The Joys of Compost

There's an irresistible alchemy involved when you can start with garbage and end up with a wildly nutrient-rich substance that has been likened to Ghirardelli chocolate for earthworms.

Composting is EASY! In the summer is a great time to start, the weather is warm, so your compost will happen fast and be ready for September and October fall planting, maybe even a bit sooner! Get your soil fat for fall. Start your winter garden while the weather is still Sep/Oct warm and the plants will grow quickly before it gets cool and they slow down. The sooner you plant, and plant in tasty soil, the sooner you get a great harvest!

Compost is decayed organic matter – poops – that's manures, dry leaves and straw/alfalfa, wet grasses and kitchen wastes. (Bread, dairy, or meat products should not be included in the compost.)

Decay is an essential life process, which helps to digest food and recycle materials. Decay is what happens when dead animals and plants break down. The key factors involved in decay are:

- Temperature
- Amount of oxygen
- Amount of water
- The presence of microorganisms

Microorganisms are incredibly important in decay. For example, they are used to break down manure (animal waste) and plant waste (compost). Decay recycles important nutrients for plant growth and for human and animal nutrition.

A compost pile and worm bin have an entire network of different bugs. Bacteria do most of the work, even though they are invisible to the naked eye. Other animals large enough to see, such as beetles, worms, centipedes, millipedes, and sow bugs, are also important decomposers. Without decomposer animals all life would stop because

new plants would not have the necessary nutrients needed to grow.

Decomposers turn our garbage into plant food.

All of our food, including animal products and processed foods, originates from the earth. We can trace our food back to its original form, and from there back to the soil.

No matter what we have packed for lunch, ultimately, we are eating food from dirt. Challenge students to name a food that did not come from dirt. Help students figure out the ingredients in different foods and, as a group, trace each food's origin back to the earth. Ask students to list everything they might have for lunch. Use a tuna fish sandwich for example:

• Bread came from wheat grown in the dirt.

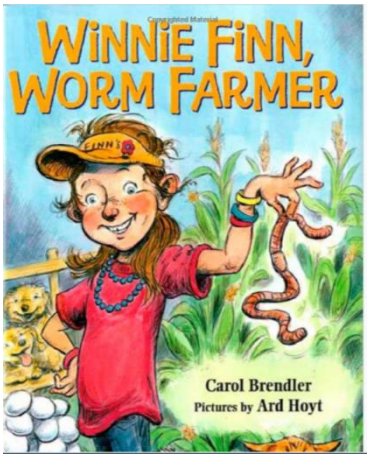
• Pickles are preserved cucumbers grown in the dirt.

• Lettuce was grown in the dirt.

• Mayonnaise came from eggs, that came from chickens, that ate grains grown in the dirt.

• Tuna living in the ocean eat smaller fish, that eat zooplankton, that eat phytoplankton, which needs nutrients from the decomposed bodies of dead plants and animals that accumulate on the ocean floor and are brought to the surface by currents.

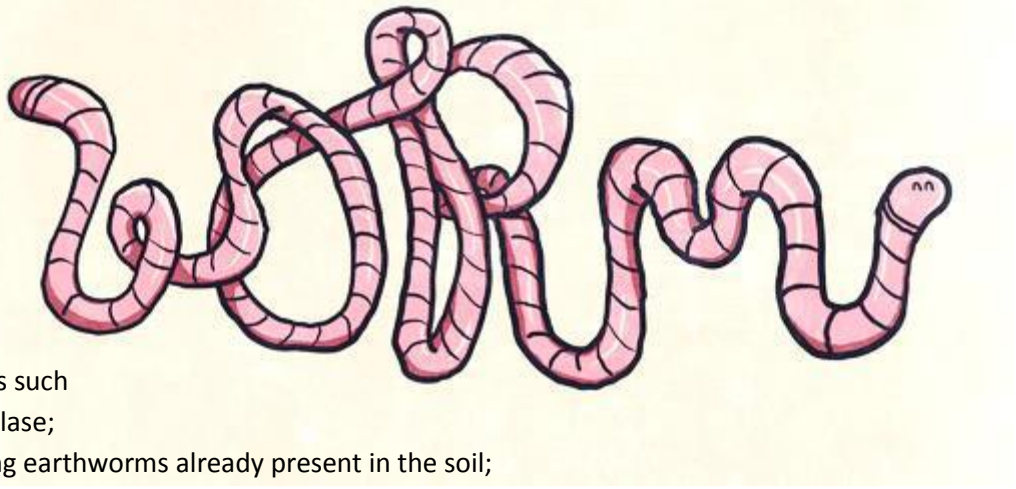
Vermicompost is Wonderful!



A great resource for this discussion is the book *Winnie Finn, Worm Farmer* by Carol Brendler

Vermicompost, or worm compost, is the final product of the breakdown of organic material by worms. There are many varieties of worms, but for worm bin composting, we use a few specific earthworm species called Red Wigglers (Eisenia foetida) or Red Earthworms (Lumbricus rubellus). Red worms are often found in soils rich with organic materials in Europe and North America. These species prefer living in compost piles and crawl horizontally throughout the pile to consume rotting food waste. Together with bacteria, red earthworms are the major catalyst for decomposition in a healthy vermicomposting system.

Vermicompost has a higher nutrient ratio than any other composting method. Additionally, worm castings are also rich with microbial life which aids in breaking down nutrients already in the soil into a form that plant roots can absorb. Worm castings also contain worm mucus which helps soil hold moisture better and keeps nutrients from washing away with the first watering. The following are some of the benefits of vermicomposting:



- improving soil's physical structure;
- improving water holding capacity;
- enriching soil in micro-organisms, adding plant hormones such as auxins and gibberellic acid, and adding enzymes such as phosphatase and cellulase;
- attracting deep-burrowing earthworms already present in the soil;
- enhancing germination, plant growth, and crop yield; and
- improving root growth and structure.

Vermicompost can be used to make compost or worm tea, by mixing some vermicompost in water and steeping for a number of hours or days. The resulting liquid is used as a fertilizer. The dark brown waste liquid that drains into the bottom of some vermicomposting systems, as water-rich foods break down, is also excellent as fertilizer.

A Parfait of Decay

To make a perfect compost (and the perfect parfait), you have to layer ingredients. Since making compost is accomplished primarily by micro-organisms, a good pile is one that includes ingredients that make them happy and healthy – enough to proliferate wildly. (Think of your pile as a micro-organism hotel or spa.)

For a compost parfait of decay, a list of necessary ingredients includes heat, moisture, oxygen, nitrogen and carbon.

Heat: No compost pile needs to be heated. Composting creates heat — surprising amounts of it — but it also needs a certain amount of heat to get going. An active pile can be maintained even in cold weather if it's well-insulated, because it supplies its own heat. But a pile built in the dead of winter, from frozen materials, is going to sit there almost unchanged until spring, because composting micro-organisms tend to get lethargic or even to go unconscious when temperatures drop below about forty degrees. Piles therefore need to be built while surrounding air temperatures are warm enough to get the process up and running.

The composting process becomes increasingly fast as temperatures rise above a hundred degrees. Temperatures between 131° and 155°F (55-68°C) are optimal: below this range, seeds and pathogens may survive, while above it even some of the beneficial organisms may be killed off.

Moisture: If you're letting compost take its time, this is not something you'll need to think about much, but if you're trying to speed up the process, then moisture is key. Many piles go dormant because they're dry.

The rule of thumb is that a compost pile should be about as damp as a wrung-out sponge. It's a good rule. What's hard is getting it there, especially when you're dampening things like leaves, which are not going to feel like a sponge until a good ways into the composting process.

One of the simplest ways to ensure that a batch pile (one built in a single stint) has the right amount and distribution of moisture is to sprinkle, rather than pour water onto it, and to do so from time to time while building the pile. If you build the pile and then try to wet it, the water will run down between ingredients rather than spreading out to wet them evenly.

One excellent test of moisture content is whether the pile heats up after it's built. If it doesn't, try giving it a good wetting, then wait another couple of days. When you turn it after it cools, note whether there are any dry spots, and be sure to dampen them.

Wet materials will need less water, dry ones more; lots of rain means no watering, dry spells mean you might need to get out the hose. Getting the moisture level right is something most composters learn as they go — one of the reasons why some authors refer to the "art" of composting.

Water isn't the only liquid you can put on your pile. Left-over coffee and tea, water used for boiling pasta, potatoes, or any vegetable, are excellent, although excessive amounts of coffee might make the mix acidic. Fruit juice, old wine or beer, and flat soda, are also fine. However, these could attract flies, so it's best to pour them in the center of the pile and then add several inches of new, brown material on top.

Oxygen: Composting will even take place without oxygen, (anaerobically), but it will generally be slower and it will certainly be smellier. It also results in a highly acidic product, whereas aerobic composting results in a product that's nearly pH neutral. Unless you're composting in a closed container, therefore, it's best to encourage the aerobic micro-organisms, which means that the pile has got to have a constant supply of oxygen.

Various tactics are used to achieve this — building the pile on a foundation of sticks or on a pallet so that air can enter from below, including in the mix hard bulky material like wood chips which create air pockets, building around perforated pipes, poking holes, lifting and fluffing with a compost aerator, and above all, turning.

Carbon: This is the "brown" stuff in the compost pile. Actually there's plenty of carbon in most green ingredients as well, but brown ones — sawdust, dead leaves, pine needles — have a much higher carbon-to-nitrogen ratio.

Nitrogen: All — as in, ALL — living organisms require nitrogen, a key part of all proteins. In a compost heap, nitrogen can be supplied by "green" ingredients such as grass clippings, weeds, green leaves from tree and hedge-trimming, vegetable scraps, and so on. Given enough nitrogen, the composting micro-organisms will multiply rapidly. If there isn't enough, they won't, and the composting process will happen, but really slowly.

Too little nitrogen means the process moves slowly and inefficiently. A cool pile is not necessarily a bad thing, if you're not in a hurry and so long as you don't add anything to your pile that could contain human pathogens or plant diseases. If you want a hot one, it's got to have plenty of nitrogen.

One of the simplest ways to get a pile to pick up its pace is to add nitrogen in the form of manures, or other forms of nitrogen. Too much, though, will cause the pile to emit ammonia, a serious air pollutant. This problem won't go undetected; you'll smell it.

Now, they say that good compost is like a perfect chocolate parfait to a worm's tastebuds. Let's see if we can make a Parfait of Delicious Decay (aka a S'mores Parfait by the pinning mama) that will appeal to our own! A Parfait of Decay is quick and easy to make. It only has a few ingredients and it is no bake, just like our Compost Pile!

Ingredients for 'Parfaits of Decay'

- 1 Package Jello instant chocolate pudding- Prepared
- 1 Cup Jet Puffed mini marshmallows
- 4 Graham Crackers crushed into crumbs
- ¾ cup of chocolate syrup or fudge sauce
- Small clear cups

First whip up your pudding (adding moisture to our compost pile to get it going!). It only takes about 5 minutes for this to set so you don't have to do much preplanning.

Next prepare your chocolate syrup or fudge sauce. To make it pourable you may need to eat it in the microwave (applying the heat that rises within our compost when it gets going) for 1.5-2.5 minutes stirring every 30 seconds until all of the chocolate is pourable.

Now it is just layering. Use a small clear cup to make the parfait. Use a spoon to drop in some pudding and smooth. Then add a layer of graham cracker crumbs (brown carbon), then a layer of chocolate syrup, and lastly marshmallows (plant based nitrogen!) Repeat for a second layer (we and then drizzle some syrup (making sure our compost is nice and moist) on top. Simple, beautiful, and impressive! Now make sure to turn your compost pile (adding oxygen) and enjoy! Mmmm, compost, a win all the way around!

Materials Needed

- 2-5 light colored armbands
- 1-2 dark colored armbands

Background Information

Without decomposers such as bacteria, fungi, worms, ants, beetles, and mites, decomposition would stop and resources which sustain life would be depleted. A seemingly endless variety of decomposers all serve different functions in the decomposition process.

Every compost pile has its own food web. In this activity, we will look at the role decomposers play in the cycle of life: life, death, decay, and re-birth.

Management Skills

This game can accommodate any number of participants. It can be a "walking" tag game if it is to be played in a confined area.

Procedure

1. Introduce the life cycle and the role of decomposers in nature and in composting.
2. One participant will play the character "death" and wears a dark colored armband. If the group is large, you can have two.
3. Two to five participants are decomposer characters and wear light colored armbands. As a general rule, 1/5 of the class should be decomposers. All other participants

are plants or animals.
4. Plant and animal characters “die” when they are tagged by the death character. When tagged, they freeze in place until one of the decomposers unfreezes them by walking around them three times. The decomposers unfreeze the plants and animals as fast or faster than death freezes them.
5. The game has no natural end. You should let participants play long enough to experience the concept, and stop the game well before participants get exhausted or lose interest.
6. To summarize, form a circle and review the life cycle and the role of decomposers. Encourage students to talk about how they felt during the game, and what they learned.

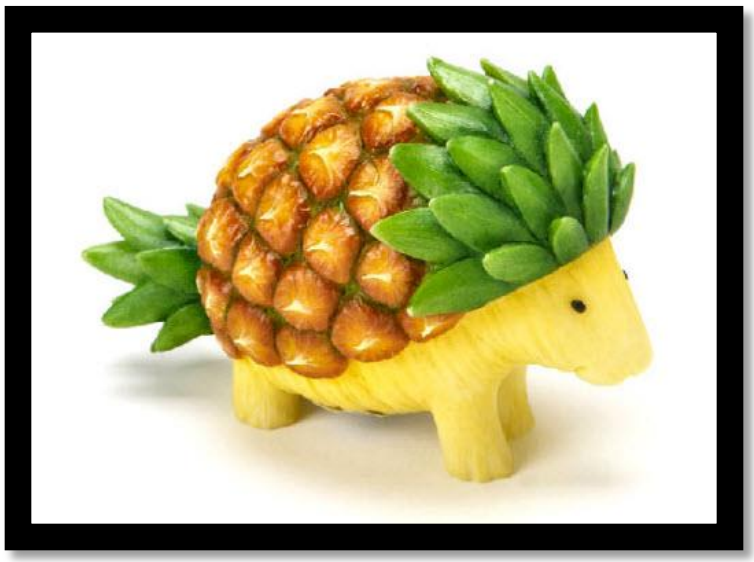
Other Options
• To demonstrate that life would stop without the decomposers recycling dead things, you can allow the death character to tag and freeze the decomposer characters along with the plants and animals. The game, and life on earth, ends when everyone is frozen except the death character.
• Once everyone is dead on the ground, use guided imagery to encourage students to feel what it might be like to be part of the soil and, slowly, with water and sunlight grow into a plant.

Animals, Vegetables, or Minerals

Since plants go into animals why not make animals out of plants!

- Families must enter the competition with their students and supervise the creation .
- Family must make the creation on site during the assigned time.
- The creation needs to be of a creature, animal or something in nature.
- Vegetables and fruits can be brought from home for the competition. We will provide them also at the site.
- Entries will be judged on creativity and quality.
- All remaining (inedible) scraps will be composted.

Share photos with the class participants to inspire them.

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