

# COMPOSTING 101

## What is composting?

**Composting** is the controlled aerobic decomposition of raw organic materials (such as food scraps and dry leaves) via fungi, bacteria, and other microbes in order to create **compost**, a dark, crumbly, earthy-smelling soil amendment.

## What are its benefits?

 <b>Reduces waste</b>	Wasted food is the largest single component of everyday garbage. Composting food scraps and yard trimmings diverts waste from polluting landfills and incinerators.
 <b>Enhances soil</b>	Applied to soil, compost enhances soil organic matter, structure, fertility, microbial activity, water holding capacity, and ability to resist plant diseases.
 <b>Protects the climate</b>	Landfills and incinerators emit potent greenhouse gases. But compost added to soils helps sequester carbon, while offsetting fossil-fuel-intensive fertilizers. Healthy soils are an important carbon sink.
 <b>Grows community</b>	Community composting encourages people to engage with each other while learning how their food is grown. Commercial sites sustain 4-8 times more jobs per ton than landfills and incinerators.

✓ **Materials that can be composted:**    ✗ **Materials to avoid:**

GREENS		BROWNS		Materials to avoid	
	<b>FRUIT &amp; VEGETABLE SCRAPS</b> (No stickers)		<b>FALL LEAVES</b>		<b>MEAT, FISH, OR BONES</b>
	<b>EGG SHELLS</b>		<b>PLANT STALKS</b> (6" or smaller)		<b>EGGS OR DAIRY PRODUCTS</b>
	<b>COFFEE GROUNDS &amp; PAPER FILTERS</b>		<b>WOOD CHIPS &amp; SHAVINGS</b> (Not chemically treated)		<b>PRODUCE STICKERS</b>
	<b>TEA BAGS</b> (No staples or plastic)		<b>SHREDDED NEWSPAPER &amp; BROWN BAGS</b> (No glossy pages)		<b>GLOSSY PAPER</b>
	<b>GARDEN TRIMMINGS</b> (6" or smaller)				<b>DISEASED AND PEST-INFESTED PLANTS</b>
					<b>WEEDS WITH SEEDS</b>
					<b>FATS, OILS, OR GREASE</b>
					<b>COOKED FOOD</b>
					<b>PET WASTE &amp; KITTY LITTER</b>
					<b>TREATED OR PAINTED WOOD</b>
					<b>HERBICIDE-TREATED PLANTS</b>
					<b>DRYER LINT</b>
					<b>USED TISSUES</b>
					<b>"COMPOSTABLE" TABLEWARE &amp; PLASTIC BAGS</b>

# The 4 Ingredients Needed for Composting Microbes

## GREENS

- Materials relatively high in nitrogen, which microbes need to grow and reproduce
- Greens help provide moisture

## BROWNS

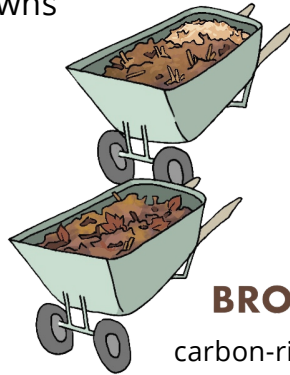
- Materials relatively high in carbon, which microbes need for carbohydrates and energy
- Bulky browns help keep the pile aerated and absorb extra liquid

### Basic recipe of greens and browns:

1 part greens  
2 parts browns



**GREENS**  
nitrogen-rich material



**BROWNS**  
carbon-rich material

## AIR

- Composting is an aerobic process!
- Microbes need air to breathe
- The right pile density (AKA bulk density) is important for air flow and to maintain oxygen levels in the pile
- Mixing and turning reduce pile density making it easier for air to flow, and avoid anaerobic pockets (parts of the pile lacking oxygen)

## WATER

- Microbes need water to live
- 50 to 60% moisture by weight is ideal during active composting
- Microbes live and move around in a thin film of moisture around each particle in the pile
- Moisture is needed throughout the entire pile!

# COMMON STEPS IN COMPOSTING

## 1 Determine composting material collection and storage

- Browns should be stored and readily available at all times

**!** Greens should NOT be stored on site. When they decompose alone they will create odor problems.



## 2 Chop up large materials as needed

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

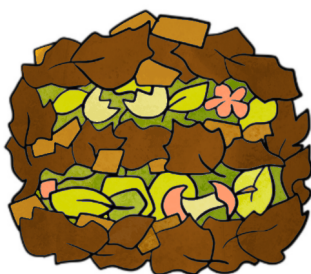


**!** 2 to 6 inches is ideal

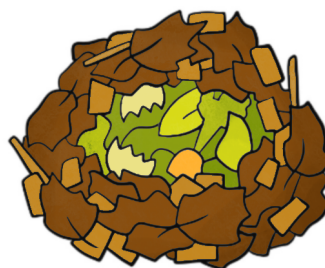
## 3 Build and add to compost pile • Check recipe

- When determining the recipe, consider: What materials will be used? How much of each is available? What is the system's capacity?
- For stationary piles, start with a 6-inch base of browns and looser material to create air flow.
- To get proportions right, measure materials with the same volume wheelbarrow or container
- Remember the basic recipe: at least 2 parts browns to 1 part greens by volume (online compost recipe calculators can help)
- Pay attention to air flow, moisture level, and ratio of greens to browns in the pile
- During the active composting stage, continue adding greens until the bin/chamber/pile is full

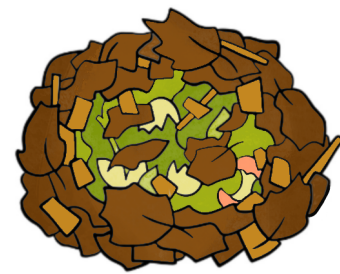
**Lasagna method:  
layer greens and  
browns**



**Make a small hole  
in the pile, add greens,  
then cover with browns**



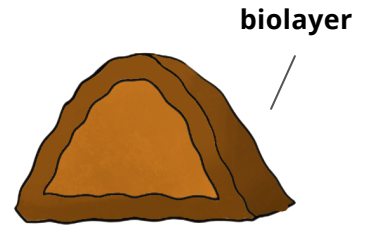
**Mix greens and  
browns separately,  
then add to the pile**



# 4

## Cover any exposed greens with browns

- No food scraps should ever be visible!
- 4 to 6 inches of browns will act as a biolayer or biofilter, preventing nuisance odors, flies and other unwanted critters



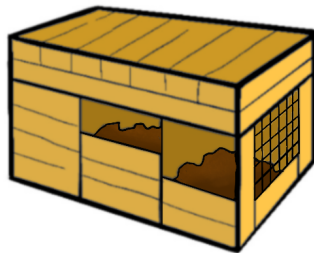
# 5

## Aerate and mix regularly

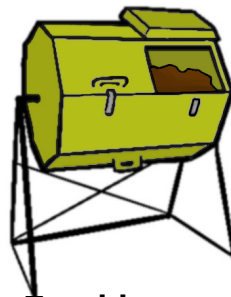
- Mix, tumble, or turn the pile based on the composting system in use
- When the bin/chamber is full or pile is at capacity, it's ready for active composting! Flip it into the next bin/chamber or start a new pile.

### What does turning do?

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



3-Bin System



Tumbler



Aerated Static Pile

# 6

## Monitor and record temperature, moisture level, and odor

- Tracking and recording these are good practices for any composter
- Use compost thermometers to gauge and record temperatures
- Use the hand squeeze test to assess moisture
- Make sensory observations and keep records to track patterns and trends
- Adjust the recipe and take action accordingly

### Temperature Tells the Story

Composting microbes give off energy as they consume the organic material, causing the pile to heat up. Monitoring temperature will reveal how well the composting process is progressing. Low temperatures, for instance, indicate reduced microbial activity. Reaching certain temperature levels are critical for reducing the risk of pathogens.



**131°F**  
(for at least 3 consecutive days)  
reduces risk of pathogens



**145°F**  
prevents most weed  
seeds from germinating

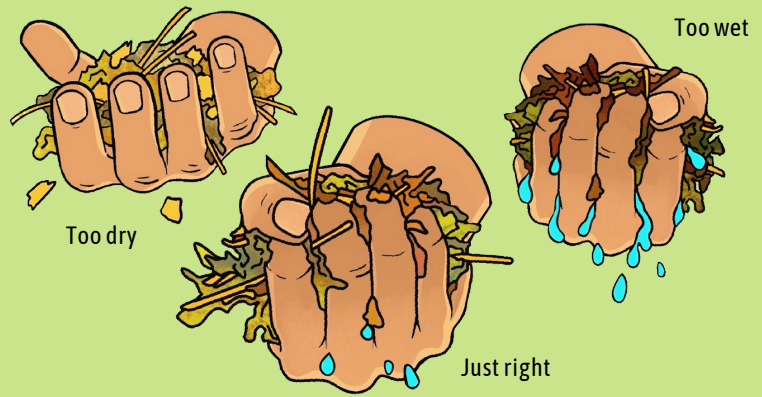


**122 - 140°F**  
when rapid decomposition  
is taking place

### Moisture Tip:

Use the "Hand Squeeze" moisture test

**!** The ideal moisture level feels a wrung-out sponge



## 7

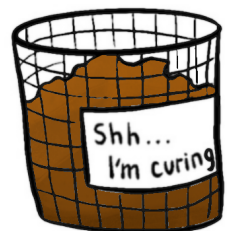
### Troubleshoot as needed

Critters	Odor	Moisture
<ul style="list-style-type: none"><li>▶ Cover exposed food scraps with a thick layer of browns</li><li>▶ Make sure there is no meat, dairy, fats/oil, or cooked food in the pile</li><li>▶ Maintain at least 3 feet of open space all around the system (avoid clutter and trim vegetation) to eliminate potential rodent hiding places</li><li>▶ Turn piles thoroughly and regularly to discourage rodents from creating a habitat</li><li>▶ Add a barrier (such as gravel or hardware cloth) at the base of bin systems</li></ul>	<ul style="list-style-type: none"><li>▶ Adjust recipe</li><li>▶ Add more browns</li><li>▶ Check moisture</li><li>▶ Check bulk density (could be too dense)</li><li>▶ Mix to aerate</li><li>▶ Cover greens with dry browns</li></ul>	<p><b>Too Wet</b></p> <ul style="list-style-type: none"><li>▶ Turn pile</li><li>▶ Add more dry browns</li></ul> <p><b>Too Dry</b></p> <ul style="list-style-type: none"><li>▶ Add water throughout the pile</li></ul>

## 8

### Cure

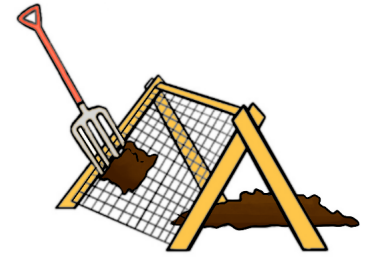
- Start curing (process by which compost finishes) when pile no longer heats up after mixing and food scraps are no longer visible
- Either move old compost to new bin/chamber to cure or stop adding to the system altogether to allow the entire pile to cure
- Allow pile to cure for generally 2 to 9 months (minimum 4 weeks)
- By the end, the composted materials will have shrunk to about one-third of their original volume



# 9

## Screen

- After curing, sift the compost through a screen with mesh that is 1/4 inches or smaller
- Screening removes materials that have not broken down (such as wood chips, corn cobs, and fruit pits) as well as contaminants
- Remove contaminants like produce stickers, twist ties, and plastics
- Reintroduce compostable material screened out (the "overs") back into the active pile
- Screening is important to remove woody materials, which when left in compost will use up nitrogen in soil that plant roots need

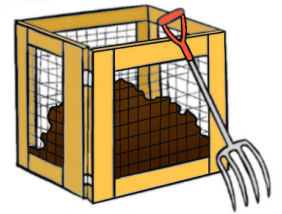


# 10

## Store and use finished compost

- There are multiple ways to store compost
- Finished compost is dark brown, crumbly and loose, and has an earthy smell
- Use finished compost for soil, potting mix, and mulch

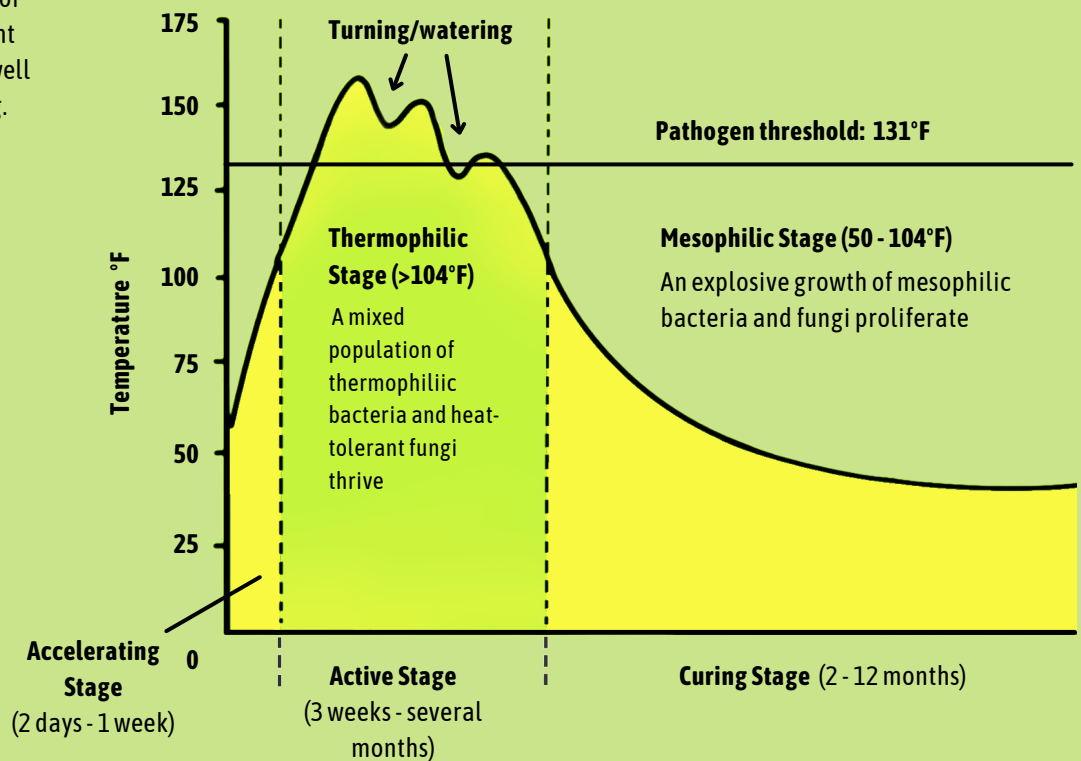
**!** Don't let the compost dry out!



## Composting Timeline

The timeline for the full composting process depends on many factors such as starting recipe, adequate aeration, and moisture levels. More active management will speed the process but curing still takes time!

This chart illustrates the rise and fall of the pile's temperature during different stages of the composting process as well as the impact of turning and watering.



Visit ILSR's Composting for Community Website:



**Neighborhood Soil Rebuilders**  
COMPOSTER TRAINING PROGRAM

Oct. 2021

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