

RUTGERS

New Jersey Agricultural
Experiment Station



Keys to Successful Composting

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***Rutgers Community
Garden Series***

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Rutgers Cooperative Extension of Union County

- Outreach arm of the university
- Collaboration between Union County and university
- Mission: RCE helps the diverse population of New Jersey adapt to a rapidly changing society and improve their lives and communities through an educational process that uses science-based knowledge.



What is a Rutgers Environmental Steward?

....a volunteer that is trained in the important environmental issues affecting New Jersey and works to help solve local, environmental problems.



- Weekly classes January- June, 2019
- Internship
- No environmental background needed!
- Weekly class topics:
 - Climate Change
 - Soil Health
 - Invasive species
 - Pollinator Conservation
 - Solid Waste and Recycling
 - Stormwater management
 - Green Infrastructure
 - Habitat Conservation
 - Environmental Policy
 - Alternative energy and more....



New Class Starts January, 2020
Westfield, NJ

<https://envirostewards.rutgers.edu/>



What is Composting?

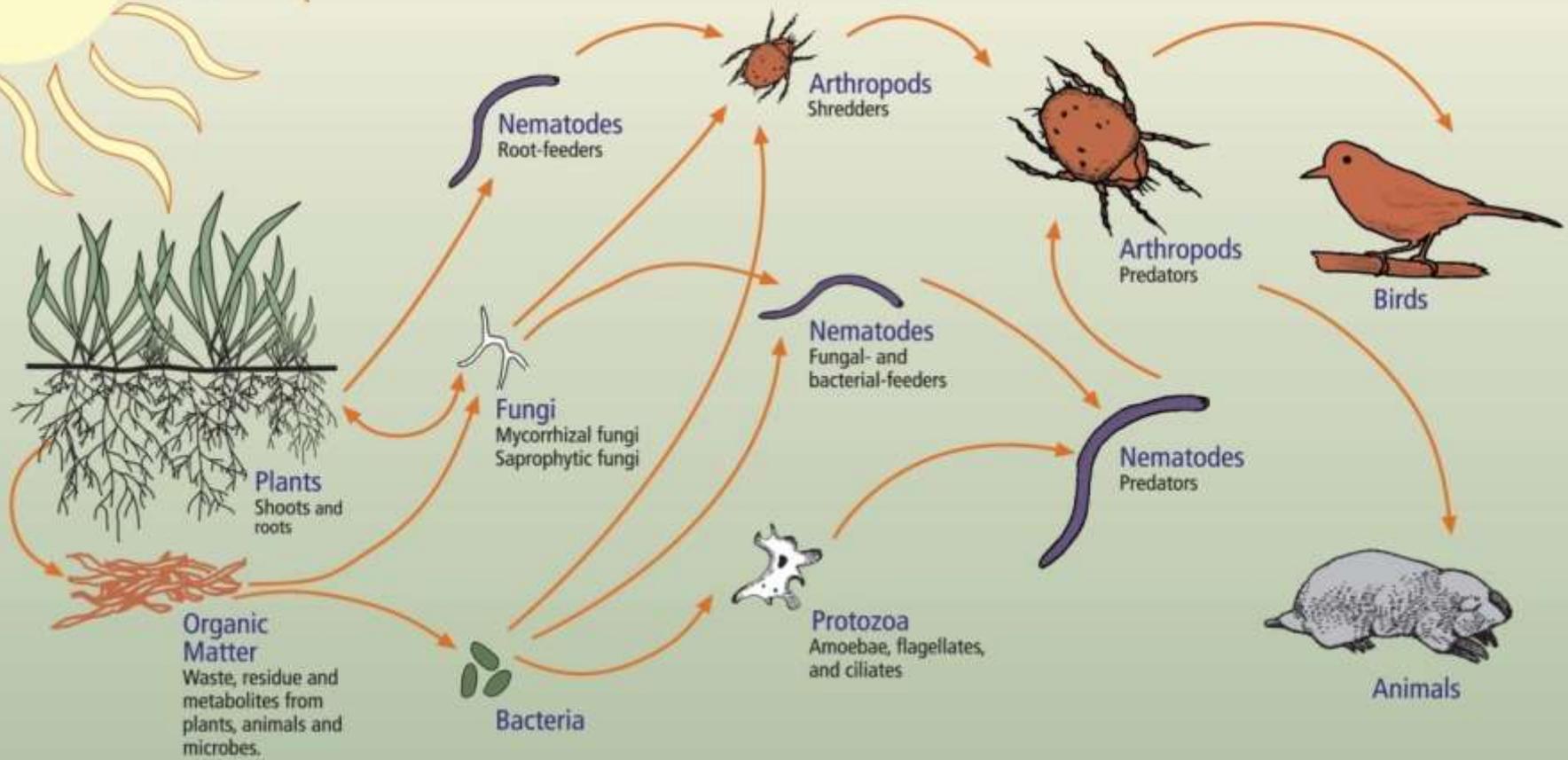
Composting is a natural process where organic materials decompose and are recycled into a dark, crumbly, earthy smelling soil conditioner known as “compost”.

What kind of organisms are involved in composting?

Worms, insects, microorganisms (bacteria), fungi!



The Soil Food Web



First trophic level:
Photosynthesizers

Second trophic level:
Decomposers
Mutualists
Pathogens, Parasites
Root-feeders

Third trophic level:
Shredders
Predators
Grazers

Fourth trophic level:
Higher level predators

Fifth and higher trophic levels:
Higher level predators

What are some of the benefits of using compost?

- Improves soil structure (workability of the soil) by providing organic matter to the soil.
- Increases aeration
- Stimulated healthy root development
- Increases water drainage
- Increases water holding capacity (moisture retention)

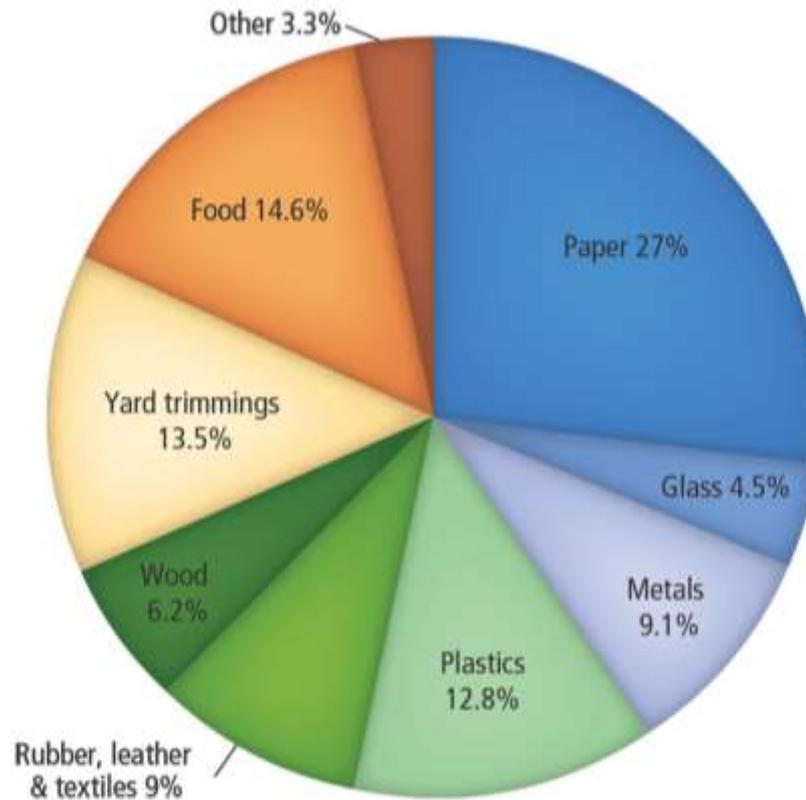


What are some of the benefits of using compost?

- Promotes beneficial soil microbes (biology)
- Controls soil acidity (pH)
- Reduces our exposure to lead in the soil
- Reduces garbage in landfills



Source: EPA



**Total MSW Generation (by Material), 2013
254 Million Tons (before recycling)**

34% of the waste stream are “organics”.
Most of that is yard waste and food

Let's make some compost!

What items can be added to the compost pile?

- **Green** Materials (Nitrogen rich):
 - “Kitchen scraps”- vegetable and fruit scraps, coffee grinds, egg shells
 - Grass clippings
 - Weeds (w/o seed heads, non-invasive)
- **Brown** Materials (Carbon rich):
 - Leaves
 - Hay
 - Shredded newspaper
 - Wood shavings
 - Shredded cardboard
- Cut everything up for faster decomposition



Image credit: <http://composteverything.net/wp-content/uploads/2012/07/worm-compost-illustration.png>



Let's make some compost!

What items can NOT be added?

- Meat
- Oil
- Grease
- Animal feces
- Diseased plants
- Seed heads of weeds
- Avoid fruit/vegetable seeds

Commercial compost operations must keep their compost between 131 and 170 degrees F for 3 days to kill pathogens and weed seeds.



Many different composting techniques but generally:

- The really lazy way
 - Add material to the pile
 - Set compost where it will rain
 - 12-18 month process
- Just a little more work and can have great results much sooner! 5-15 weeks
- All methods need patience and willingness to experiment



Let's make some compost!

Greens

+ Browns

+ Water

+ Air (mixing once a week)

= COMPOST!

- Proper composting involves aerobic bacteria that need oxygen to thrive

Let's make some compost!

How much green and how much brown?

- Organisms need: Carbon (BROWNS) for energy and Nitrogen (GREENS) for protein
- The ideal ratio of carbon to nitrogen in a compost pile is

~30:1 (by dry weight)

Carbon to Nitrogen Ratio of Materials

MATERIAL	C:N
Vegetable Scraps	12-20:1
Grass Clippings	20:1
Coffee Grounds	20:1
Cow Manure	20:1
Corn Stalks	60:1
Fruit Wastes	35:1
Leaves	60:1
Peat Moss	58:1
Newspaper	50-200:1
Pine Needles	60-110:1
Sawdust / Wood	600:1
Straw	80-100:1

Let's make some compost!

How much green and how much brown?

~30:1 (by dry weight)

Example: Grass clippings- 20:1
 Dry leaves- 60:1

To achieve 30:1....

2 bags of grass clippings + 1 bag of dried leaves=
(20:1 + 20:1 + 60:1) = (100:1) / 3 = 33:1

Don't get caught up in the numbers!

Let's make some compost!

How big of a pile?

- No smaller than 3x3x3 feet
- No larger than 5x5x5 feet
- Need sufficient mass to maintain heat

Why does the pile get hot?

- When carbon material is oxidized to CO₂ energy is released in the form of heat.
- Organisms working hard to break down organic material generate heat.
- Consider compost thermometer
- Turn the pile once it reaches 140° F or higher



Compost Bins



Compost Bins



Compost Bins



Compost Bins



Using Your Compost

Ideally, incorporate before planting your garden

- Apply 1/2 inch of compost to the soil surface
- Till the compost into the top 6 inches of soil
- 3-5 cubic feet of compost will provide a 1/2 inch layer of organic matter over a 100 square feet area.

Composting Video



Produced by RCE of Middlesex County- Available on YouTube
<https://www.youtube.com/watch?v=kdrRWRWEYg&feature=youtu.be>

Summary

Composting is easy!

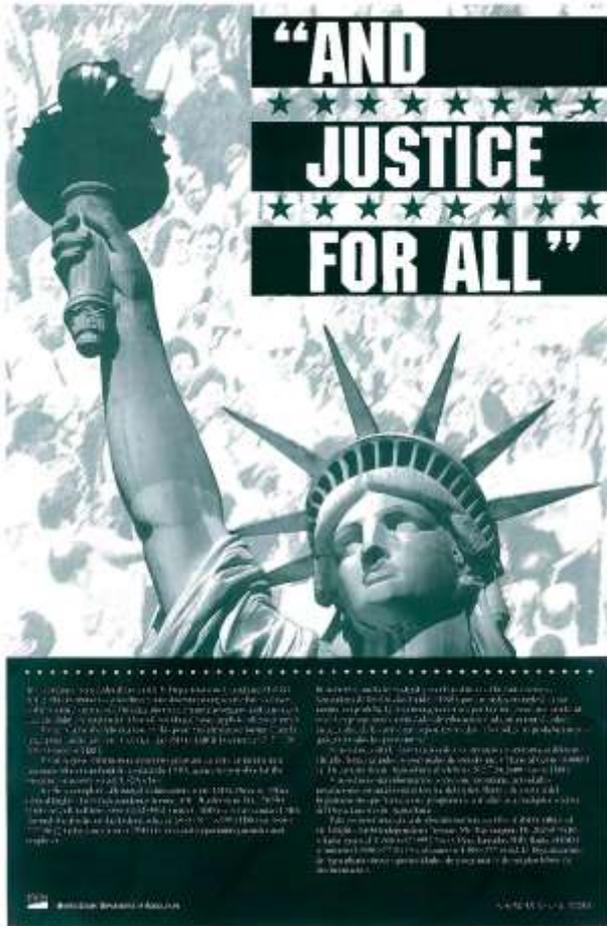
Nitrogen+
Carbon+
Oxygen+
Water=

COMPOST SUCCESS

Questions?



Rutgers Cooperative Extension



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Rutgers Master Gardeners

- For more information contact your county Rutgers Cooperative Extension office.
- www.njaes.rutgers.edu