

Intro to Composting with Back2Earth

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Composting is arguably the lowest effort, highest impact change you can make to genuinely reduce some of the worst impacts of modern living. This guide is designed to provide all the information you need to successfully start and maintain a collective compost pile with no odor, minimal pests, and minimal effort. It also aims to balance detail and simplicity to make it thorough and accurate, yet easy to read and understand. Enjoy your educational journey and the magic of the process that is composting!

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What is composting?

Composting is the practice of creating ideal conditions to accelerate the natural decomposition of organic* material. The process consists of “decomposer” organisms (like earthworms, insects, fungi, bacteria) that consume the material, breaking it down as they feed on it.

The word compost (noun) is also used to refer to the finished product that is created by the composting process.

* Organic in this context refers to “living matter”, and not the USDA’s food certification

Why do it?

Perhaps the better question is why not? The costs of not doing it are significant, and the sole “advantage” of not doing it is saving about 10 minutes per week.

Let’s start with food waste:

First, it is a little discussed but huge problem. Roughly [30-40%](#) of all food produced for human consumption is wasted. It is the **single largest source of municipal waste** in the US, making up [24%](#) of the national stream. Worst, over [55%](#) of US food waste is landfilled.

What’s the problem with Landfills?

1. Landfilled food has to be transported there, which represents roughly 65 million tons hauled and uncounted vehicle miles traveled every year.
2. Decomposition in a landfill generates between 15 - 30 times the amount of greenhouse gas emissions than composting because of their structure and chemistry.
3. Decomposition is much slower and can even stop altogether. Mined landfill samples have uncovered foods as much as 50 years old with no signs of decay.
4. Landfilling is a linear process that delivers minerals and nutrition from soil to a sealed chamber with toxins, which is both unsustainable and irresponsible.

Keeping food out of landfills and into compost costs less financially, costs less in planetary resources, increases planetary stability, and takes about 10 minutes per week.

So what do I actually need to do?

Understand the basics

The best place to start is understanding the factors that impact the compost process and how they work.

1. *Composition*

Successful compost needs a relative balance of two main components:

- Nitrogen (or “Greens”), which is most present in the fresh material like kitchen scraps, or freshly cut/pulled plants.
- Carbon (or “Browns”), which is present in dry, dead things like wood, straw, leaves, and paper.

Decomposers need both and in the right ratio for it to work well. The calculation is not exact and the tolerance is quite forgiving, but too much Nitrogen will make your pile stinky & sludgy, and too much carbon will make it progress really slowly.

Approximate brown/green ratios are provided later in the ‘Adding Materials’ section, but if you error on one side, error on the Carbon side.

2. *Air*

Oxygen is an essential ingredient to the chemistry of the decomposition process.

Decomposers consume it as they digest, and without it the process turns “anaerobic” which produces a bad odor and makes a bad end product.

Oxygen is easily introduced by regularly mixing up the pile, once a week, so fresh air can access every part of it. Also, a browns material that is rigid (like small sticks or straw) will help create a loose structure that allows greater air circulation.

A pile that's too dense, matted, or left unattended will end up anaerobic in the core and will need a more thorough mixing, “fluffing”, and potentially some more browns.

3. *Water*

Moisture is also necessary for the decomposers to succeed, but this doesn't require a high degree of maintenance. Mixing the pile weekly will be sufficient to keep water balanced throughout, and only the extremes of being constantly baked dry or soaking wet need to be avoided. In a temperate climate this will be naturally moderated by the site location and bins. If the pile gets too wet, it can simply be exposed to more sun and air, and mixed a few more times to increase evaporation.

If the pile does get baked dry, water can be added but it's more practical to save the energy and just wait until wet conditions return for the process to resume. When water does come, it's best to try to mix it into the pile so it can penetrate to the core.

If you really need it, use soap-free water from rinsing or cooking grains or produce.

4. *Temperature*

The process of decomposition is a warm one. Decomposers release energy from the materials as they break them down and the pile will generate its own heat. As with all of chemistry, the higher the temperature, the faster the process goes.

The important thing to know is that the pile can actually get so hot that it kills the decomposers living in it. Fortunately, this happens around 160° which is unlikely to occur in a home compost, and can easily be avoided by mixing regularly to dissipate the energy from the core to the edges of the pile.

While daily outdoor temperatures do not play a significant role in the compost process, winter temperatures will slow the progress and even stop smaller piles, but everything returns to normal as soon as warm conditions return.

A compost thermometer can be a nice thing to have to track the performance of the pile, but is absolutely not necessary to compost successfully. For reference, a pile is considered “active” and performs the best when its temperature is between 130°-150° at the core, and it is “passive” and slower if it is below.

5. *Time*

This will vary considerably based on all of the factors listed above, and each material has its own timeline even in identical conditions. In general, a healthy active pile will fully decompose within 2-4 months. A pile that is not maintained will take 12-24.

Larger, woodier browns decompose the slowest while smaller, leafier browns go the fastest. A small pile will progress more slowly, as will a pile with excess browns.

Chopping kitchen scraps into roughly 2” cubes will drastically accelerate the process.

It is also important to remember that this timer restarts each time the last “fresh” green material is added. Forever adding to the same pile will result in a forever unfinished pile.

Starting and maintaining your pile

Now that you know how it works, here’s all you need to do:

Collect your scraps

Keep a collection going in a small container in the kitchen so you don’t have to go out to the pile for every scrap. Check out the tips section for a few different options.

Add Materials

Every time you add greens (Nitrogen-rich kitchen scraps), add a proportional dose of browns (Carbon-rich dry dead material). This proportion is not highly precise, and will vary based on the material used for the browns. Roughly speaking, wood-y material should be about ½ part browns per 1 part greens, and lighter yard waste like leaves or dried grasses would be about 1 to 1½ parts brown to 1 part greens.

Dig out a flat area in the existing compost before making your addition. Spread your addition into a thin layer, then cover it up with older compost to reduce pests and give it a jump start.

Mix

Once a week, the pile needs to be mixed to regulate the oxygen, moisture, and temperature and keep things progressing evenly. The core is always the most active and least exposed and the edges are just the opposite, so the best way to do it is to bring the insides out and put the outsides in, or “flip” the top to the bottom and the bottom to the top.

Monitor

Every time you add materials or mix, take a moment to inspect the progress. Here are the types of things you’ll want to look for:

- Are the scraps breaking down noticeably?
- Are things progressing evenly throughout the pile?
- Are there any strong odors?
- Have any animals been digging in the pile?
- Is the pile particularly wet, or particularly dry?

Check out the “Troubleshooting” section below to address pile problems.

In summary, the routine looks like this:

1. Save your scraps.
2. When your container is full, bring it to the pile.
3. Dig a flat spot near the top, then layer your scraps in it.
4. Add a layer of browns.
5. Cover your new additions with the existing compost.
6. Rinse your container.
7. Mix once a week!

Finishing A Pile

Eventually the active bin will fill to a point where mixing becomes too difficult to manage.

When you reach that point, stop adding new material to the bin, mark it as ‘aging’, mark the next empty bin as ‘fresh’.

You will need to continue mixing the aging pile, but you can reduce the mixing to once every two weeks. The process will continue for another several months, and is complete when the contents are homogenous and smell of forest floor.

And if any of this sounds too difficult, know this:

- Compost is perhaps the most forgiving process on the planet. It never “dies”, and the only consequences of doing it “wrong” are bad odors, and unwelcome animals.

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- It is not rocket science. There are definitely ways to do it better and worse, but the above descriptions and some basic reasoning are all it takes for things to be odorless, pestless, and successful.
- Nothing is irreversible. If you goof up it can always be corrected by adding browns, mixing, and learning for next time.

What can I compost?

What goes into the pile has a huge impact and following these recommendations is essential to a positive compost experience. While some items listed as restricted are indeed biodegradable or included on commercial composting lists, they are deliberately excluded here to avoid odors, pest problems, personal health risks, and general compost frustrations that arise in non-commercial environments.

Accepted: (cooked or raw)

Fruits and Vegetables	Egg Shells (no white/yolk)	Paper napkins
Bread / Buns	Nuts & Seeds	Pizza boxes (shredded)
Rice and Grains	Non-invasive house plants	

Prohibited:

- Meat, bones, or other animal parts
- Dairy products (milk, cheese, butter, cream ...)
- Pure cooking fats / oils
- Very high fat items (salad dressing, peanut butter)
- Paper Towel
- Pet waste / cat litter
- Household dust
- Dirt
- Diseased or Invasive plants (parts or whole)
- Packaging that is waterproof or looks like plastic, even if it says 'Compostable'

Edge cases:

- Trace amounts of meat, fats, or dairy are ok if they're mixed in with a high ratio of other materials. For instance, vegetables sauteed in oil, or spaghetti with a light meat sauce will be fine. Just be sure to monitor for extra pest activity or odors.
- The grease on pizza boxes is fine provided the box is cut up and mixed in well.
- Teabags are tricky for a few reasons: some have nylon bags, which is a no-go (these are shiny and don't tear). Some have staples, which is chemically fine but is a hazard if it's going to be used in a yard/garden. If it doesn't have either, it can be safely composted, and if it turns out to be nylon, just pull it back out later.

But don't forget

As great as composting is, it has far less impact than not wasting food to begin with. Here are just a few numbers that underscore how important reduction really is:

Nearly [40%](#) of the land surface of Earth is used for agriculture, which accounts for [70%](#) of global freshwater use ([80 to 90%](#) of US consumptive water use), and is responsible for [80%](#) of global deforestation.

The impacts of food production cause [70%](#) of terrestrial and [50%](#) of aquatic biodiversity loss, and food systems as a whole account for [30%](#) of global greenhouse gas emissions.

If global food waste were [a country](#), it would be the third largest emitter, behind China and the United States.

The best waste to manage is the one that is never created.

Tips:

1. When collecting kitchen scraps:
 - a) The nicest option is a carbon-filtered pail which lets the compost breathe and eliminates odors.
 - b) An air-tight container can be used but its contents will decompose anaerobically, and release the odors each time it is opened.
 - c) Be sure to rinse the container after it is emptied to keep the smells and pests under control. It will also help to let it dry after rinsing if possible.
 - d) Avoid any open or unsealed containers which will smell and attract pests.
 - e) Another option is to use a bag in the freezer, which eliminates odors and remains very clean, but wastes energy.
2. Chop larger scraps into pieces (ideally < 2") before you toss them. The smaller your raw materials (Browns & Greens), the faster the process will go.
This also minimizes pest attraction since there are no large, appealing pieces.
3. Pull the PLU stickers off produce before you peel it. They don't decompose...
4. Bury your new additions slightly in the pile to limit flies & pest attraction.
5. You can go for a "lasagna" approach of layering greens and browns when you add them, or you can loosely mix the browns into the greens before covering. Just be sure that there aren't any very thick layers or large clumps of just greens or browns.
6. Avoid making clumps of materials that mat (like paper), or leaving large sheets of material (like cardboard) which interfere with air and water balance.
Shred large pieces and fluff small pieces to allow aeration and water flow.
7. A tarp can be used to
 - a) Protect against a heavy/prolonged rain/snow fall (cover before, remove after)
 - b) Trap moisture in during a hot/dry period (cover during day, uncover overnight)
 - c) Retain pile heat during cold periods (keep covered except when adding/mixing)

Troubleshooting

1. Pile is stinky or sludgy:
Add more browns & mix thoroughly. Follow up in 1 week and repeat as needed.
If this is a regular occurrence, the site lead will need to notify participants to routinely add more browns in future additions.
2. Pile is dry and brushy or crumbly:
If there is a very high ratio of browns to greens, add fewer or no browns with your next additions. If this persists for more than 2 weeks the site lead will need to notify participants to add fewer browns in future additions.
Water can be added, but should be done sparingly. When it is, it should be mixed into the pile to ensure it penetrates to the core.
3. Core is hot & stinky with white mold-looking growth:
This is “anaerobic” decomposition. Be sure to stir more thoroughly, and/or more frequently until it subsides. If this occurs regularly, the site lead should check with the turners to ensure all parts of the pile are being thoroughly mixed. Participants may also be instructed to better incorporate their browns into their greens when making additions.
4. Things don't seem to be breaking down:
A banana peel is an excellent litmus test. It should show visible progress in 1-2 weeks and be nearly indistinguishable in 3-4. If its not, consider these possibilities:
 - Excessive-Carbon mix: double check your green brown balance (see #2)
 - Whole or big scraps: chop large items into smaller pieces
If they're already in the pile, use the transfer shovel to slice them up.
 - Slow browns: if the only browns available are woody, the process will take much longer.
 - New pile: it may take a month or two for the pile to be large enough and develop enough decomposer activity to reach an active pace.
 - Cold season: wait for outdoor temperatures above 60°F
5. Pests have gotten into my pile:
Check the integrity of the frame for breaks or chewed spots. If you find any they will need to be repaired, or patched. Be sure to notify Back2Earth program staff to determine repair options and possible participant outreach to prevent repeat occurrences.

FAQ's

1. Doesn't compost smell bad?

Only when it's done poorly. Too much Nitrogen (greens), too little mixing, or adding animal products will all cause bad odors.

When done right, compost actually has either no odor, or a subtle scent of forest.

2. Does composting attract pests?

If done incorrectly, yes. Animal products will attract animals like racoons, possums, and rats, and unstirred piles will become nests for mice, chipmunks and other rodents. Adding the right materials, using a protective container, and keeping the pile stirred at least once a week will deter all of these.

The worst pest that a good compost will attract is fruit flies and mosquitos, and even those can be mitigated (see 'Tips').

3. Can I add Citrus to my compost?

Yes, if it's not in bulk quantities. Citrus does have antimicrobial properties (which is why it appears in cleaning products) and the microbes are the ones doing the decomposing. That said, if you throw out several pounds of citrus at a time, or you have a predominantly citrus diet it will slow the decomposition, but if it's just a dose of rinds with a majority of other materials, it makes no difference at all.

4. Will my compost spontaneously combust?

No. This is only a risk for extreme volumes of dry, carbon rich materials like substantial stacks of hay bales or commercial mulch piles. Kitchen scraps are over half water by weight, and your yard likely isn't even large enough for a pile of browns that could ignite.

5. What's growing in my compost??

Those are called volunteers! It's the seeds of something you've thrown away that have the right conditions to germinate and start growing. You can mix them in on the next cycle if you want, or pluck them out and try to grow them!

6. Can I compost something rotten/moldy?

Absolutely. In fact, it's already starting to break down. Mold is just another decomposer that will join the others once you add it to the pile.

7. What if something non-compostable ends up in my pile?

In general, large non-biodegradable things that end up in your pile are fine and can simply be pulled out when you see that they're not breaking down.

Problematic exceptions are things that look like plastic and claim to be biodegradable (like

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grocery bags). Some can “kind-of” break down into many tiny pieces that don’t decompose completely and cannot be filtered back out.

8. What do I do with my compost in the winter?

Essentially nothing different. When the weather is cold, the composting process will slow down, but that's no reason to stop adding. The pile can freeze with no consequence, and everything will take back off as soon as the weather warms up.

If you see that it's not decomposing much or freezing, you can potentially mix it less because there's no benefit, but keep adding browns with the greens and do your best to keep the greens covered. Be ready to mix a little more frequently and monitor the Brown/Green balance once spring comes and things start up again!

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