Toothpick Star Trick

You will need:

- Wooden toothpicks
- A plate
- Water and a water dropper

What you need to do

1. Start with round toothpicks that are brand new and dry. Without breaking them completely, bend each one at the middle so it cracks but doesn't break into two pieces. Press the ends together to widen the split.

2. Place the split middles of the toothpicks together in the centre of the plate to form a star shape. The edges of the toothpicks should touch each other. You've made a closed, five-pointed star.

3. Use the plastic dropper to add drops of water at the middle of the star where the splits are closest to each other. The goal is to place the water so that all the exposed, broken ends get soaked. However, don't add so much that the toothpicks start to float.

Why it happens

The toothpicks you used were probably made of dried birch wood. When you break the toothpicks, you stretch and compress the wood fibres inside them. When you put drops of water in the middle of the closed star formation, the dry wood fibres in each broken toothpick absorb some of it. This causes the fibres to swell and then to expand. The absorption of the water into the toothpick is due to capillary action. Capillaries are microscopic hollow tubes within the wood that draw water along the length of the toothpick. Capillaries normally carry water and food throughout a living plant's stem and leaves.

As the wood absorbs the water, each individual toothpick tries to straighten itself as the soaked fibres expand. This straightening action causes the toothpick ends to push against each other. As the toothpicks straighten and push against each other, the inside of the star opens up into the final star shape.

The Reversing Arrow

You will need:

- A glass filled with water
- A piece of paper
- A pen

What you need to do:

1. Fill the transparent glass with water.
2. Using the black permanent marker, draw a horizontal arrow on the piece of paper.
3. Place the piece of paper with the horizontal arrow behind the transparent glass of water. Make sure the paper is touching the transparent glass of water and observe the horizontal arrow.
4. Move the piece of paper with the horizontal arrow away from the transparent glass of water and observe the horizontal arrow.
5. You should see the arrow appear to change direction

Why it happens

As you moved the piece of paper with the horizontal arrow away from the transparent glass of water, the arrow appears to reverse. Light travels in a straight line until it hits an object. Then, the light may reflect or bounce off the object, refract (bend) or pass through the object, or absorb or get caught by the object. The light is refracted (bent) as it passes through the transparent glass, the water, then through the back of the transparent glass, and finally through the air to the paper with the horizontal arrow. This refraction causes the horizontal arrow to appear as if it is reversed.

Making Water Travel on a String

You will need

- 2 cups
- Some water
- A piece of string

What you need to do

1. Cut a piece of string
2. Fill one cup about halfway with water
3. Soak the string in the water for 10 seconds or until it is soaked through
4. Put one end of the string into the cup with water and hold the other end above the empty cup
5. Hold the cup with water up, using your pointer finger to keep the string at the bottom of the rim as you turn it towards the empty cup
6. Pour the water slowly along the string… watch as it clings to the string and drips off the end into the empty cup! (Be prepared to clean up a little as spilling is bound to happen…)

Why it happens

Water has some special properties, it can stick to itself (cohesion) and other things (adhesion). This goes down to the molecular level in how a water molecule looks: it has two hydrogen atoms and one oxygen atom. These atoms end up having positive and negative charges, which cause them to stick to one another. This is why you see raindrops clump together on your windscreen when it rains, why water makes nearly spherical drops, and why it makes a stream of water as it flows down the string in this experiment!

At first, you soak the string in the water, and the water adheres to it. Even though water may drip out of it, it is still soaked in there. That is adhesion. When you pour water along it, you notice the water clings to other water molecules attached to the string, and you see it form a little stream underneath the string. That is cohesion!

Make a Lava Lamp

You will need

A glass
Some water
Food colouring
Vegetable oil
Salt
Sugar

What you need to do

1. Pour water into a plastic cup.
2. Add a couple of drops of food colouring to the water and mix.
3. Pour a layer of oil onto the water. Oil and water do not mix, they will form separate layers.
   The oil sits on top of the water as the particles are less tightly packed than those of water.
   Oil is less dense.
4. Add a teaspoon of salt or sugar on top of the oil.
5. Watch what happens!

Why it happens

When the salt or sugar is added on top of the oil it sinks through the layers to the bottom of the cup.
The salt or sugar takes some oil to the bottom of the cup and traps it. As the salt or sugar dissolves into the water the oil is released and returns to the top.

Make a Skittles Rainbow

You will need:

- Some skittles
- White plate
- Some water

What you need to do

1. Place your skittles or sweets into a white container, try to alternate the colours.

2. Carefully pour water into the container, if the skittles move, just push them back into place quickly.

3. Watch what happens..

Why it happens

Skittles are coated in food colouring and sugar. When you pour water over the skittles the coloured coating dissolves spreading through the water. The colour and sugar **dissolve** into the water and then **diffuse** through the water, making it the colour of the skittle.