DIET COKE AND MENTOS ERUPTION

You will need:

- Large bottle of Diet Coke
- About half a pack of Mentos
- Funnel or tube

Instructions:

1. Make sure you are doing this experiment in a place where you won't get in trouble for getting Diet Coke everywhere. Outside on some grass is perfect, please don't try this one in your family lounge!!
2. Stand the Diet Coke upright and unscrew the lid. Put some sort of funnel or tube on top of it so you can drop the Mentos in at the same time (about half the pack is a good amount).
3. Time for the fun part, drop the Mentos into the Diet Coke and run like mad! If you've done it properly a huge geyser of Diet Coke should come flying out of the bottle, it's a very impressive sight. The record is about 9 metres (29 feet) high!

Why does this happen?

Although there are a few different theories around about how this experiment works, the most favoured reason is because of the combination of carbon dioxide in the Diet Coke and the little dimples found on Mentos candy pieces.

The thing that makes soda drinks bubbly is the carbon dioxide that is pumped in when they bottle the drink at the factory. It doesn't get released from the liquid until you pour it into a glass and drink it, some also gets released when you open the lid (more if you shake it up beforehand). This means that there is a whole lot of carbon dioxide gas just waiting to escape the liquid in the form of bubbles.

Dropping something into the Diet Coke speeds up this process by both breaking the surface tension of the liquid and also allowing bubbles to form on the surface area of the Mentos. Mentos candy pieces are covered in tiny dimples (a bit like a golf ball), which dramatically increases the surface area and allows a huge amount of bubbles to form.

The experiment works better with Diet Coke than other sodas due to its slightly different ingredients and the fact that it isn't so sticky. I also found that Diet Coke that had been bottled more recently worked better than older bottles that might have lost some of their fizz sitting on shop shelves for too long, just check the bottle for the date.

ORANGE FIZZ

You will need:

- An orange or clementine
- ½ teaspoon baking soda

Instructions:

1. Cut the orange into slices or peel separate into sections
2. Dip a slice or section into the baking soda
3. Take a bite! As you chew, it should start to bubble in your mouth

Why does this happen?

When acids and bases mix, you get some exciting chemistry! Oranges and other citrus fruits are filled with citric acid. It is safe acid, and it's what gives oranges, lemons and limes their sourness. Baking soda is a base, the opposite of an acid. It's also safe, but doesn't taste very good on its own, and will give you stomach ache if you eat a lot of it. As the citric acid and baking soda mix, it makes millions of carbon dioxide bubbles, the same gas you breathe out, and the same one that makes soda so fizzy.

SNOW FLUFF

You will need:

- 1 cup corn starch
- 1 cup shaving cream
- Food colouring

Instructions:

1. Pour the cup of corn starch into a large bowl. Use a spoon to scoop the shaving cream on top of it. Put 5-10 drops of food colouring on top. Stir to mix.
2. When the mixture looks like grated cheese, use your hands to squish the mixture even more.
3. Pretty soon the shaving cream and corn starch will form a ball, about the same texture as dough.
4. If your mixture is really wet and sticky after mixing, it needs a little more corn starch. If it won't stick together and falls into pieces, add a little more shaving cream.
5. That's it! Try sculpting snow angels, snowmen, or make a tiny snow fort!

Why does this happen?

The tiny pieces of corn starch get mixed into the shaving cream and suspended in the mixture. Shaving cream is mad of tiny tiny bubbles, and the surface tension on the surface of the bubbles helps 'float' the corn starch particles when the two mix.

SUN DIAL

You will need:

- Straight stick about two feet long
- Small rocks
- A watch
- Chalk (optional)
- Sand (optional)
- Bucket (optional)

Instructions:

1. Find a sunny spot and push the stick vertically straight into the grass or earth. If your backyard doesn't have any grass or earth, fill a small bucket with sand and place your stick into the bucket.
2. Start in the morning when the sun is up. At 7:00 am use a small rock or seashell to mark where the shadow of your stick falls. Come back at 8:00am, 9:00am, 10:00am, and so on until there is no more daylight in the day. You may want to mark your pebbles with the time they were placed using chalk.

3. By the end of the day your sundial will be complete.

Why does this happen?

The sun's light will make your long stick cast a shadow. The shadow will change its angle depending how the sun's light is hitting the stick because our Earth is constantly rotating and revolving around the sun.

1. Measure how long the shadow that is casted by the stick is. Measure it in winter and spring. Are the measurements different? Which season has the longer shadow?
2. Make a second sun dial after we reset our clocks each year. How are the two sundials similar? How are they different?