

LESSON: Composting with Worms

GRADE: 5th Grade

TIME: 45 minute session + observation time

SUMMARY:

Students consider what happens to their trash. In small groups, they create worm bins and make observations. Discussion connects their observations to the system of matter moving among plants, animals, decomposer, and the environment.

OBJECTIVES: Iowa Core Science

- **5-LS2-2.** Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

MATERIALS & RESOURCES:

- Examples of trash and recyclable items
- Containers with a lid and air holes
 - Tip: Use a nail to poke 4-8 holes in an air-tight plastic container
- Newspapers
- Water in a container
- Supply of food waste – see **Outdoor Education Guide**, page 3
- Worms – Red Wigglers, scientific name *Eisenia fetida*, recommended

INTRODUCTION:

Engage students by showing a variety of food waste and trash items, some of which can be recycled.

- Where does our trash go?
- What does it mean to recycle?

Communities have their own recycling programs. As an example, learn more about Des Moines's recycling program:

<https://www.mwatoday.com/residents/recycling/accepted-not-accepted.aspx>

Items can be recycled in nature, too. We are going to observe the process by **vermicomposting**, which means composting with worms.

EXPLORATION:

- 1. Build worm bins in small groups:** Tear newspapers into strips. Dip strips in water and place in container – $\frac{3}{4}$ full with fluffy wet strips, not smushed together. Place a handful of worms in the bin and close the air-tight lid.
- 2. Add food and 2 other trash items:** See the tip sheet at the end of the lesson. Also add 2 non-food trash items – for example, a plastic water bottle and piece of cardboard.
- 3. Observe the bins:** Every few days the students will open the bins and observe. Try to observe over a couple of weeks. How are the worms and the environment changing? What is happening to the food scraps? What is happening to the non-food trash items?

IOWA CORE REFLECTION / JOURNAL PROMPTS:

In one sentence, summarize your observations. How do worms contribute to the system of matter moving from plants to animals to decomposers to the environment?

As students share their ideas, record key phrases on chart paper. Some phrases that will be valuable for the discussion:

- Worms ate (decomposed) food scraps and paper
- Paper and food scraps are made from plant material
- Worms did not eat plastic or metal
- Black strings (called castings) appeared in the worm bins

Help students understand that worms are **decomposing** the food scraps when they eat it. Add this vocabulary word to the chart paper. Worms decompose plant material, though some will take more time than others. Decomposers include fungi and bacteria. Decomposers are important because they recycle plants (aka our food) into castings providing soil nutrients. These nutrients allow new plants to grow and cycle continues. Matter is not lost in this cycle; it changes form.

BRIGHT SPOTS: Would worms make good pets? In what ways are worms “small but mighty”? What have you learned about our trash and recycling? How could composting change the contents of our trash?

OUTDOOR EDUCATION GUIDE: Tips for Composting with Worms

What should I put in my vermicomposting bin?

Yes, put it in the bin	Better to throw it away
Apple Apple peels Banana peels Biscuits Carrots Celery Cereal Cucumber Lettuce Newspaper Oatmeal Pancakes Potatoes Tomatoes	Meat waste and bones Fatty foods Excessive citrus Non-biodegradables
Worms also consume many things not on this list!	

Helpful hints:

- I usually feed them once a week, and a small amount, especially at the beginning. For a small (8x8) bin, I start with 1 banana peel per week. It will take several weeks for them to eat the food items. They will multiply within a few weeks.
- I like to feed them more vegetables than fruit, especially during fruit fly season. Place food scraps under the damp newspaper bedding.
- Ensure that the newspapers stay damp. Add additional wet newspapers every few weeks. I have never had worms escape the bins, unless it became too dry.
- Keep them at room temperature. Red wigglers cannot survive outdoors in Iowa, but they thrive in the bin's high humidity environment.
- Provide air flow because worms need oxygen to survive.