



WATCH EARTHWORMS WORK

I wonder...

How do earthworms move and eat (and help plants grow)?

Earthworms play an essential role in our ecosystem thanks to how they move through the soil and what they eat, breaking down food and other organic matter into nutrients that plants can use. In this activity, you'll make a wormery—a worm habitat—that you can take home to observe firsthand how these simple but amazing creatures work.



MATERIALS

- 2 liter soda bottle (clean and empty)
- 1/2 liter water bottle with cap (empty)
- 1 cup soil
- 1/2 cup sand
- Scissors
- Dark construction paper or card stock
- Tape
- Trowel
- Ruler
- Water
- *Optional:* leaves, grass clippings, or vegetable garden waste
- 2 or 3 earthworms (see “where to find earthworms” on the last page; you may also send students home with instructions to find their own worms)

NOTE: Part of this adventure is completed at home, so each family should take home a copy of these materials, including the Journal pages!

Create the wormery:

Cut the top off the larger bottle where it widens out. Fill the smaller bottle with water and replace the cap, then center it inside the larger bottle (the water helps the smaller bottle keep its shape).





Using the trowel and your ruler, fill the remaining space in the large bottle with alternating layers of soil and sand—2 inches of soil, 1 inch of sand, repeat—until you get 2 inches from the top of the bottle. End with soil on top. Pack down the soil and sand layers with your fingers.

Optional: You can also add small pieces of dead leaves (leaf litter) or grass clippings between layers. This will help students see decomposition in action.

Add a small amount of water, just enough for the contents of the container to be damp but not soaking wet.

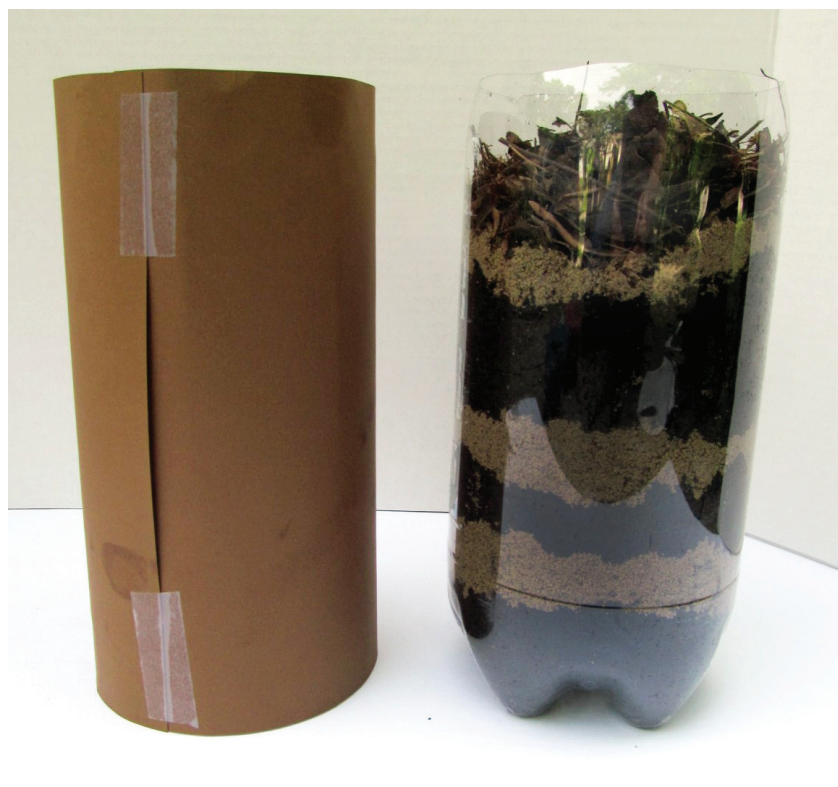
Gently lay a few earthworms on top, then place a few leaves, grass clippings, or vegetable garden waste over them.

NOTE: You may also send students home with empty wormeries and instructions to search for their own worms.

Wrap paper around the container and tape it. Make sure the paper can be removed easily to check in on the worms throughout the week.

Take care when transporting your wormery.

- Hold from the bottom.
- Keep from direct blowing heat or cold.
- Do not leave outside; take inside as soon as you get home.





Observe

Leave your covered wormery in a quiet spot out of the sun for a few days to give the worms time to settle in.

Each day, add a little water to keep the wormery moist. Top it off with leaves, grass, or vegetable waste if any soil is exposed. (This provides more food for the worms and also helps keep the wormery moist.)

Remove the paper in the evenings to check on the earthworms (this is when they're most active).

Record your observations and trace the worms' paths in your Safety Smart® Science Investigator's Journal, then replace the paper. Take progress photos (**without flash**) and ask your parents to share your photos and observations on social media with **#sciencenightfun!**

After about a week of observations, return the contents of the wormery (including the earthworms) to your backyard or other damp, shaded dirt area. The worms will thank you!

What is going on here?

Worms may not have arms or legs, but that doesn't mean they aren't great movers! They have short, bristly hairs called **setae**. To move, a worm stretches itself out and then extends its setae in the front to anchor itself. Then it brings its back end forward and makes itself short.

Earthworms are important to our **ecosystem** because as they move through the soil, they bring organic matter (leaves and grass clippings, food bits, etc.), oxygen, and water down to the roots of plants and trees, where it's needed most. They also eat decaying organic matter, bacteria, and fungi and break them down into nutrients that the plants can use. The tunnels that the worms make allow the water and nutrients to get down to the tree roots.

Earthworms do such a great job breaking down organic matter that some people add worms to their compost bins. This is called **vermicomposting**. Worms help speed up the process of decomposing kitchen waste into organic matter, which makes for excellent garden fertilizer. Your wormery is essentially a mini vermicomposter!

Think about this:

What do you think will happen if you put layers of compost between the sand and soil? Will the worms move it when they make their tunnels?

Try adding different types of lettuce or vegetables on top when needed (brightly colored veggies are best) and see what the earthworms do with it. Do they move the vegetables? Do the vegetables get eaten or ignored?

Lightly tap the wormery near where the worms are; how quickly do they move, and in which direction?

Try pouring enough water into the wormery close to one side so you can see the water line about 2 to 3 inches from the bottom (make sure there is still a dry place to crawl to). Do the worms move to higher ground or stay near the damp areas?

What more should I know?

Earthworms are pretty simple organisms—they have no bones, arms, legs, eyes, or ears—but they can still sense light and sound! They breathe through their skin, and they have five organs that function like hearts to circulate their blood. All of that blood flowing makes earthworms really good at healing; in fact, if a worm loses its back half, it can regrow its body. These creatures are so valuable to our ecosystem, some people keep them as pets to help make great fertilizer for their gardens.



Where to find earthworms

- Check a local tackle/bait shop or big-box store.
- Buy them online.
- Gently pick up worms that come to the surface when it's raining.
- Moisten an area of your yard and cover it with wood or cardboard; come back the next day and dig carefully to catch the worms.

EXTRA ACTIVITY: MAKE A CUP COMPOSTER

MATERIALS

- 16 ounce clear plastic cup
- Plastic wrap
- Rubber band
- Hole punch
- Potting soil or backyard soil (this is to kickstart the composter with all the good microbes and bacteria that help break down the kitchen waste)
- Garden or kitchen waste, starting with bits of fruit or shredded lettuce

Make your mini composter:

Using the hole punch, place three to five holes around the cup about 1 inch from the top; this allows for some airflow.

Fill the cup just over halfway with soil and kitchen or garden waste (only fruits and veggies; no dairy or meat products). Add water to moisten the contents but not drench them.

Cover the cup with plastic wrap and secure it with the rubber band. Punch holes in the top to allow for some airflow.

Observe

Place the cup composter in a sunny location. Every few days, give the contents a stir. Add more water if it feels or looks dry.

Watch the kitchen waste turn black as it decomposes into nutrient-rich soil! Use it to fertilize some seeds in your garden or in a small flowerpot.

Think about this:

Decomposition happens slowly over a few days or weeks. If you keep a video log of your experience making the mini composter and checking on it, you'll be able to chart the time it takes for the kitchen waste to decompose! Talk about your observations as you make each new video for your log. Share it with your family members and classmates.



LEARNING MESSAGES

Complementary Next Generation Science Standards

- ◇ Topic focus: Life Sciences
- ◇ Disciplinary core ideas:
 - LS2 Ecosystems: Interactions, Energy, and Dynamics
- ◇ Cross-cutting concepts: Systems and system models, cause and effect



Safety Smart Science Investigator's Journal: Watch Earthworms Work

Sketch and label your wormery throughout the week. Try taping tracing paper to the outside of the bottle so you can trace the paths the worms make!

Day 1	Day 3
Day 5	Day 7

What do worms prefer to eat?

Try putting different kinds of vegetable kitchen waste at the top of your wormery and observe what happens. Do the worms move it? Do they like it? Do they avoid it? Does color make a difference?

Date food given	Type of food given	Observations after 1 day	Observations after 3 days	Observations after 5 days

What's happening to the layers of sand and soil? What about the leaf and grass clippings?

What happens when the worms are exposed to light or when you tap on the side of the wormery? Why do you think this happens? Ask your parents to share your observations on social media with **#sciencenightfun**.

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