

This colourful experiment uses Skittles to demonstrate solubility and diffusion.

## Materials

- A packet of Skittles lollies
- A flat plate with a rim (white if possible)
- Tap water in a small cup or jug
- A sugar cube or 1 teaspoon plain white sugar

## Instructions

1. Make a pattern of Skittles around the edge of the plate. Try not to let them touch, and space them as evenly as possible.
2. Gently pour your water into the middle of the plate until all the Skittles are in the water, being careful not to disturb or move the Skittles.
3. Watch what happens! (For best results, be careful not to bump the plate or the table.) The full effect will take a couple of minutes (total time will depend on the size of your plate).
4. When the colours have reached the middle, carefully place a sugar cube (or a small pile of plain sugar) into the middle of the plate.

## Further investigation...

- Repeat the experiment with different colour patterns, or placing the Skittles in different spots on the plate. How does this affect the resulting pattern?
- How far does the colour from a single Skittle reach? Place a single Skittle in the centre of a plate of water and see if it covers the whole plate.
- Try the experiment with other coloured lollies – e.g. Smarties, M&Ms, jellybeans... (don't forget to keep a few aside for snacking!)

## What's happening?

Skittles are tasty little balls of sugar with a coloured sugar coating. When the water touches the Skittle, the sugar in the coating starts to **dissolve**, taking the colour with it.

When something dissolves, it might look like it's disappearing, but what's really happening is that the **molecules** are separating from each other and floating around in the water. The sugar molecules aren't changed by this process, so dissolving is a reversible (physical) change. Stirring makes sure that all the sugar is spread evenly through the liquid.

But even if we don't stir, the molecules of sugar spread themselves out evenly anyway. This is a process called **diffusion**.

When the sugary coatings of the skittles first started to dissolve, all the sugar was around the edges of the plate. This meant that the water at the edge of the plate had a lot more sugar molecules in it than the water in the middle. The colours dissolved along with the sugar, which let us see where the sugar molecules were going – they moved in towards the centre of the plate where there was no sugar.

You might have also noticed that when the colours reached each other, they didn't mix. This was because the amount of sugar in each colour of water was about the same. When the molecules of sugar reach another area with the same amount of sugar, they don't diffuse any further, so we get nice clear borders between each colour.

When you add the sugar cube to the middle of the plate, once again, the sugar starts to dissolve. But suddenly, there's a lot more sugar in the middle of the plate than there is around the edges. So we saw that extra-sugary water in the middle start to push back out towards the edges to even things up.

## Check your understanding

1. What happens to something like sugar when it dissolves? Does it disappear?
2. Is dissolving an example of a physical change or a chemical change? Explain your answer.
3. Why did we see the colours moving towards the middle of the plate?
4. Why didn't the colours mix together in the middle of the plate?
5. Describe what happened when you added the sugar cube. Why did the water in the middle of the plate turn clear?
6. Explain your understanding of these scientific terms: dissolve, diffusion, molecule