



TREACLE TOFFEE: FROM SOLID TO LIQUID AND BACK AGAIN

Make some tasty treacle toffee and explore changes of state!

YOU WILL NEED

- An adult to help
- Brown sugar (500g)
- Water (150ml)
- Golden syrup (100g)
- Black treacle (100g)
- Butter (75g)
- Cream of tartar (¼ teaspoon)



WHAT YOU DO

Step 1

Place the sugar and water in a saucepan and heat. Stir while the sugar melts and combines with the water.

Step 2

Add the rest of the ingredients and heat gently for about 10 minutes. The mixture must be heated to the 'soft crack stage', which is when you drop a small amount into a glass of cold water and it separates into threads which are hard but not brittle - 143°C if you have a kitchen thermometer.



This activity must be done under the **supervision of an adult** to ensure safety when cooking.



Step 3

Pour the mixture into an oiled tin, and leave to set. You can mark the mixture into even pieces with a knife before it sets, or break with a rolling pin when it has hardened.

THE SCIENCE BEHIND IT

There are three main states of matter: solid (like a diamond); liquid (like water); and gas (like helium in a balloon, which is lighter than air so floats upwards). When the sugar was heated in the pan with the water it melted and became a liquid, and it then mixed with the water because they are both liquids. Other examples of melting are when you heat up an ice cube in your hand and it slowly turns into liquid water, and even metal can melt into a liquid (but it has to be very, very hot!)

Then, after adding the rest of the ingredients, the mixture had to be heated to the 'soft crack stage', which is when there is only a little bit of water left in the mixture. This was because the heat from the hob allowed the water to evaporate, turning the liquid water into a gas called water vapour. You can see the water vapour leaving the saucepan as steam. This is how clouds in the sky are formed; heat from sunshine evaporates water from rivers and oceans and the steam collects into clouds in the sky. When you cool down gasses they turn back into liquids, like when you breathe onto a cold window and it turns the water vapour in your breath back into liquid water - this is called condensation.

When you left your treacle toffee to set it turned from a liquid to a solid by freezing, like when you put water in the freezer and it turns into ice. So remember, some liquids do not need to feel cold to freeze!

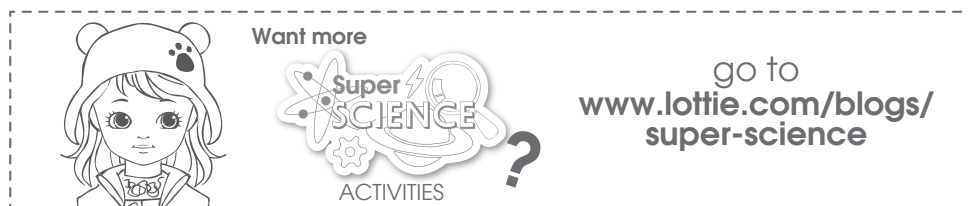


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