

Compost Science Experiment

Decomposers and the cycling of matter, grades 6 to 8

Name _____ Class _____ Date _____

Background. When leaves, plants, and food scraps die, they don't pile up forever. **Decomposers**, such as bacteria and fungi, and **detritivores**, such as earthworms, pill bugs, and millipedes, eat the dead material and break it down. They use some of it for energy and release carbon dioxide and water, and they leave behind **compost**, rich in the nutrients plants need. This is how matter **cycles** in an ecosystem.

Compost needs **greens**, which are rich in nitrogen (vegetable scraps, fresh grass clippings, coffee grounds), and **browns**, which are rich in carbon (dry leaves, straw, shredded paper). A good mix is about 2 to 3 parts browns to 1 part greens, kept as damp as a wrung-out sponge.

Build a compost bottle

You need: a clear 2-liter bottle, scissors, garden soil, browns, greens chopped small, water, a thermometer, and a marker.

1. Cut the top off the bottle. **2.** Add 2 inches of soil, then 2 inches of browns, then 1 inch of greens. Repeat until the bottle is three-quarters full. **3.** Sprinkle with water until damp, not dripping. **4.** Cover with plastic wrap poked with small holes, and set it out of direct sun. **5.** Mark the top level with a marker. Stir or shake gently once a week.

Prediction

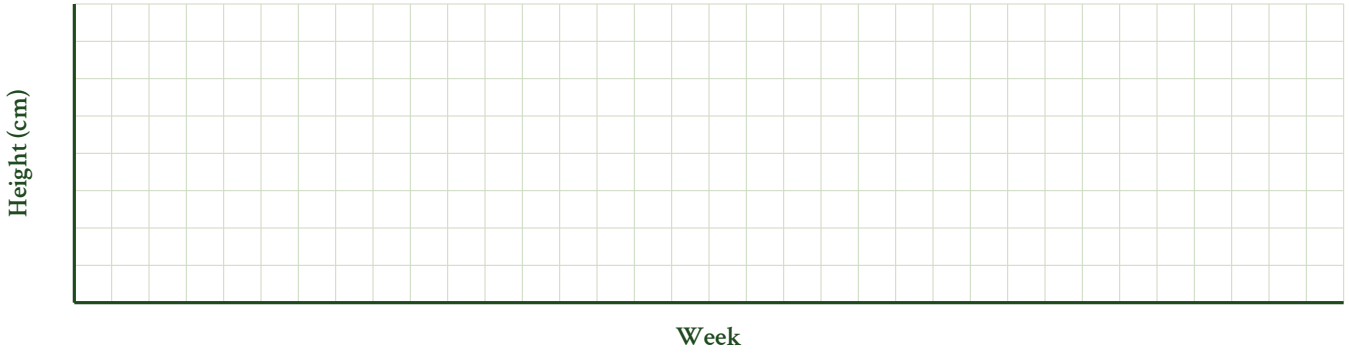
What do you think will happen to the level and the look of the layers in 4 weeks? _____

Data

Week	Temperature inside (°F)	Room temperature (°F)	Height of contents (cm)	What I see and smell
0				
1				
2				
3				
4				
5				
6				

Graph

Graph the height of the contents each week.



Conclusion

1. What happened to the height of the contents? Where did the missing matter go?

2. Which materials broke down fastest? Which were slowest? Why do you think so?

3. A classmate filled a bottle with only food scraps and kept it very wet. It turned slimy and smelled bad. What went wrong, and how would you fix it?

4. Number these in order to show how matter cycles in a garden: ___ a tomato plant grows with nutrients from the soil ___ the vines are added to the compost pile ___ worms and microbes break them down ___ compost is spread on the garden.

5. Gardener's question: why do gardeners add compost to their soil every year?

Compost Science Experiment: Teacher Page and Answer Key

Standard: NGSS MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

What to expect: the contents settle and shrink, often by a quarter to a half in 4 to 6 weeks. Soft greens (lettuce, fruit peels) break down first; woody stems, straw, and shiny paper are slowest. A small bottle warms only a few degrees above room temperature, much less than a big garden pile, which can reach 130 to 160°F. Water droplets form on the plastic, white threads of fungi may appear, and the smell should be earthy.

1. The level drops. Decomposers used the material for food and released much of its carbon as carbon dioxide gas and its hydrogen and oxygen as water; the rest became compost and nutrients in the soil. Matter was not destroyed; it changed form.

2. Soft, wet, chopped materials with a lot of nitrogen break down fastest, because microbes can reach and digest them easily. Woody, dry, or waxy materials are high in carbon and tough, so they are slowest.

3. Too many greens and too much water: the spaces filled with water, oxygen could not get in, and bacteria that live without oxygen took over and made bad smells. Fix it by mixing in browns, like dry leaves or shredded paper, and stirring to let air in.

4. 1, 2, 3, 4 (the plant grows, the vines go to the pile, decomposers break them down, compost returns the nutrients to the garden).

5. Compost feeds the soil with nutrients, holds water like a sponge, loosens heavy clay, and feeds earthworms and helpful soil life, so plants grow better.