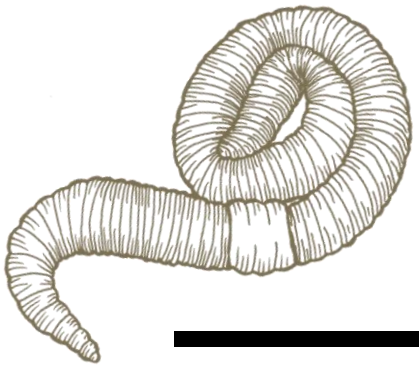


The ***Black Gold*** Standard

A Beginner's Guide to Composting

What is Compost?

Simply put, compost is decomposed organic matter.

"Organic matter" – food waste, paper and wood products, yard trimmings, natural fibers such as cotton and wool, and animal fur and human hair – is matter derived from a living (or once-living) organism and, therefore, capable of decay. Microorganisms such as bacteria, protozoa, and fungi, worms, and insects feed on and break down organic matter into the warm, crumbly, nutrient-rich product known as compost, or what many gardeners lovingly refer to as ***black gold***.

Compost vs. Soil

Compost is not soil, but a *soil amendment* – a product meant to improve soil.

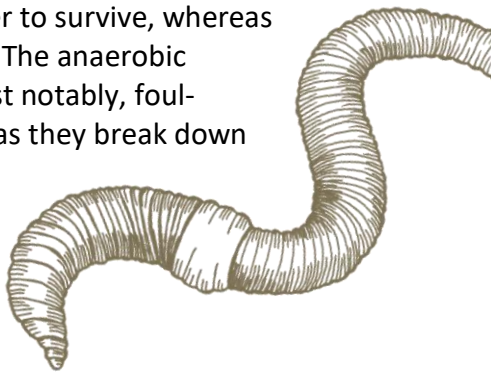
Healthy soil consists of a mixture of minerals, nutrients, organic matter, water, oxygen, and microorganisms, worms, and insects, collectively known as "decomposers". Compost is composed of much the same, but often contains much higher quantities of nutrients and organic matter, and much lower quantities of minerals.

Because minerals physically support plant roots and create pockets of space for water and oxygen, compost is typically too soft and dense to serve as an adequate growing medium for most plants. And its high nutrient content can shock plants, seriously harming or even killing them.

How is Compost Made?

Decomposers – particularly, the arguably most important decomposers, microorganisms – require **water**, **oxygen**, **carbon**, and **nitrogen** to produce high-quality compost.

- **Water** can accelerate the decomposition process and helps to regulate the temperature of compost, which naturally rises as the microorganisms feed.
- **Oxygen** is necessary to maintain aerobic conditions in compost. "Aerobic" decomposition involves microorganisms that need oxygen in order to survive, whereas "anaerobic" decomposition involves microorganisms that do not. The anaerobic decomposition process is comparatively cold, slow, wet, and, most notably, foul-smelling, because the microorganisms involved release methane as they break down

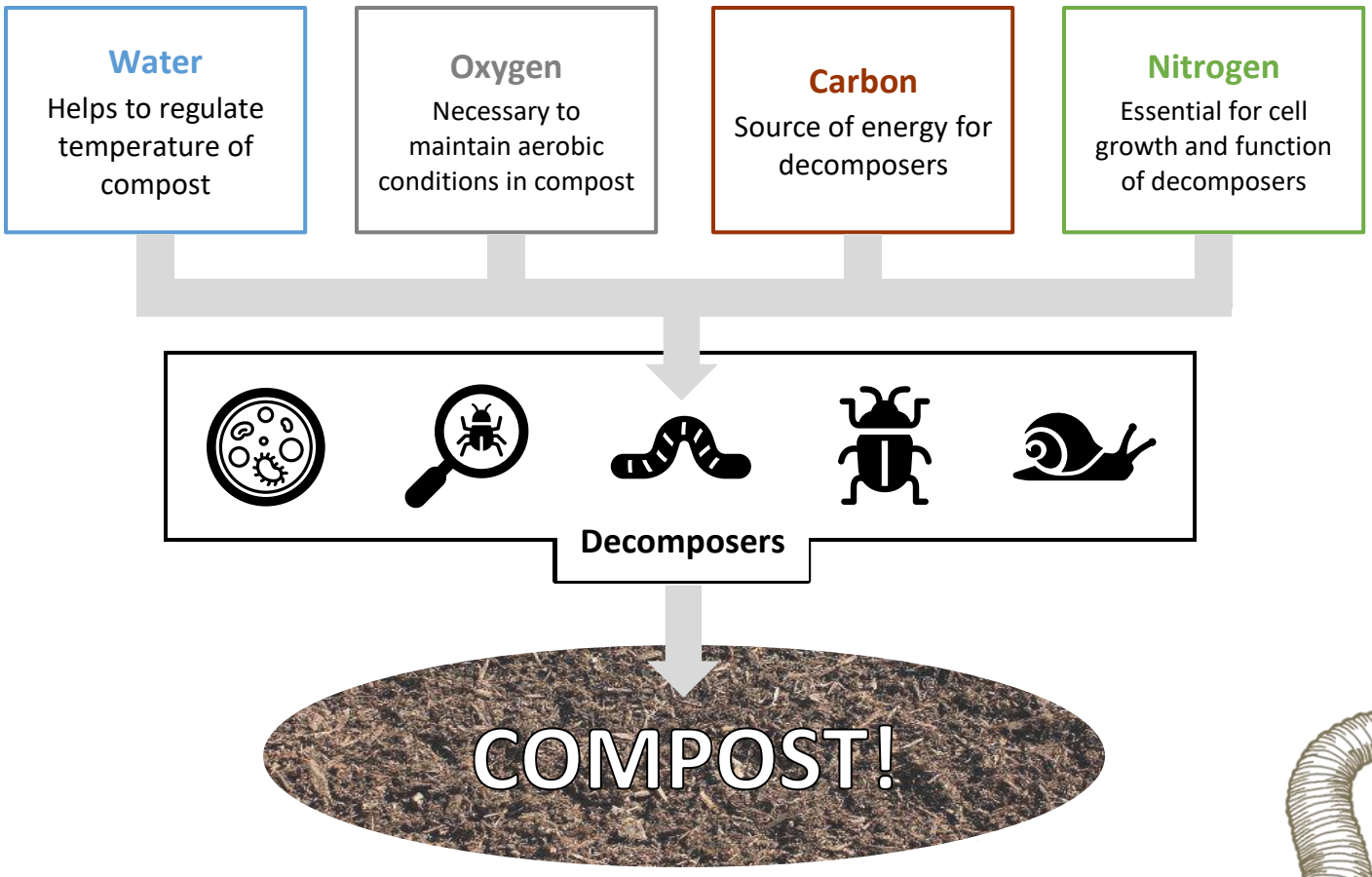


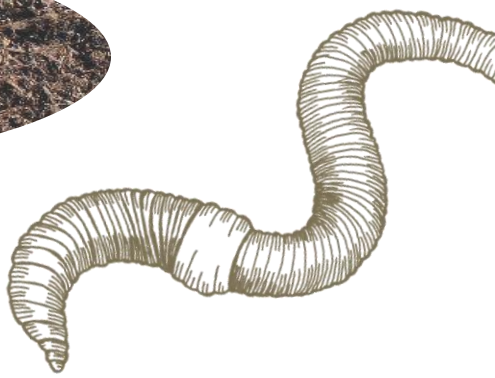
organic matter – all of which makes aerobic, or oxygen-rich, decomposition the much-preferred option in most cases.

- **Carbon** provides the microorganisms with energy. Carbon-rich materials include paper products, fallen leaves, and wood chips. These materials are also known as “browns” due to not only their color, but also the fact that they are typically dry and brittle.
- **Nitrogen** is essential for microbial cell growth and function. It can typically be found in high concentration in soft and/or wet organic matter such as fruit and vegetable scraps, coffee grounds, and grass clippings. Nitrogen-rich materials are also known as “greens”, as many were once green or derived from something green.

The Process

Microorganisms feed on and break down the organic matter provided, releasing valuable nutrients. As they feed, the temperature of the compost increases, during peak decomposition, to between 130 degrees and 160^{o}F. After the process has reached its peak, the organic matter is quickly reduced to unrecognizable *humus* and the temperature of the compost decreases to that of the ambient air temperature. Once all “green” organic matter has been broken down and the temperature has stagnated, the compost has cured and is ready to use – as mulch or even incorporated directly into the soil.





DO COMPOST…

Green = Nitrogen-rich | **Brown** = Carbon-rich

Non-dairy/meat food scraps

- Fruits and vegetables, including peels, pits, and cores
- Coffee grounds
- Tea leaves and non-plastic tea bags
- Nut shells
- Eggshells
- Stale or uncooked cereal, rice, pasta, and bread

Paper products with no wax (glossy) coating

- Tissues, napkins, and towels
- Cups and plates
- Black-and-white newspaper
- Printer paper
- Toilet paper and paper towel rolls
- Egg cartons
- Cardboard

Yard waste (non-woody)

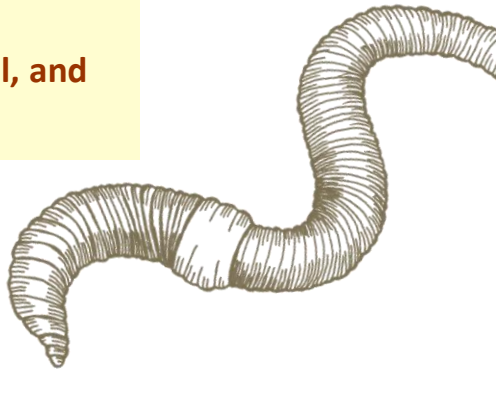
- Grass clippings
- Leaves
- Trimmings from non-invasive, non-diseased herbaceous plants that are not in seed

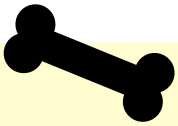
Yard waste (woody)

- Straw
- Twigs and small branches
- Evergreen needles and cones
- Wood chips
- Sawdust

Manure produced by HERBIVORES, such as chickens, sheep, goats, cows, and horses

Items made of cotton, linen, bamboo, silk, wool, and other natural fibers

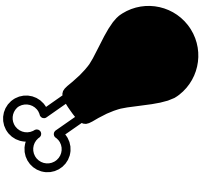




DO NOT COMPOST…

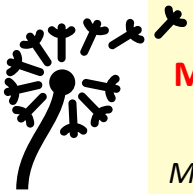
Dairy products, meat, bones, oils, and fats

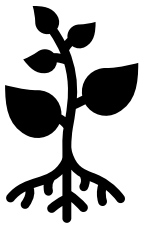
Unless very carefully managed, adding dairy products, meat, bones, oils, and fats to compost will attract unwanted attention from pesky scavengers such as opossums, raccoons, and foxes.



Diseased plants, invasive plants/"noxious weeds", or plants in seed

If a diseased plant, invasive plant, or plant in seed is composted, the resulting compost may transfer the disease, invasive plant, or seed to the area it is applied to.





Manure produced by OMNIVORES or CARNIVORES, such as cats, dogs, and pigs

Manure produced by omnivores and carnivores may contain disease pathogens; compost must become quite hot (at least 140 degrees Fahrenheit) in order to kill these pathogens.

Why Compost?

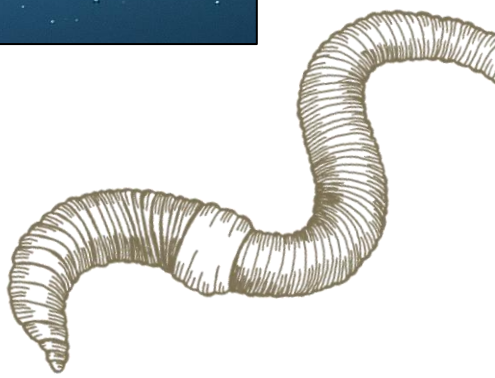
The benefits of composting are as plentiful as they are diverse – and more far-reaching than they might appear at first glance.

Yes, **compost enhances soil**…

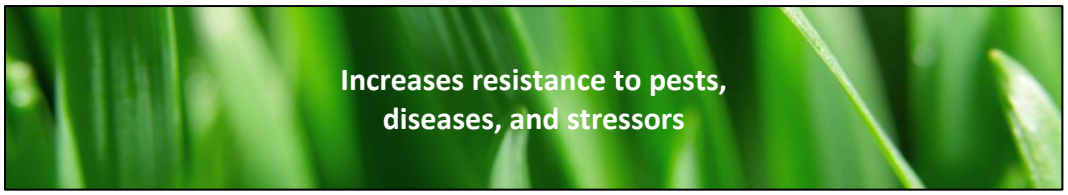
- Increases nutrient availability
- Increases microbial activity
- Improves structure
- Improves water retention capability
- Reduces need for chemical additives

… **cleans water**…

- Reduces stormwater runoff
- Filters, traps, and gradually degrades pollutants



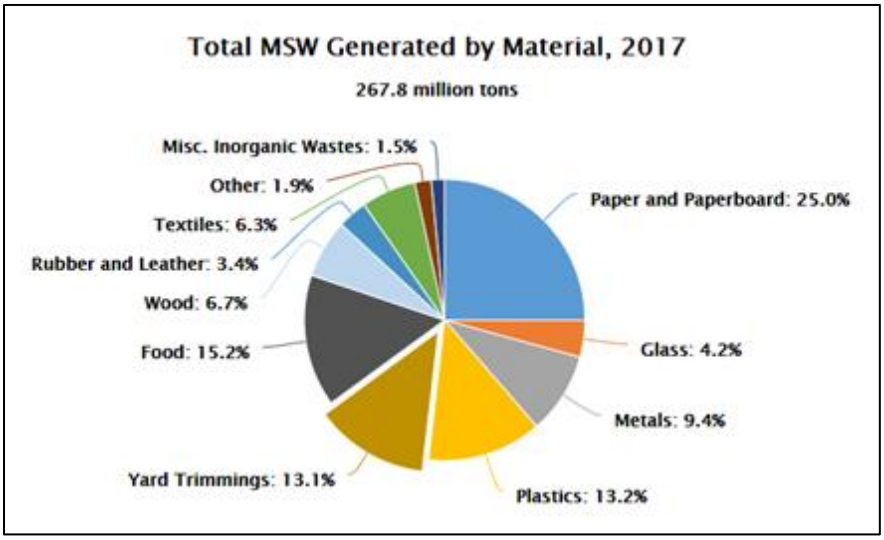
… and **strengthens plants**…



…but **it can also have an impact on climate change**.

According to the U.S. Environmental Protection Agency, the average person generates nearly 5 pounds of "municipal solid waste", i.e. garbage, per day. 5 pounds of paper, plastic, glass, metal, wood…and food.

In fact, of the roughly 268 million tons of municipal solid waste generated in 2017, about 15 percent – or little over 40 million tons – comprised of food waste. Other compostable materials, including paper, yard waste, and wood, accounted for another 45 percent. And yet, just 10 percent of all municipal solid waste was composted that year. Over 50 percent was disposed of in landfills.

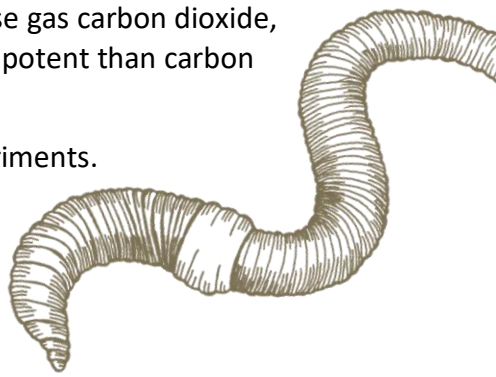


© U.S. Environmental Protection Agency

When organic matter is disposed of in a landfill, the extreme compaction and resulting lack of oxygen forces it to undergo anaerobic decomposition, a byproduct of which is methane. Methane is a "greenhouse gas": when released into the atmosphere, it absorbs and traps heat radiating from the Earth instead of allowing it to escape into outer space. The anthropogenic increase in atmospheric concentrations of greenhouse gases such as methane has resulted in global warming, which has, in turn, greatly accelerated climate change.

Although the composting process does, in fact, produce the greenhouse gas carbon dioxide, methane has a Global Warming Potential (GWP) over 25 times more potent than carbon dioxide in the short term.

In short, the benefits of composting far outweigh its detriments.



Composting at Home: Methods and Systems

There are two basic methods of composting: **cold**, or passive, and **hot**, or active. Each composting system utilizes one of these methods.

Methods

Cold (Passive)

Cold, or passive, composting involves intermixing greens and browns, covering the mixture with more browns if necessary to hide any eventual scent, and leaving it to decompose, turning the pile only once every few months or so.

This method is simple and easy to follow, but slow to produce useable compost, taking 6 – 12 months to do so. It also has a higher chance than the hot/active method of becoming anaerobic and attracting pests, as any organic matter will linger for long periods of time.

Cold composting is ideal for anyone who does not have the time or physical ability to tend to a compost pile at least once a week.

Hot (Active)

Hot, or active, composting involves consistently layering, aerating (turning), and watering the compost pile to ensure the decomposers always have enough nutrients, oxygen, and water.

This method requires that, at the very least, weekly attention be paid to the compost, specifically to monitor its temperature and moisture level and aerate or water as needed. The turn-around time, however, is much shorter than that of the cold/passive method: useable compost may be produced in as quickly as 6 weeks.

This method is ideal for anyone who has a lot of organic matter and/or a regular need for high-quality compost.

Closed Bin System

- Typically made of recycled plastic dark in color to retain heat
- Available in variety of shapes and sizes
- Lidded to retain moisture and shield from pests. Open on bottom to give decomposers access
- Add organic matter to top of bin, retrieve finished compost from bottom

✓ Well-suited for small spaces

✗ Has limited capacity; turning compost is difficult; only allows for cold composting – lid prevents temperature regulation

© Mother Earth News

Tumbler System

- Typically made of recycled plastic dark in color to retain heat
- Available in variety of sizes
- Attached to support structure that raises unit above ground to be easily turned with handle or by hand

✓ Well-suited for small spaces; less labor-intensive than other systems

✗ Has limited capacity; harvesting finished compost can be difficult; only allows for cold composting – lid prevents temperature regulation

© Gardens Alive!

Open Bin System

- Home-made – construction material can vary from wire fencing to lumber to cinder blocks
- 1-3 bins, each with three permanent walls and one that is removeable to provide easy access for turning and harvesting compost. Open on both bottom and top
- Multiple bin system allows for hot composting: turn pile from one bin into other to aerate, hasten decomposition

✓ Can be customized to best suit space; holds large amount of compost; allows for either hot or cold composting

✗ Can be expensive to build; labor-intensive; multiple bin system requires significant space

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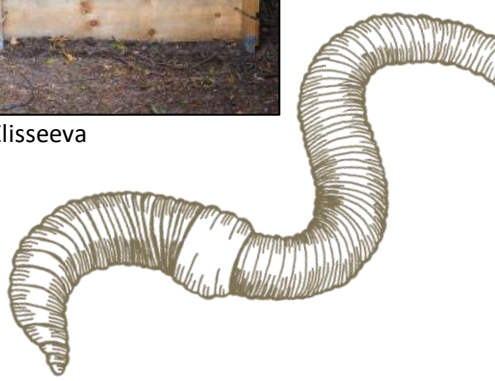

Trench System

- Bury organic matter directly in soil to decompose over time

✓ Quick and easy; can be implemented almost anywhere; allows for composting of material that attracts scavengers (dairy products, meat, oily/fatty/cooked food)

✗ Decomposition process may take months; compost cannot be harvested; only allows for cold composting

© BBC Gardeners' World Magazine

Piling System

- Pile organic matter together in open area, cover with browns to hide smell and dissuade scavengers

✓ Quick and easy to establish and maintain; easy to harvest finished compost; allows for either hot or cold composting

✗ Unappealing appearance

© Blue Moon Acres

There is no one "right" way to compost. No matter the system, the result will always be – eventually – compost!

A few final tips:

- Create layers of, or thoroughly mix, greens and browns – this ensures enough carbon and nitrogen is available to decomposers
- In open systems, bury food beneath a thick layer of browns to prevent pests and scavengers from seeking it out
- Shred or break apart large and particularly tough items such as fruit/vegetable peels, bread, and cardboard to hasten their decomposition

And lastly, remember to be patient. Black gold is certainly worth the wait!