Mini Explosions

About CHaOS

Cambridge Hands-On Science -CHaOS for short - is a volunteer led group from the University of Cambridge.

We believe that science is fun and relevant to everyone! CHaOS take our wide range of hands-on science experiments & enthusiastic student demonstrators to venues across the country!

We always love to hear what you think of our experiments - so to get in touch, find even more experiments, and see more of what we do, visit our website!



CHaOs@Home Experiment Files

www.chaosscience.org.uk

Disclaimer

This experiments should only be carried out **under supervision of a responsible adult** Teachers should perform a risk assessment before use I'm Boris Bones, the friendly CHaOS skeleton. I'm going to guide you through this experiment!



Today, we'll be exploring gases! What do you already know about gases? Can you name any?

YOU'LL NEED

Lemon juice, Bicarbonate of soda, Film canisters, clear container with a hinged lid, spoons Make an impressive explosion with kitchen ingredients & find out more about what makes things go bang!



SAFETY

Lemon juice and bicarbonate **may irritate eyes or broken skin.** In case of contact, **wash with plenty of water**. Consider using a **closed box** for the explosions, or using **safety goggles** so that the juice can't get in your eyes. Be careful of **spills - wipe them up** straight away to avoid **slippages**.



Put a teaspoon of lemon juice inside the film canister.

With a different spoon, add a teaspoon of bicarbonate of soda. What can you see happening? Is it a solid, liquid or gas being produced?

Write down what you think would happen if you put a lid on. This is called your hypothesis.

What

pushes the lid off of the canister?

TOP TIP Keep a finger on the lid to stop it coming off while you are putting it into the container.

Step 3

Rinse out the canister with some water, and add another teaspoon of lemon juice.

Very carefully, press half a teaspoon of bicarb into the inside of the canister lid. Use dry fingers or a spoon to press it in place, so it won't fall out.

Open the lid of your clear container, and get ready - you need to be quick here!

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Put the lid on the film canister firmly, then flip it over and place in the clear container, closing the lid.

Explanation

Lemon juice contains an acid called citric acid. When acids react with other chemicals, they can produce gases. The bicarbonate of soda contains carbon and oxygen that are released by the reaction in the form of carbon dioxide. Gases like to expand and take up much more room than liquids or solids, but when the lid is on the canister the carbon dioxide is trapped inside. At first, the friction on the lid of canister holds it in place. Eventually the force of all the carbon dioxide particles pushing on the inside overcomes friction and pushes the lid off. The force from the gas is known as pressure - explosions create high pressures by rapidly releasing energy. Now the built-up gas escapes and pushes the canister into the air like a rocket. The gas produced in this experiment is Carbon Dioxide (CO₂). Can you name any other gases?

Keep Thinking! Limestone is a rock sometimes used to build buildings. It contains calcium carbonate, which is like bicarbonate of soda but has a calcium in place of the sodium. If rain is a bit acidic, it damages the limestone by reacting with the carbonate just like the lemon juice.

Fun fact!

Citric acid is found naturally in many fruits and can make up to 8% of the weight of lemons and limes. More than 2 million tons is produced every year to be added to food and drink to control how acidic it is.

Want more?

Check out more experiments with household acids! Try "Cleaning Coppers" or "Red Cabbage".



