

Notes for educators – Food waste emissions experiment

These notes accompany the Compost Processes Experiment sheet.

Compost ingredients are often called 'Browns' and 'Greens'.

Browns are things that are dry and full of carbon e.g. dead sticks, twigs, cardboard.

Greens are things that have moisture in them e.g. vegetable peelings, grass cuttings.

Another way to help you judge if an ingredient is brown or green is to imagine a pile in the corner of a warm room. After 6 months the browns will be the same, but the greens will be rotted, smelly and sludgy.



Notes on the method

It is important that pupils consider what they expect to happen, observe regularly and record findings to compare with their ideas/hypotheses.

Increasing the surface area of the ingredients allows decomposition processes to happen in a shorter time.

The browns are rich in carbon and the greens are rich in nitrogen. Composting organisms need to feed on both. It's their balanced diet.

Put the lid and date on the bottle. Adding a lid tightly prevents the movement of air in and out of the bottle. This means that there is a limited supply of oxygen in the bottle. *Aerobic* bacteria need oxygen. *Anaerobic* bacteria can survive without it. Once the available oxygen has been used up, the anaerobic bacteria take over.

- Aerobic bacteria consume the compost materials and excrete carbon dioxide as well as making nutrients such as nitrogen, phosphorous and magnesium available for plants to take up.
- Anaerobic bacteria are not as efficient as aerobic bacteria at consuming compost materials. They excrete methane and can create conditions that are harmful for plants. Methane is more powerful than carbon dioxide as a greenhouse gas and is smelly. We want to encourage aerobic bacteria.

Draw a line around the bottle to show the top of the ingredients. This will help you to observe changes in the volume of the materials. In a week or so, you should see them shrink away from the line. No material has been removed. Invite pupils to conjecture on what is happening. As the large pieces are consumed, they occupy a smaller space so there is less air space between them. Less air space may encourage anaerobic bacteria, which we want to avoid. Twigs are helpful in creating air pockets, or you can gently shake the bottle to create air pockets.

Invite ideas on how pupils can 'observe' the release of carbon dioxide and/or methane. Both are colourless gases. If you have put the lid on tightly, gas produced in the bottle will not be able to escape and the air pressure inside the bottle will increase. It is possible to observe this internal pressure by gently squeezing the bottle feeling the increased resistance, pushing back on the walls of the bottle. You may hear a hiss of the gas escaping as you open the lid. If the process has become anaerobic, there will be a smell of methane when it is opened.

Dispose of your experiment materials sustainably e.g. clean and recycle the bottle, add the compost to soil outside. You can develop learning through microscopy of soil organisms. Making and using good quality compost is an excellent way to increase life and carbon in the soil.