

## How to Make a Classroom Worm Bin

**OVERVIEW:** Discover why earthworms are considered a gardener's best friend. The worm bin or *wormery* built in this activity allows students to observe the worms as they convert plant material into rich compost.



**GRADES:** PreK-5

### **MATERIALS:**

The New Jersey Agriculture in the Classroom powerpoint presentation *Worms and Other Decomposers*, available to download on the New Jersey Agriculture in the Classroom website:  
<https://newjersey.agclassroom.org>  
under Teaching Resources, Basic Gardening Lessons.

Large plastic bin  
Soil from your garden or outside the school  
Red wiggler worms  
Shredded paper  
Black plastic sheet, or plastic, cloth, or wood lid for bin  
Clean kitchen fruit and vegetable scraps, coffee grinds, tea leaves, egg shells

*NOTE: Don't go out and dig for night crawler earthworms that live in the soil to populate your worm bin. Night crawlers need to tunnel through dirt to eat and survive. Instead, you need red worms, Eisenia foetida (also known as red wigglers). They live in rich organic material such as dead leaves on the ground, manure, and compost (not soil), and are adapted to crowding and warmer temperatures.*

### **PROCEDURE:**

Show your class the New Jersey Agriculture in the Classroom powerpoint presentation *Worms and Other Decomposers*.

Tell students you are going to make a worm bin so that you can harvest the worm castings for compost for your garden. Explain that the red worms you will use in the bin are somewhat different from worms you find in the garden. They don't live in soil. They live naturally in manure piles and compost. They live and feed near the surface in leaf litter and do not create tunnels.

## *Vocabulary:*

*Vermiculture:* the raising of worms to make compost

*Worm castings:* worm poop, also known as vermicast

*Worm tea:* is made by leaching worm castings in water (just like a tea bag). The resulting liquid after it has steeped for several hours is a tea-colored liquid that can be used to fertilize plants.

## Making the Worm Bin:

Find or buy a plastic bin or dishpan. An approximate size is 16" x 24" x 8" or 10 gallons, but bigger or smaller bins will work as well. Make sure the bin is clean by rinsing it with tap water to remove any residues which may be harmful to the worms.

Drill about twenty evenly spaced ¼-inch holes in the bottom of each bin. These holes will provide drainage. Drill ventilation holes about 1 – 1 ½ inches apart on each side of the bin.

Prepare the bedding. Your worms will live in bedding that is one-half soil and one-half shredded paper. Do not use bagged soil that contains fertilizer or pesticides. These could be lethal to worms. Instead, any soil from outside is fine.

For the paper, you can use office paper that is shredded in a shredder. Use only white paper with black ink. An occasional logo with colored ink is okay, but too much colored ink will be harmful to the worms.

Place the paper strips into a large plastic garbage bag or container. Add water until bedding feels like a damp sponge, moist but not dripping. Add dry strips if it gets too wet.

The bedding should be 6-8 inches deep at the bottom of your container. One-half of this bedding should be soil and one-half should be moist shredded paper. Add and mix the soil and paper strips, making sure the bedding is not packed down to provide air for the worms.

Add the worms. Your worms will mostly feed and live in the topmost layer of the bin, so it is the surface area that matters when figuring how many worms to use. As many as 300 worms can live in one square foot of composting surface. So if the top of your bin is four square feet, you can have as many as 1200 worms, but a smaller amount of worms will work well also.



Feed your worms fruit and vegetable scraps, such as peels, rinds, and cores. Egg shells, coffee grinds, and used tea leaves are good, too. Limit the amount of citrus fruits that you place in the bin so that it does not become too acidic. *NO MEATS, BONES, OILS, OR DAIRY PRODUCTS.*

How much should you feed your worms? A worm will eat about half its body weight daily. One thousand worms weigh about one pound and will eat about 3.5 pounds of food scraps per week.

Cut or break food scraps into small pieces – the smaller, the better. Measure the amount of food. Monitor the bin every week to see if the worms are eating the food and adjust feeding levels accordingly. Bury food scraps in the bin. Lift up bedding, add food scraps, then cover food with bedding.

Place a layer of dry shredded paper on the top of your worm bin. This will help maintain the moisture balance, keep any possible odors in the bin, and help prevent fruit flies from making a home in the bin. Replace this layer frequently if fruit flies are present, or if bin gets too wet.

Cover the bin with a lid made of plastic, black plastic sheeting, plywood or cloth, but leave the lid slightly ajar so the bin receives some air. Place the bin away from windows and heaters. Worms prefer temperatures of 55 to 70 degrees Fahrenheit.

FEED, WATER and FLUFF! To keep worms happy, feed them about once a week. If the bedding dries up, spray it with water. If bedding gets too wet, add dry paper strips. Fluff up bedding once a week so the worms get enough air.

### Harvesting your compost:

After three to six months, you should have a fair amount of worm castings stored up in your bin. Now it's time to harvest. Keep in mind that you might not be able to save every worm when harvesting the compost. That's okay; your worms have probably multiplied, and there should be plenty to continue composting.

Put on rubber or plastic gloves and move any large uncomposted vegetable matter to one side. Then gently scoop a section of worms and compost mixture onto a brightly lit piece of paper or plastic wrap. Scrape off the compost in layers. Wait awhile after each layer to give the worms time to burrow into the center of the mound. Eventually you will end up with a pile of compost next to a pile of worms. After harvesting, you should replace the bedding and then return the worms to the bin.

If you prefer a hands-off technique, simply push the contents of the bin all to one side and add fresh food, water, dirt, and bedding to the empty space. The worms will slowly migrate over on their own. This requires much more patience. It could take up to a few months for the worms to fully migrate to the other side of the compost bin.

You can add the worm compost directly to your garden or potted plants, or you can make the liquid fertilizer "worm tea," described in the vocabulary.

### Student Observations:

Have the students draw the contents of the bin. Label this drawing as "start." Ask students to hypothesize about what will happen over the next few weeks to the worms, the bedding, and to the food. Have students check the bin regularly, draw and write what they see, and date their observations.

Ask the students: Have any of the fruits and vegetable scraps disappeared? How about the bedding? What does it smell like? How many worms are there now? What do they look like?

### EVALUATION:

Students' drawn and written observations of the changes in the worm bins.

### EXTENSIONS:

Read:

*Wiggling Worms at Work* by Wendy Pfeffer

*Diary of a Worm* by Doreen Cronin

*An Earthworm's Life* by John Himmelman

### New Jersey Learning Standards

Science: PreK:5.1.1-5, 5.3.1,3 K:LS1.1, ESS2.E 1:LS1.A,B 2:LS4.1  
3:LS1.B 4:LS1.A 5:LS2.A

