

LEO CREEK

# PRESERVE

Composting Handout

Compost is simply decomposed organic material.

Composting is the process of adding a balanced combination of biodegradable materials together, such as leaves, grass clippings, and kitchen scraps. With the help of decomposers and the right conditions, the raw materials break down into one homogeneous nutrient rich, soil-like material — Finished Compost.

When compost is applied to soil it:

* Returns valuable nutrients to the soil.
* Increases water-holding capacity, soil structure, and soil quality.

 Enhances soil carbon sequestration and reduces methane emissions from landfills.

* Helps suppress plant diseases and pests.
* Encourages the production of beneficial bacteria and fungi that break down organic material to create humus, a nutrient-filled material.
* Reduces dependence on less environmentally friendly fertilizers.

All organic material will decompose if left along long enough.

A passive compost pile is when materials are piled up and then allowed to slowly decompose over time. It could be a free-standing pile but is most often contained within a compost bin of some sort. It is referred to as "passive" because we are simply letting nature take its course. It is a fairly slow process. The pile stays cool.

At Leo Creek Preserve we use the hot compost method of making compost, when possible, turning our organic material into compost in just a few weeks during spring, summer, and fall.

What is Hot Compost?

A properly made, well maintained hot compost pile creates the perfect environment for legions of microbial activity — bacteria, protozoa, and fungi to feast on organic matter. Worms and nematodes are in there chowing too. These creatures are called decomposers. As they eat the simple carbons in these piles and poop out slightly more complex carbon chains. They not only free up key nutrients making them available to plants; they also reproduce. The heat of their reproduction causes the pile to warm. When you stick your hand in a compost pile or even a heap of grass clippings and feel the heat, that's the hubba-hubba of microbial sex.

* Once the pile reaches 100 degrees F, the pile is considered to be active.
* Between 130-160 degrees, the pile is hot.
* When it reaches 160 degrees — TURN IT!

Heat rising above 160 degrees means the microbes are reproducing so quickly they use oxygen faster than it can penetrate the pile. If that happens, the aerobic microbes go to sleep and the anaerobic microbes take over, and instead of a sweet-smelling compost pile, you'll have a foul-smelling pile filled with ammonia.

Composting in Place

Some biodegradable materials can simply be left to decompose in place. Fallen leaves are a good example, providing a layer of mulch that eventually breaks down into nutrients accessible to plants.

Chop and Drop Mulching

4 Rules of Composting

1. Quality materials

1. Adequate volume of pile
2. Consistent moisture
3. Good air circulation

Materials Required for Composting

1. Greens
2. Browns
3. Water
4. Air

Air is the only part that cannot be added in excess.

All living organisms need relatively large amounts of carbon (browns) and smaller amounts of nitrogen (greens).

Greens Browns Don't Use

|  |  |  |
| --- | --- | --- |
| Kitchen scraps | Leaves | Meat, fat, bones, dairy, little citrus |
| Grass clippings | Straw | Wood ashes or BBQ charcoal |
| Leafy plant trimmings | Nut shells | Diseased plant material |
| Spent flowers, herbs | Brown pine needles | Lime |
| Livestock manure | Corn cobs | No dog, cat, human |
| Weeds not gone to seed | Shredded newspaper and cardboard | Weeds gone to seed |
| Pet bedding, hair, and fur | Sawdust and wood chips | Branches or wood chunks |

Locate your pile away from the hot sun and areas where rainwater collects.

1. Mix 1 part green material with 2 or 3 parts brown material to form a pile approximately 4' x4' x4'. Layer a variety of green and brown materials if possible — like lasagna! Start with a layer several inches thick of browns.

For fast composting, chop it up first with a lawn mower or mulcher.

1. Mix in an inch of soil or manure. (This isn't necessary; but will kickstart microbial activity).
2. Keep the pile as moist as a wrung-out sponge. (If the materials are dry as you are layering, lightly wet down each layer before adding more material).
3. Turn the pile every week to let air in. When turning bring the material on the outside of the pile to the hotter inside where there is the most decomposer activity.

Finished compost will take between four weeks and one year, depending on the size of the organic material used, the balance between greens and browns, how often you turn it, and how well you maintain the moisture of the pile. When the weather is very warm, here at Leo Creek, we can make finished compost in 6 weeks if it is turned regularly, no woody material is added, and the larger material was mulched or chopped.

Grass clippings are a great compost material if you let the grass clippings dry out for a couple days before adding to your compost pile. Then add in thin layers, intermixed with brown materials such as dry leaves or dead plant debris.

More on Greens and Browns — The Carbon:Nitrogen Ratio

Carbon and nitrogen are the most important of the many elements required for microbial decomposition of organic matter to. For microorganisms, carbon is the basic building block of life and a source of energy. Nitrogen is also necessary for such things as proteins and cell structure.

The Carbon:Nitrogen ratio (C:N) gives the amount of carbon in a material compared to the amount of nitrogen, which is always expressed as 1. The higher the C:N ration the more carbon is present. Grass clippings have a C:N ration of 20:1 which means that there are 20 units of carbon present for every unit of nitrogen.

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| --- | --- | --- | --- |
| Organic  Material | C:N ratio | Organic  Material | C:N ratio |
| Coffee Grounds. | 20:1 | Leaves | 60:1 |
| Food Waste | 15:1 | Straw | 80:1 |
| Grass Clippings | 20:1 | Sawdust | 500:1 |
| Manure | 20:1 | Wood | 700:1 |
| Cornstalks | 60:1 | Paper | 100-800:1 |

The ideal C:N ratio for composting is around 30:1. Microorganisms that digest compost need about 30 parts of carbon for every 1 part of nitrogen they consume. If there is too much nitrogen, microorganisms cannot use it all and the excess is lost in the form of smelly ammonia gas. Piles that have high amounts of carbon will decompose — slowly. In the meantime, the microorganisms will look elsewhere for nitrogen, often depleting the soil.

The terms "greens" and "browns" are a bit of a misnomer. Color is not a reliable indicator of what is a green or brown. Grass clippings when dry are still green material because all they have lost is water. Manure and coffee grounds are in the green camp. Straw and corn cobs are always brown.

As the table indicates, most materials available for composting do not have the ideal C:N. Don't struggle to strike just the right C:N balance. When constructing your pile be aware that "browns" with high C:N ratios like cardboard and sawdust need more "greens" or nitrogen to get the temperature high enough for very active decomposition.

An easy mix that gets you close to the ideal C:N ratio is: 1 part kitchen scraps or grass clippings to 2-3 parts dry leaves or dead plant waste.

We find it works better to measure by weight and not by volume. We also try to collect and then layer a variety of green and brown materials.

Regarding paper products and other items marked "biodegradable" or

"compostable". These items probably will decompose; but a lot of them take a very long time and may be better suited for commercial composting systems than for the home composter.

And finally, we have found that some seeds survive the heat of the pile, then germinate and produce "volunteer" plants in the garden. It happens. The seedlings are easy to pull. Just add them to your pile of "greens".

Trouble Shooting Guide

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| --- | --- | --- |
| Symptoms | Problem | Solution |
| Bad Odor | Not enough air or too much nitrogen | Turn it.  Add brown material |
| Compost is not breaking down, and the center of the pile is dry. | Not enough moisture. | Moisten and turn the pile. |
| The compost is damp and smells ok but will not heat up. | Not enough nitrogen. | Mix in green material. |
| Compost is damp and warm only in the middle. | Too few materials and too small area. | Collect more material and mix the old ingredients into a new, larger pile. |