



4-H Earth Is Our Home Activity



Topic: Decomposition • **Estimated time:** 40 minutes for the activity and 1 week to see results • **For individuals and groups**

Soil-ology: Do You Dig It?

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Did you know there are careers that let you play in dirt? In this activity, you become a soil scientist or, more specifically, a **pedologist**, someone who studies how soil is formed. Get ready to build your own composting jar. Watch **decomposition** happen right before your eyes!



Learning Outcomes

Project skill: Understanding decomposition as part of the food web. • **Life skill:** Understanding systems

Educational standard: NGSS 5-LS2-1. Develop a model to describe the movement of matter among, animals, decomposers, and the environment. • **Success indicator:** Builds composting jar



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Supplies

- 16 ounce, wide-mouth glass jar, such as a Mason jar
- lightweight cloth, such as cheesecloth to cover the jar opening
- rubber band
- permanent marker
- magnifying lens
- measuring cup
- plastic spoon
- ruler
- 2 cups of **organic** yard debris, such as leaves, grass, and soil from your yard or garden
- 1 cup of fruit and vegetable peels and cores
- a half cup of water
- 2–3 paper towels



For easy cleanup, do this activity outside.

What to Do

1. Using your ruler, fill your glass jar with 2 inches full of the yard debris. Be sure to include plenty of soil. Save the rest for step 5.
2. Place the plastic spoon inside the jar where it can be seen from the outside.
3. Add the fruit/vegetable peels/cores to the jar and press them down until they contact the organic layer. Be sure some are against the side of the jar, so you can see them from the outside. TIP: Apple, banana, potato, and carrot peels work especially well because they break down quickly.
4. Tear a paper towel into small strips. Layer the strips over the fruit/vegetable layer. This layer should be no more than ½ inch deep.
5. Use the rest of the organic matter to fill the jar, leaving 1 inch of space at the top. To add moisture to all the layers, slowly pour in the ½ cup of water.
6. Using the rubber band and lightweight cloth, cover the top of the jar. The cloth should allow airflow into the jar.
7. Using the marker, draw a line to mark the soil level at the top of the jar. Record the date. Place the jar in a warm, sunny location in the house. Observe the jar each week and record the soil level and date, also note any changes in the plastic spoon. When you can no longer see the different layers in the jar your compost is ready to use.



Talking It Over

Write your answers to these questions on a separate piece of paper and talk about them with your project helper or another caring adult.

SHARE What layer seemed to **biodegrade** the fastest? Which layer was the slowest?

REFLECT Can you explain why the layers decomposed at different rates?

GENERALIZE Why is it important to limit our use of plastics and use **biodegradable** materials?

APPLY In nature microorganisms play a key role in breaking down organic matter. How did the microorganisms get into the jar?

COMPOST

More Challenges

Create a compost pile or bin in your backyard. Invite family members to compost food waste and yard waste. Share your finished compost with your flower garden or potted plants!

Background

For organic materials to become compost, they must go through three stages of decomposition: degradation, conversion and curing.

In the first stage, **degradation**, the organic materials are broken down by tiny microorganism consuming the proteins and carbohydrates in the materials (the food scraps).

In the second stage, called **conversion**, the **microorganisms** create energy and release water and carbon dioxide. At this point, the temperature rises, and the **humus** is formed. Once the decomposition completes, the temperature drops, and the compost is considered “fresh.”

If fresh compost is mixed into the soil, it is possible for the microorganisms to start working again, consuming the nitrogen that plants need. It is best to let the compost cure. During the **curing** process, microbial activity stops, the compost cools, and—if outside in the environment—earthworms and other insects will return. The curing process is complete when the compost is dark brown. It can then be mixed in with garden soils or used on plants.

In the jar experiment, only degradation and conversion occur. With such a small amount of compost materials, it is all right for it not to cure before it gets mixed back into the garden or yard.

Composting does more than just keep food scraps out of landfills. Soil with composted, organic matter cuts down on the water and fertilizer needed for garden plants and crops. It helps plants grow at a steady rate, resulting in uniform growth. It also helps the soil absorb and hold water, which leads to better plant growth. Composted gardens have been proven to produce fewer insects and disease problems on the plants. Why? The increase in good microorganisms helps to reduce disease, and better growing conditions help make plants naturally resistant to pests.





Vocabulary Words

biodegradable. Capable of being able to break down naturally by the action of microorganisms.

biodegrade. To break down naturally by the action of microorganisms.

conversion. The second stage of decomposition, in which microorganisms create energy and release water and carbon dioxide.

curing. The third stage of decomposition, in which microbial activity stops and earthworms and other insects return.

decomposition. The state of breaking down into parts or simpler compounds; the state of decaying.

degradation. The first stage of decomposition, in which microorganisms consume the proteins and carbohydrates in organic materials.

humus. Brown or black material that results from partial decomposition of plant and animal matter.

microorganism. An organism of microscopic size.

organic. Of, related to, or formerly part of a living organism.

pedologist. Someone who studies soil.



Did you know?

Each year, thousands of tons of kitchen scraps, lawn clippings, and waste from gardens end up in landfills.

Learn More!

Project Learning Tree has many good ideas for getting into composting in the article “Composting Experiments, Tips, and Resources for the Classroom (and at Home).” It’s online at plt.org/educator-tips/composting-tips-experiments-resources-classroom-home.

Everything about composting, from building a bin to using compost as fertilizer, is covered in the book *Green Kid’s Guide to Composting* (2013) by Richard Lay.

Sources

Campbell, Sue. 1998. *Let it Rot!: The Gardener’s Guide to Composting* (Third Edition). Storey’s Down-To-Earth Guides.