



Composting with a Wiggle

Introduction

Worms play a crucial role in the breakdown of many organic wastes making them grand and vital participants in the natural decomposition and recycling processes. As their name suggests, earthworms live in soil. Some species live in the leaf litter on the soil surface while others dwell several meters below. The term *vermicomposting* comes from the latin *vermis* meaning worm; literally, vermicomposting means “worm composting.”

In recent years, people have used worms in composting on large scale farms as well as in their homes as “organic garbage disposals” using large buckets and boxes. Vermicomposting is not just for “eco-freaks” — raising worms in a bottle or bucket allows us to witness their role in decomposition and recycling, and gives us insight into the life cycle of some fascinating animals.

Materials

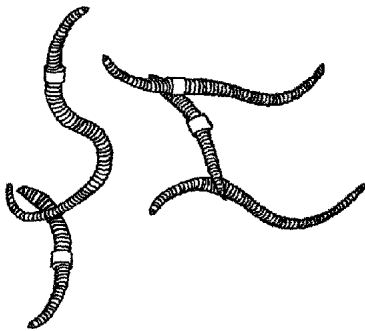
- one 2-liter bottle
- one 2-liter bottle base removed from additional bottle
- newspaper
- redworms: we ordered ours from Flowerfield Enterprises in Kalamazoo, MI (616-327-0108); they sell redworms by the pound. You can also buy redworms at fishing or bait stores.
- Bottle Basics tools for marking and cutting bottles, including the following:
 - scissors
 - nails
 - propane torch or Bunsen burner
 - razor blade in safety holder
 - marker or grease pencil
 - drawer or box top to stabilize bottles

Building your column

1. Remove label from bottle using hot water or hair-dryer. Peanut butter works well for removing stubborn glue remnants; use 1-2 teaspoons of peanut butter on a warm bottle and rub.



- Cut off the bottle top about 1 cm above the shoulder
- If your bottle has an attached base, cut down about 3 inches into the base — keeping it glued to the bottle — and continue cutting around its circumference until you remove the three-inch portion. This cut makes more of the column visible. Be sure not to cut into the base bottom — if you do this, the column will have stability problems.
- Melt four 0.5 cm holes with a large, hot nail in a ring around the base for drainage. These holes should be placed low enough on the bottle so excess liquid can drain out of the column.
- Melt one or two rows of six to ten 3.0 mm holes (using a smaller hot nail) around the bottle to provide necessary aeration.
- Use the second bottle base as a lid for the column.



Constructing a screen

Worms are creatures of the dark and will avoid light. Keep them happy and in the dark by constructing a paper screen.

- Cut a piece of dark paper about 4 cm taller than the finished bottle and wide enough to encircle the entire column.
- Tape the paper around the column, keeping it loose so that you can remove the screen easily.

Preparing the bedding

Many types of bedding can be used — shredded leaves, peat moss, or straw. We use newsprint — it is clean and readily available — but don't let this keep you from experimenting with your own bedding mixtures!

- Cut 8-10 pages of newsprint into 0.25-0.75 cm strips using shears or a guillotine straight blade paper cutter. Cut these strips in half.
- Toss the bedding like a fresh green salad. This is important because if the strips are not separated they will clump together when you moisten them.
- Worms breathe through their skin and to do this they need to be wet. Keep their bedding moist to accommodate this transfer of oxygen through their skin. This explains why earthworms are slimy! Moisten the bedding in a bowl or bucket using 2-3 cups of water, adding more water if necessary. Knead the water into the paper until it is saturated. Then, drain the bedding well by gently squeezing out excess water. Re-toss the bedding vigorously.
- Mix a few tablespoons of soil into the bedding. This inoculates the bedding with natural soil microorganisms which hasten breakdown and improve the quality of the bedding.
- Fill bottle 2/3 with the moist (but fluffy!) bedding.
- Worms prefer a near neutral or slightly basic pH: 6.5-8.5. Mix some powdered lawn lime or finely crushed eggshells into the bedding if a litmus paper test indicates that your column is too acidic.

- Although worms are physically tough, the temperature of your column should stay within 20-25°C. If the temperature rises above 35°C, your worms will cook!



Note: Although worms survive well in bottles, five gallon buckets (and other large containers) often work better. In a bucket, you can maintain a larger worm colony for a longer period of time. Simply follow the bottle, bedding and feeding procedures, adjusting quantities accordingly. Institutional food buckets are perfect for this construction: check your school cafeteria.

A couple bucket pointers:

- Use a hand-drill for the drainage and aeration holes: make these holes about 1 cm in diameter.
- Fill the bucket only a little over half full with bedding.
- Make sure to keep the lid on the bucket at all times.

Adding the redworms

Simply place 15-20 worms on top of the bedding. They will quickly find their way into the bedding.

Feeding your worms

Worms cannot live by newsprint alone, though this might make an interesting experiment!

Add organic food every 3 to 4 days for as long as you have the worms — any sort of plant material works, from kitchen waste to leaves. Worms feed by sucking or pumping materials into their bodies with a muscular pharynx, so the food should be moist and in small (1-2 cm) pieces.

Feel free to add other foods beside plant matter: worms will eat pasta, pizza crusts, paper, coffee grounds, etc. Meat, however, is a problem since it will spoil. Also, according to some vermicomposting experts, lawn clippings can



create a strong odor.

Used sparingly, your worms should have no problems with an occasional

snack of grass! A

rule of thumb: worms need 2 or 3 times their mass of food every few days.

Place food directly on the bedding and then cover with about 1-2 cm of moist bedding.

Maintaining the experiment

Simply follow above guidelines to keep the worms alive. Then, just let them do their thing! Keep them dark. Keep them cool. Keep them moist, but be careful about how much water you add — not too much, not too little. Follow your nose. If things smell too nasty, something may be wrong. All of these procedures can be tested and revised: use your own judgement and creativity!