

Lesson 14:

Classroom Composting



Time Allotted

60 Minutes

Target Audience

Grades 5-8 

Objectives

- Students will utilize a natural function to create a valuable garden resource
- Students will build and maintain a classroom worm compost bin

Materials

- Large plastic bin with holes drilled in bottom and two lids
- Shredded newspaper
- Spray bottle filled with water
- One pound of red wiggler worms, available from bait shops, garden centers, or online
 - windycityworms.com
 - redworms.com
 - urbanwormgirl.com
 - unclejimswormfarm.com
- Food waste, broken into small pieces

Summary

Students create a worm compost bin for their classroom. Lesson 13, From Waste to a Resource, should be completed prior to this activity.

Background

Composting is the controlled decay of plant and animal matter to create a rich material that can then be added to existing soil to improve structure and nutrient content.

Check with your principal to make sure worm composting is allowed in the classroom. Some school districts have regulations regarding food storage and whether or not food may leave the lunchroom. If you are able to implement a larger, school-wide composting system, see the Extensions section for more information.

This lesson helps teachers and students create a worm compost bin for their classroom. By composting food scraps, organic material that would otherwise be dumped into a landfill can be used in gardens instead. In a landfill, organic material has difficulty breaking down naturally due to a lack of oxygen. Deterioration in a landfill is an anaerobic (without oxygen) process, whereas composting in a worm bin is an aerobic (with oxygen) process.

Method

1. Before this lesson, review the following process for creating your own worm compost bin and complete any steps necessary prior to class.
 - Drainage — optional, drill 20-25 evenly spaced 1/4" holes in the bottom of plastic bin and place on top of second lid to collect compost tea.
 - Ventilation — near the top of the box, drill 2 rows of 1/16" holes. In one lid, drill 30 or so evenly spaced 1/16" holes.
 - Bedding — shred newspaper or office paper, moisten it with a spray bottle, and fill the plastic bin about 2/3 full.
 - Worms — add worms to moist bedding, being sure to cover them with additional bedding if needed. Bedding is used to soak up the moisture from decomposing food scraps. If the contents are too wet, add more bedding.
 - Feeding — place kitchen scraps in bedding, chopping it into smaller pieces if necessary to aid in the break-down process. Do not give worms meat, fish, or dairy, avoid oils and salt, and go easy on citrus as it contains a compound toxic to worms. As worms multiply, they will consume scraps faster; check your bin every few days to monitor the process.

- Location — choose a well-ventilated spot with easy access and temperatures between 55-77°F year round.
 - Monitoring — here are some tips for troubleshooting and monitoring your bin:
 - o Moisture — if contents seem too dry, add a little water with a spray bottle; if too wet, add a little dry, shredded newspaper.
 - o Smell — the worm composter can become anaerobic if more food than the worms can eat is added. If this happens, don't add any food scrap for a few weeks to allow the worms time to catch up. When cared for correctly, compost bins should not smell foul.
 - o Fruit flies — Make sure food is buried and covered with bedding to avoid attraction of fruit flies.
 - o Dying or escaping worms — check moisture and adjust if necessary. If contents are brown all over, it may be time to harvest.
 - o Tea tray — if the tray has a lot of brown sludge in it, put into watering can and top with water, allowing the mixture to steep. Water plants with this highly nutritious compost tea fertilizer.
 - Harvest — when all bedding is gone (usually 3-5 months), it is time to harvest.

To harvest, don't add new food for two weeks and push the contents to one half of the bin, placing any large undecomposed scraps to the empty side of the bin with fresh bedding. Continue burying the food scraps only in the "empty" side of the bin. Over the next 2-3 weeks, the worms will move over to the new side (where the food is).

Dump the entire contents of the worm bin onto a sheet of plastic and divide into several piles. As the piles are exposed to light, the worms will move to the bottom of the pile, allowing you to harvest the top most layer. After removing the top layer, allow the pile to sit in the light for 2-3 minutes before harvesting the next layer. Repeat this process until the worms are left at the bottom. Any leftover food scraps can be added to the next composter.
2. Remind students that food put into a landfill does not break down as quickly as the food in their worm bin. When food in landfills does break down, it emits a harmful gas called methane (a by-product of anaerobic decomposition) that contributes to global warming.

Ask: What are some other reasons why food waste may be harmful?
 3. Have students explain what organisms are breaking down the food in their worm bin. When they mention worms, explain that there is a special species of worm that people often use for indoor composting. Red wigglers process food waste efficiently, speeding up the process of decomposition. The worms digest the food waste and bedding, leaving behind a nutrient-rich material called castings (worm poop) that can be used when planting a garden. Red wiggler worms also reproduce quickly, which allows for more worms to eat more food.
 4. Create a classroom compost bin according to the above process. Explain to students that worms' bodies are light sensitive, meaning the worms should be buried under layers of food scraps and newspaper to avoid the light. Remember to keep the bin closed to avoid letting in light or attracting flies.
 5. Have students research and create a poster of food items that are appropriate for the red wigglers to eat. Post the results near the compost bin.

Extensions

- Have students research uses for anaerobic bacteria, especially in waste water treatment plants and as a source for renewable energy. Have them report and share their findings.
- Have students create a composting guide for other classes. Help them to create a composting system for the school. Explain to the students the value of multiple worm bins in the reduction of the school's food waste. For assistance in this process, visit compost.css.cornell.edu, or contact Seven Generations Ahead at act@sevengenerationsahead.org.
- Have students conduct a research project to discover more about worms. Earthworms are beneficial organisms for growing food on farms and in gardens. In many parts of the country, however, earthworms are an invasive species that damage forest floors. Students can present their findings, written or visually, on the benefits and drawbacks of worms in an ecosystem.
- Have students research different composting methods.
- Invite a local "compost professional" (master gardener, vermiculturist, composter) to discuss what they do and why.
- Visit a local compost facility (small scale or commercial) or wastewater treatment plant to find out how our waste is processed and diverted (treated and reused vs. wasted) on a large scale.

Younger Audience Adaptations

1. Have all the materials assembled in advance — holes drilled, newspaper collected, food scraps chopped - and have students shred paper for bedding and assemble the bin.
2. Read *Earl the Earthworm Digs for His Life* by Tim Wagner and have students create posters with tips about the worms and how to use the bins — do's and don'ts, appropriate food items, fun worm facts.
3. Observe which food items break down fastest or how long different items take to decompose by keeping a "worm food log."

Sources

Cornell University: <http://compost.css.cornell.edu/worms/basics.html#Harvesting>