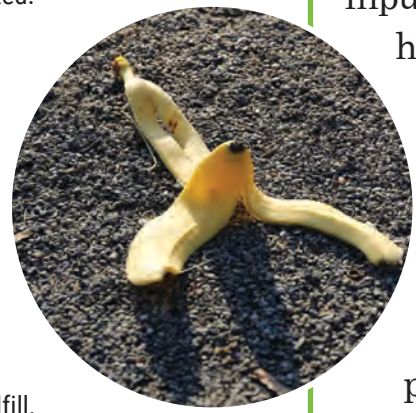
the dirt on **COMPOST**

VERMONT

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Did you know?

Almost 20 percent of all Vermonters' landfilled waste is food scraps that could have been composted.[1] If thrown in the trash, they release methane, a greenhouse gas at least 34 times more powerful than carbon dioxide[2], while decomposing in the anaerobic conditions of a landfill.



1. DSM Environmental Services, prepared for Vermont Department of Environmental Conservation Solid Waste Program, 2018 Vermont Waste Characterization Study: dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/2018-VT-Waste-Characterization.pdf

2. Intergovernmental Panel on Climate Change (IPCC) 2013 Working Group Assessment Report: climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_All.pdf

WHAT IS COMPOST?

In a forest, leaves, logs, and dead animals pile up, rot, and make fertile soil. It happens naturally. Home composting is a way to manage this process; either in a passive, hands-off manner, mimicking the natural process of the forest floor; or by adding inputs and turning material regularly to hasten the process.

In this booklet, we'll describe many ways to compost food scraps in your backyard. There are a few key ingredients and a variety of approaches to make the process go smoothly. Whether you have never composted before, or you're a 20-year composting conqueror, you'll find tips and strategies to help you along.

VERMONT'S UNIVERSAL RECYCLING LAW

Vermont's Universal Recycling Law, Act 148, passed unanimously in 2012. The law changed Vermont's waste management system in several ways, including banning all food scraps from the landfill starting July 1, 2020. This mandate refers to all Vermonters—businesses, grocery stores, schools, offices, cities, events, and residents.

Backyard composting is an inexpensive, fun, and simple way to create a wonderful soil amendment for your lawn and garden while keeping your household in compliance with the law. This booklet will help you get started (or improve) composting in your backyard, but if you don't have the space, or can't do it for any reason, there are other options, including:

- All Vermont's **transfer stations, bag drops, and fast trashes** accept food scraps, often for a fee.
- In some parts of Vermont, **food scrap haulers** will pick up from residences for a fee.
- Food scraps can be dropped off at **many commercial compost companies**.
- Join (or start) a **neighborhood community composting site** and learn to make compost together to apply on a community garden.
- Share space with a neighbor! Invite your neighbors to join you in composting in your backyard, or see if someone near you will let you bring your food scraps to them. **Gardeners love having extra compost.**

Pro Tips

SAVE YOUR LEAVES! If you compost at home, store your leaves (or your neighbors') in an old trash can or pile next to your backyard bin. There, they'll be easy to mix in with your food scraps. Save leaves in bags or bins in a shed or garage for easy winter access.

FREEZE IT! If you are holding onto food scraps to drop off somewhere, keep them in a bag in your freezer to eliminate smells. If you compost at home, dump your kitchen compost pail every 2 days and you won't even notice it's there! For a low maintenance system, cover your kitchen pail, dump it once a week, and wash it regularly.

Can I compost meat?

Best practice is keep meat and bones out of the compost. Doing so will keep odors down and wildlife at bay. You still have several options for meat and bones:

- **Use a green cone** (learn more at cvswmd.org/green-cones).
- Drop off meat scraps at a **local transfer station or commercial composting facility**.
- **Bury bones in your garden** by digging 18" -2' deep and covering with soil.
- **Add to trash** (Act 148 does not ban meat scraps from the landfill for **home-composters**; it does for businesses).

See local food scrap drop-off options at: **https://anrmaps.vermont.gov/websites/Organics/default.html**

GETTING STARTED

If you are new to composting, start with a self-assessment:

- How much **SPACE** do you have?
- How much **TIME** do you have?
- How much **ENERGY** do you have?
- How much do you care about producing **QUALITY COMPOST** (versus finding a convenient way to keep food scraps out of the trash)?
- How will you **USE** the compost you create? On a lawn or garden? For trees or shrubs?

Keep your answers to these questions in mind as you think about the kind of system that makes the most sense for you and your lifestyle. It doesn't matter if you cold-compost, hot-compost, or anywhere in between, as long as it works for you!

WHAT GOES IN? WHAT STAYS OUT?

Anything that has ever been alive can be composted. That includes vegetable peels, coffee grounds, leaves, egg shells, dairy, citrus peels, small sticks, leaves, wood chips, etc. Start by keeping meat scraps out of your compost bin, but there are options (such as transfer station drop-offs or a green cone) for those as well.

Pro Tip

Remember to remove PLU stickers, twist ties, and elastic bands from food scraps before composting.

What goes in? Greens and Browns

"Green" *ingredients are wetter and nitrogen rich, such as food scraps, grass clippings, or fresh plant parts. Greens are:*

- Fruit and vegetable scraps
- Coffee grounds and tea bags
- Grass and shrubbery clippings
- Green yard plant parts, such as yard waste or weeds

"Brown" *ingredients provide carbon. Add three times as many browns as greens to your pile for a 3:1 ratio. Browns are:*

- Dead plants, weeds and clippings
- Leaves (raked in fall)
- Small sticks
- Straw and hay
- Wood shavings or chips
- Shredded newspaper, cardboard, office paper

What stays out?

- Meat, bones, fish scraps (unless you are a pro)
- Yard plants that seem diseased — when in doubt, leave it out (make a separate pile away from your garden)
- Anything treated with pesticides
- Weeds that have gone to seed
- Pet waste, which can carry diseases (you can use a green cone for pet waste)
- Cut flowers from a florist (these contain fungicides, which can slow or stop the composting process)

Carbon to nitrogen ratio: why it matters

Food scraps turn into compost because microorganisms break them down. These microorganisms need the right balance of nitrogen and carbon in their food. "Greens" have lots of nitrogen and "browns" have lots of carbon, so to achieve the ideal carbon to nitrogen ratio, keep a stock pile of dry leaves or wood shavings near your compost bin.

For every bucket of food scraps you dump in your compost bin, add three containers of dry browns. The dry browns also help keep the pile fluffier, which lets more air into the center of the pile.

8 TYPES OF COMPOST CO

1. The Pit

Dig a hole at least 1 foot deep; throw your food scraps into it; cover with soil and you are finished. You can plant on top of the compost pit almost immediately. *More info:* ***wikihow.com/Make-a-Compost-Pit.***

PROS: Easy peasy! No pile turning, no need for a supply of browns. Good for small spaces, gardeners, people who don't like to manage a full pile.

CONS: Must dig a new pit regularly. Digging isn't an option in winter.

2. The Trench

Same idea as The Pit, but you start by digging a trench 1-2 feet deep, typically within a garden. Add food scraps and cover as you go, slowly filling in the trench one day at a time. Once you've filled and covered the trench, plant seeds or transplants directly on it. *More info:* ***instructables.com/id/Trench-compost.***

PROS: Easy, perfect for gardeners and small spaces; can continually add plants throughout growing season.

CONS: Must dig a new trench regularly. Digging isn't an option in winter.

3. The Trash Can

A great option for winter. Use a lidded trash bin. Drill 1" holes about 12" apart evenly around the bin to promote airflow. Start the bin with "browns" such as leaves or wood shavings. Add food scraps and alternate with browns. Cover tightly and roll on its side weekly. If using only for winter, dump contents into your compost bin in the spring. If not, continue adding material until bin is full, then let sit for 2-3 months before harvesting. *More info:* ***thebalance.com/how-to-make-a-compost-bin-from-a-garbage-can-1388581.***

PROS: Great way to compost in winter, easy and inexpensive. Keeps food scraps contained before adding to a bigger pile.

CONS: Food scraps may not fully compost. This system may require finishing the compost process in a regular bin or compost pile.

4. The Pallet Bin

Get three loading pallets from a local warehouse or grocery store. Wire them together at the corners leaving one side open. Add onto this to create a 2- or 3- bin system. Line the bottom and sides of the bin with ¼" or ½" hardware cloth and add a hardware cloth lined pallet door and lid to deter animals. *More info:* ***instructables.com/id/Pallet-Compost-Bin.***

PROS: Inexpensive and easy; start composting right away. Built-in aeration due to gaps in pallet construction.

CONS: Easy access for pests unless using hardware cloth. Must manage compost pile with adequate "browns" and turn regularly to deter animals.

Basic steps for composting

- **Food scraps go in.**
- **Add 3 times as many "browns" (carbons, such wood shavings) as "greens" (food scraps).**
- **Turn the pile to mix ingredients on a regular basis.**
- **Keep the pile as damp as a freshly squeezed sponge. If it gets too dry, you can always add water.**

ONTAINERS

Pro Tip

Consider combining methods to span the seasons. What works best for you in summer may not work in winter.

5. The Tumbler

Tumblers are great for small households that do not produce much food waste, or as a first step in a compost system that finishes in a bin. People love tumblers because they're fully enclosed. Put your food scraps in and turn! However, if not properly managed, tumblers can be problematic. See page 12 for tips on successfully composting with a tumbler. *More info:* ***growveg.com/guides/the-pros-and-cons-of-compost-tumblers.***

PROS: Enclosed system deters animals.

CONS: Can cost more than other options. Requires regular management; doesn't always work. May need to finish composting in a separate bin.

6. The Multi-Bin System

Use untreated lumber to make a two- or three-bin system. Hemlock, locust or cedar are ideal. Line the interior and bottom with hardware cloth to keep pests out, and add a door and lid. *Plans are available at:* ***cvswmd.org/home-composting***

PROS: Rotating materials through the three bins allows for aerating and curing, and leaves space for storing browns. Great for winter composting because of the ample space needed when materials freeze and don't break down quickly.

CONS: Requires time to set up and time to regularly manage the system.

7. Other Store-Bought Composters

There are many styles of bins. Line open bottoms with hardware cloth. In the fall, shimmy the bin off the ground and pull out the hardware cloth. Reset the bin, add dry leaves, and shovel any fresh scraps back in the bin. Mix the old pile and leave it to finish breaking down. Now you have an empty bin for the winter. TIP: Choose a style that is at least 3' in diameter for best results.

PROS: Typically easy to set up so you can start immediately. Enclosed system deters animals.

CONS: Costs $50-100 or more at retail prices. Often don't have adequate aeration. Turning compost can be tricky.

8. The NOT Composter: The Green Cone

Green cones are partially buried solar "digesters." They do not make compost; materials digest underground and fertilize the soil nearby. They are totally enclosed systems, so animals are less attracted to them. Unlike composters, Green Cones do not require management once installed.

PROS: Can add meat, fish, and dairy. Can be sited inside a garden to capture nutrients generated by decomposing food scraps. Unobtrusive, does not attract animals, and does not require additional "brown" materials.

CONS: Can cost more than other options. Must be sited in full sun with well-drained soil. If using a Green Cone for all your food scraps, it will fill up quickly and you may need two. If used for pet waste, plan to site the Green Cone well away from vegetable gardens. Do not add browns to these!

Pro Tip

Green cones need:

- **Full sun for at least half the day**
- **Well-drained soil**

Never add browns to a green cone!

MANAGING YOUR COMPOST PILE

Key Compost Ingredients

1. Greens (nitrogen rich material like food scraps or fresh grass clippings)
2. Browns (carbon rich material like leaves, dried grass clippings, or wood shavings)
3. Air
4. Water

Think of your compost pile as a pet: it needs food (greens and browns), air, and water to survive.

Compost can be managed as "hot" or "cold," depending on how much work you put into it and how quickly you want a finished product.

For both hot and cold composting, make sure to stockpile browns, such as leaves or wood shavings. Add a watertight container next to your compost pile that's just for browns. A trash can with a lid is perfect for this. You may need to dedicate a space for stockpiling extra browns, so you'll always have enough for that 3:1 ratio of browns to greens.

Hot Composting

If you have a lot of material (at least a 3'x3' pile), and you're interested in managing your pile more intensively, try hot composting. Start by investing in a compost thermometer with a long probe and check the temperature regularly. If you have enough material, you will notice that the compost temperature tends to spike around 150°F and then starts to drop. When the temperature drops to around 100°F, it's time to turn the compost. When the temperature no longer fluctuates, you can use it right away or let it sit in a pile (called "curing") for a few weeks or months. The hot phase can take as little as 3-4 weeks. *For more info:* ***thespruce.com/how-to-hot-compost-2539474***

Pro Tip

If all areas of the pile have reached 131°F for three consecutive days, that's hot enough for long enough to kill pathogens and weed seeds.

Useful Tools

You won't need many tools, but the following can help:

- **Gardening fork or pitchfork to turn the pile.**
- **Wheelbarrow to haul compost ingredients to and from pile and finished compost to your garden or lawn.**
- **Compost thermometer to check the temperature of the pile if you are hot composting.**
- **Compost aerator to get more air into the pile.**

Cold Composting

Don't worry if your pile doesn't reach an "optimal" temperature. Your food scraps will still compost, just more slowly. Most homes won't generate enough food scraps to create a pile big enough for hot compost anyway.

Cold composting (or "passive composting") is slower than hot composting. It may take 6 months or over a year to get finished compost. Seeds and pathogens will not die in cold compost, so it's important to keep weeds and diseased plants out of the mixture when you're adding materials to your pile.

Think You Are Composting? Think Again.

You may think you are composting when you add food scraps and leaves into your backyard bin, but what you are really doing is **farming microorganisms.**

Microorganisms such as bacteria, fungi, and actinomycetes account for most of the decomposition that takes place in compost. They are the "chemical decomposers," because they release chemicals for decomposition and change the chemistry of organic wastes. The larger decomposers, or macroorganisms, include mites, centipedes, sow bugs, snails, millipedes, springtails, spiders, slugs, beetles, ants, flies, nematodes, flatworms, rotifers, and earthworms. They are the "physical decomposers" because they chew materials into smaller pieces.

Just like you, microorganisms need food, water and air to survive and thrive. When you add carbons and food scraps, you're feeding them. When you turn your pile, you're adding the oxygen they need to convert food scraps into compost. If their environment gets too dry, they'll need water, just like you. Take good care of your microorganisms, and you'll have a working, odor-free compost system.

COMPOST: STEP BY STEP

1. **Decide what type of compost system you will use.** Ideally, your compost bin will have an open bottom (lined with hardware cloth to keep pests out) so worms and microorganisms can easily crawl into your pile where they will go to work for you. If you use an enclosed bin, such as a tumbler, throw a shovelful of soil in every spring to inoculate the pile.

2. **Add ingredients.** The following can go in your compost bin: any food scraps (except meat, fish and bones), including egg shells, coffee grounds and filters, tea bags (not plastic or cloth), cheese rinds, plate scrapings, vegetable peelings, fruit scraps, etc; plant clippings, grass clippings (as long as there is no fertilizer, herbicides or pesticides on them); small sticks or wood chips (for aeration); brown and green tree leaves; weeds and dead plants (but not diseased or bug-filled). Add 3 parts browns to 1 part greens (see page 4 for details). Avoid meats, bones, and animal fats as they can smell and attract pests.

3. **Let nature take its course.** The pile will gradually sink down as stuff decomposes. Continually add new materials, covering food scraps with leaves, wood shavings, shredded paper, or plant clippings to keep flies and critters out of the pile. Mix occasionally to get air into the center of the pile.

4. **Harvest compost from the bottom of the pile.** You don't need to wait until the entire pile has finished composting. Simply take the finished compost from the bottom of the pile as you need it. When compost is ready it looks like mulch or soil.

- **Optional: Screen it!** If you don't mind a few crumbled egg shells or the occasional avocado pit, go ahead and spread your compost as soon as it is done. If you prefer a more finished product, take the extra step to screen.

Pro Tip

Make a screen with lumber and 1/2" hardware cloth by creating a square with the lumber, and stapling the hardware cloth onto it. A 3'x3' size should be sufficient, especially if you want to set it over a wheelbarrow. Sift finished compost through the screen, and add any materials too large to get through the screen back into your compost bin.

Instructions at: instructables.com/id/Compost-Screen/

HOW TO USE COMPOST

- **LAWN:** Compost on the lawn will reduce watering needs and help prevent erosion. Apply a layer approximately 1/8"–1/4" deep. Water thoroughly.
- **GARDEN:** Add compost every year before planting. Apply 2"–4" (add more for deficient soils) and turn into the soil. Compost can be used as a top dressing.
- **TREE AND SHRUBS:** Before planting, dig a hole larger than the plant base, mix compost with soil, using 1 part compost to 2 parts soil. **Established trees:** Top dress a 2" layer 6" from base of tree with coarse compost (un-sifted) in the spring or early summer. **Established shrubs/perennials:** Apply a 1"–2" layer of coarse compost around the base of plant.
- **POTTED PLANTS:** Add 1/4" to 1/3" compost to sterile soil when you repot your plants. Or top dress annually, 1/4" layer of fine compost and scratch into the potted soil.
- **STARTER MIXES:** Create your own seed starter mix using: 1 part mature sifted compost, 2 parts soil, 1 part sand, perlite, or vermiculite.
- **CHEER UP WILTING PLANTS:** When plants are wilting or dropping leaves, surround them with compost, either in the garden or in a pot.
- **WHEN MULCHING:** Put compost around plants before adding mulch.

When is my compost ready?

When your compost is ready, it will smell earthy and look soil-like or loamy. You may still see broken egg shells, small sticks, etc.

The more involved you are, the sooner you'll have compost. With hot composting, you can produce finished compost in as little as three weeks.

For a "cold" compost pile, expect it to take several months for the process to complete. To speed things up, turn pile regularly. Remember: composting is a natural process that will happen, regardless of how involved you are.

TROUBLESHOOTING

Compost not working? Check out these common composting problems, and our simple solutions:

My compost is not heating up.

You do not have to compost with heat, but it goes faster if you do. If you're trying out hot-composting, remember that hot compost requires volume and some work. The pile needs to be at least 3'x3' (but 4'x4' or larger works better). Alternate green and brown materials and mix together, then leave it alone until the pile heats up to above 141°F. At this point, you may notice steam rising out of the bin. Use your hand to gauge the heat level in addition to a thermometer. The heat indicates the microorganisms that break down materials are active. Wait for the pile to cool slightly to no less than 100°F, and turn the pile. Let it heat again and repeat until it stops heating up.

My compost is dry.

Grab a handful of material from your compost bin and squeeze. Is it damp and holding together or dry and falling apart? If holding together, it's wet enough from your food scraps and rain. If dry, you may want to add a gallon or two of water to keep it damp.

Tumbler Tips

Add a shovelful of finished compost or soil to inoculate your tumbler with microorganisms. If food scraps in your tumbler stop composting, troubleshoot:

- **Is it wet? (Add browns)**
- **Is it dry? (Add water)**
- **Are the food scraps staying intact (not decomposing?) Add a bit of soil to jump start the process.**

The ideal way to use a tumbler is to combine it with a bin system. Start composting food scraps in the tumbler. When it fills, empty it into a compost bin, add browns, and let sit while you fill up your tumbler again. This method prevents pests, and provides built-in aeration as you move the compost from tumbler to bin.

My compost stinks.

Compost should not stink. If it does, it means something is not working and it's time to fix it. Typically, a smelly bin indicates your bin has grown anaerobic, meaning there is no oxygen allowing microorganisms to do their job breaking down materials. That's when the pile gets sloppy and smelly. It's easy to fix. Add a layer of dry browns, and use your pitchfork to mix the pile together, then add a layer of leaves or wood shavings about 3"–4" thick on top.

- **Smelly pile and no time?** If you have neglected your compost pile and it's gotten smelly, no worries! Add 4"–6" of wood shavings (not chips) on top of the pile until you have time to deal with it. This is a great way to cover up the smell and block pests from going in or out until you have time to turn the pile to incorporate air and carbons (like the wood shavings). It works like magic!

My compost is not making compost.

Look under the pile. You should find some decomposed mulch-type materials and possibly even new soil. That's compost.

My compost is attracting flies.

Cover kitchen scraps with leaves, or try our emergency tip: add a few inches of wood shavings on top of your pile until flies die down, then mix the wood shavings in with your food scraps, and keep on composting. In the summer, regularly adding a 2"–3" layer of wood shavings over your compost pile blocks flies from going in or out.

Winter composting? No problem.

Many people stop composting in the winter, but you don't have to. Just remember these tips and you can compost all year:

- Think of tromping through the snow to your compost bin as your **winter exercise!** Wear your snowshoes, or use a sled to make it more fun.
- **Food scraps will freeze over the winter,** so plan for it. Empty your bin, set up an extra bin, or try trash can composting, knowing that your winter food scraps will pile up.
- **Food scraps don't actually compost in winter's frozen conditions.** You're really storing materials that will begin the compost process as soon as winter ends. That's OK. Just plan for it by starting winter with an empty or extra bin.
- **Keep adding browns,** even in the winter.
- Your compost bin will pile high, but as soon as spring comes, it will reduce to less than half of its original volume. At that point, **add more browns and turn the pile, then layer even more browns on top** to kick-start the composting process.

WHAT ABOUT BEARS & OTHER ANIMALS?

Vermont has seen an increase of bear-human interactions, so it's important to take a few steps to discourage bears and to manage your compost so it doesn't attract animals. Here's how:

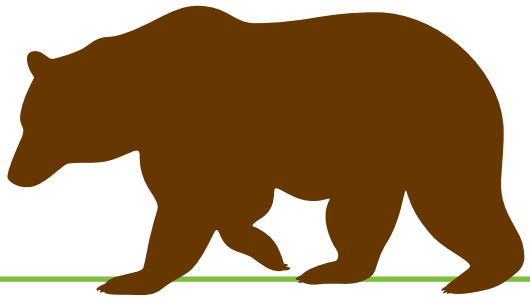
- **Take down your bird feeders (unless it's winter)!** A bird feeder is hanging bear bait. Bears can smell bird seed from 1–2 miles away, so landscape with native plants that attract birds instead and only feed birds when there is at least 8-10" of snow on the ground.
- When composting, **use three times as many browns as greens.** This minimizes smells and speeds up the composting process.
- **Regularly turn your pile** so materials compost more quickly.
- **Compost fresh scraps in an enclosed container** that would be challenging for a bear to open. Tumblers are especially challenging for bears to open.
- **Do not add meat scraps or bones** to your compost pile. You can put these items in the trash, freeze them and bring them to a drop-off when you have enough, or bury them by pit-composting or trench-composting.
- To keep rodents and smaller animals out, **line your compost system with 1/4" wire-mesh hardware cloth.**

Pro Tip

Deter bears by soaking a rag in ammonia; leave the rag in a plastic bucket next to your compost system. Bears' sensitive noses will be repelled by the ammonia smell, and they will stay away. Replace every 2–3 weeks. If you are managing your pile with browns and turning it regularly, and you have left the ammonia-soaked rag nearby, bears will not be interested. If a bear comes on your property anyway, make some noise! Yell or bang pots and pans (or both) so it has an unpleasant experience, making it less likely to return.

Got bears anyway?

- **Check with your neighbors.** Is anyone leaving out birdseed or other treats for bears? Minimizing bear-human interactions saves bears' lives and makes human lives safer, but everyone needs to work together. One person attracting a bear with birdseed can bring a bear into an entire neighborhood.
- **Stop composting at home until the bear leaves** the area **or surround your bin with an electric fence** (smear peanut butter on the fence so the bear gets a little zap to the face).
- **Contact VT Fish and Wildlife for advice** before the bear becomes a problem.



Report bear interactions at:
anrweb.vt.gov/FWD/FW/WildlifeBearReport.aspx

RESOURCES

cvswmd.org/home-composting for free bin plans

anrmaps.vermont.gov/websites/Organics/default.html for a list of food scrap drop off sites

VTrecycles.com for more information about composting and recycling, or to find a food scrap hauler

uvm.edu/extension/mastergardener/vermont-master-composter-course for info about the Vermont Master Composter course

802recycles.com to find your local waste experts. Some offer free backyard composting classes and sell backyard compost bins.

Questions? Contact us at Vermont DEC (802-828-1138) or @VTrecycles or @TheVermontDEC

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With much gratitude to the original authors of "The Dirt on Compost." Adapted with permission from:

CVSWMD

Central Vermont Solid Waste Management District

137 Barre Street, Montpelier, VT 05602
(802) 229-9383 · cvswmd.org

This publication adapted with permission from the The Dirt on Composting written by Julie Berbiglia, Composting and Master Gardener, Scarritt-Bennet, with Sharon Smith, Recycling Coordinator and Master Composter, Metro Public Works, Division of Waste Management, Nashville, Tennessee.

This edition was rewritten and edited by Cassandra Hemenway, Central Vermont Solid Waste Management District and Vermont Master Composter. Design by Dana Dwinell-Yardley. Updated March 2019.

Printed on 100% recycled paper.