Greenhouse gases and temperature experiment

Overview

This experiment is great for highlighting the effects that greenhouse gases (mainly carbon dioxide) have on our planet. The inside of the bottle represents planet Earth, and the bottle represents our atmosphere, trapping the greenhouse gas and increasing the temperature inside the bottle. Before performing the experiment, it would be beneficial for the students to have some prior knowledge of how greenhouse gases are produced, both naturally and man made e.g. breathing, and from car exhausts. So that they can understand that our actions, affect the size of our carbon footprint.

Resources: Bicarbonate of soda, 2 x 2L Plastic Bottles, 2 x Glass Thermometers, Blu tack, 800ml White Vinegar, 2 x Balloons.

Instructions:

Step 1 – Pour 400ml of white vinegar into each plastic bottle.
Step 2 – Using the blue tack stick each thermometer to the inside of each bottle neck, so that the thermometers are fully inside each bottle.
Step 3 – Take one balloon and stick it over bottle no. 1, placing it on a windowsill. This is your control experiment. Take the recording of the temperature.
Step 4 – Bottle no. 2 is your actual experiment and represents our planet. Tip some bicarbonate of soda into the balloon (it's a little bit messy so you might want to do it over a sink). Stick it over the bottle top, but do not tip the bicarbonate of soda into the bottle yet.
Step 5 – Place bottle no.2 on the windowsill next to the control experiment and tip the bicarbonate of soda into the vinegar to create carbon dioxide (tip: if you have put a lot of bicarbonate of soda in your balloon, it might shoot off once it is mixed with the vinegar, so hold onto the neck tight or use an elastic band to secure it). Take a temperature reading now and then from both experiments every few hours.

Extension:

- What do you notice about the temperature differences between each?
- Could you extend the experiment, for days, or weeks with temperature checks?
- Record your answers into the form of a bar or line graph to accurately display how they differ.
- What impact is this temperature change having on our planet?
- How can we effectively reduce our carbon emissions, both individually and collectively?