Backyard Composting

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What is composting?

Composting is simply speeding up the process of decomposition of organic materials by microorganisms

Compostable Kitchen Bags

- easy, odor-free, and clean
- made from corn starch and vegetable oils
- breakdown 45 days

Why compost?

- Landfills are closing to yard waste
- Landscape refuse accounts for up to 20% of landfill wastes
- Residents could reduce their total annual volume of wastes by 35% if they composted at home.

Why compost?

Knowledge you are making a difference

- helping prevent pollution
- saving natural resources
- curbing climate change
- reducing your “environmental footprint”on the Earth

Reasons for Backyard Composting

- bans on outdoor burning
- practical and convenient way to handle yard refuse
- easier and cheaper than bagging

Reasons for Backyard Composting

- supplies nutrients and organic matter
- buffers soil from chemical imbalances
- easier to handle and mix with the soil
- free fertilizer

Reasons for Backyard Composting

reduced water use and irrigation costs

- compost holds 20X the water of soils low in organic matter

Healthy Soils, Healthy Plants

- supports healthy plant growth – protects plants from disease
- reduce need for landscape chemicals
- prevents erosion
- improves soil structure and resists compaction

Decomposition is Important

Adding undecomposed materials directly to the soil without first composting

- microbes will compete with plants for soil nitrogen
- results in poor plant growth and pest problems

Composting Process

Composting consists of four components

- aeration
- moisture
- temperature
- particle size

Composting Process: Aeration

Oxygen is required for some microbes to decompose organic wastes efficiently.

- called aerobes
- when not enough oxygen is available, aerobes die

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Composting Process: Aeration

- Mixing the pile once or twice a month provides the necessary oxygen and significantly hastens the composting process.

Composting Process: Aeration

Some microorganisms decompose organic wastes in the absence of oxygen

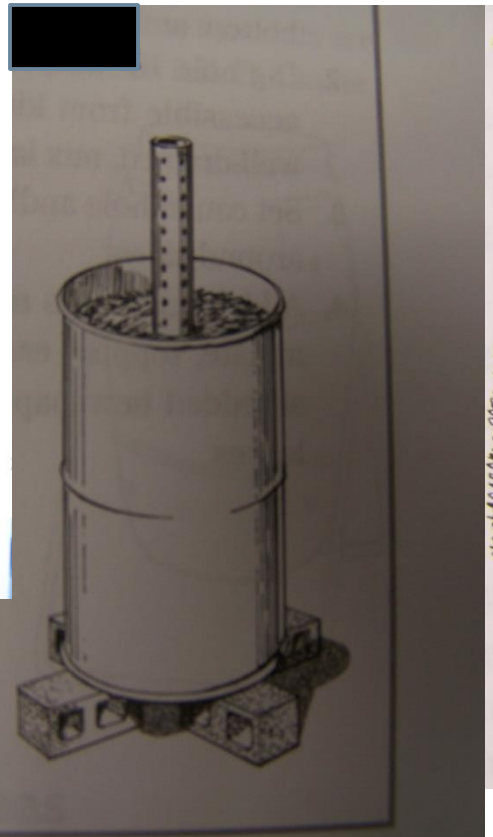
- called anaerobes
- the process is slowed by up to 90%
- foul odors may develop
  - hydrogen sulfide (rotten eggs)
  - cadaverine
  - putrescine

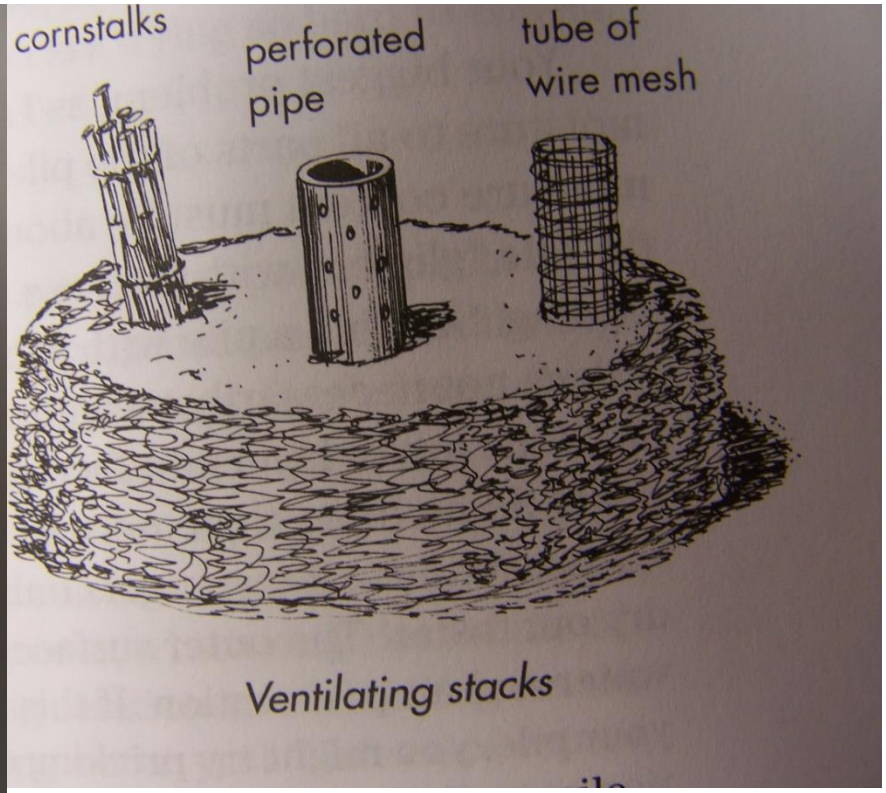
Composting Process: Aeration

A pile that is not mixed may take three to four times longer to decompose.

number one problem in composting is lack of oxygen*

Aeration to reduce odor





Composting Process: Moisture

proper moisture will feel like a well-wrung sponge

number two problem in composting is incorrect moisture*

Composting Process: Moisture

Under 40% is too little moisture

- slows decomposition

Over 60% is too much water

- forces out the air, leading to anaerobic conditions
- slow down the process
- causes foul odors

Small Particle Size: wood

- The smaller the size of the refuse particle, the more quickly the microbes can consume it.
- Grinding the organic material before composting greatly reduces decomposition time.

Composting Process: Particle Size

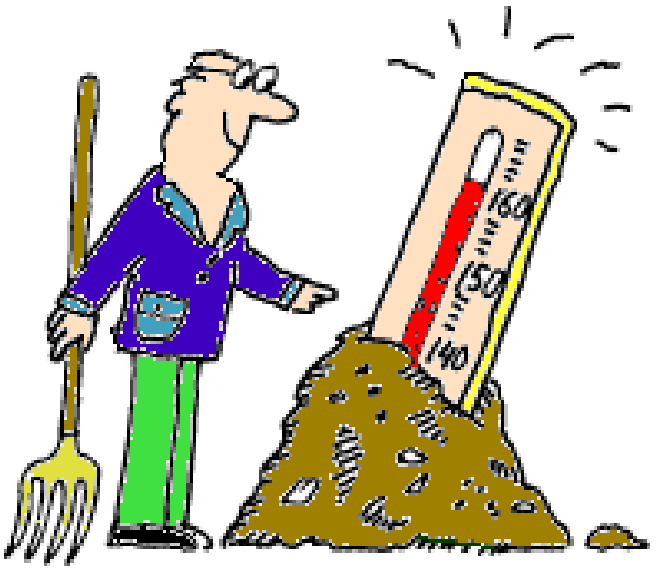
- A low cost method of reducing the size of fallen tree leaves is to mow the lawn before raking.
- Windrowing the leaves into long narrow piles one foot high will make the shredding process more efficient.
- If the mower has an appropriate bag attachment, the shredded leaves can be collected directly.

temperature

As they eat, organisms generate a large amount of heat, which raises the temperature of the pile and speeds up decompositon.

On cool mornings, you may see steam rising from the heap.

temperature



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A minimum pile temperature of 130 to 150°F for <u>at least</u> 3 days is necessary to destroy weed seeds and plant pathogens

(15 days is more effective)

temperature

Very few homeowners can create a “hot” pile, with temperatures high enough to kill pathogens and weed seeds.

Composting Process: Temperature

If the pile does not heat up, the cause may be one or more of the following:

- too small a pile
- not enough nitrogen
- lack of oxygen
- too much moisture
- not enough moisture

Materials NOT for Composting

- adding lime to pile will convert nitrogen to ammonia and hasten the loss of nitrogen from the pile
- lime may hasten decomposition, but not worth the loss of nitrogen
- South Dakota soils already alkaline, no need to add calcium, dolomite, or lime

Materials NOT for Composting

Meat scraps

Fats, oils, grease

Pet and/or human feces

Diseased plants

Weeds when seed head present

Materials NOT for Composting

- Walnuts and walnut leaves
  - allelopathic (toxic to some plants)
  - use small amounts
- Treated grass clippings
  - most lawns treated for dandelions
  - many lawns treated for insect control

Materials NOT for Composting

Ash from your charcoal grill

- excessive levels of sulfur and iron, enough to be toxic to your plants
- coal decays so slowly it is found in archaeology digs

Large chunks of anything

- corn sheafs, brush, or wood chips

Compost Materials

- You can burn the peels of fruits to create ash, which releases the potassium quicker
- Wood ash not only breaks down into potash, it is also a pest deterrent.
  - unfortunately, it will also leach out the nitrogen from manure
  - add to manure later

Suitable Compost Materials

“browns”

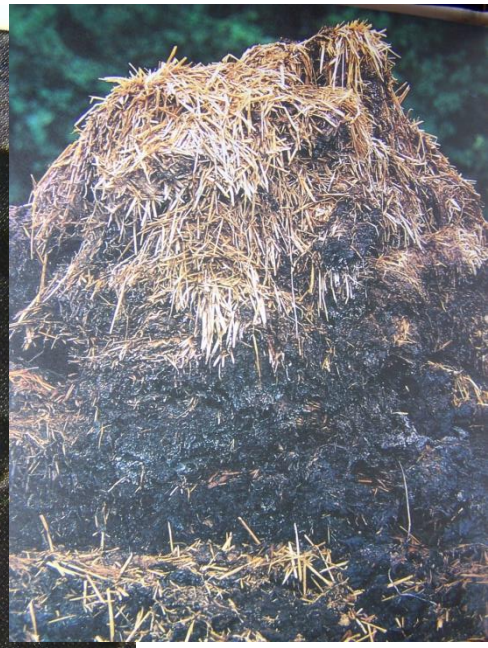
- dried leaves
- twigs
- newspapers
- Straw
- Sawdust

“greens”

- grass clippings
- kitchen food scraps
- yard trimmings
- green plant debris

Suitable Compost Materials

Suitable Compost Materials



Starting the Compost Pile

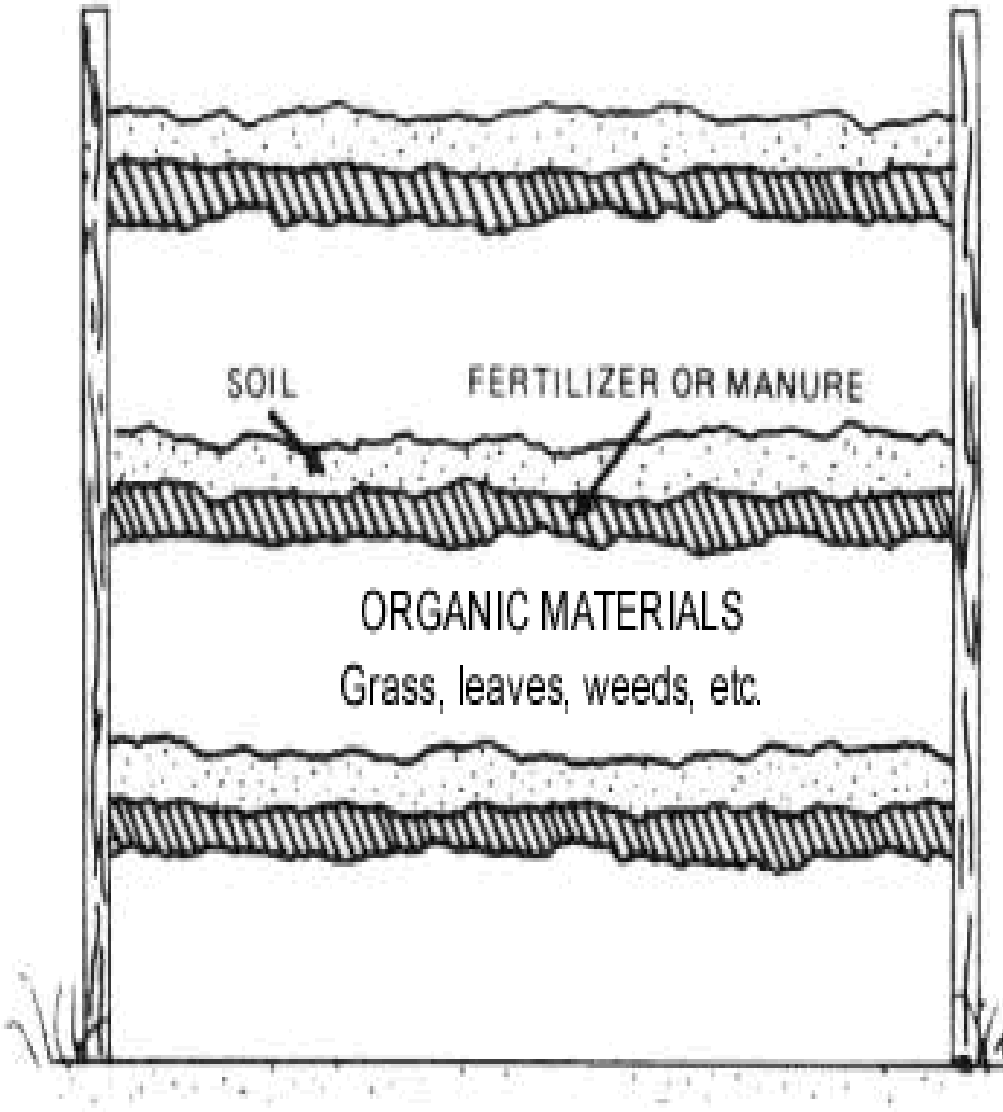
- coarser materials decompose faster in the bottom layer.
- allows air circulation around the base of the pile creating a chimney effect that will take air up through the pile and heat it up

Starting the Compost Pile

Bottom coarse matterial.

Then layer each of organic waste, soil and fertilizer.

Repeat until the pile is completed.



Starting the Compost Pile

- Pile up to about five feet high
- Moisten all layers as they are put in the pile - watered until moist, but not soggy.
- Finish pile off with six inches of straw or hay, with a scooped out basin on top to catch rainwater.

using browns & greens

Equipment

Needed

- Gloves
- Pitchfork
- Hose or watering cans
- Pruning shears
- Flat shovel (not spade)
- Wheelbarrow

Not needed

- Aerators
- Saws, lopping shears, and hedge clippers
- Screens

Free workers do decomposition

Major players are mircroorganisms

- bacteria
- fungus
- actinomycetes

the pleasant, earthy smell comes from actinomycetes

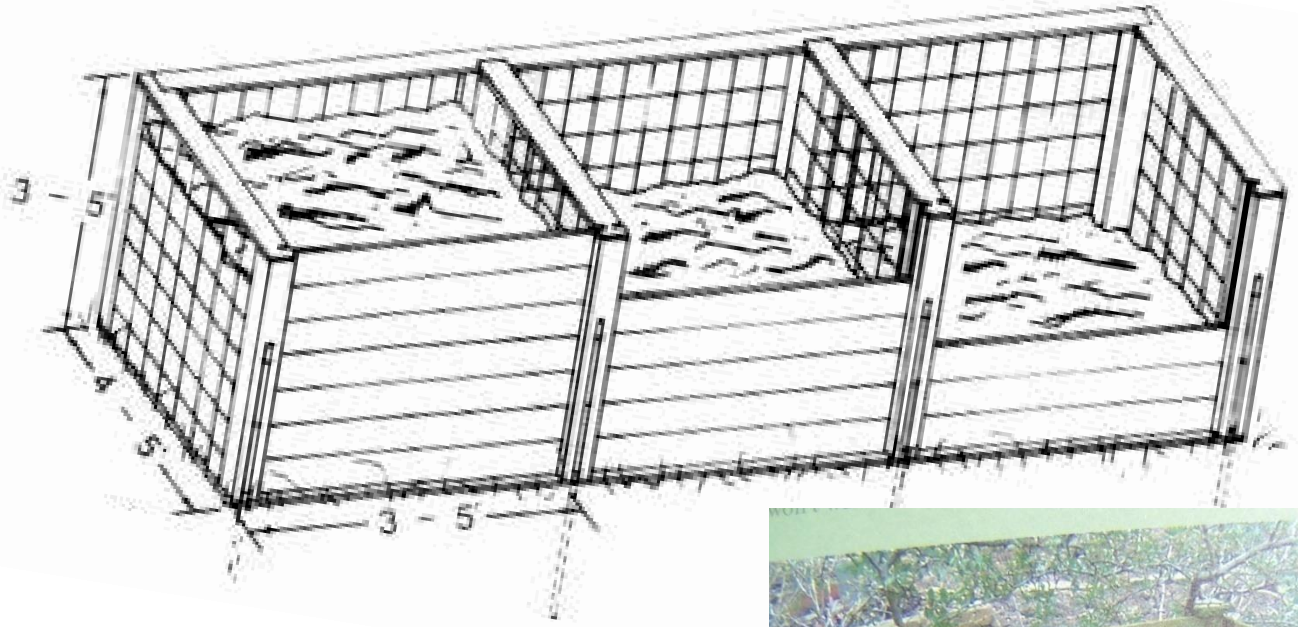
Free workers do decomposition

- Macroorganisms help
  - worms
  - pillbugs (also called sowbeetles)
  - centipedes
  - other insects running around and in the piles
  - nematodes

Composting Structures

Composting Structures

- contain the pile
- save space
- hasten decomposition
- keep the yard looking neat
- can consist of a variety of materials
- can be as simple or complex as desired.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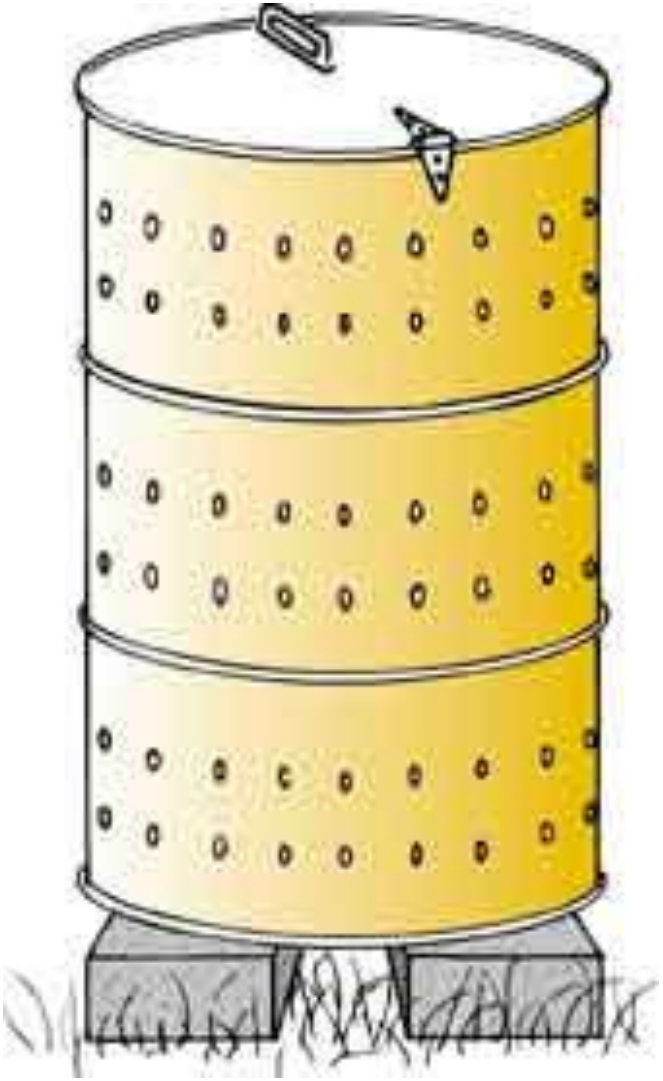

Any metal or plastic barrow or drum can be drilled with holes to increase aeration.

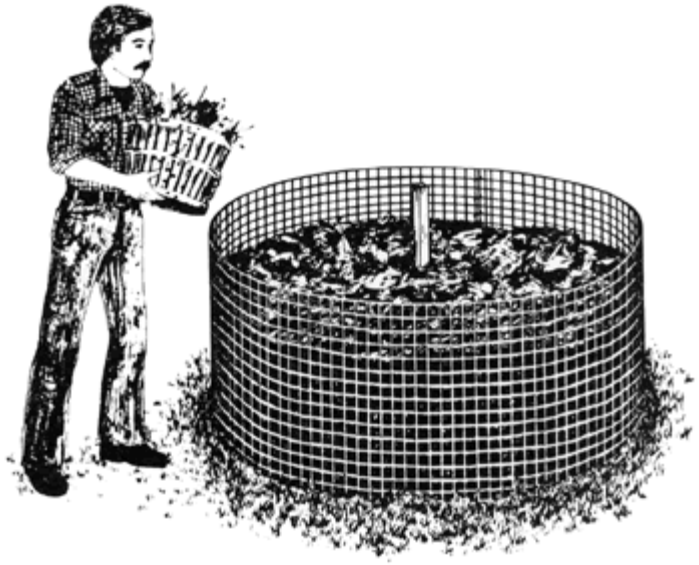

Photo by Wayne J. McLaurin and Gary L. Wade Extension Horticulturists in Georgia

Georgia's Guide to Managing Organic Landscape Refuse

Horticulture 1 Circular 816 Reprinted June 1999

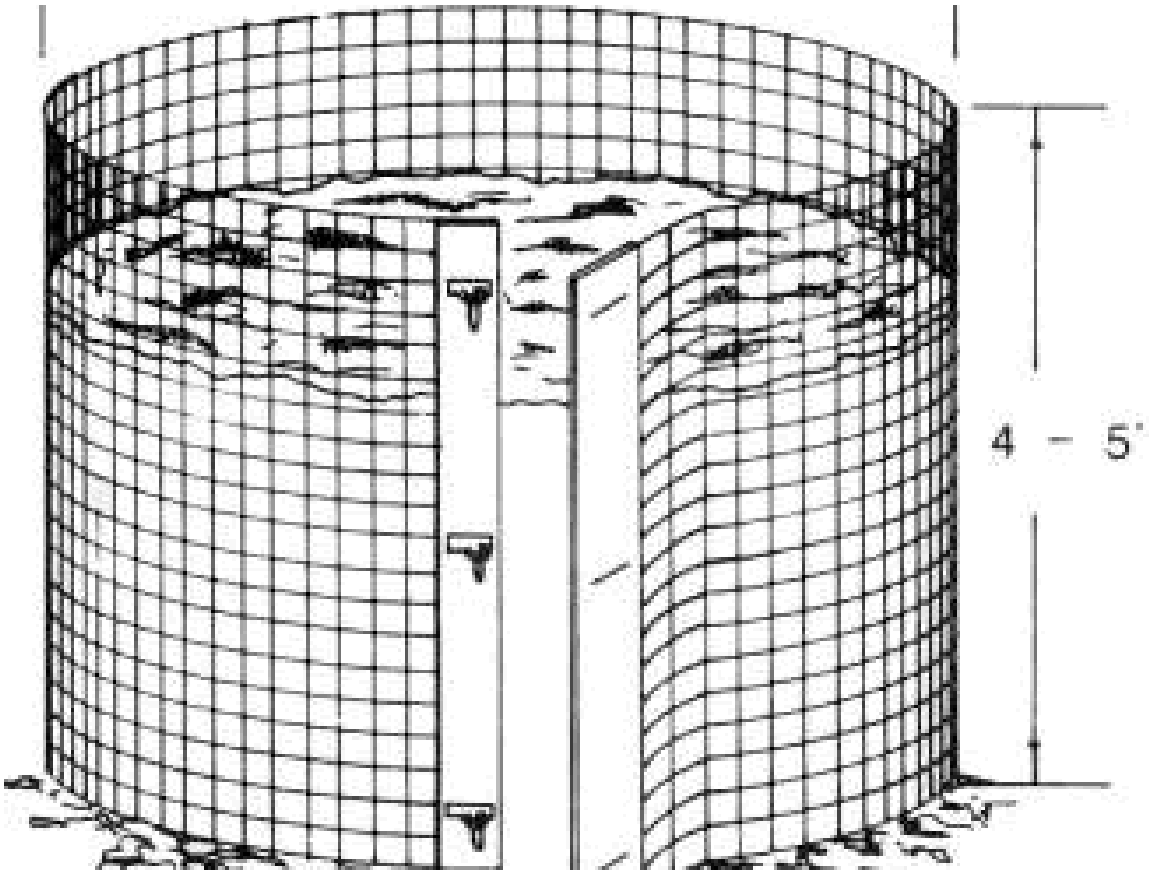

Figure 2

Chicken wire or other finer weaves of wire make cheap, easy to make, portable areas to hold the compost “pile”.

Compost Bin Structures

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other structures

- no one structure is best. Most are for the city dweller wanting an easy way to make small amounts quickly

- Invent your own, or consult one of the several new books on composting.

Location of compost piles

- close to where it will be used - near the garden or kitchen
- where it will not interfere with activities in the yard
- where the sight and smell will not offend neighbors
- in partial sunlight help (to heat the pile)

where NOT to put compost piles

- the more wind and sun to which the pile is exposed, the more water it will need

- do NOT place piles against any buildings – the moisture may cause problems.

where NOT to put compost piles

- sloped areas may cause the pile/bin to tip over
- don’t place on non-porous surface – this inhibits decomposition
- Stay at least 3 feet away from large trees – the excess nitrogen runoff may affect them

Maintaining the Compost Pile

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If the pile does not heat up, the cause may be one or more of the following:

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- not enough nitrogen
- lack of oxygen,
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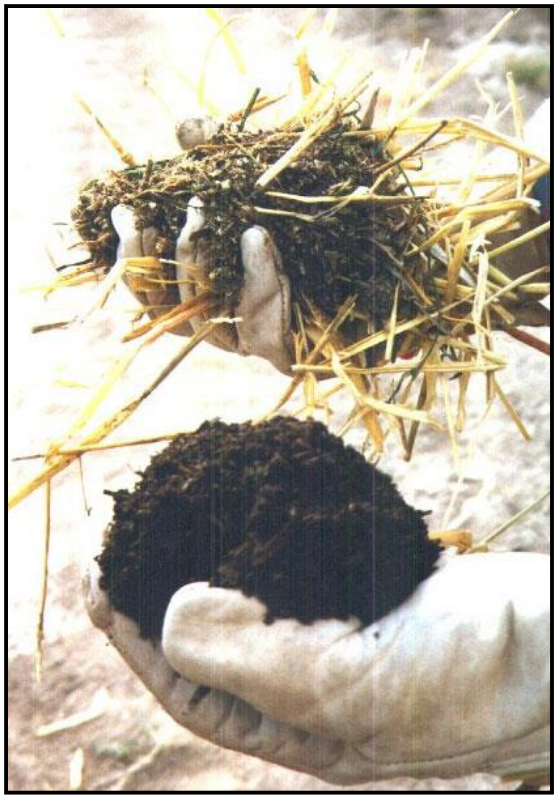

Troubleshooting guide to composting problems.

Symptoms / Problems

The heap is damp and sweet smelling but still will not heat up.

Solutions

Lack of nitrogen. Mix in a nitrogen source like fresh grass clippings, fresh manure, or bloodmeal.

Troubleshooting guide to composting problems.

Symptoms / Problems

The compost is damp and warm only in the middle.

Solutions

Too small. Collect more material and mix the old ingredients into a new pile.

Troubleshooting guide to composting problems.

Symptom / Problem

The compost has a bad odor.

Solution

1. Not enough air. Turn it.
2. Add browns (dry material) if the pile is too wet.
3. Minimize odor by covering pile with layer of dirt or finished compost.

Troubleshooting guide to composting problems.

Symptoms / Problems

The center of the pile is dry.

Solutions

Not enough water. Moisten and turn the pile.

Troubleshooting guide to composting problems.

Symptoms / Problems

Pile never finishes.

Solutions

Continuously adding materials will keep starting the process over each time.

Start a second pile and allow the first pile to finish.

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