



Composting for Home Gardeners



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What is composting?



Controlling the natural process of decay to transform organic wastes into a valuable soil amendment called compost.



Why compost?

Waste management

- Yard waste banned from landfills
- Encourages responsibility for your waste
- Reduces need for municipal collection

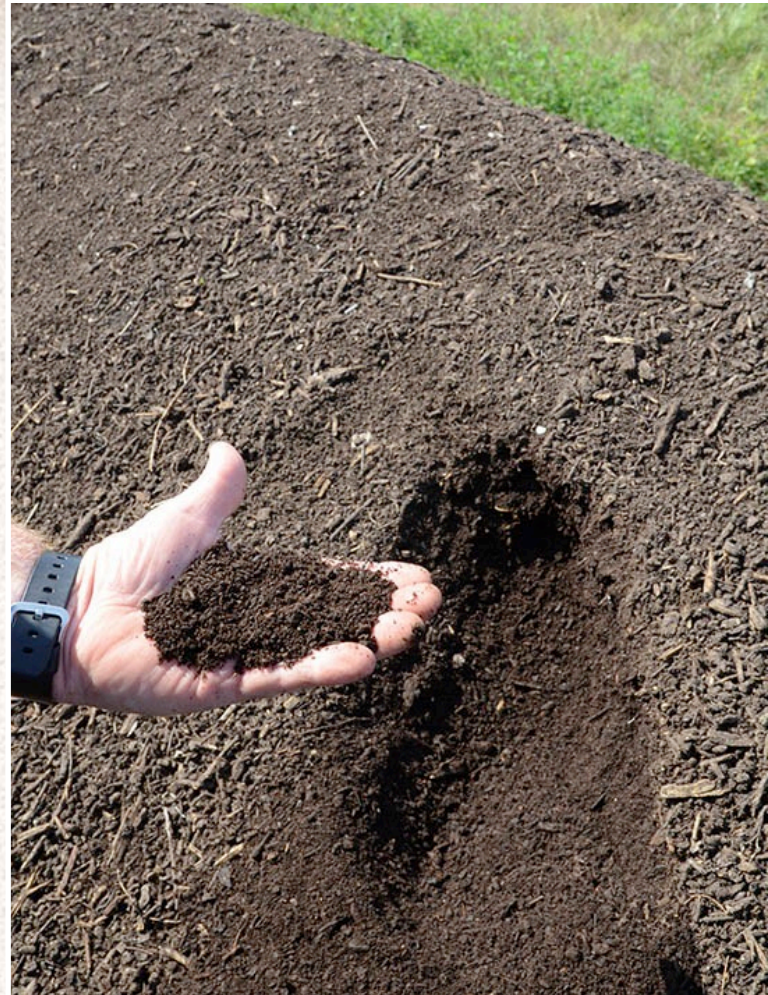
Finished Compost

- Valuable soil amendment
- Healthy soil leads to healthy plants
- Save \$



Benefits of adding compost to soil

- **Supplies organic matter**
- **“Lightens” heavy soils**
- **Improves moisture retention in sandy soils**
- **Contains humus – “soil glue”**
- **Improves soil structure**



Benefits of adding compost to soil

- **Encourages vigorous root growth**
- **Allows plants to more efficiently utilize nutrients**
- **Enables soils to retain nutrients**
- **Buffers soil pH**
- **Supplies beneficial microorganisms**
- **Feeds soil life**



How is compost made?

Natural process:

Biological decomposition of organic matter in the presence of oxygen

Human influenced:

We can speed up or slow down the process



Microbes do the work

- Bacteria (including actinomycetes) and fungi
- Chemical decomposers – enzymes
- Found in:

- Soil
- Leaves

- Food scraps
- Manure

- Finished compost

Are compost
starters
needed?

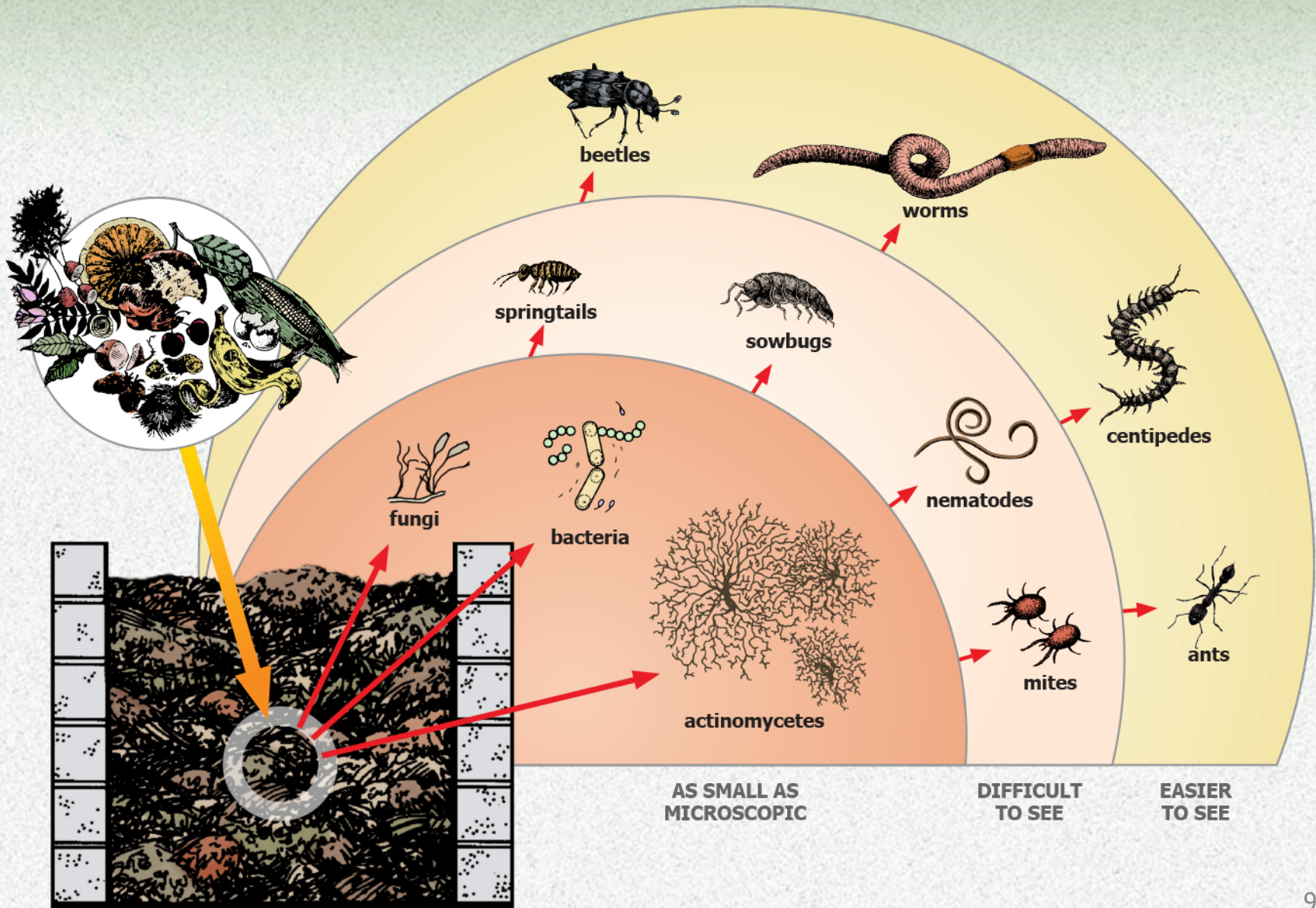


One teaspoon of good garden soil to which compost has been added may contain:

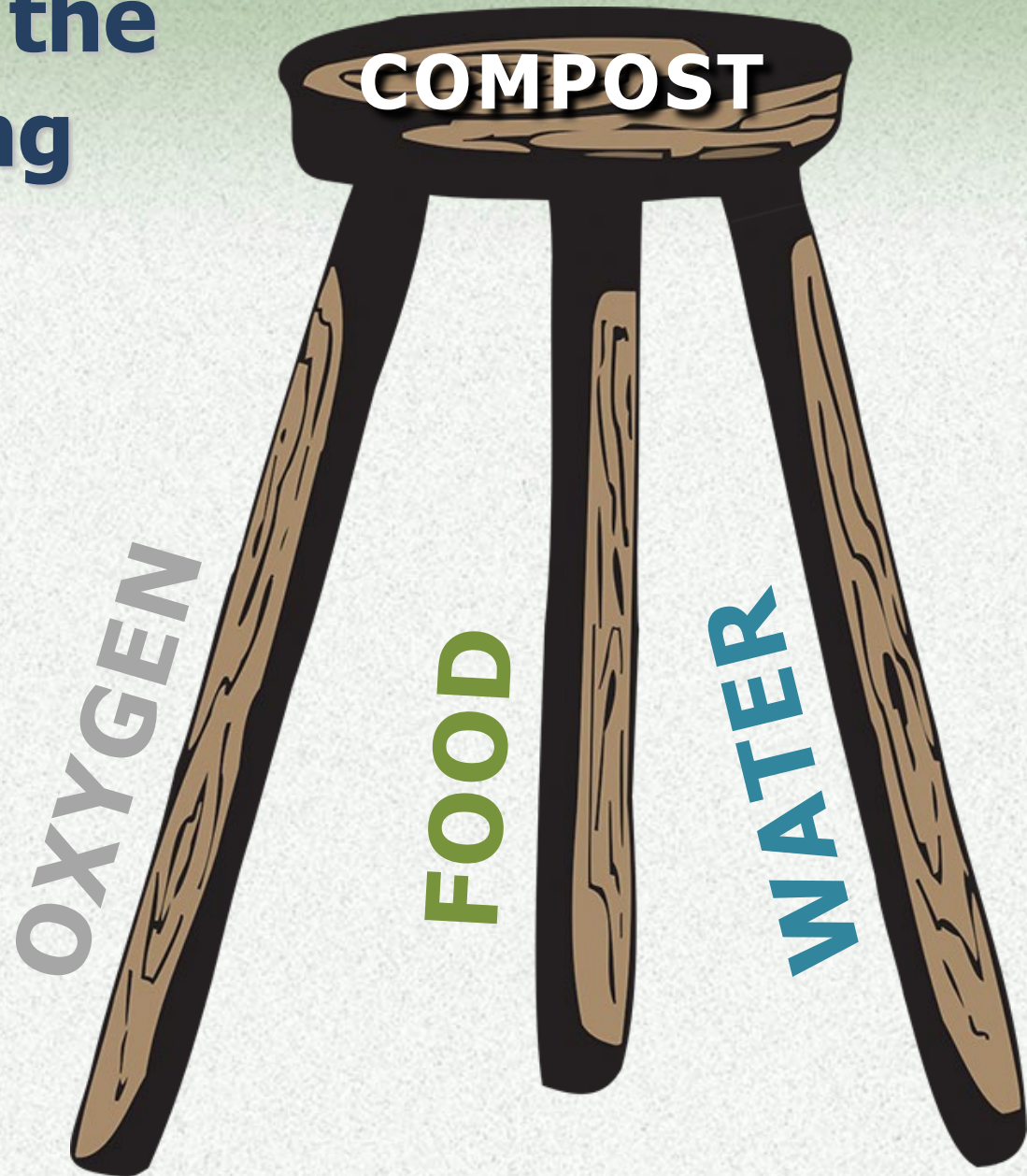
- 100 million bacteria
- 800 feet of fungal threads



Macroorganisms



Needs for the composting process



Acceptable materials – “food for decomposers”

- Leaves, grass clippings and yard debris
- Kitchen scraps: vegetable and fruit peels, coffee grounds and egg shells
- Used potting soil
- Most weeds and garden debris
- Paper and cardboard
- Sawdust, hay and straw
- Manure from herbivores
- Hair, fur and other natural fibers



Compost pile “food” to avoid

- **Persistent weeds: crabgrass and quackgrass, invasive species and weeds gone to seed**
- **Meat, dairy and oils**
- **Cat or dog waste**
- **Diseased plants**
- **Lime and ashes**
- **Treated lumber or sawdust**



Don't Add - Plant materials treated with pesticides

- Some pesticides can be persistent
- Some survive the composting process
- Can damage other plants



Materials with special needs

**These require additional consideration
or limited volume added**

- **Pine needles**
- **Walnut leaves**
- **Sod**



Organisms need a balanced diet

– Carbon (C) and Nitrogen (N) –



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

- Carbon-rich materials are known as “browns”
- Nitrogen-rich materials are known as “greens”

General Guide - add 2-3 browns for every green by volume



BROWNS

Leaves

Straw

Paper

Sawdust

**Animal bedding
mixed with
manure**

GREENS

Grass clippings

Vegetable scraps

Coffee grounds

Manure

- **Cow**
- **Horse**
- **Poultry**
- **Rabbit**

BROWNS

- **Decay very slowly**
- **Coarse browns keep pile aerated**
- **Tend to accumulate in fall**
- **May need to stockpile until can be mixed with greens**

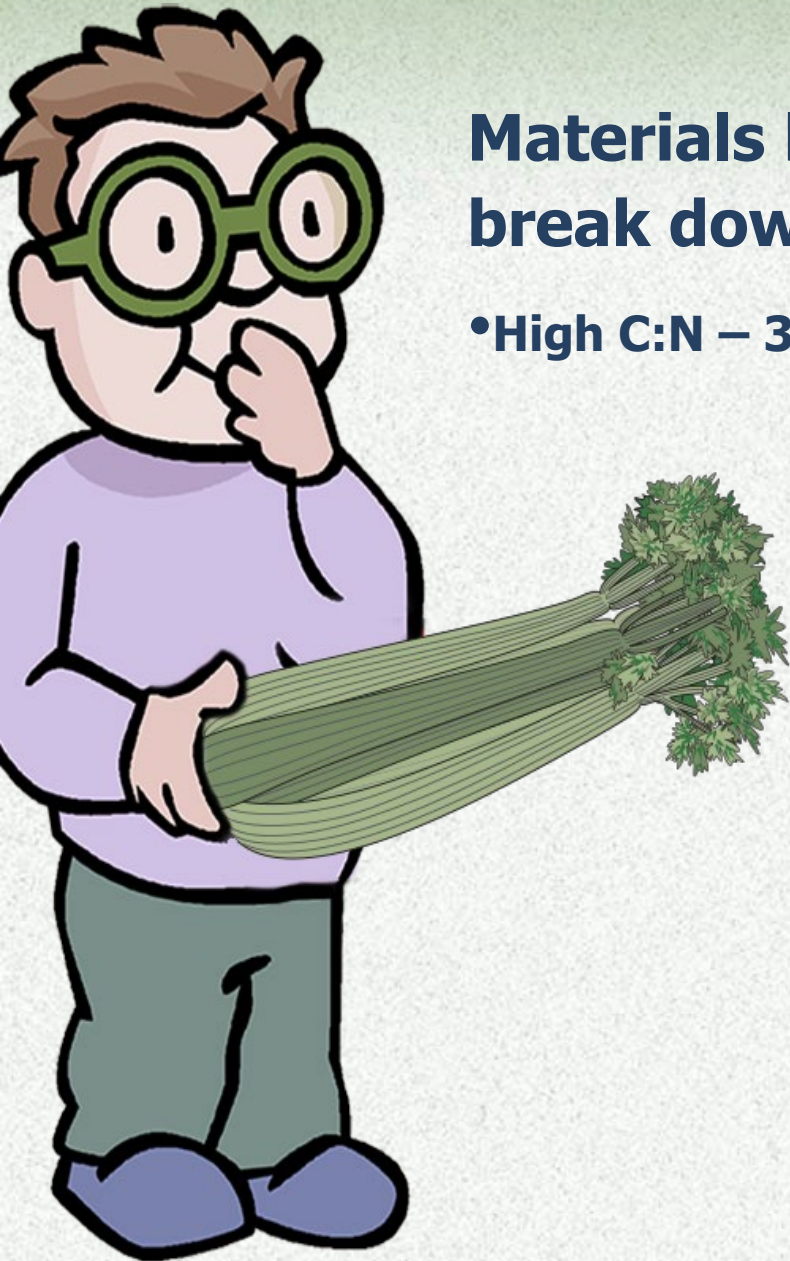
GREENS

- **Decay rapidly**
- **Aerate poorly – may have foul odors if composted alone**
- **Tend to accumulate in spring and summer**
- **Supply nitrogen**
- **Best composting when mixed with browns**

Diet continued

**Materials high in carbon
break down slowly**

- High C:N – 30:1 and higher amounts of C



**Materials that are
too rich in nitrogen
can lead to anaerobic
conditions in the
compost pile**

- Low C:N – less than 25:1

A final thought on C:N ratio

Mix two
or three
volumes

BROWN

to one of

GREEN



Oxygen

A pile starved for air will become anoxic or even anerobic

- **Oxygen acids and amines (stinky compounds)**
- **Aerobic activity stops**

Compost pile is out-of-balance

- **Food or water out-of-balance (low C:N ratio or pile is too wet)**
- **Too many greens**



Three types of
venting

Particle size

Smaller particles have a greater surface area

Some larger particles are needed to maintain air flow

Particles create pore space within the pile

A compacted pile lacks the needed pore space



Water

Vital to support compost pile organisms



“Damp as well as wrung-out sponge”

40% to 60% moisture

Temperature

90° – 140° is optimal

Temperatures above 130° can kill pathogens and weed seeds

Excessive temps (greater than 160°) can kill beneficial organisms



Questions about Troubleshooting ?



Troubleshooting

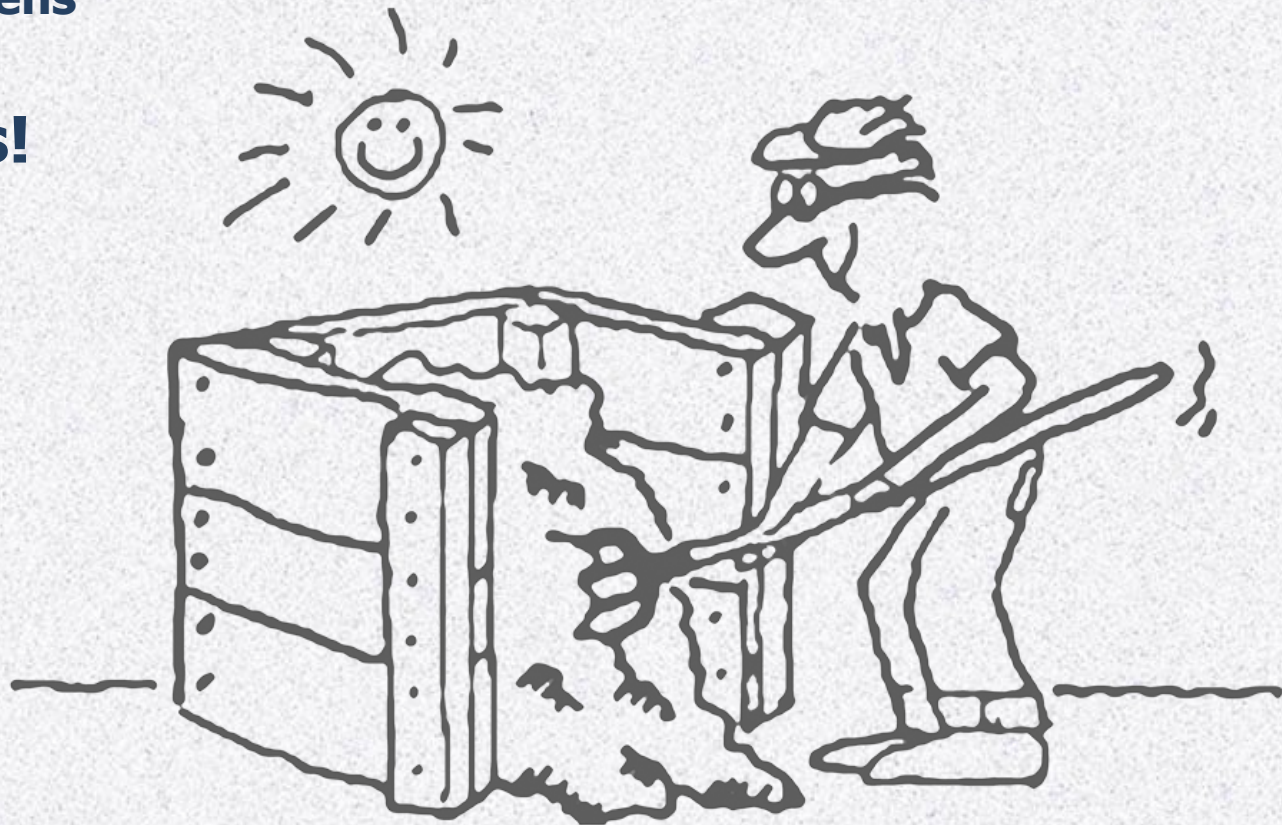
Nothing is happening!

- Pile is too dry
- Not enough "greens"

My pile stinks!

- Too wet
- Excess "greens"
- Pile compacted

Pests



Does my compost have to get **hot**?

Good compost can be made in a pile that never gets hot, but

- **Decay will be slower**
- **Not enough air, too little water or too many browns in the mix could all keep a pile from heating**

High pile temperature provides the benefit of

- **The most rapid composting**
- **Killing pathogenic (disease causing) organisms**
- **Killing weed seeds**

Pile size

Pile should be about 1 cubic yard to maintain temperature

- **under 1 cubic yard is generally too small to reach temperatures above 130°F**

Larger piles (greater than 3 cubic yards)

- **May prove difficult to turn**
- **Lack oxygen in pile center**

Choosing a compost strategy

Hot piles

- Process takes about three months
- Plan ahead
- Store brown

Cool piles

- Process takes one-half to two years
- Add materials as they accumulate
- Less effort



Hot compost pile

Pile built all at one time

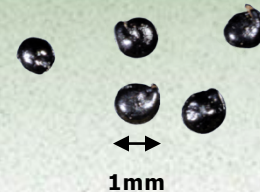
Pile must be tended often

Compost in about 12 weeks

Benefits:

- Faster than cool method
- Reduces weed seeds

Lambsquarter seeds



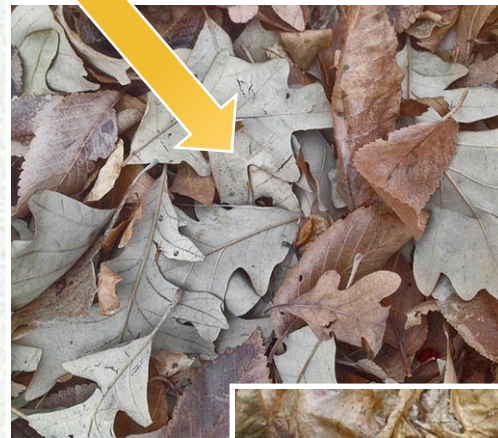
Hot compost pile

Mix 2-3 volumes of **BROWNS** to 1 of **GREENS**

Water as you add materials

Turn pile:

- Weekly for first 4-6 weeks
- Bi-weekly for next 4-6 weeks
- Let cure (let stand without turning) for 4 weeks after pile begins to cool



Cool and easy composting

Pile built as materials accumulate

**Less intensive
management**

6 months to 2 years

**Good method for
kitchen scraps**

**Keep browns handy
to cover**

- **Leaves**
- **Straw**



Pile turning tips

Mix materials from outside to middle

Open pore space

**Use garden fork
or shovel**

Add water if needed

**Commercial
turning (mixing)
tools for compost
are available**



To bin or not to bin

Composting does not require a bin, but be sure to select a method that will work for you and your community

- **Compost heap, pile, trench and sheet may have aesthetic concerns**
- **Bins can be home-built or manufactured**



Examples of home-built bins



Wood/Wire



Concrete Block Three-Bay



All-Wood



Wood Pallets



Wire Mesh

Examples of commercial bins



Orb



**Home
Composter**



Tumbler

Bin or pile location

Near where the compost will be used

Two feet or more from buildings

Good drainage

Away from wells

Be a good neighbor

Check local ordinances



Using compost

**Gardens, flower beds, lawns
and houseplants**

- **Clay soils – improves drainage and tilth**
- **Sandy soils – increases moisture holding**
- **All soils – improves soil structure**
- **All soils – adds nutrients: nitrogen, phosphorus, potassium and micronutrients**



When the composting process should be finished

Finished is also known as “mature” or “stable” compost

Compost is dark, loose and crumbly

Organic materials are unrecognizable

Ambient temperature





Simple test for mature compost

Germination test

- Will seed germinate in compost?
- Good test if using for potting soil

Bag test

- Seal compost in a plastic bag for 5-7 days
- Should produce no foul odor



Compost use continued

Unfinished compost can pull nutrients from the soil where it is placed

Compost can be screened

- **Removes larger particles**
- **Necessary if used for top dressing**

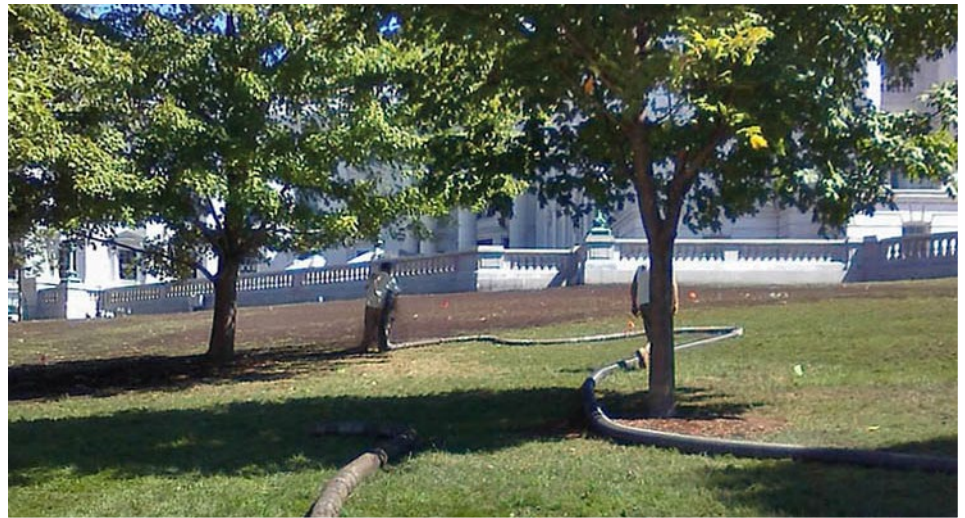


Compost application rates

2 inches mixed into top 6 to 8 inches of soil

**Side-dress or mulch:
1-3 inches**

**Top-dress lawns:
up to 1/2 inch
screen compost**



Spreading compost on the Wisconsin State Capitol lawn

Composting key points

- ✓ **Balanced diet**
- ✓ **Keep pile damp**
- ✓ **Turn pile when you need to**





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Photos and illustrations courtesy of: Joe Van Rossum, Penn State Cooperative Extension, UW-Madison CALS, USDA-NRCS, Ken Chamberlain/OSU/bugwood.org, Kevin Erb, Jeffrey J. Strobels, Jeff Miller, Kevin Schoessow, and David Parsons/NREL.

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