



Developed with Laura Beres, High School Teacher, Britestar Christian Virtual Education

Waste and its impact on the environment

Volume 27 | Gr. 2–8

Time: Initial lesson and assembly: 60 minutes; 8 weeks total for observation time



Standards

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

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Objective

Students will be able to explain the impact of different types of waste on the environment.

Materials list

- Now You See It, Now You Don't™ See-Through Compost Container ([SB47477](#))
- Soil [[KI01037\(P\)](#)]
- Rocks ([SB50622](#), [SB50623](#))
- Gravel/pebbles [[KI01049\(I\)](#)]
- Sand ([S09940](#))
- Gloves ([C20030](#), [C20031](#), [C20032](#))
- Safety glasses ([SB39510](#), [SB39512](#))
- Dried plant material
- Samples to place in landfills: Styrofoam, apple cores or bread, and small paper plates

Vocabulary

- **Organic waste:** Waste from organisms or their life processes that can easily be broken down
- **Inorganic waste:** Waste that does not contain organic compounds and cannot be easily broken down
- **Decompose:** To separate into components or elements
- **Full-loop life cycle:** A life cycle for a material that never comes to an end; for example, organic waste such as food scraps or grass clippings that are composted and turned back into soil
- **Linear life cycle:** A life cycle for a material that comes to an end; for example, things made from fossil fuels that will end in a landfill
- **Compost:** A mixture of decayed or decaying organic matter used to fertilize soil

Teacher notes

- Students should have already learned the scientific method (Question, Hypothesis, Observations, Data Analysis, Conclusion).
- As a control to the experiment, all three chambers should be filled with the same materials and layering. The only thing that should change is the sample material.
- Be sure that students use the same amounts of material to fill each chamber. You may also add 1–2 ounces of water to each chamber after all layers are in the chambers. Continue to add water to each chamber to keep the soil damp but not soaked over the weeks of observation.
- Soil or dirt from the environment is better than store-bought since it will already have some decomposers within it.
- The lesson can be done individually or in groups, and the observation period can be lengthened or shortened to fit unit or timing constraints.
- Safety glasses should be worn when pouring sand, dirt, or rocks in case of flying debris.
- Gloves should be worn when handling food samples during assembly and all samples when cleaning up.

Teacher prep

- Prepare a lab station for each group that includes a compost container, organic soil, gravel, sand, dried plant material, a Styrofoam cup, an apple core or piece of bread, a small paper plate, safety glasses, and gloves.
- Reproduce the “Waste and its impact on the environment” handout on pp. 3–4 for each student and place copies at the stations.
- Decide how many weeks you will run the experiment.



Instructions

1. Start by asking students to define “decomposition.” Record the answers from the group and then discuss.
2. Next, brainstorm decomposers in the environment and talk about why they are important.
3. Then, review the definitions in the Vocabulary section. Have students think of examples for organic and inorganic waste that they generate in their daily lives. Then, discuss the following questions:
 - What takes longer to break down — organic or inorganic waste? Why?
 - What happens to things thrown in the trash or recycling bin?
 - How do landfills impact the environment? (Leaching into water supplies, causing bad odors, taking up space that could be used for other things, etc.)
 - What can we do at home to limit the amount of waste that ends up in landfills? (Recycle, compost organic matter, reduce or reuse inorganic materials, etc.)
4. Clear up any of these misconceptions:
 - All things eventually decay or decompose.
 - Landfills don’t impact the environment.
 - Disposable means compostable.
5. Then, assign students to lab stations. Have them write down their guiding question and their hypothesis.
6. Next, have them assemble their composting chambers. Remind them to assemble each chamber with the same layers and amounts of soil. We recommend 2–3 inches of rocks and/or gravel for a foundation, 3–5 inches of sand to help with drainage, and 4–6 inches of soil with organic materials. If room allows, you can repeat these layers.
7. Avoid direct sunlight and make sure to water the compost pile to keep it moist (not soaking wet). Make sure gloves are worn when investigating if there are odors or signs of pests.
8. Have students write down their observations each week. At the end of the experiment, have them analyze the data and write down their conclusions. Discuss as a class.

Extensions

- Connect to food chains and food webs by talking about decomposers and their roles in the environment.
- Test how other factors impact decomposition, such as sunlight or darkness, the amount of water in the system, and the type of materials in the container.
- Have students create a poster, slideshow, or other end product to demonstrate their knowledge.



Waste and its impact on the environment

Name: _____ Period: _____ Date: _____

In this activity, you will assemble three different composting chambers to compare how materials decompose over time.

Pre-lab thinking

1. What items might decompose quickly?
2. Do decomposing things impact the environment? Why or why not?
3. What materials have a negative impact on the environment?

Guiding question

Hypothesis

Experiment

Follow the instructions from your teacher to assemble the composting chambers, placing a different waste item in each. **Assemble all three composting chambers with the same layers and amounts of organic material!**

Observations

Item 1: _____

First day:	Week 1:
Week 2:	Week 3:
Week 4:	Week 5:
Extra observations or week 6:	Extra observations or week 7:

Observations (continued)

Item 2: _____

First day:	Week 1:
Week 2:	Week 3:
Week 4:	Week 5:
Extra observations or week 6:	Extra observations or week 7:

Item 3: _____

First day:	Week 1:
Week 2:	Week 3:
Week 4:	Week 5:
Extra observations or week 6:	Extra observations or week 7:

Analyze the data

Can you accept or reject your hypothesis? Why? _____

Conclusion

What did you learn most from this experiment? Which items changed the most? Which items changed the least? Why do you think that happened? What was something that surprised you about the experiment? If you could do it again, what are three different items that you would test?
