

Worms and Decomposers

Overview: Students will learn about the role of earthworms in decomposition.

Subject area: Science

Grade level: 3rd-5th

Next Generation Science Standards:

5-LS2 Ecosystems: Interactions, Energy, and Dynamics

- **5.LS2.1** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Objectives: Students will be able to observe what earthworms eat, discuss decomposition and the role of decomposers, observe how earthworms fit into the food chain, and locate earthworm castings.

Prep time: 30 minutes

Lesson time: 30 minutes

Teacher Background: Earthworms spend most of their time in the soil. They often move forward by taking the soil in front of them into their mouths and passing it through them and out again. Thus, essentially eating their way through the soil, earthworms extract the food value they need from the bits of decaying organic matter in the soil. Excreted waste is known as worm castings. (See attachment A.)

Although earthworms are like other consumers in that they are unable to produce their own food, they are unlike in that they do not eat live organisms. Instead, they extract food energy from decaying organic matter (plants and animals that have died). In the process, they break down the organic matter into smaller parts.

Having been physically broken down by the digestive system of an earthworm, the organic matter is now ready for a group of organisms called decomposers. Decomposers, such as bacteria and fungi, chemically break down the organic matter into nutrients such as Nitrogen, Phosphorus, and Potassium. The nutrients are then more available to the plants growing in the soil. In this way, earthworms and decomposers facilitate the constant recycling of nutrients in nature.

Materials needed:

- Active worm bin ([DIY instructions](#))
- White Board and marker

Space needed: Garden

Staff needed: 1

Preparation steps: Set up a worm bin ahead of time or use an already established worm bin.

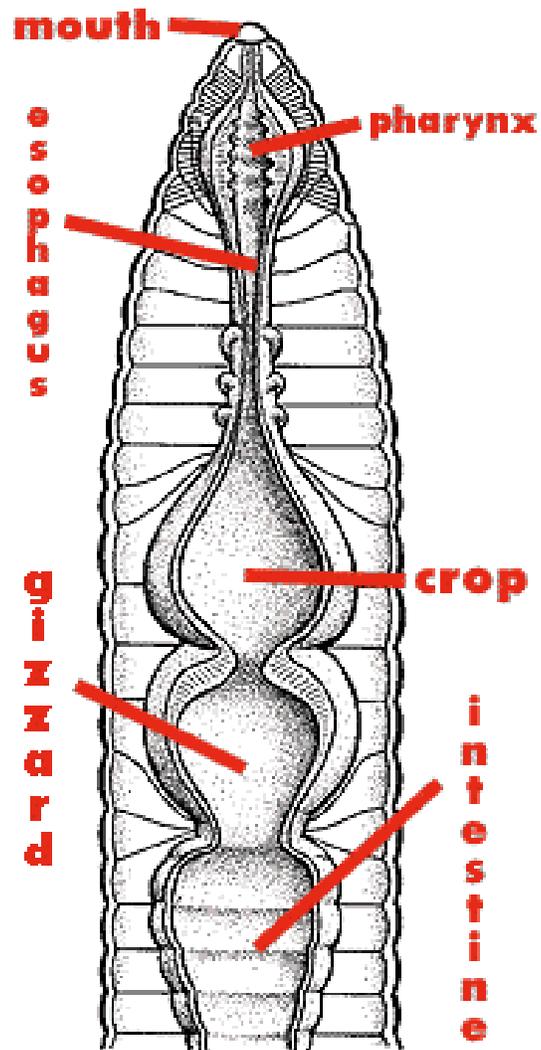
Presentation steps:

1. Review the food chain. See attachment B for an example of a food chain.
2. Discussion:
 - a. *What do worms eat?* Decaying plants, all fruits and vegetables that are kitchen scraps, egg shells, etc. **Basically everything except meat and dairy.**
 - b. *How do earthworms eat?* (discuss decomposition and decomposers) Earthworms don't have teeth, but they do have mouths. The food they eat needs to be small enough to be drawn into their mouths. Then, they have a gizzard, which through muscular contractions, helps to grind their food down into smaller pieces, like our teeth. After the food passes through the gizzard, it moves into their intestine, where they absorb nutrients (also like us). Any undigested material is excreted as a worm casting.
 - c. *Why are worms important in the garden ecosystem?* The castings are extremely beneficial to our garden soil. When they are part of what we call vermicompost, which are castings, organic matter, and bedding materials, this mixture has the ability to help the garden soil be much healthier. It is like a vitamin for the soil! The nutrients now available to plants in the soil help them to grow healthily and in turn, we are healthy when we eat them!
 - d. *How do worms fit into the food chain?* Worms are part of a special group of species that eat dead or decaying organic matter. They are called decomposers. Decomposers are very important in our food chain, because they recycle the energy, and help us to start all over again!
3. Worm Bin Observation:
 - a. *Why are there holes in the worm bin?* To let air into the bin so the worms can breathe; to keep the inside of the bin from getting too wet.
 - b. *Why is there a lid on the worm bin?* To keep it dark inside the bin; they naturally live underground, in darkness, and though they don't have eyes, they sense and move away from light.
 - c. Before opening the worm bin, explain the rules for handling a worm:
 - i. Respect the worms—they are very helpful to our garden and all living creatures should be respected.
 - ii. To hold a worm, hold your palm flat and do not squeeze your hand.
 - iii. Do not drop the worm.
 - iv. Do not touch the worm too much (just let it be in your hand).
 - v. Keep the worms' skin moist.
 - vi. If you no longer want to hold the worm, tell the instructor and he or she will help you gently place it back in the bin, under the soil.
 - vii. Make sure to wash your hands after holding the worms.
 - d. Open the worm bin and let the students take a look. Vermicompost is evenly granulated and is a dark coffee color.

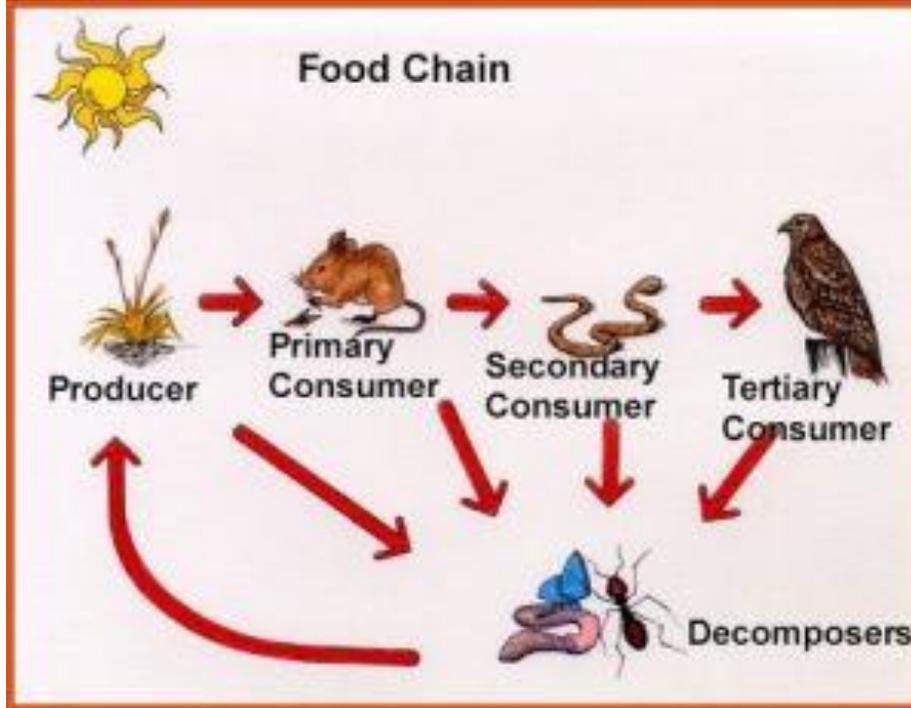
Conclusion:

Ask students: *What do worms need to survive? How do they benefit our garden? What do they eat?*

Attachment A



Attachment B



Energy (sun), Producer (plant), Primary Consumer (mouse), Secondary Consumer (snake), Tertiary Consumer (owl), Decomposer (worm, ant, fungi)