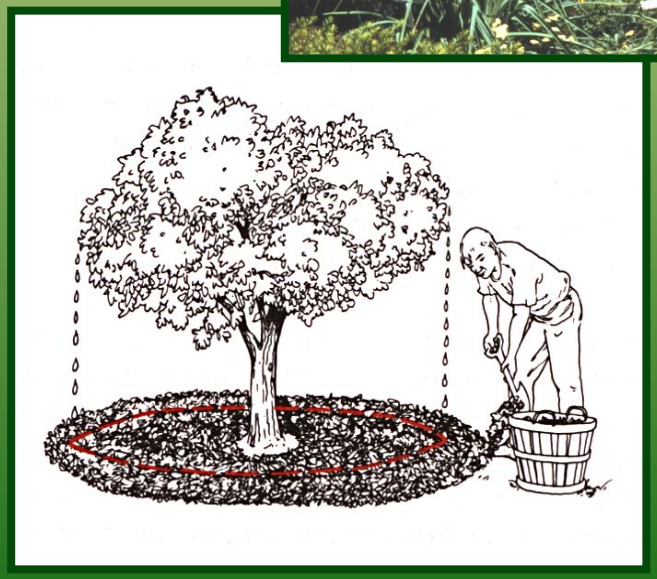
- Nitrogen and phosphorus are mostly in organic forms
  - Released slowly to plants
  - Not readily leached from the topsoil
- Compost contains many trace nutrients that are essential for plant growth

Using finished compost

- **Soil amendment**
  - Be sure that compost is mature, has an earthy smell (no ammonia or rotten smell), looks dark and crumbly with few recognizable starting materials
  - Compost improves soil health when mixed in the top 4 to 6 inches (work in no more than a 2” layer of compost)
    - Will improve water and nutrient retention of sandy soils
    - Will loosen compacted clay soils and make them more friable

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, 1/4” depth raked over lawn
  - Best if lawn is cored before applying compost
  - Retains moisture, supplies slow release nutrients, prevents soil compaction

Using finished compost

- **Potting mix**
  - Compost must be very mature to avoid injury to plants
  - Use fine textured compost
  - Mix no more than 1/3 compost by volume
- **Compost Tea**
  - Soak porous bag filled with compost in water
  - Use liquid to water yard, garden & houseplants

What do you need to make compost?

- Decomposers – Your composting work crew. These are the microbes (mainly bacteria and fungi) that do all the work for you.
- Food for the decomposers The organic materials to be composted
- Oxygen, water, and warmth in the right amount to keep the work crew happy

Where do the decomposers come from?

If you build it, they will come…

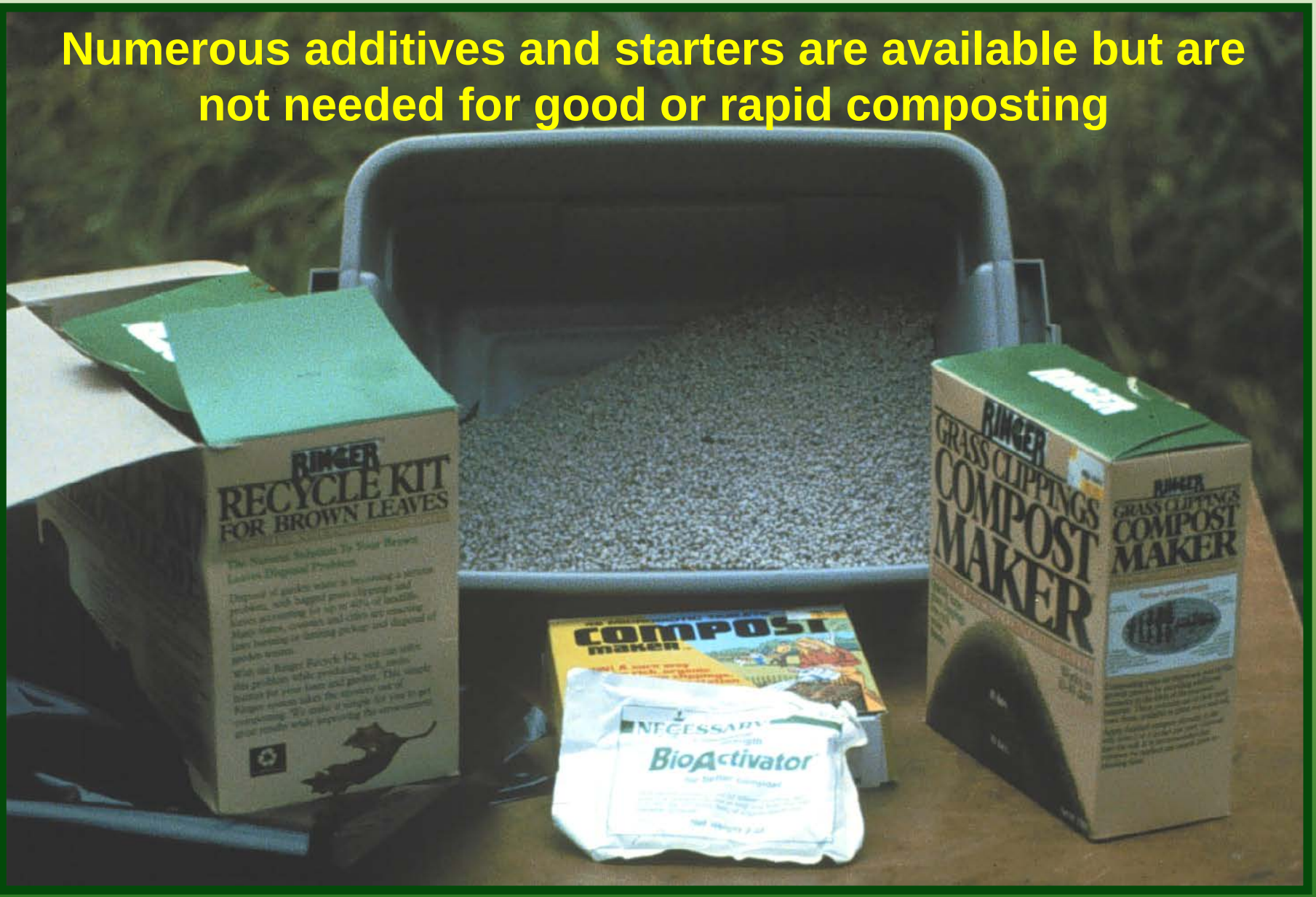
- Soil
- Leaves
- Food scraps
- Manure, and
- Finished compost

Each of these will add microorganisms to the compost pile.

One teaspoon of good garden soil to which compost has been added contains:

- 1[illegible]
- 80[illegible]

Numerous additives and starters are available but are not needed for good or rapid composting



Macro Organisms

Macro organisms help finish the compost process.

Look for these critters:

- **Earthworms**
- **Sow bugs**
- **Mites**
- **Springtails**
- **Beetles**
- **Millipedes & Centipedes**
- **Even Snails and Slugs**

What is the best 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:

And more!

What other foods will your decomposers eat?

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

- **Used potting soil**
- **Egg shells**
- **Coffee grounds & filters**
- **Hay**
- **Most weeds/garden debris**
- **Manure from herbivores - plant eaters (hot compost piles only)**
- **Paper, cardboard**
- **Small brush, twigs and untreated sawdust**
- **Hair, fur, natural fibers & feathers**
- **Up to 10% pine needles**

Materials to avoid…

Avoid organic materials that could cause problems during or after composting

- **Oil, fat, grease, meat, fish or dairy products**
- **Hard to kill weeds (bindweed, quackgrass) and weeds that have gone to seed (could infest garden area when compost is used)**
- **Charcoal briquette ash – chemically treated**
- **Thorny branches**
- **Whole branches or logs**
- **Treated Lumber**

Materials to avoid…

Cat or dog 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 & promotes ammonia odor problems)
- Wood Ash, add sparingly to the pile (will add some potash to compost but will increase pH and ammonia odor problems)
- Some Pesticide Treated Grass & Weeds, as they do not all break down quickly. Never use these greens as mulch; it may kill trees and other plants.

Is shredding necessary?

- Have greater surface area per unit volume
- Allows microbes to get at more of the food

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**

More about food for your decomposers

Your compost workers will thrive if you give them a balanced diet.

Composting will be most rapid if the decomposers are fed a mix of carbon rich and nitrogen rich materials.

- **Carbon rich organic wastes are known as "browns"**
- **Nitrogen rich organic wastes are known as "greens"**

Browns

High carbon materials such as

- Leaves (30-80:1)
- Straw (40-100:1)
- Paper (150-200:1)
- Sawdust (100-500:1)
- Animal bedding mixed with manure (30-80:1)

Greens

High nitrogen materials such as

- Vegetable scraps (12-20:1)
- Coffee grounds (20:1)
- Grass clippings (12-25:1)
- Manure
  - Cow (20:1)
  - Horse (25:1)
  - Poultry (10:1), with litter (13-18:1)
  - Hog (5-7:1)

Browns

- Decay very slowly
- Coarse browns can keep pile aerated
- Tend to accumulate in the fall
- Tie up nitrogen in soil if not fully composted
- May need to stockpile until can mix with greens

Greens

- Decay rapidly
- Poor aeration – may have foul odors if composted alone
- Tend to accumulate in spring and summer
- Supply nitrogen for composting
- Best composting if mixed with browns

Aerobic composting
"Hot Pile"

- Composting with decomposers that need air (oxygen)
- The fastest way to make high quality compost
- Produces no foul odors
- Aerobic decomposers produce **heat**

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.

- A thermometer is a nice tool but is not essential for good composting

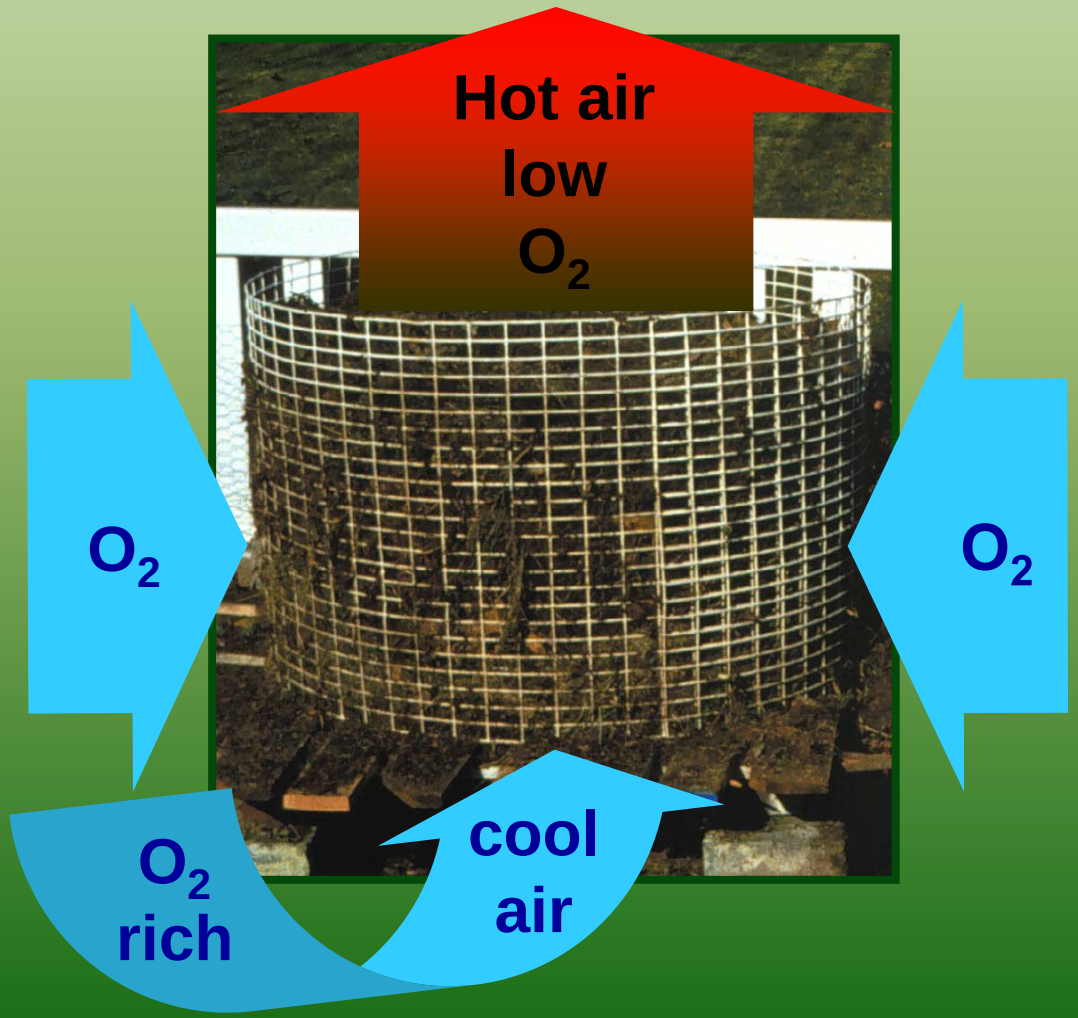
Does my compost pile have to get hot?

- 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, too 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

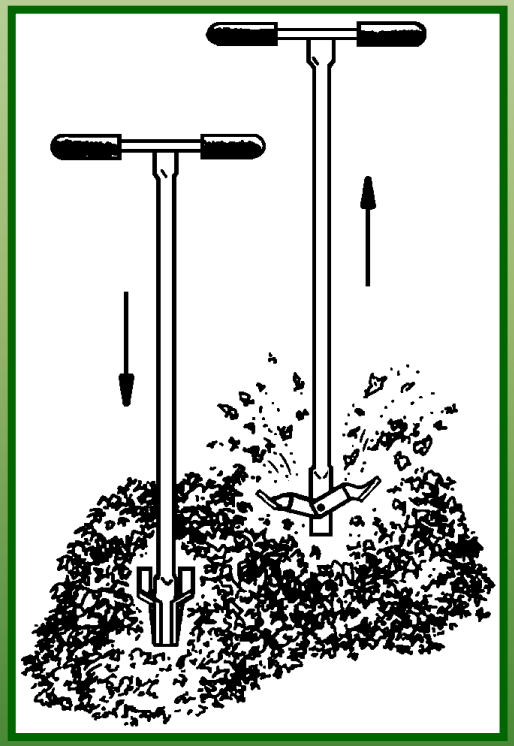
- Porosity is the air filled space between particles
- “Browns” help to maintain good porosity in the pile
- A compacted pile has lost porosity, can be increased by turning

- **Aeration can be increased by inserting sticks, cornstalks, or perforated pipes into or under the pile**

Pile aeration

Getting air to your work force

- Turning the pile mixes fresh air into the pile



- Turning tools may 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

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

Taking care of your compost pile

- The most rapid composting is achieved by
  - Mixing browns + greens (3 parts + 1 part)
  - Watering as build pile; keep damp
  - Turning pile regularly
- When pile no longer heats after turning , allow it to cure (stand without turning) for at least 4 weeks before using compost

Making a "Hot" Compost Pile (Instructions for active composters)

- Turn the pile every 5 to 7 days
  - move outer material to the pile center
  - add water if needed
- During the first few days and weeks temp should reach 130 - 140^{o}F
- After about 4 weeks less heat will be produced and compost will maintain at lower temps (100^{o}F)

Making a "Hot" Compost Pile (Instructions for active composters)

- After about 4 more weeks the pile will no longer heat after turning and volume will be about 1/3 of original.
- Allow the pile to cure (stand without turning) for 4 more weeks before using the finished compost.

Making a "Cool" Pile

(Instructions for laid-back composters)

- Build compost pile as materials accumulate
- Water and turn pile when possible
- Dig finished compost from bottom or center of pile in 6-12 months.
- Get a full batch in 1-2 years

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 materials
- The pile has shrunk to about 1/3 of its original volume & doesn't reheat

Simple tests for finished compost

Bag test: sealing compost in a plastic bag for several days should produce no 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 pile?

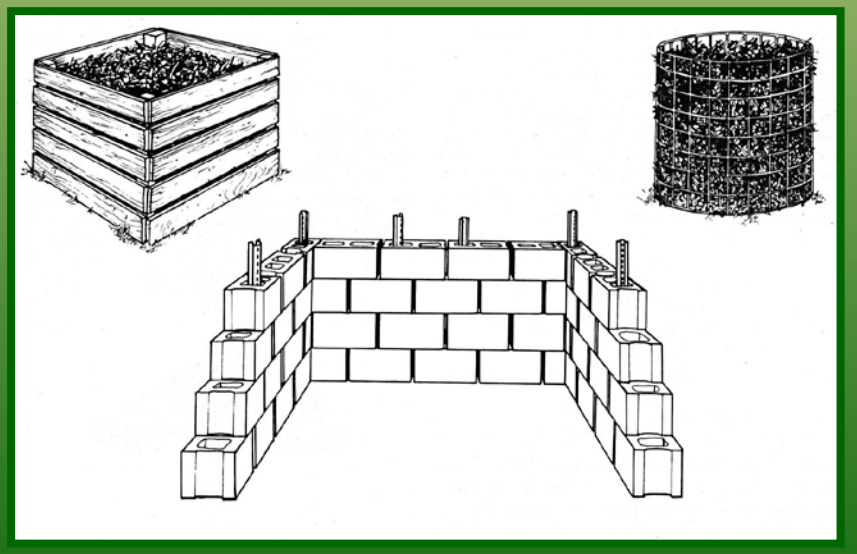
- Sunny area is fine, but shaded spot will help prevent drying out in summer
- Avoid areas that interfere with lawn and garden activities
- Adequate work area around the pile
- Area for storage of browns
- Within reach of a garden hose

Considerations for locating the compost pile

- Good drainage
- Away from any wells
- Near where finished compost will be used
- 2 feet away from a building
- Be a good neighbor
  - Make your composting area attractive
  - Don’t place too close to neighbors

Bin/pile construction

- Ideal size is approximately a 3 foot cube
  - Promotes sufficient aeration
  - Retains sufficient heat to maintain warm temps
  - Piles larger than 5 x 5 x 5 feet are difficult to turn and tend to become anaerobic in the center



Manufactured bins

Compost Troubleshooting
Odors

Odors are one of the most frequent but easily avoidable composting problems.

Rotten odor

- Putrid smell or rotten egg smell
- Usually results from anaerobic conditions
- Excess moisture, compaction
- Turn pile, add dry porous material (browns), cover kitchen scraps

Ammonia odor

- Too much nitrogen (greens)
- Add high carbon material (browns), turn pile

Compost Troubleshooting
Temperature

Low pile temperature

- Pile too small, cold weather, too dry, poor aeration, or lacks nitrogen
- 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
Animals

Pests: raccoons, rats, insects

- Presence of meat scraps or fatty food waste, rotten odors
- Remove meats and fatty foods, cover with sawdust or leaves, turn the pile
- Compost in an animal-proof bin
  - Covered bin, trash can bin, cone bin, or barrel bin
  - Wire mesh sides and floor (1/4” – 1/2” openings)
- Use worm composting (vermicomposting) for food scraps

Grasscycling

Cut lawn high and let it lie!

- Leave free nitrogen rich clippings on lawn
- Mow to 2 ½ to 3 ½ “ high to promote deeper roots & shade out weeds
- Cut no more than 1/3 of height at a time
- Will not cause thatch
- Use a sharp lawn mower blade

Wise Landscape Choices

Reduce Yard Materials

- Check Hardiness Zone
- Match soil type to plant
- Know mature plant size
- Check sun/shade needs
- Buy healthy plants
- Match salt tolerance
- Buy disease resistant varieties

Questions??????

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