

Garbology

Key Topics/Vocabulary: Decomposition, Decomposers, Composting, Prediction, Organic Matter, Fertilizer

Grade Level: 3rd - 6th

[Click here for #3 Series Description](#)



Lesson Bridge:

Connect this lesson to *Taco 'Bout Plants (2)* by asking students to consider which types of waste break down and which types do not. Do the six plant parts break down? [Close the loop](#) with this series by sharing that compost provides more nutrients for seeds to grow into even bigger and stronger plants.

Lesson Overview:

In this lesson students will learn about which types of matter can decompose by conducting a simple experiment. Items will be sealed in a bag with soil for a month then observed and weighed. Students will: observe changes over time due to decomposition, notice patterns and classify materials based on their ability to decompose, and explain how matter changes throughout decomposition.

Suggested Activities and Learning Objectives by Grade:

- 5: Compost in a Bag - Conservation of Matter Focus
 - 5-PS1-2 Is matter conserved during decomposition?
 - 5-PS1-3 Categorize materials based on their ability to decompose.

Essential Question(s) that Connect CCCs and SEPs:

- How can we set up an experiment to see what things decompose and what things do not?([Asking questions & defining problems](#))
- How do you think the items in our experiment will change over time? ([Stability & Change; Planning & Carrying Out Investigations](#)).
- What happens to the energy in plants when they start to decompose?([Energy & Matter; Asking questions & defining problems](#))

- Do you think decomposition will cause some of our solids to turn into liquids or gasses? ([Energy & Matter](#); [Stability & Change](#); [Asking Questions & Defining Problems](#)).

Vocabulary:

Decomposition- To breakdown or be broken down into smaller parts, especially by the act of living things.

Decomposers- A living thing that feeds on and breaks down plant and animal matter

Composting- An easy way for us to turn food waste into rich soil to grow healthy plants in.

Prediction- An educated guess, the act of saying what might happen in the future.

Organic Matter- Matter that has come from a recently living organism.

Fertilizer - A substance containing elements that help plants grow and used by farmers and gardeners.

Materials:

- [Series #2 Garden Journal](#) (optional)
 - [Garbology Garden Journal](#) (optional)
- 5 gallon bucket (or similar sized receptacle)
- Some sort of lid for the bucket that will allow air to come in (an old t-shirt or bag with a bungee around it works well).
- Healthy, moist soil
- Spray bottle or hose with spraying nozzle
- A variety of compostable, recyclable, and disposable items (best if acquired from the foodbank or from your garden/school)
- Masking Tape and Sharpie
- A scale (optional)

Prep:

- Email teachers in advance and ask if they would be willing to collect students' food scraps in a bucket prior to the day of the lesson (provide lid to prevent odor). This will be a science experiment that determines which types of items can decompose, so not all items need to be 'compostable.' You may also want to bring some of your own trash items or collect some waste from the cafeteria so that you are sure to have an assortment of items to experiment with.
- Schedule with the teacher to make sure the class can return in a month's time to view the results of the experiment! You can also bring the bucket to the classroom.
- Have a plan of where you want to leave your bucket of compost. Ideally it will be placed somewhere in the shade to avoid drying out!
- *Optional - Look for a fun book on decomposition/composting to read to the class. Reach out to your school's librarian to see what's available.

Activity Procedure:

Engage:

Have you ever seen food spoil or go bad? What did it look like? What do you think was happening to it?

Explore:

Take a look around the garden and see if there are any plants or leaves that look dead. Let students observe them and ask them what they think will/is happening to them? How is decay part of the cycle of life? While in the garden, let each student pick something natural off the ground (not off of a growing plant) to use in the experiment and then return to the tables for an explanation.

Explain:

Write the following underlined questions on your board and record student answers:

What is decomposition?

Follow up: *Decomposition is a magical process! It is also called rot. It is the result of billions of tiny invisible life forms such as bacteria and fungi as well as some larger decomposers like worms and other bugs that break down organic matter. These decomposers are often called the "FBI:" fungus, bacteria and invertebrates. The FBI helps to break down dead plants and animals into smaller particles called compost, by eating it! What would happen if we didn't have any decomposers? (Without decomposition, dead matter would cover the earth and we wouldn't have the necessary nutrients for new life to grow!)*

What is a prediction?

Follow up: *A guess of what will happen in the future based on observation, experience, or scientific reason.*

Define the remaining Vocabulary words.

Action: *Compost in a Bucket/Bag*

1. Place all of the student's items into the compost bucket. Make sure to add some items that will not decompose such as wrappers/packaging. Note: If you wish to get a weight so you can see the difference in before and after weights, first have students weigh themselves with an empty bucket and then subtract this from the weight of the bucket containing items.
2. Add a little bit of fresh soil and explain that one tablespoon of good garden soil has 1 billion bacteria in it!
3. Let students take turns spritzing the bucket with water.
4. Attach a lid to your bucket that will keep critters out but let some air in.
5. Place the bucket in a shady spot in your garden or shed.
6. Use masking tape and sharpie to date it.
7. If necessary, label it with the teacher's name or room number to distinguish it from other classroom's experiments.

Reflect:

What do you think will have changed in the bucket in a month? Raise your hand if you have a prediction you'd like to share with the class. What items do you think will not decompose - why? If they don't decompose in our experiment, do you think they will decompose in the environment?

Extension Activities:

- Ask students to do research on decomposers, pick their favorite decomposer, and then write and draw a cartoon strip of them hard at work in the compost pile.
- Go out to the garden or worm bins to observe decomposers.
- Have students fill out this [compost in cup worksheet](#)

- Classes can adopt a space in the garden and conduct a composting experiment to test if compost helps plants grow. Follow this guide: [What Good is Compost?](#)
- [Garbology Student Fact Sheet](#)
- [Spanish Lesson Plan](#)

One Cool Earth's Zero Waste Videos:

<http://www.onecoolearth.org/zero-waste.html>

A few other great videos:

<https://www.youtube.com/watch?v=dRXNo7Ieky8>

<https://www.youtube.com/watch?v=ufsbrz8IRgY>

https://www.youtube.com/watch?v=V8miLevRI_o