

Investigation 7 Do-it-yourself acid rain

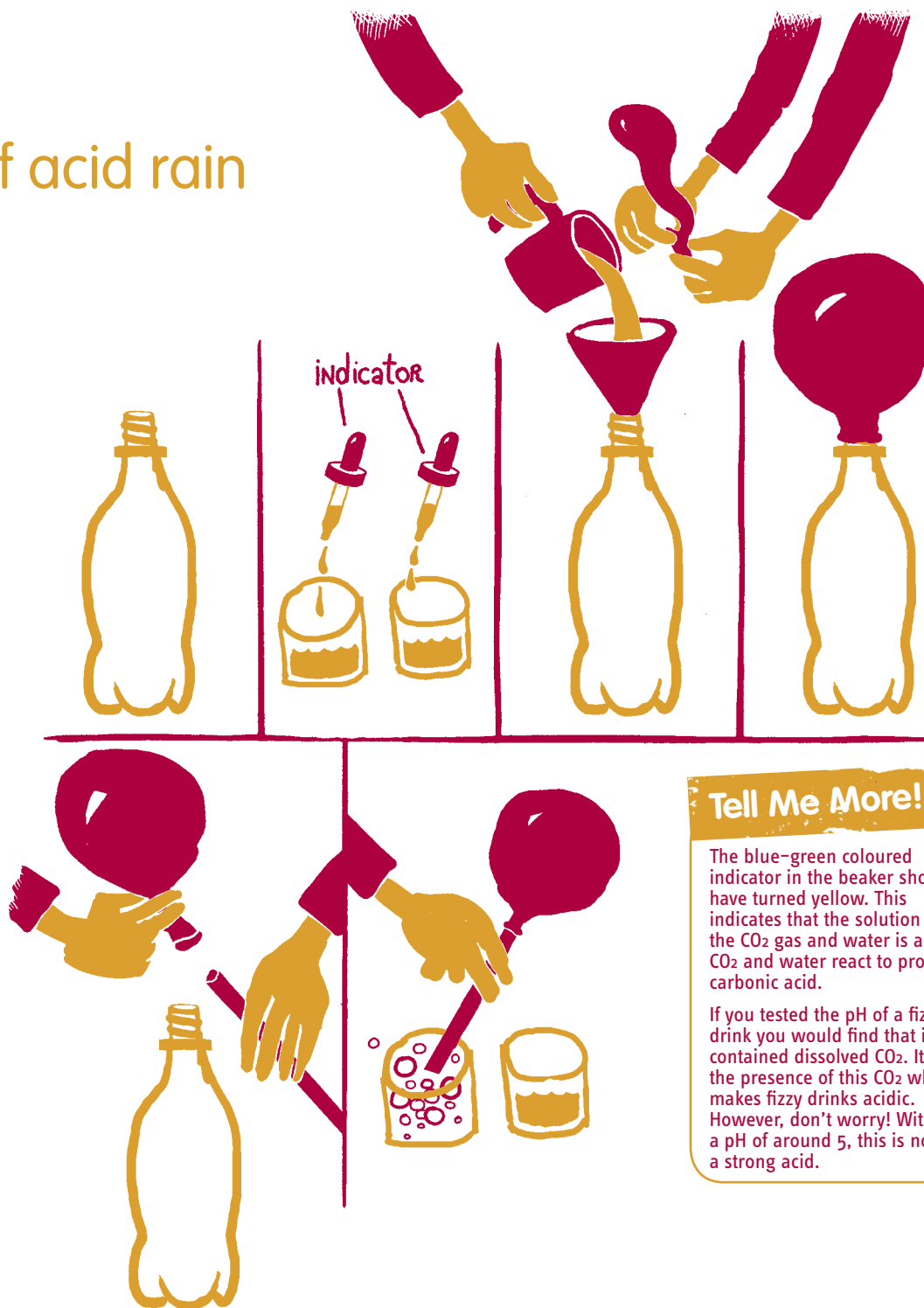
When we burn fossil fuels they release CO₂ gas. But some fossil fuels, when ignited, also release sulphur dioxide gas. This sulphur dioxide gas can, as it rises, combine with water vapour in clouds to produce a weak sulphuric acid.

This acid can reduce the pH of rain to as low as pH 3, which is an acid level very close to that of vinegar. This is why we refer to the rain contaminated with sulphur dioxide as acid rain.

This investigation shows you how to create acid rain.

YOU WILL NEED Any clean plastic (one litre) bottle • A balloon • A straw • Baking powder • Half a cup of vinegar • 300ml of water • A spoon • A funnel • Two 150ml beakers • Bromothymol blue indicator solution (This can be made from a small amount (spatula tip or an amount the size of a small peppercorn) of the bromothymol blue sodium salt in 10ml of water) • A dropper •

- Put about eight teaspoons of baking powder into the bottle.
- Set up two beakers with 25 ml of water and add some indicator to them (about a full medicine dropper). The water should turn a blue-green colour.
- One student should, using the funnel, pour the vinegar into the bottle.
- Another student should prepare the opening of the balloon to place it over the top of the bottle as soon as the vinegar is poured in, taking care to trap as much gas as possible.
- The carbon dioxide formed in the reaction between the vinegar and the baking soda should inflate the balloon.
- Pinch or twist the neck of the balloon to stop the gas from escaping and take the balloon off the bottle.
- Place the open end of balloon, making sure to keep the neck of the balloon pinched, around one end of a straw.
- Place the other end of the straw in the water in one of the beakers.
- SLOWLY release the pinch or twist that is holding the gas in the balloon, allowing it to bubble into the water and compare the colour to the second beaker.



Tell Me More!

The blue-green coloured indicator in the beaker should have turned yellow. This indicates that the solution of the CO₂ gas and water is acidic. CO₂ and water react to produce carbonic acid.

If you tested the pH of a fizzy drink you would find that it contained dissolved CO₂. It is the presence of this CO₂ which makes fizzy drinks acidic. However, don't worry! With a pH of around 5, this is not a strong acid.