RAINBOW MAGIC

You will need:

- Kitchen roll
- Felt tip pens
- Two bowls of water
- Paper clip/bull dog clip
- thread

Instructions:

1. Cut the kitchen roll into the shape of a rainbow.

2. Attach the bull dog clip to the top of the rainbow and attach thread to this (optional but makes it easier to hold).

3. Colour a rainbow with felt tip pens from the bottom of both of the ends of the rainbow up about 2-3cm.

4. Hold the rainbow over the water with the ends slightly in the water and watch the colours travel up your rainbow.

Why does this happen?

The ink from the coloured pens travels up the paper towel because of capillary action. Capillary action is the ability of a liquid to flow up-wards against gravity (the force that pulls towards the centre of the Earth). This is the same thing that helps water travel from the roots to the leaves in trees. The kitchen paper is made up of fibres (called cellulose) which form lots of little holes. Water likes to stick to other things (adhesion_ and the rest of the water also travels through because it likes to stick together (cohesion). As it goes, it sticks to the colours and takes that too. Eventually, this process will stop because the water will be overcome by the gravitational forces.

MAGIC ARROW

You will need:

- A large glass of water
- A sheet of paper

Instructions:

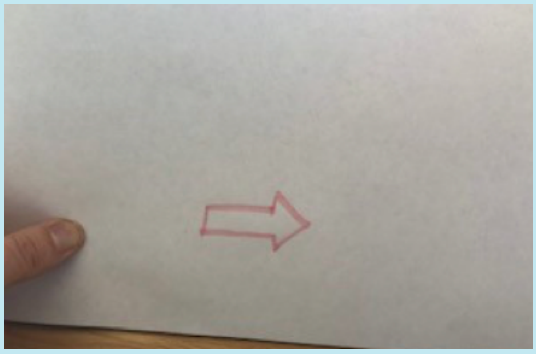
1. Draw an arrow onto a sheet of paper.
2. Place the arrow behind the glass of water.
3. You should notice that the arrows flips and now points in the opposite direction.

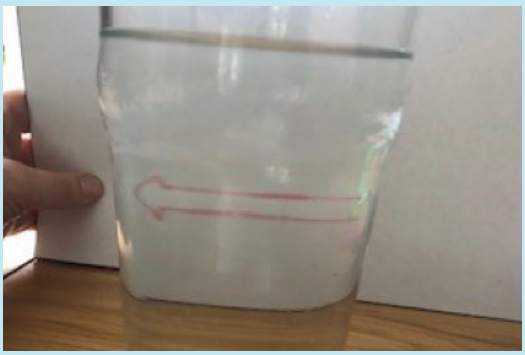
Why does this happen?

The arrow looks like it has changed direction or bent because of something called refraction. Refraction happens when light passes through one transparent (clear) thing into another. In this case, from the air through the glass, through the water, back through the glass and then back through the air hitting the arrow. This has caused the light to bend and made the arrow look like it has been reversed.

Why not try these...

Try using different shaped glasses.
Try moving the distance from the glass to the arrow.
Try changing the direction of the arrow.





PLASTIC MILK

You will need:

- 1 cup of milk
- 4 tbsp. vinegar
- Sieve

Instructions:

1. Take 1 cup of milk and warm it in the microwave for about 1 minute 30 seconds. Don't let it boil.

2. Next, stir inn 4 tablespoons of vinegar.

3. The milk will start to clump. Stir for about 1 minute.

4. Strain the milk through a sieve. All the clumps will stay in the top – really push them to get all the liquid out.

5. Transfer the solid bits to some paper towels and press all the liquid out of the lumps. You can then shape it and even add colour!

Why does this happen?

This plastic like substance that you are left with occurs from a chemical reaction between the milk and vinegar. Normally, the protein molecules (casein) in the milk are folded up. When the casein comes into contact with the vinegar (an acid), the casein and the vinegar don't mix together. The casein molecules unfold and rearrange into long chains called acid casein. This is insoluble in water and comes out as a solid (precipitates).

VOLCANO LEMON

You will need:

- Lemons
- Baking soda
- Food colouring (optional)
- Washing up liquid

Instructions:

1. Place half a lemon onto a plate. Squeeze the juice from the other half into a bowl and keep aside.
2. Using a knife (adult help needed) poke holes in the sections of the lemon.
3. Place drops of food colouring on top of the sections of the lemon.
4. Add washing up liquid all over the top of the lemon.
5. Sprinkle a generous amount of baking soda over the lemon and press it into the sections.
6. Watch your lemon volcano erupt!

Why does this happen?

The lemon contains an acid (citric acid) this reacts with the baking soda creating a gas called carbon dioxide. The washing up liquid add bubbles and foam to this.

Why not try using different citrus fruit...