



## **Breaking down the Food: Composting for Schools**

By Katie Ross

### **Background**

#### **Introduction**

Do you ever think about where all your uneaten food ends up? Usually we dump leftover food in with the rest of our garbage and it goes off to the landfills. Landfills cause soil, air and water pollution, affect local wildlife and their habitats, and release methane gas into the atmosphere. Unlike other kinds of garbage, organic materials, (this includes your fruits, vegetables, grains and anything else that came from a once-living organism) are not doomed to such a wasteful fate – rather, they can be composted and reused in the soil to fertilize other plants. Of course eliminating unnecessary food waste is the ideal option, but for any food that is not eaten, composting is the best way to use this “waste.”

#### **Why Composting?**

Americans throw away more than 25 percent of all the food served to them; in fact, in 2005 alone, almost 12 percent of the total municipal solid waste generated in American households was food scraps.<sup>1</sup> Unfortunately, when waste is thrown into landfills, it releases a greenhouse gas called methane. Methane is a less known greenhouse gas than carbon dioxide, as it only accounts for 20 percent of the greenhouse affects, but it actually has 21 times the more impact on temperature change.<sup>2</sup> The waste of food scraps directly contributes to landfills being the second largest source of human-related methane emissions in the United States.<sup>3</sup> Fortunately, wasted food scraps do not need to end up in the landfill but instead can be composted to create healthy soils that give nutrients to growing plants.

Composting is the most efficient type of recycling. Unlike recycling plastics and other materials, composting does not involve chemicals, huge amounts of energy, or transportation to bring materials to recycling plants and then back to product shelves. In fact, if the average person composted all their food and garden waste, they would prevent 5kg of methane from being released into the atmosphere every year. That is equivalent to the carbon emissions of a 40 mpg car driving 400 miles!<sup>4</sup> Therefore, composting our food waste can be a large part of the solution to global climate change.

Composting organic matter continues the natural life cycle of organic matter by returning nutrients into the Earth’s soil to grow healthy plants and trees. There are even economic benefits to composting; compost can be used as a natural fertilizer and thus eliminating the need to buy fertilizers, pesticides, and water for one’s garden.<sup>5</sup> Additionally, because less matter will need to be transported to the landfills, collection and landfill costs will be reduced. At the end of the

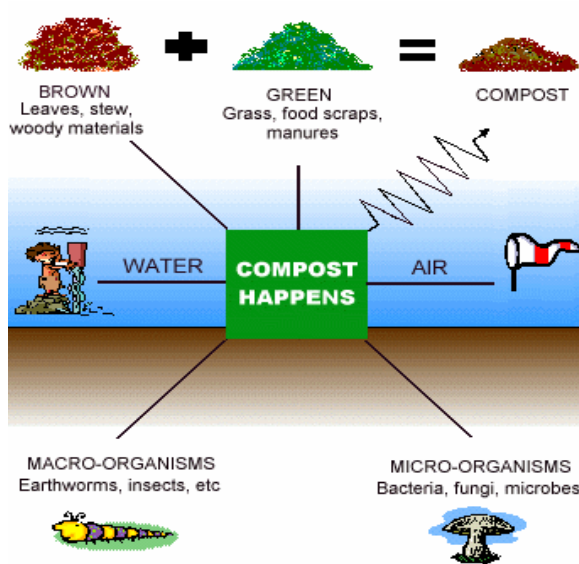
day, composting is ultimately a smarter way to dispose of unwanted food. Next, we will explore how composting works and how you can be a part of the process.

## What is Composting?

Composting is the transformation of raw organic material into its simplest form, so that it is suitable for a variety of soil-plant uses. Organic material comes from a living organism and is capable of decay. Through decomposition, the organic material is broken down through a series of processes into carbon dioxide, water, heat and humus, which is the final product of decayed organic material that cannot be broken down any further. Being that the richest soil for plants and trees is packed densely with humus, decomposition is an essential process for putting nutrients back into soils that plants use. Composting is a way for humans to be a part of Earth's natural cycle, instead of interrupting it. Plant materials are naturally converted back into the soil, which helps more plants to grow. Composting is a great way to understand the Earth and recycle natural resources.

## How is it done?

A compost pile, or a heap of organic materials intentionally set aside for use, must always include a combination of nitrogen-rich and carbon-rich organic material. Nitrogen-rich matter, (sometimes referred to as "greens") include fruits, vegetables, grains and grass clippings, and also animal wastes such as urine and hair. Carbon-rich materials, ("browns") include leaves, woodchips, and hay. Things that you cannot put into your compost pile are grease, meat, dairy products, and human waste. It is important to maintain the right ratio of carbon-rich to nitrogen-rich matter. If too much nitrogen is in your compost pile, ammonia gas will be released and your compost pile will smell so awful that you will not want to be anywhere near it. If there is too much carbon-rich material, then the composting process will be very slow. As a general rule, there should be about two times as much carbon content as nitrogen content in your compost pile.



Source:

<http://www.torfaen.gov.uk/EnvironmentAndPlanning/RubbishWasteAndRecycling/Composting/Home.aspx>

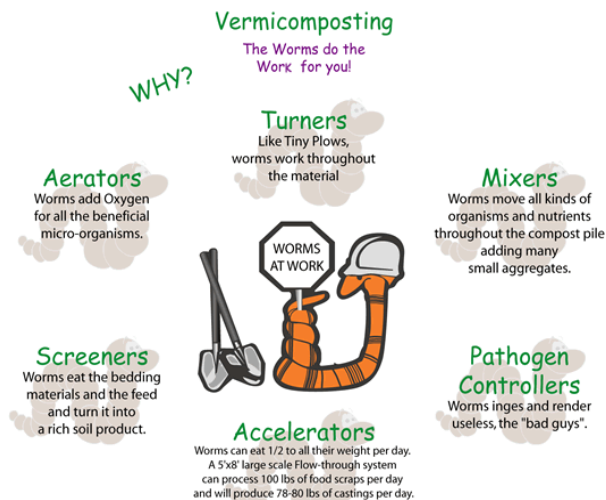
Other factors that to pay attention to when creating successful compost, include: moisture levels, temperature, particle size and oxygen levels. Moisture content needs to be kept around 50-60 percent in order for the composting process to be most effective. Water is needed for decomposition, but too much restricts the oxygen flow in the compost pile. Particle size within the pile should not be so small that water and air cannot circulate, but should be small enough as to increase surface area as much as possible. The particles should range from a ½ inch to 2 inches.<sup>6</sup> Having enough oxygen is also essential for decomposition. Without oxygen, organic

material cannot decompose in and methane gas will be created due to the suffocation of the organic matter.

It is necessary to check on your compost at least a couple of times a week. To keep air flowing in your compost, be sure to mix up the contents often by turning the pile over with a rake. This will also prevent an unpleasant odor. Remember: your compost should not smell bad if you take care of it. One way to monitor the progress of your compost is through its temperature. Temperature levels should range between 120 and 140 degrees Fahrenheit. Buying a composting thermometer will help you keep track of this. If the temperature is too low, that indicates that there is something missing from your equation. If the compost looks dry, you might want to add more water. Or, you could turn the compost to get oxygen flowing. It might also help if you chop your organic material into smaller pieces.

### Getting by with a Little Help from Your Friends – “Vermicomposting”

Vermicomposting uses earthworms to decompose food and is another great way to create compost from food scraps. Either Red Wigglers or Red Earthworms can be used to decompose food into compost. A benefit of vermicomposting is that the bin can more easily be placed indoors and can even be placed in the kitchen or cafeteria and closer to where food is prepared and eaten. The worms need to be placed in a container with a bed of “browns” or yard waste, and then food scraps can be added. Worms prefer temperatures around 55 to 70 degrees Fahrenheit, which is just around room temperature. But be careful: don’t put them outside during winter – they will die!



Source: <http://yelmworms.com/castings-vermicomposting.htm>

Worms are able to decompose meat scraps, but adding meat to your compost will attract rodents and pests, so consider this carefully. As with a regular compost pile, it is important to make sure there are enough carbon materials to prevent bad odors. The worms do the decomposing for you, and after a few weeks you will have fresh, rich compost. The best part of home-grown compost is that it will actually have more nutrients for your soil than traditionally cultured compost

### Earth Day Network Resources

- [Student Action Plan](#)
- [Lesson Plan](#)

### Additional Resources

- [Environmental Protection Agency's Composting Page](#)
- [Walt Whitman poem, "This Compost"](#)
- [Guide to starting a composting program in high school](#)
- [Guide to Vermicomposting for Teachers](#)
- [Instructions and video on vermicomposting](#)

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<sup>1</sup> "Organic Materials | Common Wastes & Materials | US EPA." [U.S. Environmental Protection Agency](#). 08 Apr. 2009 <<http://www.epa.gov/epaoswer/non-hw/organics/fd-basic.htm>>.

<sup>2</sup> "Climate Change 2001: The Scientific Basis." [UNEP/GRID-Arendal - Home](#). 08 Apr. 2009 <[http://www.grida.no/climate/ipcc\\_tar/wg1/017.htm](http://www.grida.no/climate/ipcc_tar/wg1/017.htm)>.

<sup>3</sup> "Environmental Protection Agency - LMOP: Basic Information." [U.S. Environmental Protection Agency](#). 08 Apr. 2009 <<http://www.epa.gov/lmop/overview.htm>>.

<sup>4</sup> CAT Information Service." [Centre for Alternative Technology Home Page](#). 08 Apr. 2009 <[http://www.cat.org.uk/information/catinfo.tmpl?command=search&db=catinfo.db&eqSKUdatareq=InfoSheet\\_CompostingForClimate](http://www.cat.org.uk/information/catinfo.tmpl?command=search&db=catinfo.db&eqSKUdatareq=InfoSheet_CompostingForClimate)>.

<sup>5</sup> Composting | Reduce, Reuse, Recycle | US EPA." [U.S. Environmental Protection Agency](#). 08 Apr. 2009 <<http://www.epa.gov/epaoswer/non-hw/composting/benefits.htm>>.

<sup>6</sup> The effect of Particle Size on Bioavailability." [CSS Mission Statement](#). 08 Apr. 2009 <<http://www.css.cornell.edu/compost/calc/partsizes.html>>.