

Composting with Worms



eco-cycle

Snapshot

Vermicomposting (or composting with worms) in the classroom is a practical way to keep common organic materials, such as paper towels and food waste, out of the trash. (And students will love it!)

<https://bit.ly/eco-cycle-zero-waste-schools-guide>

Objective: Students will understand how vermicomposting works and will be able to identify one way that it benefits the earth.

Age Groups: K-12th grade

Setting: Classroom

Project Duration: Ongoing

Materials:

- Plastic bin (36"x24"x18" or smaller)
- Power drill/bit
- Newspaper
- Spray bottle
- Red wiggler worms (*Eisenia fetida*)
- Fruit/vegetable scraps and non-recyclable paper waste
- Poster paper and markers
- Plastic tarp
- Garden trowel
- Empty bin for finished compost



Why This Project Matters:

School-generated organic wastes, such as food scraps and non-recyclable papers, take up space in landfills and contribute to the production of methane gas. Vermicomposting, or composting with worms, takes some of these materials out of the waste stream and creates a nutrient-rich soil amendment to enhance plant growth. The drivers of this process, worms and other decomposers, are vital members of the soil food web. The process of worm bin building, maintenance, and harvesting provides a valuable learning experience about the nutrient cycle, food webs, and the importance of soil as the foundation of all terrestrial ecosystems on earth. Students also get the added benefit of interacting with live worms and learning about their life cycle!



Project Summary:

Small-scale vermicomposting provides flexibility for teachers to compost in their classrooms without having to gain school-wide support and infrastructure. A classroom worm bin will have the capacity to handle a classroom's volume of paper towels and food waste from snacks. Maintenance of the worm compost bin will be required, as well as a plan for the finished compost.

Implementation:

Getting started:

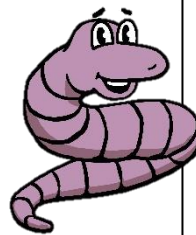
1. Acquire a small plastic bin (with lid), no larger than 36 inches x 24 inches x 18 inches. (Plastic 10-gallon 24"x16"x9" tubs are adequate.) To allow for air flow, drill rows of holes two inches apart along the top half (only) of all four sides. Do the same along the entire lid.
2. Tear newspaper into strips (2-4 inches wide) and loosely fill the bin halfway (this will become worm bedding).
3. Spray the bedding evenly so that it is moist, but not wet (like a wrung-out sponge).

4. Either locally or via the internet, purchase 1-2 lbs. of red wigglers, specifically *Eisenia fetida*. (Other species of earthworms will not work as well in the worm bin environment.)
5. Once the bin is ready and the worms are present, add them in small, spaced-out handfuls throughout the bin, burying them in bedding.
6. To feed them, bury fruit, vegetable, and paper scraps (such as used paper towels) randomly throughout the bin.



Maintenance:

1. Regularly bury fruit, vegetable, and paper scraps (cut into small pieces) as they are produced by the class, monitoring the bin closely to make sure the volume and rate are not overwhelming the worms. Signs of excessive volume/rate are mold, fruit flies and/or strong odor. A pound of worms can eat approximately 3-4 pounds of food in a week.
2. Make sure to have an ongoing supply of bedding to add when needed (as worms consume it and/or if bin becomes too wet). Shredded newspaper works well, but dried leaves and shredded office paper (plastic-free) can also be used.
3. If necessary, spray the bin with water periodically to keep the bedding moist as described above. There should be no standing water or soggy bedding in the bin.
4. Create and display a poster in the classroom reminding students what is safe for worms to eat (fruit scraps, vegetable scraps, non-recyclable paper) and what is not (plastic, metal, glass).
5. If desired, rotate student care of the worm bin (feeding, monitoring the bin, spraying with water, etc.). Students will require supervision.



Harvesting the finished compost:

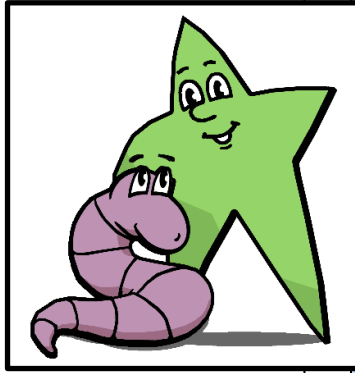
1. After several weeks, the bin will be mainly full of finished compost, which is dark and crumbly, like coffee grounds.
2. Place a tarp on the ground (outside or under a light if possible).
3. Gently empty the contents of the worm bin onto the tarp.
4. Divide contents into several small piles.



Extensions:

- For in-depth tips and classroom activities, reference these curricula: *Worms Eat My Garbage* and *Worms Eat Our Garbage*, both by Mary Appelhof.
 - Search the internet for more tips on keeping your bin healthy, trapping any fruit flies, etc.
 - Using classroom plants of the same age and species, conduct an experiment comparing growth rates of ones treated with vermicompost (variable) and others not treated with vermicompost (control).
 - Take the worm bin “on the road” to visit other classrooms. This may help recruit others to start their own bin. Populate the new classroom bins with the worm offspring from the original bin.
- (Continued next page.)

5. Worms do not like light, so they will travel to the bottom of the piles to avoid it. Sift through the piles and pull out any unconsumed food and paper scraps.
6. Continue sifting through the piles until what remains is mostly finished compost separated from the worms.
7. Collect worms and return them to the worm bin with unconsumed food and paper scraps. The remaining material should be finished vermicompost. Collect and place it into its own separate container.
8. Add fresh bedding (torn newspaper) to the worm bin and dampen bedding with the spray bottle. Make sure to bury unconsumed compostables (food and paper scraps) under the bedding. Return the worm bin to its original site.
9. Mix the finished vermicompost with potting soil (three parts potting soil to one part vermicompost) and apply to garden beds or indoor potted plants. (Straight compost can be used to start seedlings, but once the plants have sprouted, transfer them to the soil/compost mixture because straight compost has a high concentration of nutrients which can burn plants.)



Extensions:
(continued)

- Supplement math and science curricula with worm bin activities, such as:
 - Calculate and compare the amounts of food/paper consumed and finished vermicompost produced.
 - Experiment to determine the speed at which food scraps turn into finished vermicompost
 - Calculate and chart worm population growth over time.
- To monitor progress, conduct a waste audit of classroom waste before and after using the worm bin.

Assessment:

Have the students prepare a presentation for their parents or another class about their worm bin experience. The presentation should include how they built it, specifics of maintenance, the harvesting procedure, how worms turn the waste into compost, and why this helps the earth.

Through the harvesting process, have students evaluate how they are doing, what they have learned, and how they might improve their “worm operation.”

Related Activities:

- Take a Bite out of Food Waste – Chapter 4
- Backyard Composting at School – Chapter 24
- Schoolwide Compost Collection – Chapter 25
- Worm Bin Composting Workshops – Chapter 26
- Conducting a Waste Audit – Chapter 30

