Home Composting for Zero Waste
(Everything You Wanted to Know about Composting But Were Afraid to Ask)

Massachusetts Department of Environmental Protection
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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!

MassDEP
Department of Environmental Protection

Recycle Smart
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.

Video Transcript 
(To save a copy of this video, right click and select Save Target As)
Composting is easy!

To make compost, just follow these simple steps:

1. Add three parts “browns”...
   - Fall leaves, straw, salt marsh hay, shredded paper and cardboard (newspaper, paper towels, paper plates, paper bags), chipped brush, sawdust, pine needles (pine needles should not make up more than 10% of total material in pile).

2. Mix or layer materials.
   - After every 12" or so, add a few shovelfuls of rich soil or compost.

3. Keep it damp and aerated.
   - Wait a few months, and voila...black gold!

For best results, and to keep out odors and pests,

**DO NOT ADD:**
- Meat, bones, fat, grease, oils
- Peanut butter
- Dairy products
- Cooked foods with sauces or butter
- Dog and cat manure
- Diseased plants
- Weeds gone to seed
- Weeds that spread by roots and runners (vines)

Prepared by the Massachusetts Department of Environmental Protection
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 wigglers)
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%


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

*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 warranteed 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.

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
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 ½”) (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”

Look where leaves have overwintered on soil

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.

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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.

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 ¼” 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

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

US Composting Council Residential Composting During Covid-19

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

• 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, forHome Composting Tips: A Guide to Composting Yard & Food Waste (PDF 479.24 KB)
Open PDF file, 293.03 KB, forPoster: Composting is Easy (PDF 293.03 KB)
Open PDF file, 480.66 KB, forDon't Trash Grass (PDF 480.66 KB)
Get a Low-Cost Compost Bin

Indoor Composting

Open PDF file, 25.91 KB, forMassDEP Fact Sheet: How to Control Fruit Flies & Fungus Gnats (PDF 25.91 KB)
Open PDF file, 32.86 KB, forMassDEP 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, forTeaching Residents About Composting: Outline & Talking Points (PDF 30.97 KB)
Open PDF file, 6.67 MB, forPresentation: 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-o3nxI Ko&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

• The Perfect Compost Recipe
  https://www.youtube.com/watch?v=M1kIpCBD3UI
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Into black gold!

Composting is nature's recycling system at work

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Department of Environmental Protection

RecycleSmart
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   ...and one part “greens”
   Grass clippings, weeds (not laden with seeds), vegetable and fruit wastes, seaweed, eggshells, coffee grounds and filters, tea bags, manure (horse, cow, rabbit, chicken, goat, gerbil, etc).

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3. Keep it damp and aerated.
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