



Home Composting 101

A Guide to Backyard Hot Composting

What is composting?

Composting is the controlled aerobic decomposition of organic materials such as food scraps and fall leaves, by fungi, bacteria, and other microbes. The result is **compost**: a dark, crumbly, earthy-smelling soil amendment.

Composting at home is infinitely flexible! You can keep it simple with passive composting, which requires little to no maintenance but takes time (6 months or longer). This guide is designed for home composters interested in composting food scraps, achieving temperatures that reduce weed seeds and the risk of pathogens, and a quicker composting process.



What are its benefits?



Reduces waste

Wasted food is the largest single component of everyday garbage. Composting food scraps and yard trimmings keeps material out of polluting landfills and incinerators.



Empowers people

Home composting encourages people to become aware of their wasting habits and to take an active role in reducing wasted food.



Protects the climate

Landfills and incinerators emit potent greenhouse gases. But compost added to soils helps sequester carbon (pull carbon from the atmosphere) while reducing the need for fertilizers made with fossil fuels.



Enhances soil

Applied to soil, compost adds soil organic matter and enhances soil structure, fertility, microbial activity, water holding capacity, and ability to resist plant diseases.

The 4 Ingredients Needed for Composting Microbes

It's all about the microbes!

GREENS

- Materials relatively high in nitrogen, which microbes need to grow and reproduce
- Greens may provide moisture to the composting pile as they decompose

BROWNS

- Materials relatively high in carbon, which microbes need for carbohydrates and energy
- Bulky browns reduce odors in the composting pile by absorbing liquids and encouraging aerobic conditions

WATER

- Like us, microbes need water to live
- 50 to 60% moisture by weight is ideal during active composting
- Microbes thrive when there is a thin film of moisture around materials in the pile
- Moisture is needed throughout the entire composting pile

AIR

- Composting is an aerobic process! Microbes responsible for composting require oxygen
- A variety of material sizes helps to maintain air spaces in the pile as composting progresses
- Turning a pile reduces its density, makes it easier for air to flow, and discourages anaerobic pockets (areas lacking oxygen)

✓ Acceptable materials

⊗ Materials to avoid

GREENS



Fruit and vegetable scraps (no stickers)



Egg shells



Coffee grounds and paper filters



Loose tea (paper bags ok, no staples)



Garden trimmings

BROWNS



Fall leaves



Plant stalks



Wood chips and shavings (not chemically treated)



Shredded newspaper and brown bags (in limited quantities)

• Glossy paper

• Produce stickers

• Pet waste or kitty litter

• Treated or painted wood

• Herbicide-treated plants

• Diseased or pest-infested plants

• Dryer lint

• Used tissues

• Meat, fish, or bones*

• Eggs or dairy products*

• Fats, oils, or grease*

• Cooked food*

• Weed seeds or invasive weeds

• Biodegradable tableware or plastic not certified for home composting

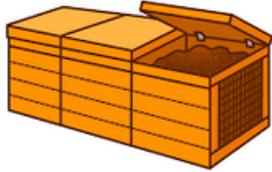
* Though technically compostable, these materials are not recommended for those new to home composting or where rodent problems exist

BEFORE COMPOSTING BEGINS

Choose a composting system

Enclosed systems help keep the process tidy and protected. Systems with a volume of at least 27 cubic feet make it easier to achieve higher temperatures. Be aware that off-the-shelf systems are often smaller. Open piles need closer monitoring for composting of food scraps.

3-Bin System



Stationary System



Single-Chamber Tumbler



Double-Chamber Tumbler



Browns Storage



holes for aeration



Only have space indoors?

Consider vermicomposting (composting with worms).

Learn more:

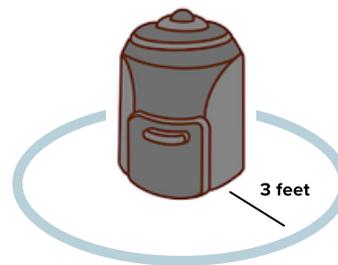
<https://ilsr.org/articles/vermicomposting-101/>



Locate and set up your system

- Place the system in a secure outdoor location that is convenient to access and where water does not pool. If possible, avoid full sun to prevent overheating (for you and your compost!).
- Add a protective rodent barrier under your system (such as ¼-inch hardware cloth) and maintain 3 feet of clutter-free space around the system to prevent animal activity. Critters love clutter!
- Collect brown materials: you will need at least double the volume of the food scraps you plan to compost.
- Store browns and have them readily available at all times. Pause adding greens to your system if you run out of browns!

Stationary System



Avoid rodents!

Learn more:

<https://ilsr.org/composting/home-composting/>



Collect or purchase tools

You can compost at home with minimal tools! Below are some helpful tools to consider.



Compost or manure forks with round tines are good for moving and mixing materials and turning piles



Work gloves and face masks can protect sensitive individuals and encourage good hygiene



You will likely need to add water to your pile, such as with a hose or watering can



Containers for moving materials can also be used for measuring composting ingredients



Monitoring temperatures with a probe and screening your finished compost are optional, but helpful steps

HOW TO HOT COMPOST IN 10 STEPS

1

Know your composting recipe!

Basic recipe of greens and browns: 1 part greens, 2 parts browns by volume*

GREENS

nitrogen-rich material



BROWNS

carbon-rich material



*Using the same size container to roughly measure green and brown ingredients can be helpful in the beginning. This basic recipe can then be tweaked as you become more familiar with your system and ingredients.

2

Chop or cut large materials (optional)

- Increasing surface area helps materials break down faster.
- Consider chopping tough food scraps and garden trimmings (such as corn cobs, pineapple tops, vines, and long stalks).
- Do NOT cut avocado or mango pits! They will eventually break down.



Cutting increases surface area!

3

Add material and water as you build a pile

- For stationary piles: start with a 6-inch base of bulky brown material such as twigs or woodchips to allow for airflow and absorb liquids. Try not to mix this base into your pile.
- Add 1 part greens and 2 parts browns to your system or pile over time using either Method 1 or 2 (see below) until the system is full or the pile is at least 27 cubic feet. Add water as needed (see step 6).
- Alternatively, fill the system with fall leaves and dry garden trimmings or build a pile of browns that is at least 27 cubic feet. Add greens in batches over time using Method 3. Make sure to maintain at least twice the volume of brown material to green material. Add water as needed.

Method 1 (Lasagna method): layer greens and browns



Method 2: Mix greens and browns separately, then add to the pile



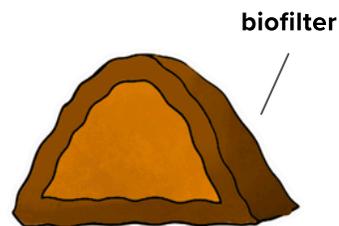
Method 3: Make a small hole in pile of browns, add greens, then cover with browns



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Cover any exposed greens with browns

- No food scraps should ever be visible, even in tumbler systems.
- 4 to 6 inches of browns or stable compost will act as a biofilter, preventing nuisance odors, flies, and other unwanted critters.



5

Turn your pile regularly

- Turn (mix, flip, or tumble) the pile for faster composting! Turn before adding more greens and regularly during active composting: aim for every 3 days for the first 1 to 3 weeks. Add water as needed.
- When the system is full or the pile large enough, it is ready for active composting! Stop adding new material, continue with regular turning, and add water as needed.

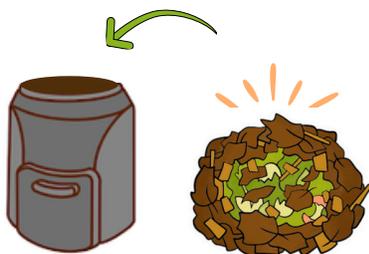
What does turning do?

- Provides microbes with air, stimulating their activity
- Releases trapped heat and moisture
- Distributes moisture, nutrients, and organisms throughout the pile
- Breaks apart clumps and "fluffs" materials

Options for turning a pile in a stationary system



Mix in place



Move system and rebuild pile

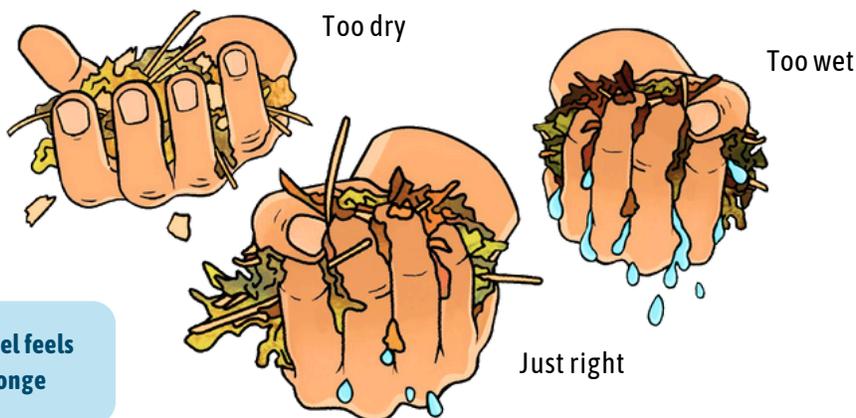


Flip material into another system

6

Add water as needed

When turning, use the "hand squeeze" moisture test to assess whether or not to add water to your composting pile. Grab a handful, squeeze, and observe!



The ideal moisture level feels like a wrung-out sponge

7

Keep an eye on your compost and troubleshoot as needed

Avoid Critters

- Cover exposed food scraps with 4 to 6 inches of browns or stable compost
- Leave out meat, dairy, fats, oil, and cooked food to reduce the potential for odors, which can attract rodents
- Maintain 3 feet of open space around the system (avoid clutter and trim vegetation) to eliminate potential hiding places
- Turn piles thoroughly and regularly to discourage critters from creating a habitat
- Add a barrier (such as gravel or hardware cloth) at the base of stationary bin systems to prevent burrowing

Have Odor?

- Review your recipe
- Check moisture with the hand squeeze test
- Add more browns
- Mix and fluff to aerate
- Cover greens with dry browns

Manage Moisture

- Use the hand squeeze test to check moisture:

Too Wet?

- Mix in more dry browns while turning

Too Dry?

- Add water throughout the pile while turning

Temperature Tells the Story

Do you notice your pile heating up? In a hot composting pile, heat-loving microbes give off energy as they consume organic material. The temperature of a composting pile tells you which microbes are likely present and how active they are. Monitoring a pile's temperature over time can tell you how the composting process is progressing and inform whether or not you might want to adjust your recipe or management. A temperature probe is helpful for this.

Particular temperatures need to be achieved to reduce the presence of weed seeds, fly larvae, or pathogens in finished compost. (Pathogens may be present in certain materials such as egg shells.) To ensure all of the material in the pile achieves target temperatures: stop adding new material, monitor temperatures, and turn regularly.

**131°F**

for at least 3 days in a row
reduces risk of pathogens

**122 - 140°F**

when rapid decomposition
is taking place

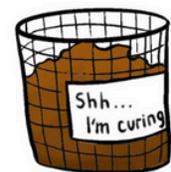
**145°F**

prevents most weed
seeds from germinating

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Cure

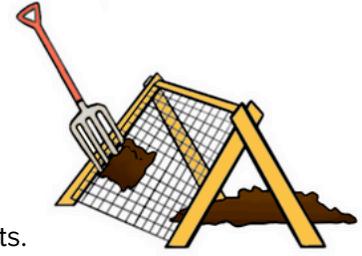
- As decomposition slows, compost needs time to cure and stabilize. Compost may be ready to cure when it no longer heats up after mixing and there are no visible food scraps (except for harder materials such as egg shells and pits).
- To cure compost, stop adding new material and let it sit in place. Alternatively, move it to a new location such as to a protective enclosure that allows for airflow. For stationary systems, you may need to remove more mature compost out from under material that is still actively composting.
- Two months or longer is recommended for curing. By the end of the entire composting process, the pile will have shrunk to about one-third of its original volume.



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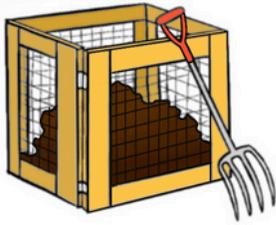
Screen (optional)

- After curing, sift the compost through a screen with mesh that is a ¼-inch or smaller.
- Screening removes hard materials that have not broken down (such as wood chips, corn cobs, and fruit pits) as well as contaminants.
- Dispose of contaminants such as produce stickers, twist ties, and plastics.
- Reintroduce the “overs,” compostable material that are screened out, back into an active pile.
- Remove woody materials from compost that will be mixed into soil to avoid binding up soil nitrogen that plant roots need. This is less important if compost is used as a mulch.



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Store and use finished compost



- Finished compost is dark brown, crumbly and loose, and has an earthy smell. If compost is not screened, harder materials (such as wood chips, corn cobs, and fruit pits) may remain. Other food scraps should not be visible.
- Store finished compost in an enclosure that allows for airflow and protects the compost from becoming water-logged. This may be a separate bin or chamber, outside under a tarp, or in another protected enclosure.
- Use finished compost by directly mixing it into soil, adding it to a potting mix, or using it as a mulch.

Composting Timeline

The timeline for the full composting process depends on many factors. For those interested in hot composting, following the steps outlined in this guide will be helpful. Hot composting is quicker than cold or passive composting, but curing still takes time!

Explore ILSR's Home Composting Resources:



ilsr.org/home-composting

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This chart illustrates the approximate rise and fall of the temperature in a pile during the composting process, as well as the associated changes in microbial communities.

Thermophiles thrive between 113–167°F, and mesophiles below 113°F.

