



## Science on the Shelves Project

### 'It's a Gas!' Activity Sheet

In this activity, you can:

- learn how to make your own fizzy drinks,
- learn how to make sherbet,
- discover the easy way to inflate a balloon and
- blow your top by making a rocket.

Please follow any **safety instructions highlighted like this in red.**

#### How to make fizzy drinks

It's easy to make your own special Fizz Powder which, when added to drinks, makes them fizzy. You will need:

- citric acid crystals,
- bicarbonate of soda,
- icing sugar.

Note that **the citric acid crystals must be food grade**, which you can find in the baking section of your supermarket, or get from chemists and home-brew suppliers. To make some fizz powder, here's what you need to do:

1. Add 6 teaspoons of citric acid crystals to 3 tablespoons of bicarbonate of soda in a bowl.
2. Crush the mixture with a spoon to form a fine powder.
3. Now add 2 tablespoons of icing sugar, mix thoroughly and put into a dry jar labelled *FIZZ POWDER*.
4. To use the powder, put 2 teaspoons into a glass and fill it up with the still drink of your choice.

#### How does the fizz powder work? – the science bit

The citric acid reacts with the carbonate in bicarbonate of soda to form carbon dioxide gas. These bubbles of carbon dioxide are what make your drink fizzy. You can find out more about carbonates in our Eggsperiments activity.

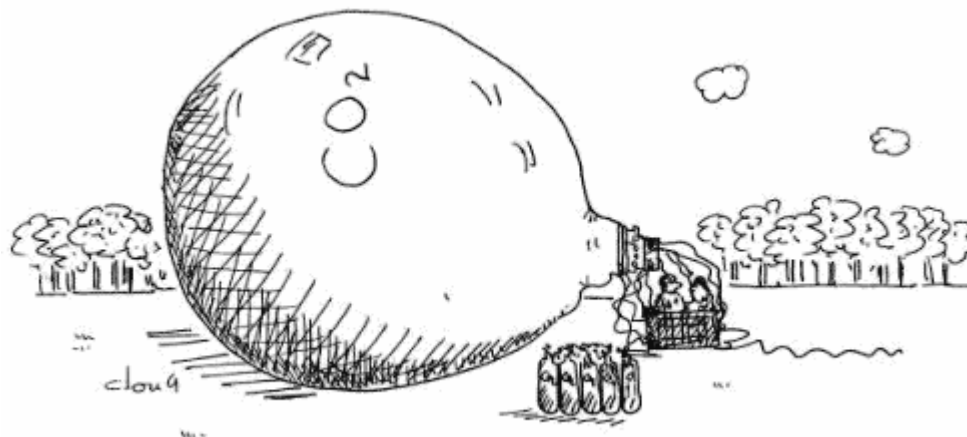
#### Why not test the acidity of different drinks? – further investigations

Add a teaspoon of bicarbonate of soda to half a glass of a drink (for example, grapefruit juice) and half a glass of a different drink (for example, orange squash). Whichever drink fizzes most is the more acidic!

## How to make sherbet

Using the same ingredients as the fizz powder you can also make sherbet! Simply follow steps 1 and 2 above for the fizz powder, but then add 4 tablespoons of icing sugar instead. When you put the sherbet on your tongue, the citric acid crystals dissolve and react with the bicarbonate of soda. This produces bubbles of carbon dioxide gas, which cause the fizzy feeling on your tongue.

## The easy way to inflate a balloon – without blowing!



***"I know it's cheap, plentiful and non-flammable  
but there's a drawback with this gas..."***

Yes, you can inflate a balloon without blowing into it yourself! You will need:

- vinegar,
- baking soda,
- a bottle,
- a balloon.

Here's what to do:

1. Pour about 20 ml of vinegar into the bottle.
2. Put 2 teaspoons of baking soda into the balloon.
3. Attach the balloon around the neck of the bottle, taking care not to let any baking soda fall into the bottle (you may need some sticky tape to secure the balloon).
4. Once the balloon is securely fastened to the bottle, lift the balloon so that the baking soda is tipped into the bottle. Sit back and watch the balloon inflate!

## What makes the balloon inflate? – the science bit

When you tip the baking soda out of the balloon into the bottle, it mixes with the vinegar and a chemical reaction produces carbon dioxide gas. As the gas can't escape, the balloon inflates.



### **Why is the top blown off? – the science bit**

When the citric acid crystals and baking soda dissolve in the water they react with one another producing carbon dioxide gas. The pressure builds up inside the film container until the point at which it can force the lid off. The lid then blows off and the pressure is released.

### **Can you control the explosion? – further investigations**

You can time how long it takes for the lid to come off and experiment with quantities, mixing and so forth, until you can get the lid to come off after exactly one minute, say.

*This activity was used by us for Science Week 2003, the BAYSday 'Hands-on Science' event held at Imperial College, London in March 2003 and the British Association Festival of Science at Salford in September 2003.*