

Earthworms Scavenge Organic Remains

Earthworms

Dig in damp garden soil, roll over a rotting log, or look under a pile of decaying leaves. It's likely you will find an earthworm. Earthworms are some of the most important recyclers in nature. They help turn decaying organic matter into soil in which healthy plants can grow.



Nature's Recyclers Fact

Are caterpillars earthworms? Are beetle grubs earthworms? No. They are insects in a stage of life called larvae.



Think About It!

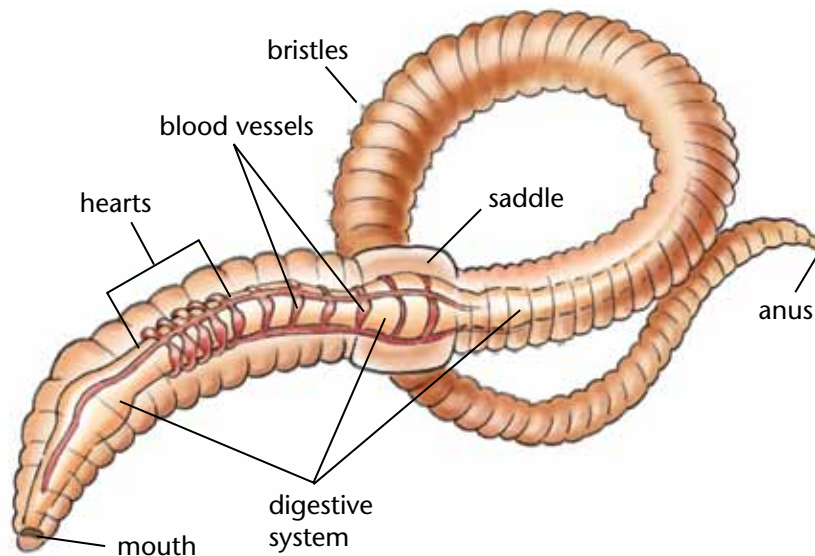
How could you test whether an earthworm senses light and dark? How could you test whether an earthworm feels sound vibrations?

What Are Earthworms?

Like beetles, earthworms are invertebrates. They don't have bones or teeth. But beetles have legs and wings and hard bodies. Beetles are insects. Earthworms aren't.

Earthworms' soft bodies are made up of **segments**, which look like rings with grooves between them. Most adult earthworms have between 150 to 170 segments.

The "head" end of an earthworm is the first segment. At the tip is its mouth. An earthworm doesn't have eyes, ears, or a nose. But it has nerves, and it can sense light, **vibrations** through the soil, and other things in its environment.



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An easy way to find the head end of an earthworm is to look for the **saddle**. The saddle is a smooth band around an adult earthworm's body. It is about one-third of the way down the body from the head.

The "tail" end of an earthworm's body is the last segment at the end that is farther from the saddle. The tail segment is at the tip of the earthworm's **anus**.

Earthworms look like long tubes—and that is what they are, outside and inside. The mouth is at one end of the tube, and the anus is at the other end.

How Do Earthworms Move?

The outside of an earthworm's body is long and thin so that it can tunnel through the dirt.

An earthworm moves by squeezing two sets of muscles together. One set of muscles makes the worm stretch out and get thinner. The second set of muscles makes the worm get shorter and fatter. The worm moves in waves as it changes from longer to shorter to longer.

Earthworms have something else that helps them move. Some **bristles** stick out of the worm's soft, moist skin all the way from the tail end to the head end. They aren't legs. Earthworms use these bristles to stick to the ground and pull themselves ahead. They also use their bristles to hold onto the sides of their burrows, so that other organisms have a hard time pulling them out.

Being slimy is another thing that helps earthworms move. The slime they make helps them slide over the ground and move through their tunnels.

How Do Earthworms Breathe?

Since they don't have noses or lungs, earthworms breathe through their skin. To do this, they need to keep their skin moist—and that's another thing the slime does. An earthworm's slime helps it breathe.

Oxygen from the air and water dissolves in the moist layer of slime on the worm's body. Then the oxygen passes through the worm's skin and into its blood. Five hearts pump blood through vessels running the length of the worm's body. If you look at the underside of a worm, you might be able to see one of these blood vessels.



Think About It!

Compare the ways a snake or an inchworm moves with the way an earthworm moves. Their bodies are the same shape as an earthworm's. What is different about their movements? Can you relate the differences to how or where they live?

Nature's Recyclers Fact

Earthworms' hearts are not like ours. They are extra thick blood vessels that connect the two main, body-long blood vessels. They squeeze together to keep the blood flowing through the earthworm's body.

How Do Earthworms Eat?

Most of the inside of a worm's body is taken up by its **digestive system**. The digestive system is a tube that runs the length of an earthworm's body. It is like a tube inside a tube. At one end, an earthworm takes in food through its mouth. At the other end, waste comes out.

To grab whatever it is trying to eat, an earthworm reaches out with its mouth and even pushes out part of its throat. Then the mouth and throat pop back in so the worm can swallow the food.

Earthworms like to eat dead leaves and organic remains. Some types of worms poke out of their burrows to find their food. Other types of worms tunnel underground to find food. Earthworms can also swallow dirt. They digest the decayed organic remains that are mixed in with little bits of rock and sand.

Once an earthworm digests its food, the rest of the material passes through its body. The undigested part comes out as droppings called **castings**.



Try This!

Look at a worm's insides by shining a flashlight through it. Do you see the long, dark tube that is its digestive system? Do you see its hearts, up near the mouth end?

How Do Earthworms Grow and Reproduce?

All earthworms have both male and female parts. When two worms mate, they both make cocoons around their eggs by oozing a goop from their saddles. Then they slip the cocoons off their bodies, so the eggs can hatch in the soil.

You may be able to find cocoons in your worm bin. They are about the size of a grain of rice. As they develop, the cocoons change color. Look for small white, light-brown, yellow, or red objects. Some people think they look like miniature lemons.

Baby worms hatch from the ends of the cocoons. They usually hatch in about a month. (But if the moisture and temperature are not quite right, they may take longer.)

Nature's Recyclers Fact

Animals that have both male and female parts are called **hermaphrodites**.

What Kind of Earthworm Are We Looking At?



There are approximately 2,700 different kinds of earthworms. They live almost all over the earth and there are a lot of them! In just one acre of land, there can be more than a million earthworms, eating, leaving castings, and working their way through the soil.

Earthworms can be separated into three major groups based on their feeding and burrowing habits.

Composting Earthworms

In class you will be working with composting earthworms. In nature they live in the top part of the soil, where there is lots of leaf litter, mulch, and manure—all of which they like to eat. They usually don't go down any deeper than 8 cm (3 in) from the soil surface. This makes them the easiest worms to keep in a worm bin.

Some common composting worms are red wigglers (*Eisenia foetida*) and red tiger worms (*Eisenia andrei*).

Word Connection

The names in parentheses are the worms' scientific names. Scientists use these names so that people don't get confused about what they're calling what. For example, you may call your composting worms "redworms," but others may call them "red wigglers."

In a scientific name the first word is the genus, and the second word is the species. A genus is a group of species that have very similar characteristics. A species is a more specific group of organisms that can breed with each other.

The words in a scientific name usually come from Latin or Greek, and they often describe organisms in some way. (Sometimes they are named after people or places too.) See if you can get an idea of what the scientific names of the earthworms described in this chapter might mean.

Latin or Greek	English meaning
foetid	stinking
lumbricus	worm
rubra	red
terra	earth

Shallow Soil-Dwelling Earthworms

Earthworms that live in shallow soil burrow within about 30 cm (12 in) of the surface of the soil. They make lots of random tunnels through animal pastures and compost piles. There they find and feed on decomposing organic matter. As they move through the soil, they pass it through their intestines. Their tunnels fill with nutrient-rich castings. Their tunneling helps mix the topsoil, and it also helps water and air get into the ground.

Redworms (*Lumbricus rubellus*) are one common type of shallow soil-dwelling earthworm.

Deep-Burrowing Earthworms

Earthworms that burrow deep into the soil don't tunnel around looking for food. Deep-burrowing earthworms come up to the surface to look for leaves and other plant material. Then they pull it down into their burrows. Their burrows are permanent, and can reach 2 meters (6 feet) down. These earthworms help mix different layers of soil, bringing organic remains down, and leaving their castings at the top

A deep-burrowing earthworm that you are probably familiar with is the nightcrawler (*Lumbricus terrestris*).

Nature's Recyclers Fact

Giant Australian earthworms can grow more than 2½ meters (8 feet) long. They are completely helpless outside their burrows.



Dwight Kuhn

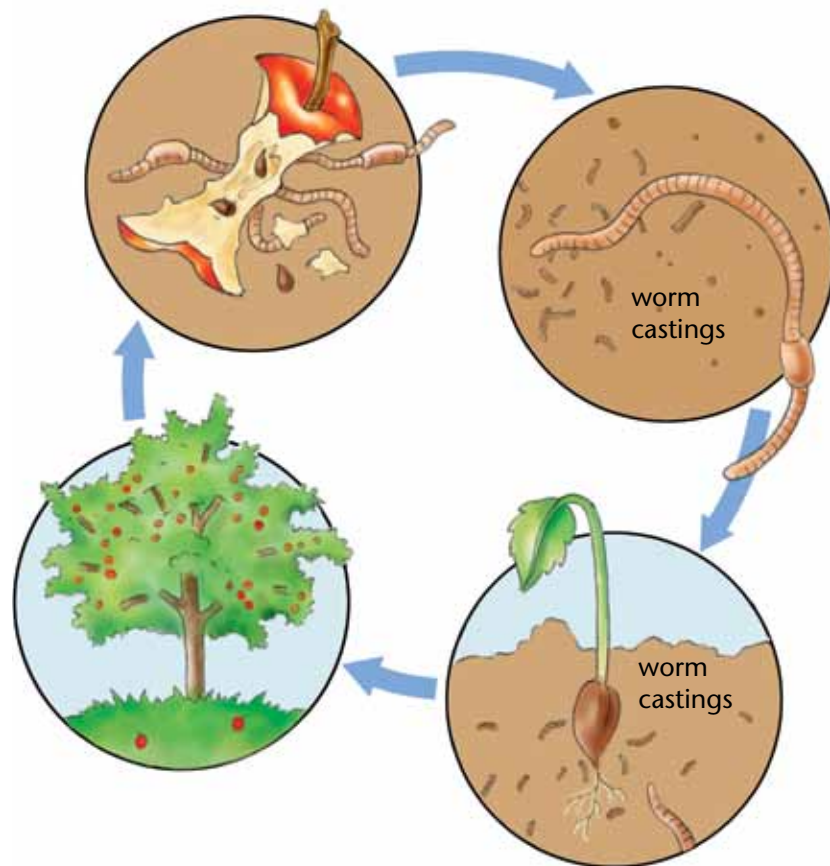
A nightcrawler (*Lumbricus terrestris*) pulls organic matter down into its burrow, and leaves castings on top.

Earthworms in the Soil

Earthworms play an important role in creating healthy soil for plants. Their digging and moving through the soil helps air and water get to young seeds and plant roots.

Most importantly, earthworms help the soil by leaving castings. Earthworm castings are rich in nutrients and minerals that plants need. The castings are natural fertilizers for plants. Without the help of worms recycling the waste of other organisms, these remains would pile up and plants would not get the nutrients they need to survive. And, if the plants could not survive, animals that depend on them would not be able to survive either.

By eating decaying matter and creating castings, they give back to their environment as they clean it up



Exotic Earthworms

The United States has only a few known native species of earthworms. Most of the earthworms here were brought by early European settlers. The worms may have arrived in soil clinging to the roots of plants, or in soil used for ballast in ships.

The **exotic** earthworms have spread throughout North America, and are found almost everywhere. All they need to survive is moist soil and decaying organic matter. They are very useful to farmers and gardeners, who can rely on worms to eat the dead plants remains. The earthworms recycle nutrients back into the soil to help the next year's crops grow. Of course, many people use worms for fishing too!

But the European earthworms are not always good for the North American environment. In the Northeast they are eating so much forest leaf litter that some plants don't have the habitat they need to grow. Scientists in Minnesota suspect that earthworms may even be putting a rare fern at risk of extinction.

Word Connections

ballast—Material that weighs down a boat to make it more stable.

exotic—From another part of the world.

Environmental Stewardship

When your class is done studying worms, what should you do with them? Don't let them go in the woods! They may be different than the types of earthworms that live in your area. Maybe you can continue composting with earthworms at school or at home.

