

STEAM Subject: Ecology

Lab: Making a Wormery

Grades: 2-8

Learning objective:

Students will build a wormery to make observations about the role of decomposers in an ecosystem.

ENGAGE:

Ask your student: What do engineers do?

Engineers design and build machines, products, systems, and structures.

Can animals be engineers? *In a way, yes!*

Ecologists refer to some animals as “ecosystem engineers.” This means they work like engineers in their natural habitat, building structures or changing the landscape around them. One example is the beaver which affects its ecosystem by creating dams.

EXPLORE:

Worms as Ecosystem Engineers

Another ecosystem engineer you may be familiar with is the earthworm. *Do you know how they affect a garden ecosystem?*

Ask students to list some examples.

- *They dig tunnels and loosen soil*
- *They assist in the breakdown of plant waste into nutrients*
- *Their waste acts as natural fertilizer for plants*

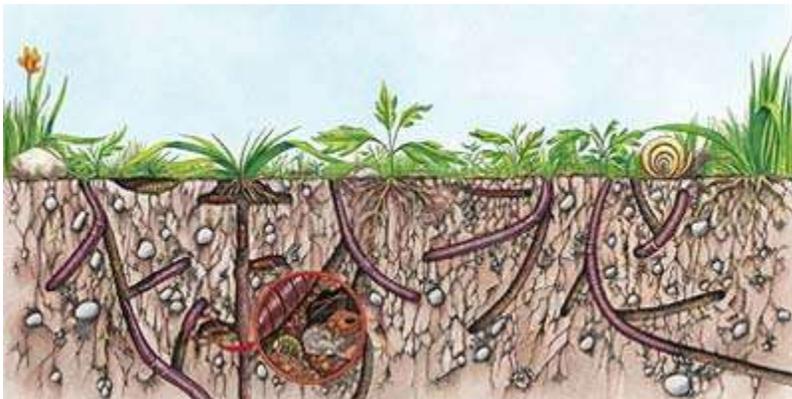


Image Source: https://www.eduplace.com/science/hmsc/3/c/cricket/ckt_3c63.shtml

You may be wondering: *How do they break down plant waste into nutrients?*

Earthworms are **decomposers**, which means they help break down dead things. They eat a mixture of plant waste (leaves, grass clippings, fruit) and soil. Their stomachs break down the plant material into smaller parts through digestion, and they release whatever they don't use for food back into the soil. This includes an array of nutrients that were previously stuck in the plant waste.

EXPLORE:

Activity Making a Wormery



Image source: <https://thetadmommy.com/wp-content/uploads/2015/05/DIY-Wormery-feature.png>

Materials needed per student:

- One 2-liter Plastic Bottle
- 5-10 Worms (Red Worm or Earthworm)
- Soil
- Sand
- Grass Clippings
- Plastic Bag

In this activity we will observe ecosystem engineers in action by creating a wormery (a worm habitat). We will fill a plastic bottle with different colored layers of sediment and observe how over time worms can mix the layers up. The following instructions call for a 2-liter plastic bottle, but you can use any clear container you have on hand. Mason jars or even smaller 8-ounce cups work fine, just make sure to add fewer worms and modify the measurements accordingly.

Directions:

1. Cut the tapered top of your plastic bottle off- you want the opening to be wide enough to stick your hand into.
2. Fill your plastic bottle with a layer of dirt that is about 2 inches deep. Lightly press it down so the layer is level.
3. Add a thin layer of sand over the dirt- this should measure about half an inch. Even out the layer by lightly pressing and smoothing out the top.
4. Add additional layers alternating between soil and sand until you are about 2 inches from the top of the bottle.
5. Add about a cup of water, or enough to make the sediment moist but not dripping wet.
6. Go outside and collect some blades of grass or other garden clippings. Add them to the top.
7. Add your earthworms- Observe their behavior. Do they immediately start burrowing, consuming, mixing? Do you see them creating any channels through the sediment yet?

8. Add a plastic bag with holes cut into it over top of the container. You may secure it with a rubber band.
9. Make sure you wash your hands after handling worms and soil.

You should observe your wormery over the next few weeks. Look to see if the plant clippings get taken down into the dirt by the worms, or if the layers get mixed together. Make sure that the wormery stays moist- if it starts to dry out add more water.

EXPLAIN:

Review Science Vocabulary

- **Decomposer:** An organism, such as a soil, bacteria, fungus, or invertebrate, that breaks down organic material, dead organisms (both plants or plants parts and animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil.
- **Ecosystem Engineer:** An animal that significantly modifies, creates, or destroys a habitat.

EVALUATE:

Students will make weekly observations.

Using your science notebook, you can make notes and drawings to describe your observations.

How would you describe the worms’ activity as ecosystem engineers?

