

Vinegar and Bicarbonate Balloons

About this Activity

Hello year 5 & 6! I thought you might enjoy a practical science activity to try out at home. Please follow the instructions carefully and make sure that you get permission from an adult – don't waste any food products!

This is an example of an irreversible chemical reaction (one that can't be undone) since a new product is made and the original substances can't be remade. The reactants are vinegar (also known as acetic acid), which is a liquid, and sodium bicarbonate (also known as sodium hydrogencarbonate), which is a solid. The main product seen via the balloon inflating is carbon dioxide gas.

For Parents: Why do this?

The standard vinegar and sodium bicarbonate practical activity always generates enthusiasm and interest, but can get very messy when carried out in open containers! This practical offers a safe, controlled and clean method for children to enjoy this reaction, whilst clearly being able to observe/identify the reactants and products. This activity links to our Year 5 topic – Properties and Changes of Materials, as well as consolidating understanding from KS2 and introducing Chemistry topics of Solids, Liquids and Gases that children will encounter in KS3.

Miss Johnston

Safety notes

- Ensure children do not taste or eat any of the food.
- Children should stand to carry out this activity. This ensures that children can step away easily if there is a spill and limits the amount of vinegar on clothing.
- There will be an increase in pressure inside the balloon at the end of the activity. Adults should help children remove the balloon when clearing away to minimise any vinegar/bicarbonate spray.

Equipment & Materials

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| • 1 empty small plastic bottle
(<i>Fruit shoot</i> /small water bottle size is ideal) | • Vinegar |
| • 1 balloon | • Bicarbonate of soda (available from supermarkets) |
| • 1 dry plastic funnel | • Small plastic spoon/spatula |

Method

1. Place 1-2 teaspoons of white bicarbonate of soda powder into a new balloon. The best way to do this is to insert the end of a dry plastic funnel into the balloon and carefully add the bicarbonate. Shake to ensure it goes into the balloon.
2. Remove the funnel and place the balloon on the table.
3. Place the funnel in the empty plastic bottle and fill the bottle with vinegar to a depth of 2-3 cm.
4. Remove the funnel and place to one side
5. Carefully fix the balloon to the top of the plastic bottle. Be careful not to position the balloon upright.
6. Place the bottle on a table and tip the bicarbonate into the vinegar by lifting the balloon upright.
7. Watch carefully what happens.

1.



3.



6.

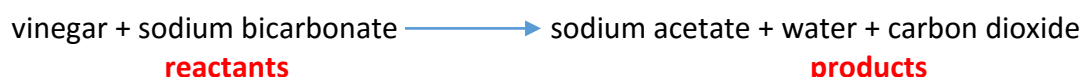


A video demonstration of the reaction can be seen here:

<https://www.youtube.com/watch?v=nRMyMIy7U6E>

Expected Observations and Results

As the reaction between the vinegar and sodium bicarbonate takes place, you will see a frothy product slowly rise up the bottle and the balloon will begin to inflate. It will continue to inflate until the reaction slows down and stops. Here's an explanation of the reaction:



Before the reaction, the reactants (vinegar & sodium bicarbonate) are separate substances. One is a solid (in powder form) and the other is a liquid. When they are mixed, a reaction takes place. The bubbles and fizzing are evidence of this. After the reaction, new substances have formed (the products). The liquid in the bottle is a mixture of sodium acetate and water, while the gas in the balloon is carbon dioxide.

Possible Further Activities

Once the you have seen and understood the reaction, there are a variety of enquiries you could undertake, including:

- Does the balloon blow up twice as big with double the amount of bicarbonate
- Does the balloon float or sink in air?
- What happens if you use lemon juice instead of vinegar?