

MIDDLESEX COUNTY SOLID WASTE MANAGEMENT AND  
RUTGERS COOPERATIVE EXTENSION PRESENT

# BACKYARD COMPOSTING

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# Composting Bins Available for Purchase



## Geobin

(For yard trimmings)  
20 cubic foot capacity  
30" high x 36" wide at  
base

**\$20**

The Middlesex County Division of Solid Waste Management is pleased to make compost bins available to Middlesex County residents at discounted prices.

**Bins are available for contactless purchase and can be picked up via appointment from behind the 13-15 Kennedy Boulevard Building, East Brunswick.**

**For more details about these sales and our sponsored composting workshops, please contact us at: [solidwaste@co.middlesex.nj.us](mailto:solidwaste@co.middlesex.nj.us) or call 732-745-4170**



## Soil Saver

(For kitchen scraps and  
yard trimmings)  
11.4 cubic foot capacity  
32" high x 28" wide x 28"  
long

**\$40**



## Wriggly Branch

Vermicomposter  
for inside use (worms not  
included)

**\$50**

**Middlesex County  
Department of Public Safety & Health**

**Solid Waste Management**  
13-15 Kennedy Boulevard  
East Brunswick, NJ 08816

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**Composting** is the transformation of organic material (plant matter) through decomposition into a soil-like material called compost.

Invertebrates (insects and earthworms), and microorganisms (bacteria and fungi) help in this transformation



# WHY COMPOST

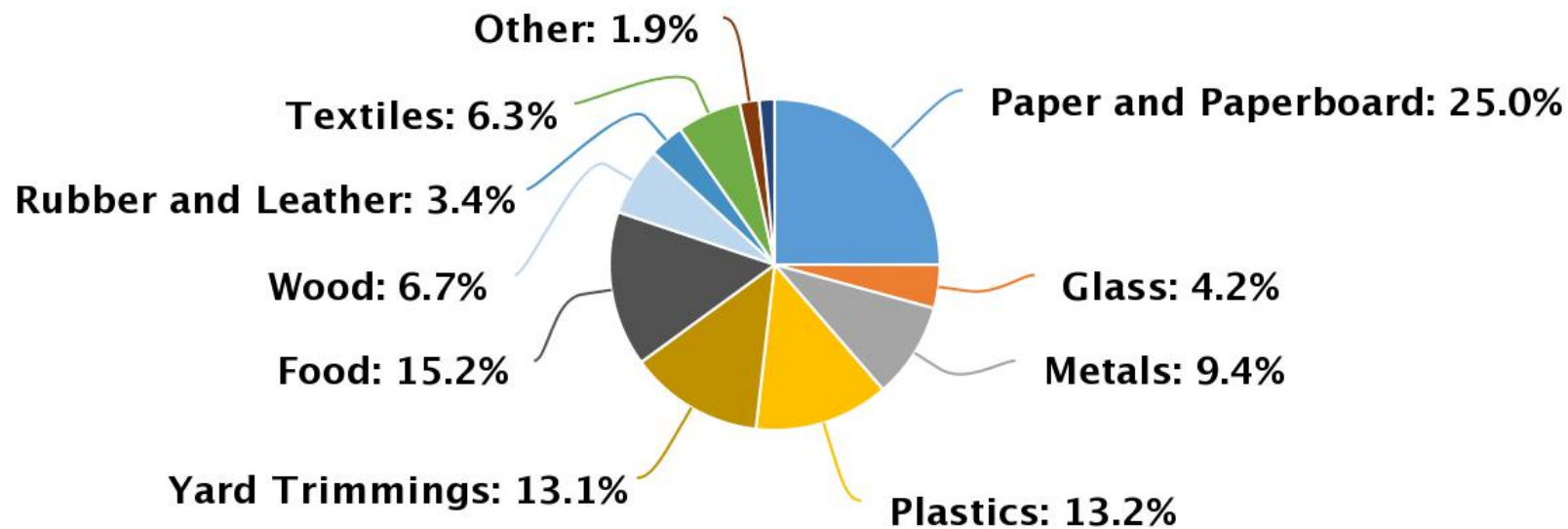
- Saves money and time
- Reduces fertilizer and water use
- Reduces need for soil and plant amendments
- Improves soil structure
- Increases aeration and water holding capacity
- Stimulates healthy root development
- Reduces chemical inputs
- Conserves natural resources



# 2017 Municipal Solid Waste Production in the U.S.

## Total MSW Generated by Material, 2017

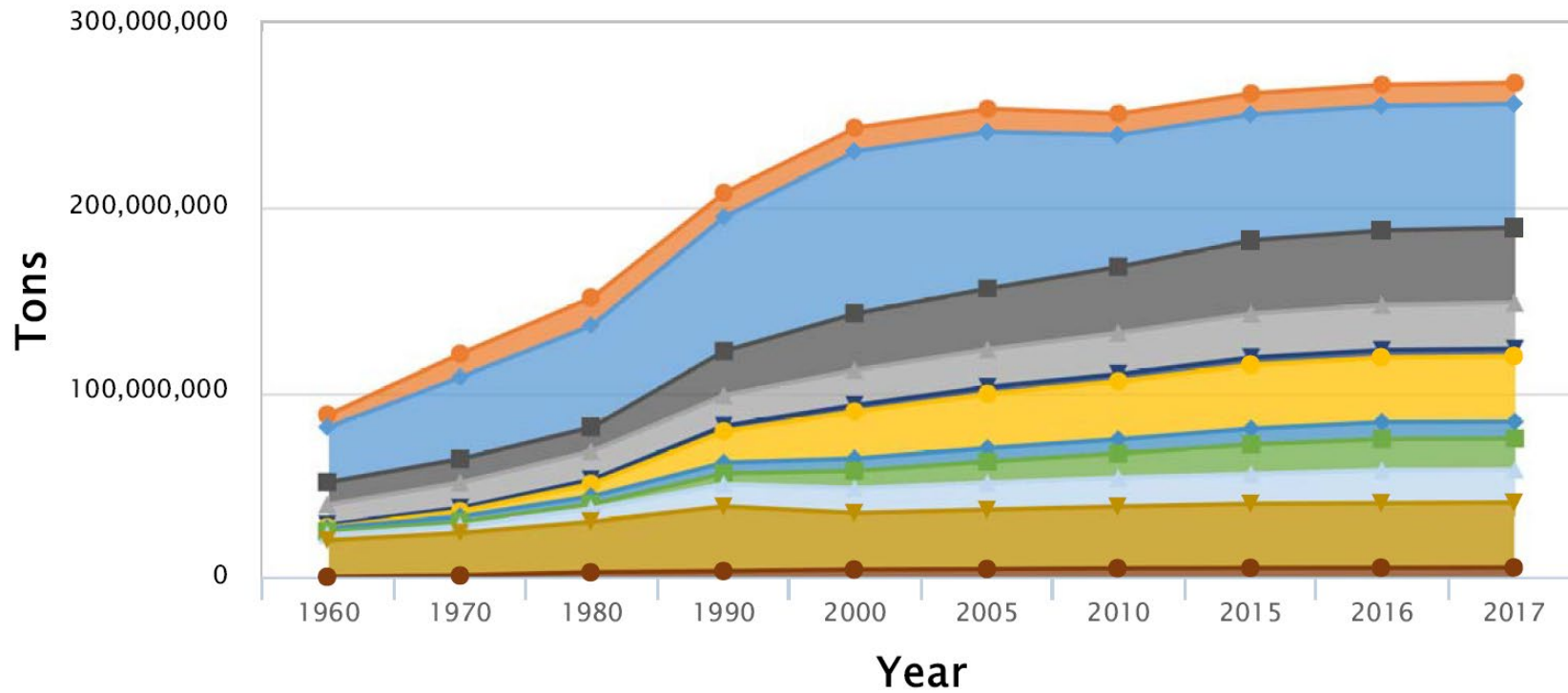
267.8 million tons



Backyard composting can increase recycling of yard and food wastes.



### Generation Tonnages, 1960–2017



Click on legend items below to customize items displayed in the chart

- Glass
- Paper & Paperboard
- Food
- Metals
- Misc Inorganic Waste
- Plastics
- Rubber & Leather
- Textiles
- Wood
- Yard Trimmings
- Other



# WHY COMPOST YARD AND KITCHEN WASTE

- National Composting Council estimates the average U.S. household generates 650 lb of compostables every year.
- Limited landfill space should be reserved for materials that cannot be recycled or composted
- Garbage handling is the 4<sup>th</sup> largest expense for many cities. Composting can reduce those costs



# Composting - Speeding up the natural decay process



A compost pile or bin allows you to control

- Air (oxygen)
- Water
- Food and
- Temperature

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





# Proper Composting

- The ratio of carbon to nitrogen (C:N) ranges from 25:1 and 40:1. This ratio balances both energy (carbon) and nutrients (nitrogen).
- The compost is about 40 to 60 percent moisture by weight.
- The oxygen content is 5 percent or more.
- The pH level ranges from 6 to 8.



# 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
- The right amount of air, water, and warmth to keep the work crew happy



# Where do the decomposers come from?

If you build it, they will come...

- Soil
- Leaves, Chopped twigs, paper
- Food scraps
- Manure, and
- Finished compost

Each of these will add  
microorganisms  
to the compost pile

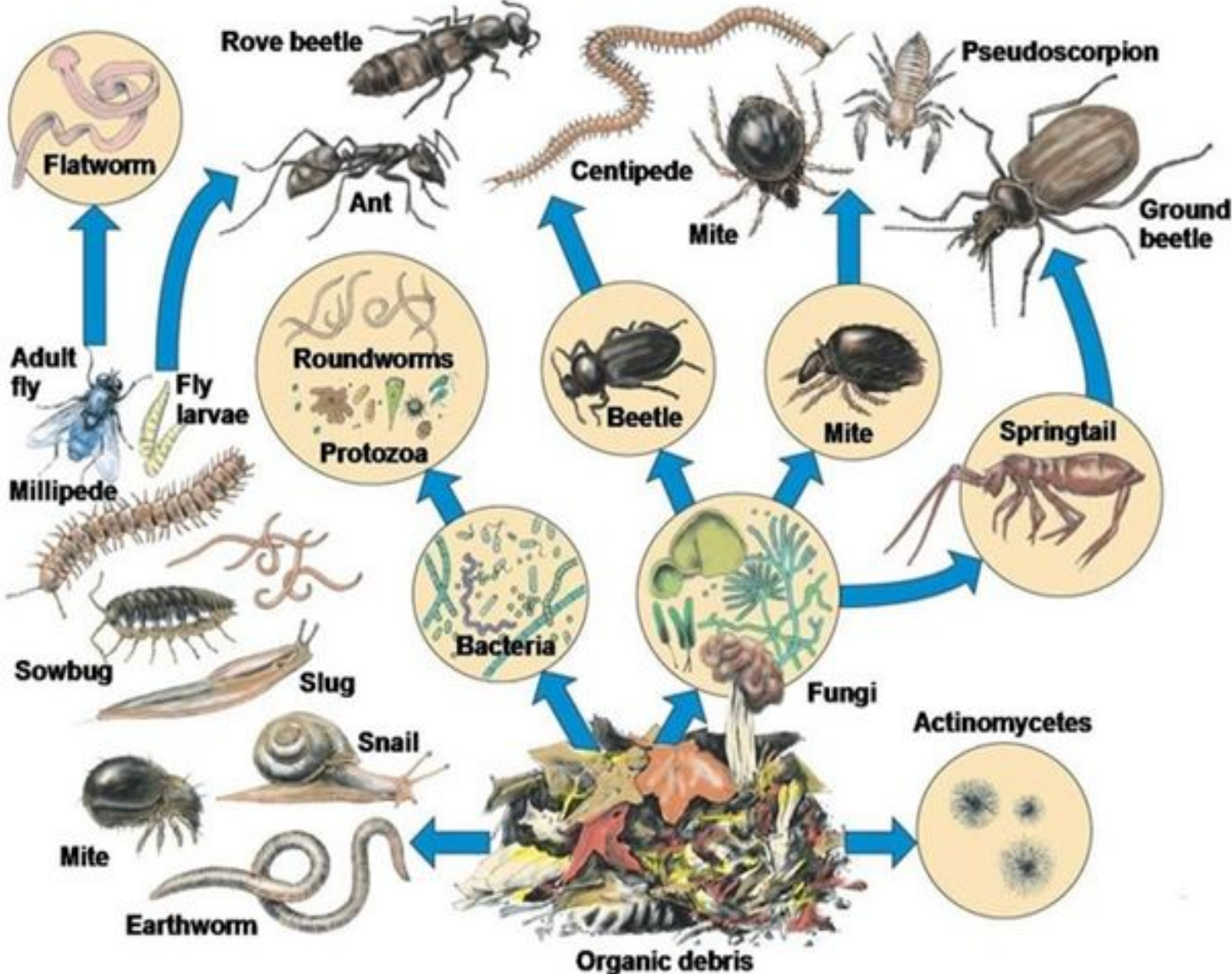


One teaspoon of good garden soil to which  
compost has been added contains

- 100 million bacteria
- 800 feet of fungal threads



# Organisms in the compost pile



# Worm Composting Or Vermi Composting

Worm composting provides a convenient method for recycling kitchen scraps into valuable resources. It is the process of using red wigglers and microorganisms (bacteria, protozoa and fungi) to convert organic waste into vermicompost or humus – an excellent soil amendment for household or yard plants.



Worm composting can produce compost for plants, worms for fishing or both worms and compost. The same basic design works for each desired outcome, but the management strategies differ slightly. In any case, kitchen scraps are recycled into a nutrient rich product. Worm composting, properly managed, has very little smell, and can actually reduce the undesirable smells associated with kitchen scraps mixed in with garbage. Vermicomposting also provides an interesting topic of conversation for dinner guests and has served as a great science project for many school children.

*By Ted May and Holly Johnson*



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



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# 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 should be composted include:



Also

- Used potting soil
- Manure
- Sawdust
- Hair







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# Materials to avoid...

Avoid organic materials that could cause problems during or after composting

- Oil, fat, grease, meat, fish or dairy products, unwashed egg shells (tend to attract pests, vermin, limit activity of beneficial microbes)
- Hard to kill weeds (bindweed, quackgrass) and weeds that have gone to seed (could infest garden area when compost is used).



# 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)



# 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



# Decomposition

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



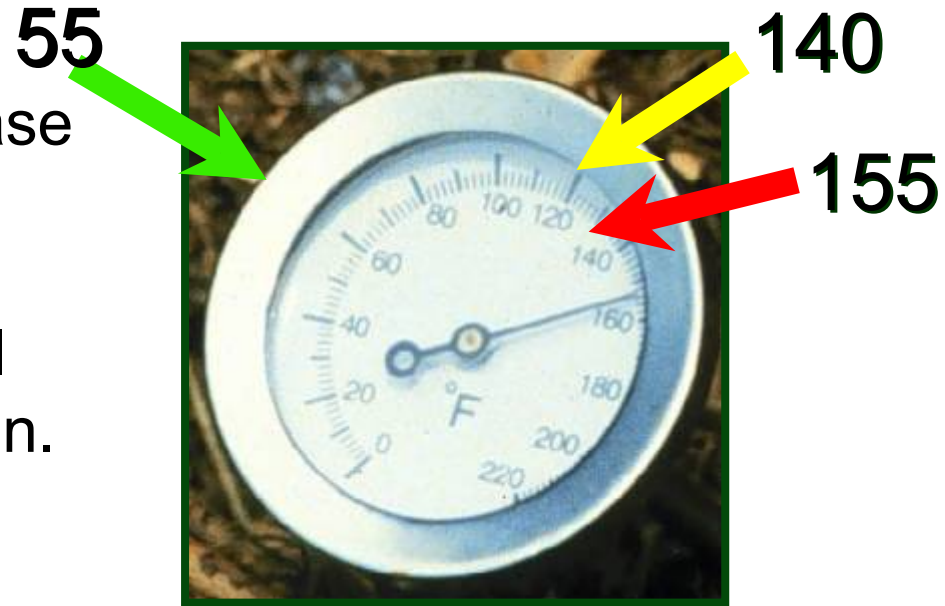
# Aerobic Composting

- 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



# Temperature

Mesophilic (moderate temperatures rising to 113 °F 45°C),

Thermophilic (high temperatures peaking at 176°F 80°C), and

Curing (cooling to ambient temperature).



# Eliminating weeds in the compost pile

**TABLE 1.** Estimated amount of time required to kill 90 percent of seeds at various temperatures.

	Temperature (F)			
	140°	122°	115°	108°
Weed	Number of hours required to kill 90% of seed			
Annual sowthistle	<1.0	2.1	13.3	46.5
Barnyardgrass	<1.0	5.4	12.6	Unaffected
London rocket	<1.0	4.0	21.4	83.1
Common purslane	1.3	18.8	Unaffected	Unaffected
Black nightshade	2.9	62.0	196.6	340.6
Tumble pigweed	1.1	107.0	268.5	Unaffected

Source: *Time and Temperature Requirements for Weed Seed Thermal Death*, by N. Dahlquist et al., 2007

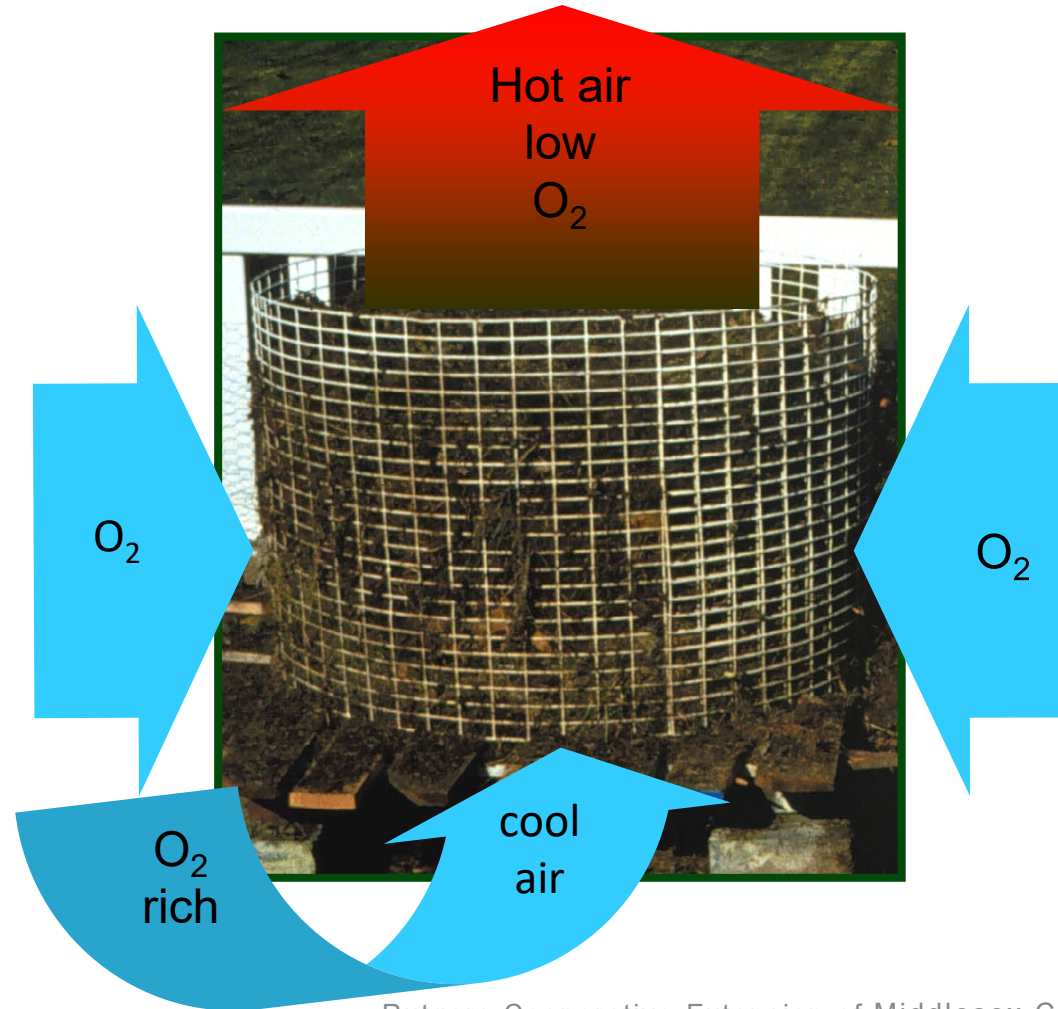


# Does my compost pile have to get hot?

- 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



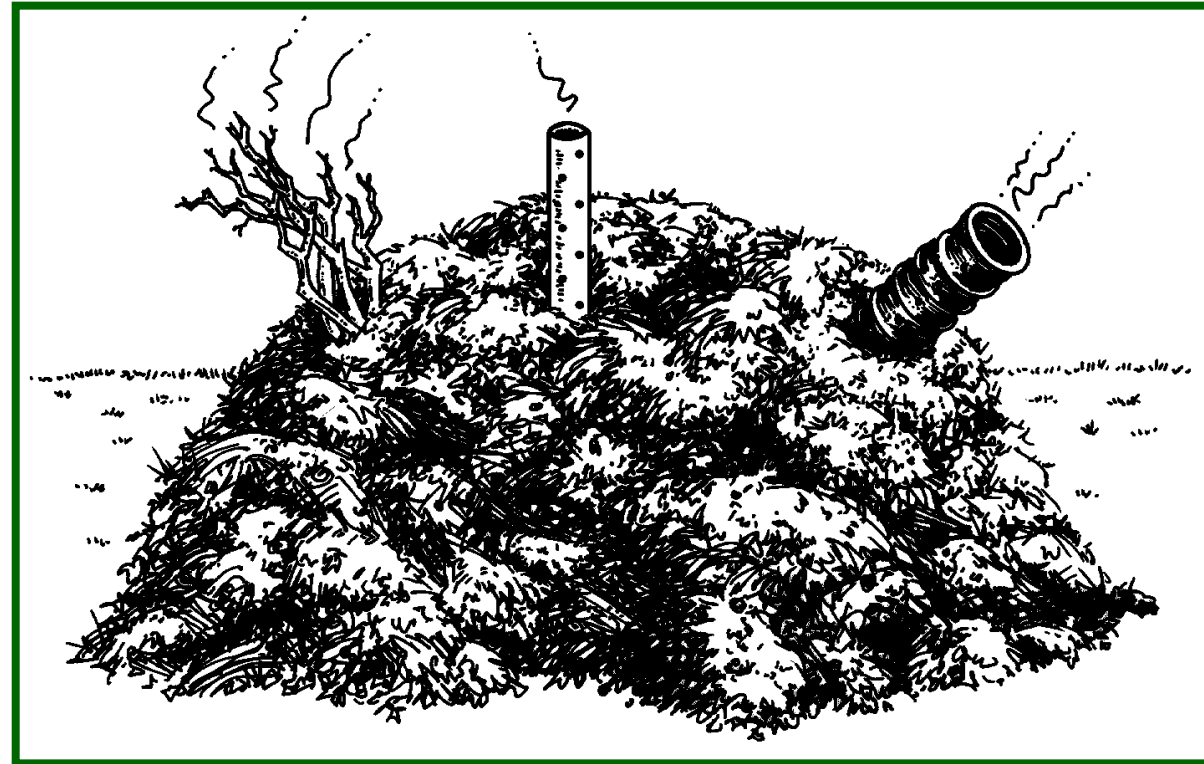
Warm air rising through the pile draws fresh air in from bottom and sides

Wind can stimulate aeration



# Pile Aeration Depends upon adequate porosity

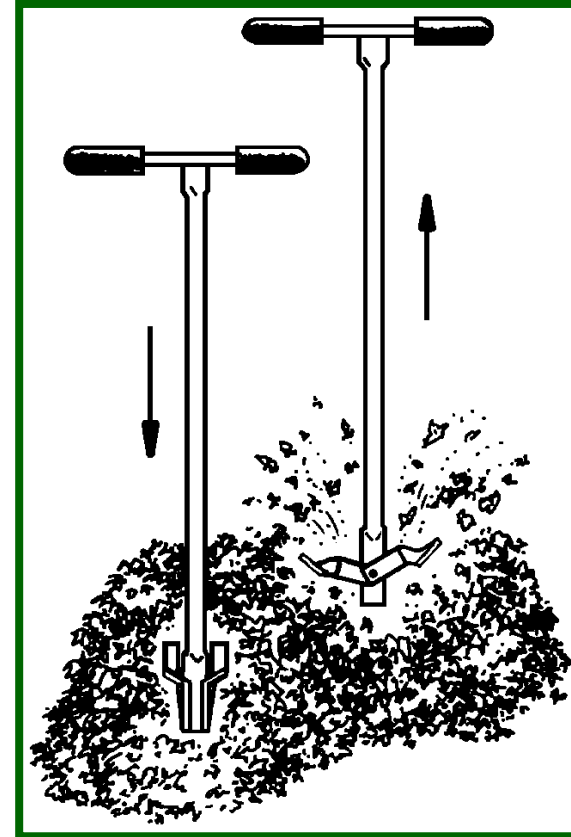
- Porosity is the air filled space between particles
- Browns” help to maintain good porosity in the pile
- A compacted pile has lost porosity, can be increased by turning
- Aeration can be increased by inserting sticks, cornstalks, or perforated pipes into or under the pile



# Pile Aeration- Getting air to your work force



- Turning the pile mixes fresh air into the pile



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



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# Making Compost the Fast Way

- Turn the pile every 5 to 7 days,
  - move outer material to the pile center
  - add water if needed
- During the first few weeks temp should reach 140°F
- After about 4 weeks less heat will be produced and compost will maintain lower temp (100°F). After about 4 more weeks the pile will no longer heat after turning and volume will be about one third of original.
- Allow the pile to cure (stand without turning) for 4 more weeks before using the compost



# 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 of its original volume



# Where Should I Put My Compost Pile?

- Shaded area will help prevent drying out in summer
- Avoid areas that will interfere with lawn and garden activities
- Adequate work area around the pile
- Area for storage
- Water available



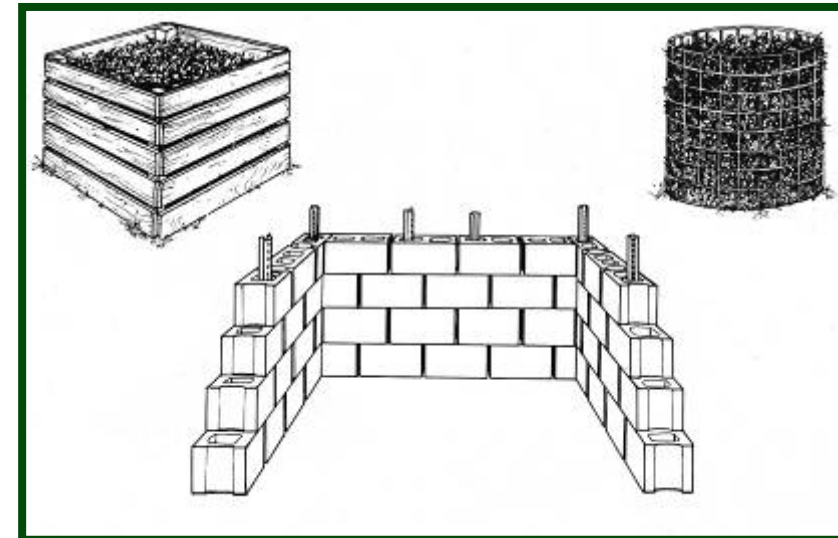
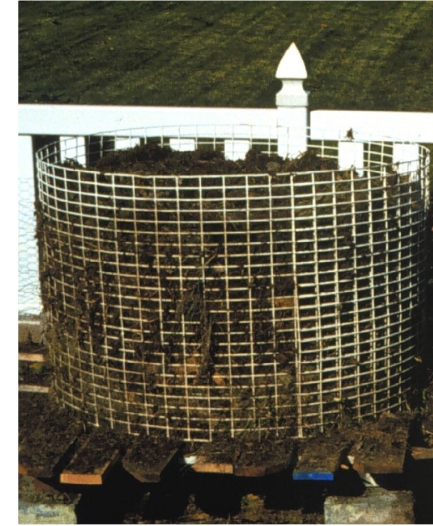
# Considerations for Locating the Compost Pile

- Good drainage
- Away from any wells
- Near where finished compost will be used
- Be a good neighbor
  - Make your composting area attractive, or
  - Keep it out of your neighbors' view



# 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



# Soil Saver Bins



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# 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

## 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 in openings)
- Use worm composting (vermicomposting) for food scraps



# 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

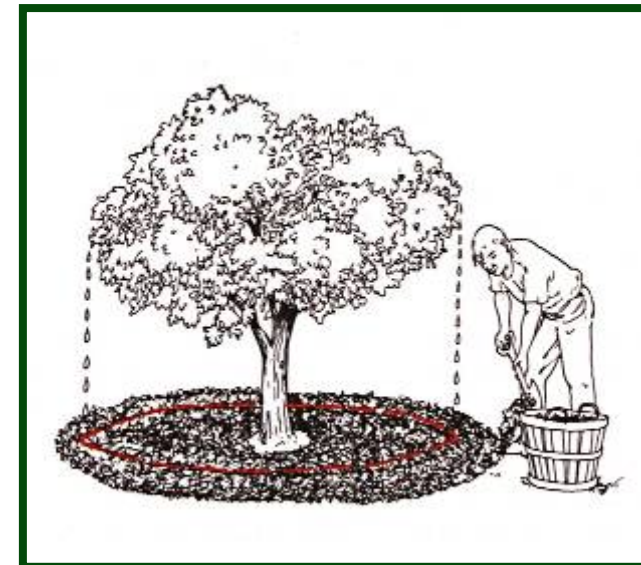
- Soil amendment

- Be sure that compost is mature, has an earthy smell (no ammonia or rotten smell), looks dark and crumbly with no recognizable feedstock
- 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



# Don'ts



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# 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
  - Mix no more than 1/3 compost



- Saves money and time
- Reduces fertilizer and water use
- Reduces need for soil and plant amendments
- Improves soil structure
- Increases aeration and water holding capacity
- Stimulates healthy root development
- Reduces chemical inputs
- Conserves natural resources



# Compost Video Available on your Mobile device and the web.



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<https://apps.guidebycell.com/gbc2/mobi/content.jsp?id=78466>

<https://youtu.be/kdrrRWRWEYg>



# Also Available: How to Take a Soil Test



- [https://www.youtube.com/watch?v=32KqO\\_4NWxo](https://www.youtube.com/watch?v=32KqO_4NWxo)



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# Thank You!

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