

Worms at Work

Overview: Building and maintaining a traditional compost pile is not an option for many schools. Worm bins offer the opportunity for kids to learn about and explore composting in any kind of setting.

Grade Level/Range: K-5th Grade

Objective:

In this lesson, students will use worm bins to:

- Learn about worms and their important role in the decomposition cycle
- Observe composting
- Create experiments to discover what materials can be composted

Time: 4 to 6 weeks +

Materials:

- Worm Bin ([make your own](#) or purchase as a kit)
- Red wiggler worms
- Compostable materials



Background Information

In nature, earthworms play an important role in the decomposition of organic matter and aid in the development of good soil structure. Here's how:

Earthworms create tunnels, loosening compacted soil and allowing water and nutrients to infiltrate. This helps lessen water run-off while also increasing the water-holding capacity of the soil. In addition, the loosened soil encourages healthy, extensive plant root systems.

They're detritivores; that is, they're on the front lines of breaking down organic matter, such as fallen leaves. As worms consume organic matter, it passes through their digestive tracts where the nutrients it contains are converted into forms plants can use. In the process, the waste is inoculated with microorganisms present in the worm's digestive tract. When the worm excretes the waste (worm poop, also called castings), the microbes are also released, enlivening the soil ecosystem. Worm castings are a highly valued garden fertilizer.

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Acting like a glue to bind soil particles, worm castings create soil aggregates, or clumps — a hallmark of healthy soil — that create abundant pore spaces so that air and water can reach plant roots.

Additional background information is available at:

[Earthworms: The Good, The Bad, and The Bizarre](#)

Drawing from the work of worms in nature, worm bins were developed as an alternate means of composting in small and urban spaces. Worm bins use special composting worms, called red wigglers (*Eisenia fetida*). These worms consume an assortment of table scraps and paper products, producing nutrient-rich castings (worm poop) that can be used to fertilize indoor and outdoor plants. The production of worm compost is called vermiculture, and it is a great way to give students an up-close look at the decomposition process. **Note:** Many worm bins are kept indoors; however, they can be kept outdoors as long as they're out of direct sun and the temperature remains between 60- and 75-degrees Fahrenheit.

Check out [Garden Basics: Worm Composting](#) for more details.

Laying the Groundwork

Many inventions were inspired through close observation of how systems work in nature. As an opener you can ask students:

- What happens to old leaves that drop from trees during the fall?
 - Do they stay on the ground forever?
 - Where do they go? What do they turn into?

Introduce students to the decomposition cycle. Explain the natural process by which organic matter is broken down and returned to the soil. Students can make and observe worm-free [decomposition bags](#) in advance of, or in conjunction with, their worm bins for comparison.

Exploration

1. Begin by giving kids time to brainstorm (either individually or in groups) various ways they could simulate the decomposition cycle in the classroom. Give them time to share their ideas.
2. Next, introduce them to the concept of worm bins. Design and build one or more worm bin composters for your classroom. Directions can be found at: [Make a Worm Compost Bin](#). Alternatively, there are many companies that offer worm bins for sale. Students can research different models and conduct price comparisons.

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3. Once you have worm bins started, encourage students to think about some questions they might like to answer about the worm bins, such as:
 - What materials decompose the fastest? The slowest?
 - Do the worms seem to have a food preference?
 - Does temperature make a difference in how fast the worms eat?
4. As a class, choose a research topic you are most interested in exploring, craft a hypothesis, and then design an experiment to test your hypothesis.
5. Give students a chance to share their experiment and results with others.

Making Connections

Food waste is an important environmental concern in our world. Introduce students to this issue and discuss how worm bins might be used as one solution.

Branching Out

For more ideas on exploring composting and the handling of food waste, check out the new Subpod for Schools Compost Guide for Educators. Subpod and KidsGardening teamed up to put this lesson guide together to teach students about food waste, the benefits of composting, and how to grow food — all while teaching them how these help our planet. You can receive a copy of the guide when you sign up for [Subpod's educator email list](#).

Related Resources

Compost Your Way: <https://kidsgardening.org/resources/lesson-plan-compost-your-way/>

Worm Composting: <https://kidsgardening.org/resources/gardening-basics-worm-composting/>

Make a Worm Compost Bin: <https://kidsgardening.org/resources/garden-activities-worm-compost/>

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