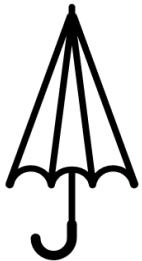


What's the weather

Science activities to try at home



Tornado in a bottle

What you need

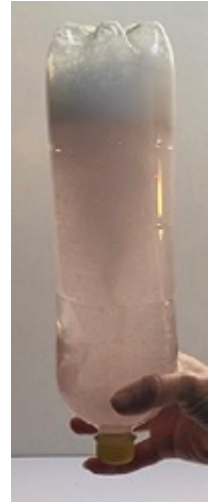
- One plastic bottle with lid
- Water
- Glitter or food colouring
- Washing up liquid



Tornado in a bottle

What to do?

- Pour water into bottle leave about 6cm of air at the top.
- Add two squirts of washing up liquid.
- Add some glitter or food colouring.
- Put the lid on and screw as tight as possible on to the bottle. The tornado will not work well unless the bottle is completely airtight.
- **Spin the bottle.** Hold the bottle at bottom and make circular movement with your hand so that the water begins to swirl around inside the centre of your bottle. This is a mini tornado.



The Science

A tornado in a bottle is generated by the spinning water. The water is responding to a force called centrifugal force. Here the water spins around forming a whirlpool, the centre of which is the 'vortex' which in this case is in the middle of the bottle.

Rain in a bottle

What you need

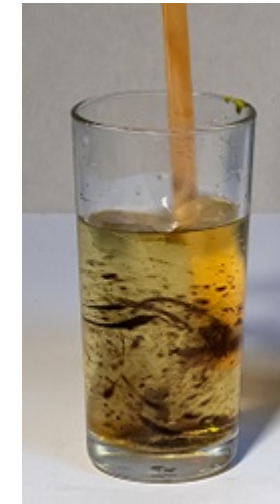
- Oil
- Selection of food colouring
- 2x Glass's of different sizes
- Spoon
- Water
- Dropper or small paint brush



Rain in a bottle

What to do?

- Add about 6 cm of vegetable oil to a tall glass.
- Add small drops of food colouring, a dropper is the way of doing this, but if you do not have a dropper dip the end of a small paint brush in food colouring and let drops fall onto the oil. Use more than one colour and add about 30 drops.
- Now stir the oil with a spoon until you have hundred of droplets distributed through all the oil. Do not worry the food colouring will not 'mix' with the oil.
- Fill another large glass or jar about two thirds full with water.
- Carefully pour the coloured oil on of this water so that there is a full layer of oil. Watch the coloured rain drops fall.



The Science

The food colouring does not mix with the oil but instead forms an emulsion, that means that when you mix the two together the food colouring breaks down into smaller and smaller droplets which are held with in the oil. Oil and water do not mix so the two layers remain separate.

The food colour droplets fall down the oil towards the water and when they touch the water layer they can mix with the water and fall like rain downwards.

Cloud in a bottle

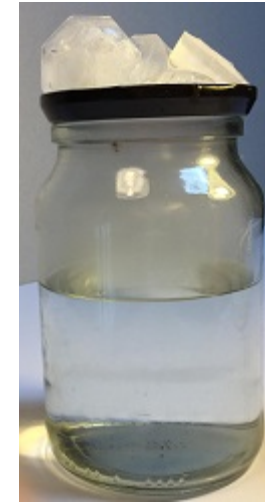
What you need

- Glass jar with lid
- Hot water
- Hairspray
- Ice cubes



What to do?

- Carefully pour the hot water into the glass jar, fill it about half full.
- Spray a generous squirt of hairspray into the glass jar, above the hot water.
- Place the lid upside down on the jar and add some ice cubes on top.
- Watch the top half of the jar, can you see a cloud?
- Unsure – try removing the lid to let the cloud out!



Cloud in a bottle

The Science

For a cloud to form there must be three things, water molecules, dust and a change in temperature or pressure. There are water molecules all the time in the air around us bouncing around, but in a cloud these stop bouncing and stick together. This is caused by the 'cloud condensation nuclei' such as dust or pollution particles combined with a change in temperature or pressure. Real clouds form when warm air rises in the atmosphere, meets dust particles and cools down. Clouds are more likely to form when it's cold.

When you add the hairspray you are polluting the air above the hot water. The ice cubes on the metal lid slowly change the temperature of the air beneath the lid, so the temperature inside the top of the bottle falls and the water molecules condense, becoming visible. The hairspray particles act as cloud condensation nuclei, allowing the water molecules to condense and stick together forming the cloud in a bottle.