The world as we know it is coming to an environmental turning point: will we continue to be careless with the earth and neglect the finiteness of its resources, or will we be mindful of the effects everything that we consume and waste? It’s up to us to decide and act accordingly. When you think of being ecologically greener, a few things probably come to mind: reducing, reusing, recycling, carpooling, turning off the lights when you leave a room. What about composting? Composting is an effective way to improve soil quality and reduce greenhouse gases in the atmosphere, and thus an important part of a green lifestyle.

So what exactly does composting mean? The word compost comes from the Latin word compositus, which means to put together, as in make a mixture of organic material. Technically, it’s the controlled decomposition of organic matter resulting in compost, or humus (Martin, et al). It is an imitation of natural life cycles that directly benefit humans, plants, and soil alike. There are several ways to go about this process, all resulting in a nutrient rich mixture to be added to soil. Any organic material, from table scraps to yard waste, can be composted. According to the US EPA, about 27% of our municipal solid waste could be diverted from landfills into a compost pile(EPA).

When all of this organic waste sits in a landfill, it poses a serious problem. Anaerobic decomposition within a landfill produces large amounts of greenhouse gases, namely methane. Methane is a very strong greenhouse gas, and absorbs more infrared radiation than carbon dioxide (Lashof). Because of this, methane has 3.7 times the global warming potential of carbon dioxide (Lashof). If this material were to be composted, a significant amount of methane production would be avoided and even reversed. By decomposing the organic material aerobically into compost, methane is never released. Then, because compost is so beneficial to plant growth, some of the greenhouse effect can even be reversed. Significant amounts of plant growth aid in carbon sequestration while increasing atmospheric oxygen levels, thereby abating global warming’s effects little by little.

Composting also reduces greenhouse gas emission by lessening the need for oil-based fertilizers, herbicides and pesticides, and by making soil more workable (Favoino). Modern chemical fertilizers, herbicides and pesticides are mainly petroleum based, and their production creates a significant amount of greenhouse gases. Increased use of compost means there is much less need for these products, and therefore less greenhouse gases are produced. In addition, there is less nitrous oxide being released into the atmosphere when chemical fertilizers are avoided. The carbon dioxide released by farming equipment for irrigation and tillage is also diminished by composting, because soil becomes much more workable and holds more water.

There are many other ways in which soil becomes healthier with the addition of compost. One of the benefits is greatly improved soil structure (Martin). In finer textured soils, compost adds to soil workability and porosity. It also aids in water and gas permeability, and makes the soil less susceptible to compaction and erosion. In coarser soils, the organic matter improves aggregation and increases the amount of water that the soil can hold. Compost balances the structure of any type of soil, making it neither too porous nor too compact, and therefore more productive.

Compost is also very effective in helping soil to grab and hold moisture. Humus can hold over 2 times its weight in water (Martin). In sandier soil, usually water tends to flow out quickly because of all of the space between particles. The formation of soil aggregates by compost allows a film of water to form over soil particles. In addition, the aggregates help water to move more laterally through soil rather than allowing all of it to drain downward. In finer, more compact soils, porosity given by compost addition allows water to seep into the soil more easily instead of collecting on the soil surface.

Additionally, compost adds nutrients to soil, and helps to retain the nutrients that are already present. The nutrient density of compost is extremely beneficial to plant growth, and its slow nutrient release virtually eliminates the need for more fertilization. Compost improves soil’s cation exchange capacity, meaning it makes the soil more able to hold onto nutrients and keep them available for plant use.

There are many methods available for keeping a compost pile, and some of them are very easy to do at home. The key ingredients for a healthy pile are carbon, nitrogen, water and heat, all in the right amounts (de Koff). Brown materials are those which have a high carbon content, including: paper, dried grass, sawdust, straw, woodchips, dead leaves and corn cobs. Green materials are high in nitrogen, and include grass clippings, manure, food waste, garden waste, coffee and tea grounds, and hair. Oily and fatty foods, as well as meat products, should not be composted because they decay too slowly and may attract pests of all sizes to your compost pile. According to agriculture research at Purdue University, a ratio of 25-30 parts brown to 1 part green is ideal, but these numbers can vary greatly and still produce a healthy compost pile (de Koff). A compost pile must also be watered enough so that it doesn’t dry out, but must not be watered so much that the microbes don’t have access to oxygen. The pile should be damp at any given time, and water should be added or the pile should be turned accordingly. The microbes also perform best at temperatures above 55°F, at which point decomposition slows. To keep a compost pile from dying out because of cooler temperatures, you can make a pile that is 3 feet on each side or larger to ensure that the middle stays warm.

Two basic methods are used to create compost piles: the hot method, and the cool method, named for their relative temperatures. In a hot compost pile, results come more quickly, but the pile must be tended to more than a cool one. Hot compost can be achieved in 2 to 4 weeks because an optimal environment is provided for decomposition: a frequently turned (aerated) pile, about 3 feet on all sides, with a 25:1 brown to green material ratio. The pile must be turned once a day to properly aerate, all of the material must be shredded for quick decomposition, and all shredded organic material needs to be stored until it can all be composted at the same time.

In contrast, the cool method takes longer, 12 weeks, but requires much less effort and precision. To construct a cool compost pile, first lay brush on the ground to create a base that air can flow in and out of. Then, layer 6 inches of brown material, 2 inches of green material, and a thin layer of soil. Continue this pattern until it is 4 to 6 feet high. The pile should be turned about every 6 weeks. If the pile begins to smell rotten, turn it more often. The smell is the result of anaerobic decomposition, and oxygen should fix the problem.

For those who don’t have much space to work, composting in a bag is just as easy. In a relatively sturdy and watertight plastic bag, combine 1 cup of green material, ½ cup of soil, 1 tablespoon of brown material, and one fluid ounce of water. Multiply the recipe as needed to fill the bag. Seal it and mix it up so that it is homogenous and thoroughly damp. Squeeze the bag every day to mix the compost, and open it up every other day to make sure that moisture levels are not too high or low. If there is too much water, open the bag and let it air dry to a suitable level; if it is not damp enough, simply add a little bit of water. This process generally takes 4 to 6 weeks.

To tell if your compost pile is ready to cure, monitor the temperature of the inside of the pile. As soon as its temperature is consistently within 5°F of the air temperature for a week or two, microbe activity is greatly slowed. The pile must also be dark and rich looking, much like a crumbling chocolate cake (de Koff). To cure the pile, simply let it sit for one to two months. This allows the microbe population to stabilize to a level that is suitable for plant growth. Too many microbes in your compost can in fact steal nutrients that would otherwise be used by plants. While the pile is curing it does not need to be turned, but moisture levels should be consistent with those in an active pile. This is also to help microbe populations to stabilize. Now you have some lovely, rich compost to feed your plants. Enjoy watching your garden flourish with life as a natural balance is restored.

Perhaps most importantly, maintaining a compost pile is a persistent reminder of the ways in which we are all linked to the Earth and the rest of its inhabitants. As a new composter, you will begin to see complex ecosystems, which you catalyzed, thrive in your backyard. I hope this beautiful process sparks meditation on the continuity of life and death on this planet, as well as the gravity of your assumed role as a steward of life. You now wield the power to convert your own organic waste into nourishment for your plants, and in turn for yourself.

References:

Favoino, Enzo, and Dominic Hogg. "The potential role of compost in reducing greenhouse gases." *Waste Management & Research* 26 (2008): 61-69. Print.

Lashof, Daniel, and Dilip Ahuja. "Relative contributions of greenhouse gas emissions to global warming." *Nature* 344.6266 (1990): 529-531. Print.

Martin, Deborah L., Grace Gershuny, and Jerry Minnich. *The Rodale book of composting*. New, rev. ed. Emmaus, Pa.: Rodale Press ;, 1992. Print.

"Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2010." *US EPA*. EPA-530-F-11-005. (2011).

de Koff, Jason, Brad Lee, and Michael Micklebart. "Household Composting: Methods and Uses for Compost." Purdue University. Purdue Extension HENV-103-W. (2007)*.*