

# **Bicarbonate of Soda & Vinegar Volcano**

Use bicarbonate of soda and vinegar to create an awesome chemical reaction! Watch as it rapidly fizzes over the container and make sure you've got some towels ready to clean up.

## **What you'll need:**

- Bicarbonate of soda (make sure it's not baking powder)
- Vinegar
- A container to hold everything and avoid a big mess!
- Paper towels or a cloth (just in case)

## **Instructions:**

1. Place some of the bicarbonate of soda into your container.
2. Pour in some of the vinegar
3. Watch as the reaction takes place!

## **What's happening?**

The bicarbonate of soda (sodium bicarbonate) is a base while the vinegar (acetic acid) is an acid. When they react together they form carbonic acid which is very unstable, it instantly breaks apart into water and carbon dioxide, which creates all the fizzing as it escapes the solution.

For extra effect you can make a realistic looking volcano. It takes some craft skills but it will make your vinegar and baking soda eruptions will look even more impressive!

# Make a Tornado in a Bottle

Using easy to find items such as dish washing liquid, water, glitter and a bottle you can make your own mini tornado that's a lot safer than one you might see on the weather channel. Follow the instructions and enjoy the cool water vortex you create!

## What you'll need:

- Water
- A clear plastic bottle with a cap (that won't leak)
- Glitter
- Dish washing liquid

## Instructions:

1. Fill the plastic bottle with water until it reaches around three quarters full.
2. Add a few drops of dish washing liquid.
3. Sprinkle in a few pinches of glitter (this will make your tornado easier to see).
4. Put the cap on tightly.
5. Turn the bottle upside down and hold it by the neck. Quickly spin the bottle in a circular motion for a few seconds, stop and look inside to see if you can see a mini tornado forming in the water. You might need to try it a few times before you get it working properly.

## What's happening?

Spinning the bottle in a circular motion creates a water vortex that looks like a mini tornado. The water is rapidly spinning around the centre of the vortex due to centripetal force (an inward force directing an object or fluid such as water towards the centre of its circular path). Vortexes found in nature include tornadoes, hurricanes and waterspouts (a tornado that forms over water).

# Make an Easy Lava Lamp

Use simple household items such as vegetable oil, food colouring, Alka-Seltzer and a bottle to create chemical reactions and funky balls of color that move around like a real lava lamp.

## What you'll need:

- Water
- A clear plastic bottle
- Vegetable oil
- Food colouring
- Alka-Seltzer (or other tablets that fizz)

## Instructions:

1. Pour water into the plastic bottle until it is around one quarter full (you might want to use a funnel when filling the bottle so you don't spill anything).
2. Pour in vegetable oil until the bottle is nearly full.
3. Wait until the oil and water have separated.
4. Add around a dozen drops of food colouring to the bottle (choose any colour you like).
5. Watch as the food colouring falls through the oil and mixes with the water.
6. Cut an Alka-Seltzer tablet into smaller pieces (around 5 or 6) and drop one of them into the bottle, things should start getting a little crazy, just like a real lava lamp!
7. When the bubbling stops, add another piece of Alka-Seltzer and enjoy the show!

## What's happening?

If you've tried the [oil and water experiment](#) you'll know that the two don't mix very well. The oil and water you added to the bottle separate from each other, with oil on top because it has a lower density than water. The food colouring falls through the oil and mixes with the water at the bottom. The piece of Alka-Seltzer tablet you drop in after releases small bubbles of carbon dioxide gas that rise to the top and take some of the coloured water along for the ride. The gas escapes when it reaches the top and the coloured water falls back down. The reason Alka-Seltzer fizzes in such a way is because it contains citric acid and bicarbonate of soda (sodium bicarbonate), the two react with water to form sodium

citrate and carbon dioxide gas (those are the bubbles that carry the coloured water to the top of the bottle).

Adding more Alka-Seltzer to the bottle keeps the reaction going so you can enjoy your funky lava lamp for longer. If you want to show someone later you can simply screw on a bottle cap and add more Alka-Seltzer when you need to. When you've finished all your Alka-Seltzer, you can take the experiment a step further by tightly screwing on a bottle cap and tipping the bottle back and forth, what happens then?

# Mixing Oil and Water

Some things just don't get along well with each other. Take oil and water as an example, you can mix them together and shake as hard as you like but they'll never become friends.....or will they? Take this fun experiment a step further and find out how bringing oil and water together can help you do your dishes.

## What you'll need:

- Small soft drink bottle
- Water
- Food colouring
- 2 tablespoons of cooking oil
- Dish washing liquid or detergent

## Instructions:

1. Add a few drops of food colouring to the water.
2. Pour about 2 tablespoons of the coloured water along with the 2 tablespoons of cooking oil into the small soft drink bottle.
3. Screw the lid on tight and shake the bottle as hard as you can.
4. Put the bottle back down and have a look, it may have seemed as though the liquids were mixing together but the oil will float back to the top.

## What's happening?

While water often mixes with other liquids to form solutions, oil and water does not. Water molecules are strongly attracted to each other, this is the same for oil, because they are more attracted to their own molecules they just don't mix together. They separate and the oil floats above the water because it has a lower density.

If you really think oil and water belong together then try adding some dish washing liquid or detergent. Detergent is attracted to both water and oil helping them all join together and form something called an emulsion. This is extra handy when washing those greasy dishes, the detergent takes the oil and grime off the plates and into the water, yay!

# Blowing Up Balloons With CO<sub>2</sub>

Chemical reactions make for some great experiments. Make use of the carbon dioxide given off by a bicarbonate of soda and lemon juice reaction by funnelling the gas through a soft drink bottle and in to your awaiting balloon!

## What you'll need:

- Balloon
- About 40 ml of water (a cup is about 250 ml so you don't need much)
- Soft drink bottle
- Drinking straw
- Juice from a lemon
- 1 teaspoon of baking soda

## Instructions:

1. Before you begin, make sure that you stretch out the balloon to make it as easy as possible to inflate.
2. Pour the 40 ml of water into the soft drink bottle.
3. Add the teaspoon of baking soda and stir it around with the straw until it has dissolved.
4. Pour the lemon juice in and quickly put the stretched balloon over the mouth of the bottle.

## What's happening?

If all goes well then your balloon should inflate! Adding the lemon juice to the bicarbonate of soda creates a chemical reaction. The bicarbonate of soda is a base, while the lemon juice is an acid, when the two combine they create carbon dioxide (CO<sub>2</sub>). The gas rises up and escapes through the soft drink bottle, it doesn't however escape the balloon, pushing it outwards and blowing it up. If you don't have any lemons then you can substitute the lemon juice for vi negar.