

Home Composting for Zero Waste

(Everything You Wanted to Know about Composting But Were Afraid to Ask)

Massachusetts Department of Environmental Protection

April 20, 2021

From this...



... to this!



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Why Compost?

- Reduces waste requiring disposal
- Reduces greenhouse gas emissions (compared to landfilling) and sequester carbon in the soil (as humus)
- Recycles nutrients and organic matter for plants
- Saves money in avoided disposal costs and reduced purchases of soil amendments
- It's empowering, fascinating and fun!



Why Should I Compost?

Food scraps
make up
almost **22%**
of the waste stream in MA
*based on 2019 MassDEP data

By composting, you can
turn those food scraps...

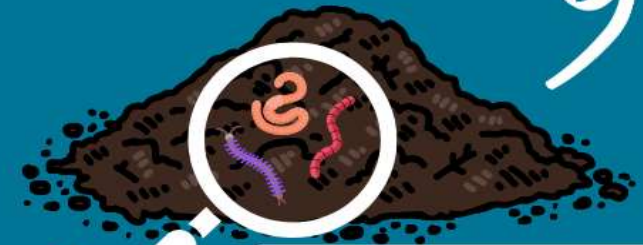
Composting...

- adds nutrients, moisture, and carbon to soil
- helps plants grow
- is fun and easy!

In a few months, you reduced
GHG emissions and helped
your plants thrive!



Into black gold!



Composting is nature's
recycling system at work



MassDEP
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Recycle
 Smart



CT Dept of Energy and Environmental Protection Composting Videos

<https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Organics-Recycling/Compost-Video-Downloads>

ct deep - Bing | Compost Video Downloads

https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Organics-Recycling/Compost-Video-Downloads#HomeCompostingVideo

DEEP is continuing to carry out its mission and provide services while keeping both the public and our workforce safe during the COVID-19 pandemic. Click here for the latest updates on DEEP's response to COVID-19: [DEEP COVID-19 Response](#)

CT.gov Home / Department of Energy and Environmental Protection / Waste Management and Disposal / Compost Video Downloads


- Waste Management Main Page >
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A Picture Speaks a Thousand Words - Composting Video Downloads

It's one thing to read a book or instructions on "how to" do something, but quite another to actually "see" how it's done. DEEP realized this over 15 years ago when we produced three very popular VHS video programs on [Home Composting](#), [Grasscycling](#) and [Large-Scale Leaf Composting](#).


These organics recycling programs are now available as streaming videos.

Select the program you wish to watch.




Home Composting - Turning Your Spoils to Soil
A 17 minute basic how-to video that teaches you:

- what makes compost happen
- what items you should and shouldn't compost
- how to build your own compost bin
- the "recipe" for great compost, and
- how to use your compost.

[Video Transcript](#) 

(To save a [copy of this video](#), right click and select Save Target As)

by Keyword 

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8:53 PM 4/19/2021



Department of ENERGY & ENVIRONMENTAL PROTECTION

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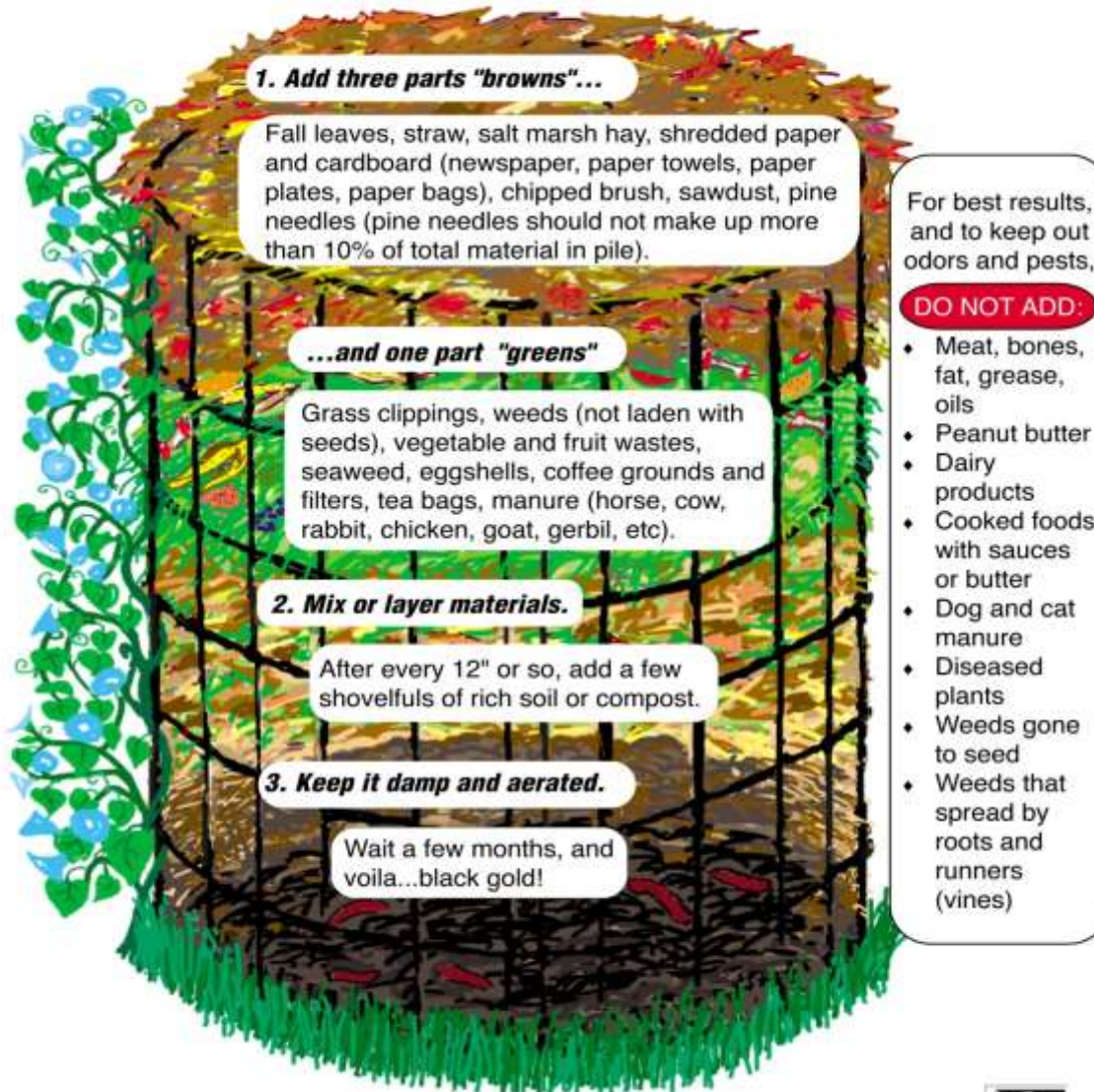
If the video does not start and you are using Internet Explorer, your computer may not have the latest updates for Windows Media Player. Please visit [Microsoft](#) to download the current version. [View guidance for other browsers.](#)

Home Composting

Video On-Demand

Composting is easy!

To make compost, just follow these simple steps:



How Does Composting Work & Who Does the Work?

The “Composting Work Force” (Compost Food Web)

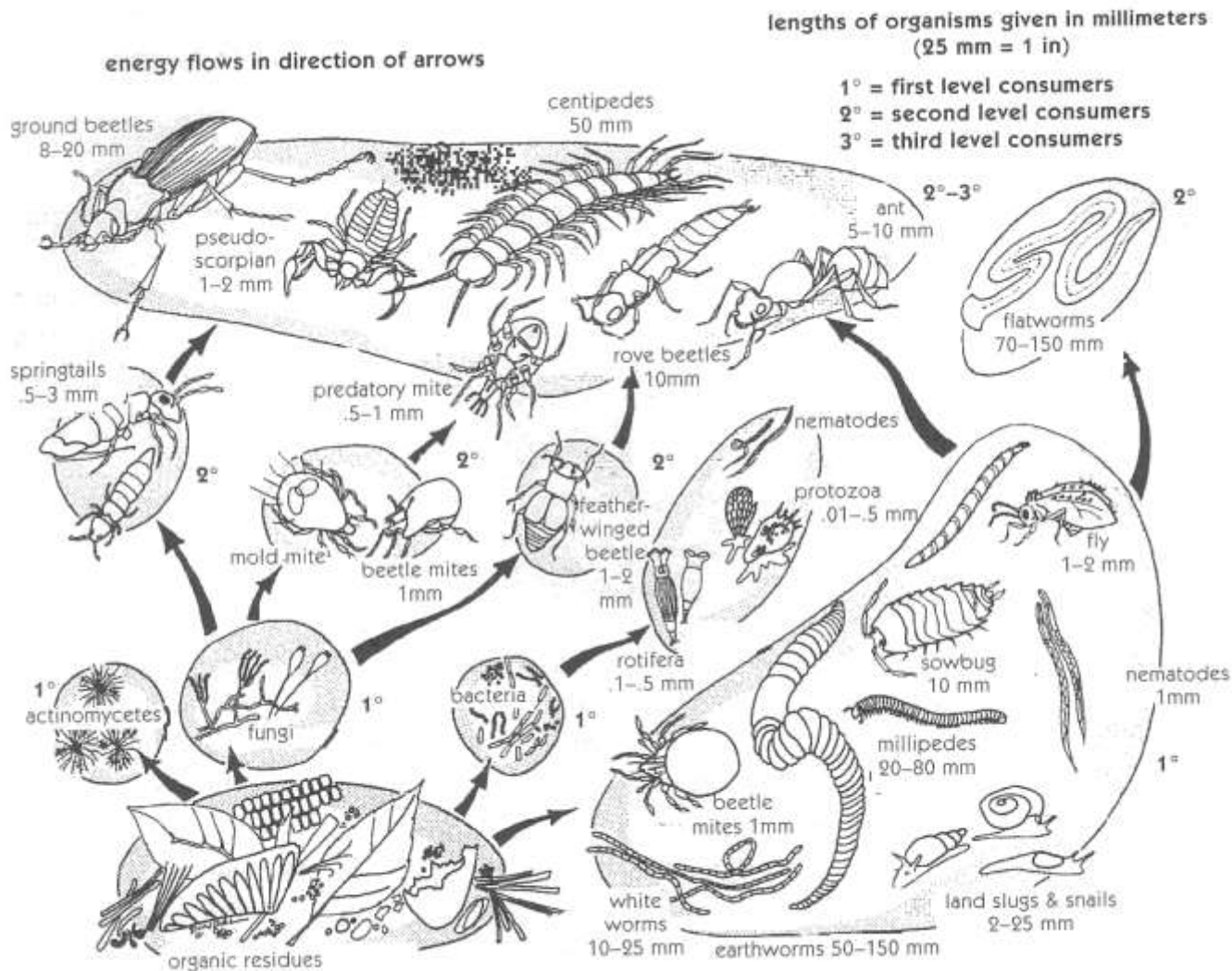


Figure 3.1 Soil organisms and their role in decomposing residues. Modified from D.L.Dindal, 1978.

Outdoor
compost
critters



Indoor
compost
workers
(red
wrigglers)



What can be composted?

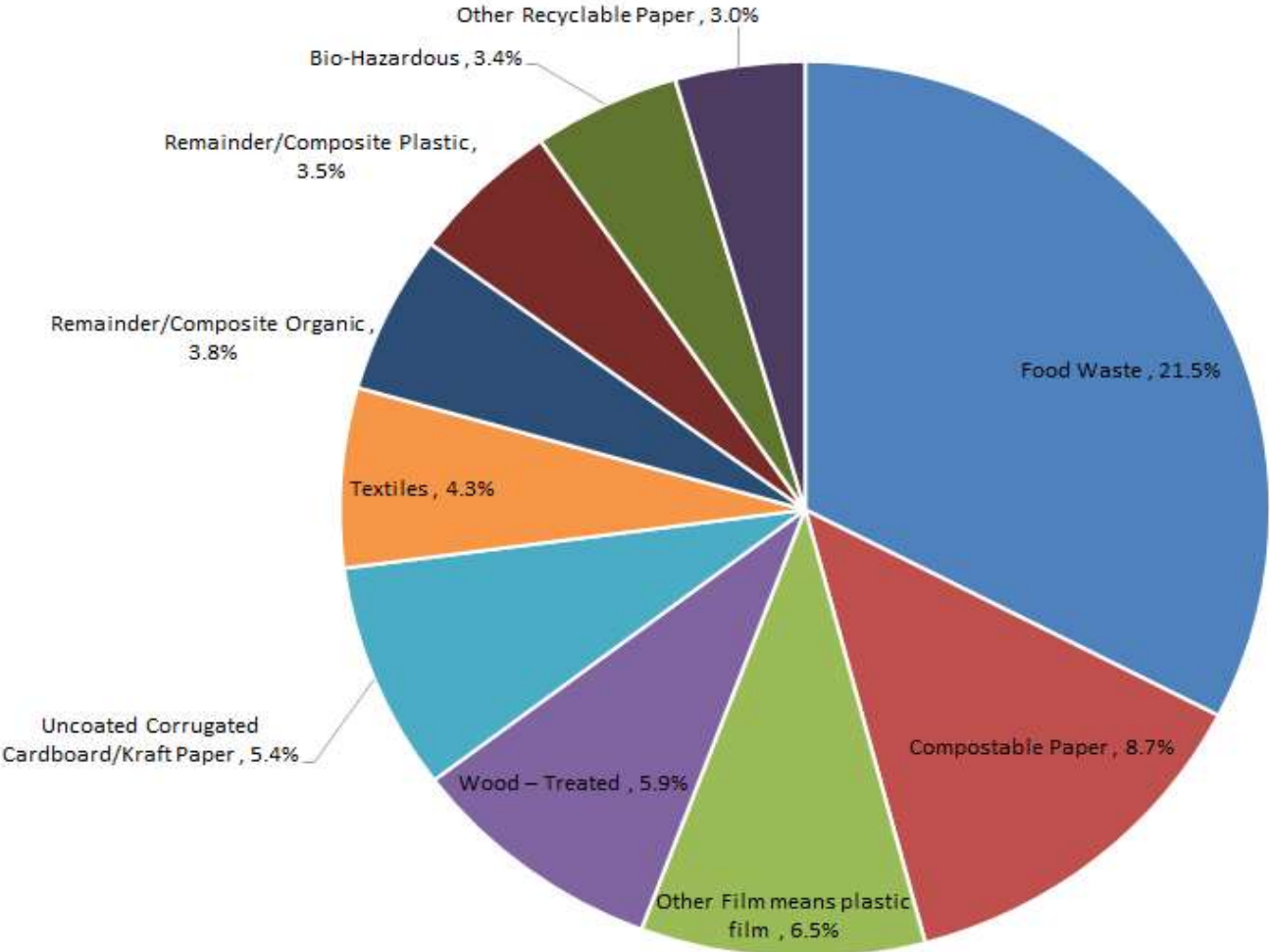
- Anything that was once alive, including:
- Food waste;
- Paper and paper products (paper plates, napkins, cardboard, coffee filters, etc.);
- Yard waste – leaves, pine needles, grass clippings, weeds, prunings, woodchips, sawdust;
- Manure
- Seaweed and the list goes on

but exactly which organic materials are composted depends on the composting system used.



How Much Compostable Material is in the Massachusetts Waste Stream? About 33%

Top 10 Materials in the Waste Stream (2019)



Food Waste: 21.5%
 Compostable Paper: 8.7%
 Yard Waste (Prunings, Trimmings, Leaves, Grass): 2.5%
Total: 32.7%

Source: 2019 Waste Characterization Study: <https://www.mass.gov/guides/solid-waste-master-plan#waste-characterization-&-capacity-studies>

*Remainder/Composite Organic: 3.8%

This material is not compostable in practice because it is combined with other materials. Remainder/Composite Organic is organic material that cannot be put in any other type or subtype. This type includes items made mostly of organic materials but combined with other materials. Examples include cork, hemp rope, hair, cigarette butts, full vacuum bags, sawdust, and animal feces.

How many ways are there to compost?

- Countless variations, including:
- On-site in bins, trash cans, buckets, worm bins, and piles
- Municipal and on-farm in windrows, piles or drums
- Commercial systems in enclosed containment vessels
- Aerobically, which produces CO₂ and humus
- Anaerobically, which produces CH₄ (methane) and happens inside our stomachs



On-Site Composting



What's in a name?

Composting v Composting – What's the difference?

The verb “composting” and “to compost” are used in multiple ways. It helps to distinguish between on-site and off-site composting.

This presentation focuses on **on-site composting**, which we define as “managing the decomposition process to convert organic waste into a soil-like product called compost or humus.”

Off-site composting involves sorting, collecting & sending organic waste away to be composted at a farm or commercial composting facility. The difference boils down to who manages the composting process.

Who can compost?

Everyone!



- At home
- At school
- At work
- At play
- On the farm
- In the basement
- On the porch
- In the woods
- In the garden



What can be composted at home?



- Most organic waste, including:
- Vegetative food scraps, egg shells, coffee grounds, tea, Yard waste – leaves, grass clippings, prunings, weeds, garden debris, brush, pine needles, etc. ;
- Compostable paper, including waxed – paper towels, napkins, plates, waxed paper, bakery tissues, tea bags, coffee filters, newspaper, paper bags, etc.;
- Corrugated cardboard, including waxed;
- Animal manure and bedding (herbivorous);

The majority of our organic waste can be composted at home!

Diversion potential of home composting



Waste streams it can manage on-site:

- Most compostable material
 - Vegetative food waste: 5-10 lbs/HH/wk = 365 lbs/yr (average)
 - Compostable paper: Varies (1-2 lbs/HH/wk) = 50-100 lbs/yr
 - Yard waste: Varies (15-100+ lbs/HH/yr)
- Total: About 500+ lbs/HH/yr

• Capacity of compost bins on state contract

- 500-1,000 lbs/bin/year (.25-.5 tons per year)

(Earth Machine – 500 lbs/year; New Age Composter – 1000 lbs/year)

If offer both types, average diversion = 750 lbs/year/bin (.4 tons)

Use rate: 92% = 690 lbs/year/bin distributed

690 lbs/yr x 10 yrs* = 6,900 lbs (3.45 tons) per bin distributed

*Compost bins warranted for 10 years

Compost Bins on State Contract FAC113

<https://www.mass.gov/media/2242696/download>

New Age Composter



Vendor: New England Plastics

New Bedford, MA

508-998-3111

Bin-11: \$53 (11 cu ft capacity)

Bin-24: \$61 (24 cu ft capacity)

Bin-30: \$66 (30 cu ft capacity)

Add \$2-4 per bin plus shipping
for orders of less than 21 bins

Compost Bins on State Contract FAC113

<https://www.mass.gov/media/2242696/download>.

Earth Machine



Vendor: ORBIS Corp.

888-675-2878 x7107

\$49.50 (20-40 units)

\$46.00 (41-100 units)

Minimum order: 20

Shipped in pallets of 20

10 cu ft capacity

Compost Bins on State Contract FAC87

<https://www.mass.gov/media/863486/download>

Dual Compost Tumbler



Vendor: Go Green Solutions

774-293-1862

\$153.99 (1-30 units)

\$136.00 (31-100 units)

7 cu ft capacity (3.5 cu ft per side)

How to Compost

- Provide:
 - Food (carbon:nitrogen)
(30:1 = fast, hot)
 - Moisture (50%) = Damp!
 - Oxygen (Passive or active
– just do it!)
 - Habitable temperature
(sufficient mass)
(3'x3'x3' = minimum to
maintain heat)



Optional Ingredients

- Added bacteria/microbes (soil, manure, compost, commercial inoculants)
- Lime (have to be careful not to raise pH too much)



Do not compost these in a low-tech system:

- Meat, meat by-products
- Fat, grease, oils (in quantity)
- Dairy products (in quantity)
- Manure from carnivores (dogs, cats, humans)
- Large branches



Do Not Compost:

- Toxic materials – pesticides, petroleum products, chlorine, treated wood, etc.
- Trash – glass, metal, plastic

For best results, try to exclude:

- Diseased plants
- Weeds gone to seed
- Weeds that spread by roots and runners (vines)
- Invasive plant parts that can resprout



Do Compost: Clean Vegetative Materials

Sources of Carbon ("Browns")

- ✓ Leaves
- ✓ Straw, hay
- ✓ Paper/cardboard
- ✓ Sawdust
- ✓ Wood chips
- ✓ Pine needles
- ✓ Dead, dried up plant parts: cornstalks, sunflower stalks, etc.
- ✓ Twigs



Sources of Nitrogen ("Greens")

- ✓ Green plants & parts:
(grass clippings, weeds, seaweed)
- ✓ Food scraps: fruit & vegetables, coffee grounds, tea bags, egg shells
- ✓ Herbivore manure
- ✓ Alfalfa meal
- ✓ Blood meal



C:N Ratio

- Responsible for odor generation
 - Odors can result from excess nitrogen
- Responsible for temperature and speed of decomposition
- Somewhat responsible for nitrogen content of end product





C:N Ratio of 30:1

Ideal for fast, hot composting

- **Browns:** may range from 40-700:1
- **Greens:** may range from 15-40:1
- **Mix 'n Match** – Use your nose
- **Equal parts by weight usually means a higher volume of browns to greens because browns tend to weigh less.**

Recipes and Ratios



- Simple “Rule of Thumb” to achieve a 30:1 carbon to nitrogen ratio is to build a pile **using a mix of:**
- **3 parts “Browns”** to **1 part “Greens”**
For example, **75% leaves** & **25% grass or vegetative food scraps**
- Can interchange other ingredients from the “Browns” and “Greens” categories.



1. Very high nitrogen material



2. Added cardboard, straw, compost and water



3. Added more cardboard



4. Topped off with hay



5. And covered

An easy way to get carbon into your compost pile is to collect scraps in a paper bag.



After dumping and burying the scraps, tear up the bag and leave the pieces on top.



Lining collection pail with paper bag makes cleaning easier and adds high carbon material to compost bin

Moisture



- Should be about 50%
- Balancing act
 - High Carbon materials usually dry, need moisture – rain, snow or a garden hose
 - If too dry, your compost will **not** decompose
 - If the leaves rustle when you stir, they're too dry
 - High Nitrogen materials are usually wet, need bulking with dry ingredients, like leaves
 - If too much wet food waste, the pile can develop odors – mix in some dry leaves, torn paper bags

Compost System



- Desirable:
 - Enclosed (if composting food waste)
 - Rodent-proof (metal, secure cover and floor and openings less than 1/2") (if rodents are in the area)
 - Volume -1 cubic yard = 27 cu. ft. = 3'x3'x3'
= optimal size for efficient, hot composting
 - Built-in aeration system to eliminate turning
 - Easy to use for those who will be using it
 - e.g., if kids, it should be kid-friendly
 - Indoors if no yard, deck or porch

Where Should I put my Compost Bins?

- Space – how much will you need?
- Convenience – easily accessible
- Proximity to water source (faucet, not wetlands)
- Appearance - visibility (or invisibility)
- Drainage – no puddling or standing water
- Exposure – shade minimizes evaporation
- Environmental considerations – wetlands, buffer zones, proximity to the gardens or where the compost will be used
- Neighbors - avoid potential problems – out of sight, out of mind



Locate your compost bins where they will be convenient for you to use and near a source of water



Tools of the trade – gloves, a hose, cultivator, trowel, hoe, shovel and wheelbarrow or buckets



How do I get my compost? A simple way is to dig down until you reach it and scoop it into a bucket



Use a hoe or cultivator to peel the undecomposed material away, then shovel out the compost into a bucket or wheelbarrow



15 minutes later...



After harvesting compost, I planted Basil seeds directly into 100% compost. Make sure the compost is about a year old to make sure it is “stable”.

Compost holds water like a sponge, so don't overwater the seedlings.

12 days later, here come the seedlings!

Using compost at 100% strength usually isn't recommended, but it gives seeds a good start!





Add compost to potted plants



This rose has been in this pot for 12 years! Compost is added once a year.

Don't be afraid to mulch with leaves, even oak leaves. Your plants will thrive!



What if I don't have a yard or other outdoor space? Try composting indoors by making a worm bin – no one has to know! (unless you want them to)!



Drill holes about 3" apart in sides of bin

Use torn waste paper as "bedding" (browns)



Add red wiggler worms – from THE GREEN TEAM or collect them “in the wild”



Find red wigglers under damp leaves or old horse manure piles. Add 2 or more to start your indoor worm bin. Over time they will multiply, but won't overpopulate the bin.



Young red wiggler worm on a wet oak leaf.



Add them to your bin with a handful of the humus or soil found under the leaves.

Dig below surface to bury food scraps



Keep a 3-4" layer of paper as a top layer



How can I prevent fruit flies in my worm bin or living space?

Here are some tips:

1. Remember **3 parts browns** to **1 part greens**, and always bury the food scraps under 3-4" of waste paper as the top layer of your bin; add more paper daily;
2. Avoid adding banana peels to your worm bin (add them to garden soil instead);
3. Freeze food scraps for several days, then thaw them out before burying in your bin;
4. Don't overfeed your worm bin – add 1-2 cups food scraps per week to start. You can increase the amount added as time goes on, as the decomposition rate increases. If you can smell the food scraps, add less scraps or take a break.
5. Add more worm bins to your setup, if you have a lot to compost.

If fruit flies appear, stop adding food scraps (but keep adding paper) until flies are gone.

Make a fruit fly trap – a container with red wine vinegar or banana peels attracts fruit flies and they can be released outdoors. Punch $\frac{1}{4}$ " holes in the cover for flies to enter.



When you no longer find fruit flies going to your trap, you have won! (1-3 weeks typical)

Resources

Mass. Dept of Environmental Protection Home Composting Resources
<https://www.mass.gov/lists/home-composting-green-landscaping>

CT Dept of Energy and Environmental Protection Composting Videos
<https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Organics-Recycling/Compost-Video-Downloads>

Cornell University Home Composting Resources
<https://gardening.cals.cornell.edu/garden-guidance/compost/>

US Composting Council Residential Composting During Covid-19
https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/documents/coronavirus/sp_uscc_covid_residential_co.pdf

Wiggle Room Worm Composting Info, Worms and Supplies
<https://www.wiggleroom.org/>

University of Massachusetts Soil Testing Laboratory
<https://ag.umass.edu/services/soil-plant-nutrient-testing-laboratory>

The Green Team
<https://thegreenteam.org>





Books

- Minnich, J. and Marjorie Hunt. 1979. *Rodale Guide to Composting*, Rodale Press, Emmaus, PA
- Appelhof, Mary. 2000. *Worms Eat My Garbage, 2nd Ed.* Flower Press, Kalamazoo, MI.

Journals

- *Biocycle*, pub. JG Press, Emmaus, PA.
- *Organic Gardening*, pub. Rodale, Inc., Emmaus, PA.

Resources for Organics Diversion (General Public)

Educational

Mass. Dept of Environmental Protection

Home Composting Resources

<https://www.mass.gov/lists/home-composting-green-landscaping>

Home Composting & Green Landscaping

Composting is a convenient, beneficial, and inexpensive way to handle your organic waste and help the environment.

TABLE OF CONTENTS

- [Backyard Composting](#)
- [Indoor Composting](#)
- [Composting Instruction & Learning](#)
- [Sustainable Lawn & Garden Practices](#)



Home Composting & Green Landscaping

<https://www.mass.gov/lists/home-composting-green-landscaping#backyard-composting>

Backyard Composting

[Video: Turn Garbage into Gold Composting at Home](#)

[Open PDF file, 479.24 KB, for Home Composting Tips: A Guide to Composting Yard & Food](#)

[Waste](#) (PDF 479.24 KB)

[Open PDF file, 293.03 KB, for Poster: Composting is Easy](#) (PDF 293.03 KB)

[Open PDF file, 480.66 KB, for Don't Trash Grass](#) (PDF 480.66 KB)

[Get a Low-Cost Compost Bin](#)

Indoor Composting

[Open PDF file, 25.91 KB, for MassDEP Fact Sheet: How to Control Fruit Flies & Fungus](#)

[Gnats](#) (PDF 25.91 KB)

[Open PDF file, 32.86 KB, for MassDEP Fact Sheet: Vermicomposting - Indoor Composting with](#)

[Worms](#) (PDF 32.86 KB)

Composting Instruction & Learning

[MassDEP Home Composting Workshops & Demonstrations](#)

[Open PDF file, 30.97 KB, for Teaching Residents About Composting: Outline & Talking](#)

[Points](#) (PDF 30.97 KB)

[Open PDF file, 6.67 MB, for Presentation: Turn Garbage into Gold Composting at Home](#) (PDF

6.67 MB)

Sustainable Lawn & Garden Practices

[Lawns & Landscapes in Your Watershed](#)



Videos



- **Video: Turn Garbage into Gold Composting at Home**
<https://www.youtube.com/watch?v=X22-o3nxlKo&feature=youtu.be>
- THE GREEN TEAM How to Assemble the New Age Composter
<https://youtu.be/08qDLLv1Hgc>
- CT Dept of Energy and Environmental Protection Composting Videos
<https://portal.ct.gov/DEEP/Waste-Management-and-Disposal/Organics-Recycling/Compost-Video-Downloads>
- The Perfect Compost Recipe
<https://www.youtube.com/watch?v=M1klpCBD3UI>

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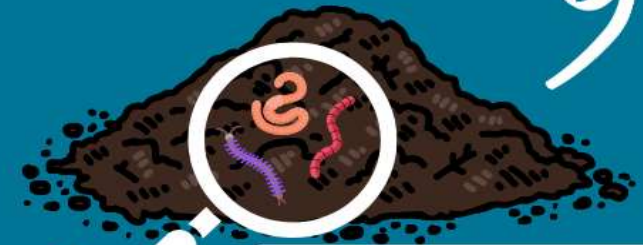
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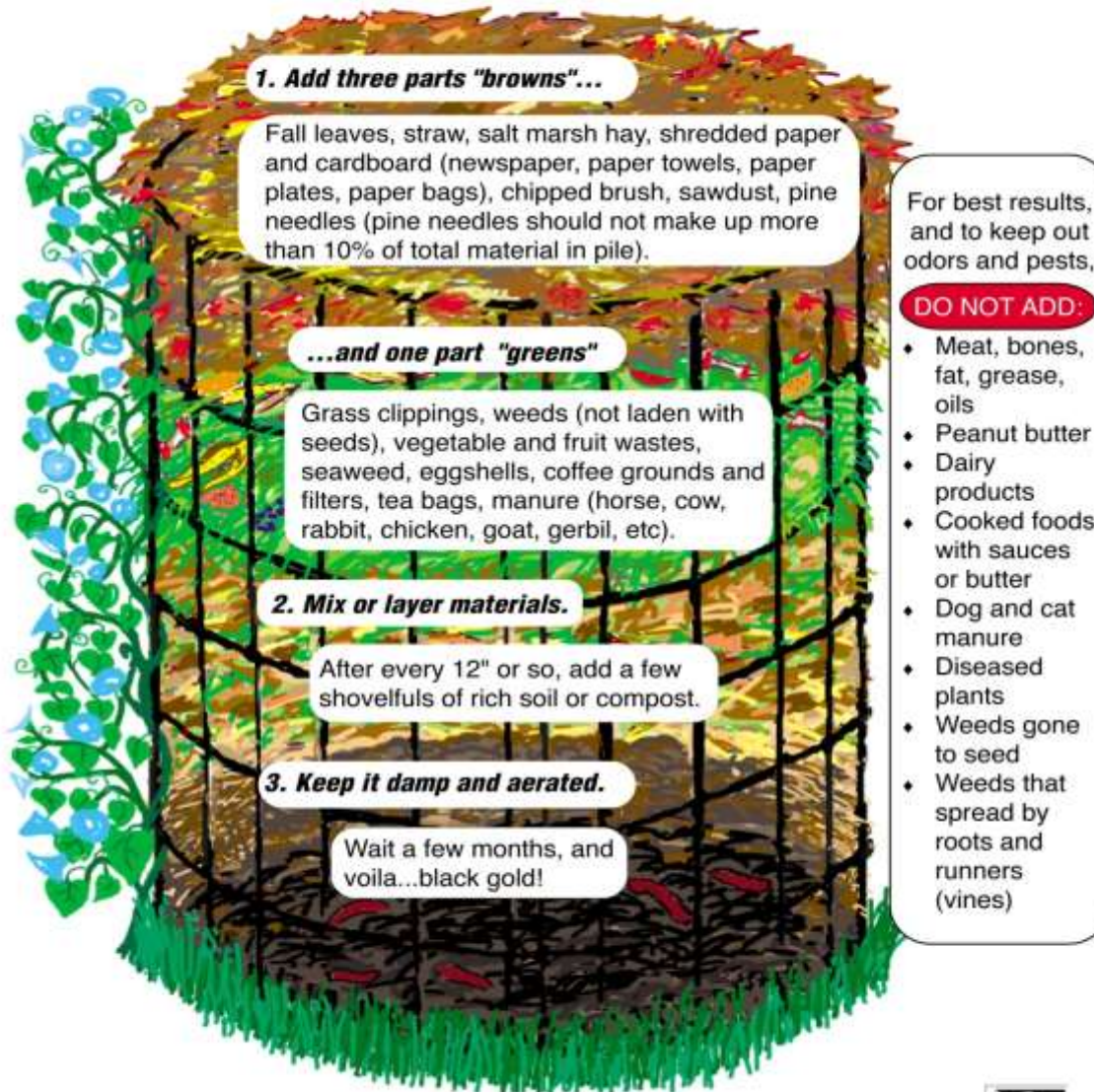


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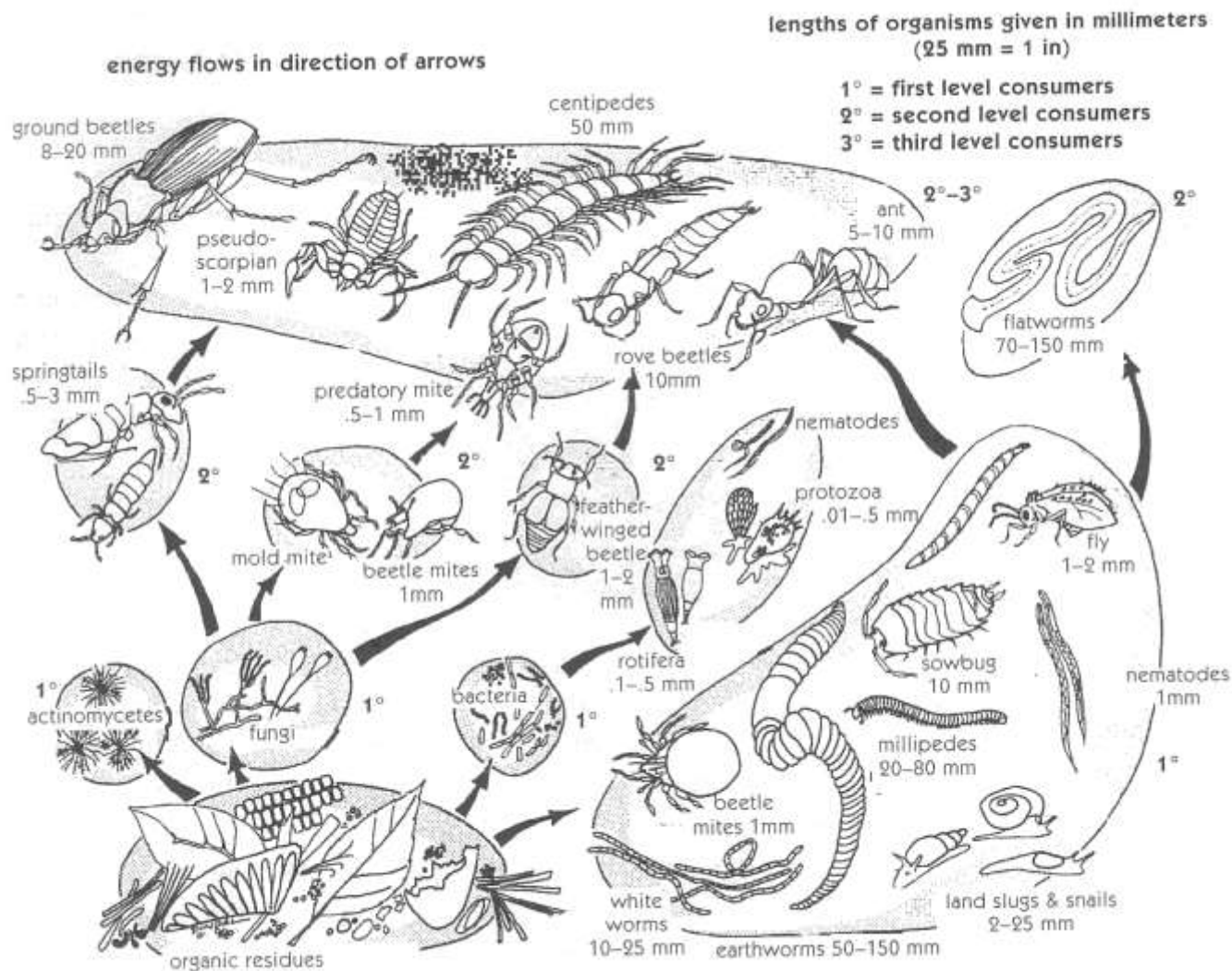


Figure 3.1 Soil organisms and their role in decomposing residues. Modified from D.L.Dindal, 1978.



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