

STEM in the lab

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EARTH DAY: Compost Bottle



GRADE LEVELS

This activity is appropriate for grades K-6.



MISSION

Create a reusable compost bottle out of a 2-liter plastic bottle.



VOCABULARY

REUSE: use more than once.

RECYCLE: convert waste into reusable material.

BIOENERGY: renewable energy produced by living organisms.

BIOMASS: the total mass of organisms in a given area of volume.

COMPOST: decayed organic material used as plant fertilizer.



MATERIALS

Teachers should provide:

- » 2-liter plastic bottle
- » Scissors
- » Soil, newspaper, leaves, or anything from your home or yard that can be composted
- » Something to stir compost
- » Spray bottle, hose or sprinkling can
- » Small towel
- » Observation journal

ABOUT THIS ACTIVITY

Have you ever built a purposeful project only using recycled materials from home? When gathering recycled materials, you may wonder what to build. In celebration of Earth Day, create a compost bottle out of a 2-liter plastic bottle. Composting is a way to reuse organic waste and allows nutrients to develop in soil. Building a compost bottle is a purposeful and reusable project in which you can record your observations weekly and then use the soil for a family garden or to plant flowers.



Idaho National Laboratory is the nation's leading laboratory for bioenergy feedstock research. An example of bioenergy feedstock is composting, which is a type of controlled storage for organic waste that can be used as raw material to make up energy. Other examples of bioenergy feedstock are corn stocks or wood chips. You will be doing an experiment with composting so that you can observe the idea of how biomass chemistry works as waste material breaks down.

INSTRUCTIONS

1. Collect a 2-liter plastic bottle. Rinse the bottle well and remove the label.
2. With adult supervision, cut off the top of your bottle.
3. Think about what type of organic materials you will want to place in your compost bottle when determining your compost bottle's size.
4. Collect soil, organic and raw materials (plant based or organic waste) to place in your compost bottle. Start with soil at the bottom of your compost bottle and alternate between soil and compostable material.



***What types of organic waste can you collect for your compost bottle?
Could you place any food items that were leftover from the day in your compost bottle?***

5. Think about food waste you have left over after eating breakfast, lunch or dinner.



What types of organic waste can you find in your backyard to place in your compost bottle?

6. Go on a scavenger hunt in your yard or a nearby park to collect plants or other organic materials.
7. Once your compost pile is full, pour some water into your bottle, so it can start composting. You do not want it to be damp with water nor sitting in too much. Water over time, and stir your compost each time you water. Place a towel over your compost bottle.
8. Watch your compost bottle over time. Collect notes and data. Write or draw pictures of your observations each week.



***How has your compost bottle changed over time?
What do you observe is happening to your organic waste?
Does your compost bottle look different in any way?
Over time, is there room for more or less organic materials to be added to your compost bottle?***

9. After collecting data and observations on your compost bottle, share your findings with a family member.
10. Use compost soil to plant a family garden or flowers in your yard, or to pot plants in your home.

THE SCIENCE BEHIND IT

Were you able to use your compost soil after a few weeks? You may have noticed the compost compacted down in your bottle overtime, allowing more space in your bottle for more organic materials. The compost soil compacted down over time because you added moisture to your soil and compostable material. Through your data and observations collected in your journal, you may have noticed how the moisture helped decay the organic materials. Decayed organic material helps improve your soil quality, which in return provides your plants with rich soil for growth.

EXTENSIONS

- » Older kids can alternate green matter and brown matter in their compost bottle and experiment with different levels of moisture on the rate of decomposition. Afterward, they can record their observations and data in their observation journals.
- » Watch educational, kid-friendly biochemistry videos and composting videos in relation to the compost bottle experiment.
- » Collect observations in an observation journal on how your compost soil is helping your garden, plants or flowers grow. Then share your findings with a family member.

RESOURCES

Educational videos on bioenergy, biomass, and composting:

- » Biomass at INL for 6th grade
<https://youtu.be/Mm8vPYtcAs0>
- » Bioenergy at INL for 6th grade
<https://youtu.be/FTSw2P2XkmA>
- » Composting for K-6th grade
<https://youtu.be/dRXNo7Ieky8>
- » Homemade Compost K-3rd grade
<https://youtu.be/kA3q07paNbE>



Composting for K-6th grade

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