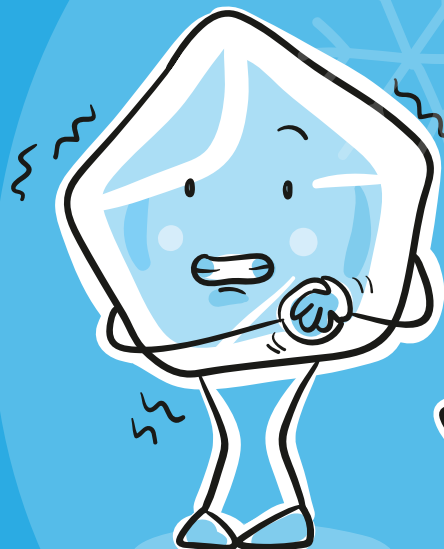


ACTIVITY

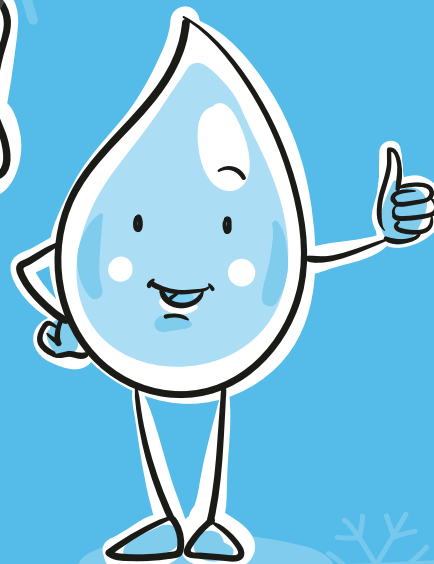
3

CHEMISTRY AT HOME

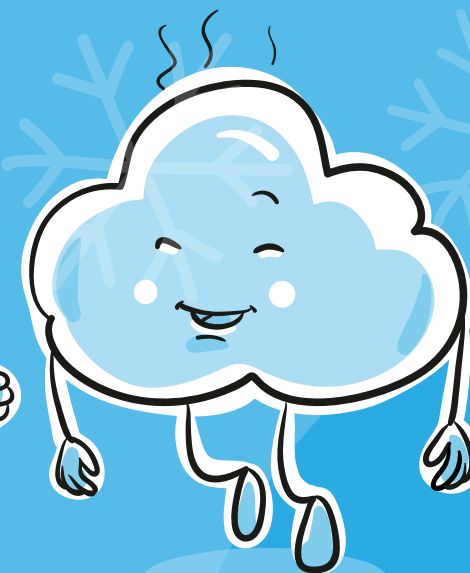
SAVE THE ICE CUBE



SOLID



LIQUID



GAS

● ○ ○ EASY



4-10



1 HOUR

+ freezing of ice



- 1 Learn that water changes state depending on its temperature
- 2 Discover that heat is transferred from one material to another
- 3 Experiment with different materials to find out which is the best insulator

ENCOURAGING TOMORROW'S CHEMISTS TODAY

DISCOVER MORE ACTIVITIES AT SALTERSINSTITUTE.CO.UK



SAVE THE ICE CUBE

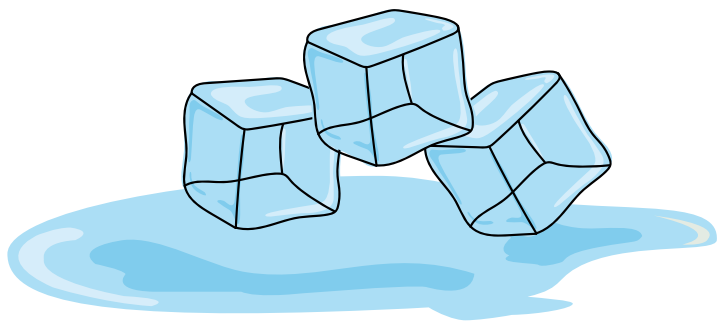
You've probably come across water in each of its three states. The ice you put in a drink is solid water, the water you drink is a liquid and if you've ever watched a kettle boil, the gas you see at the end is water vapour!

Water changes state depending on its temperature

If ice is heated it changes into water, and this is called melting. If water is cooled below 0°C it freezes to form ice.

Do you know what temperature water needs to be to turn into a gas?

To stop ice melting you need to insulate (protect) it from warm air. One way to do this is to wrap the ice in an insulating material such as bubble wrap or a towel. These materials absorb heat from the environment, stopping it reaching the ice.



Safety

Leave the ice cubes out for 5-10 minutes to melt a little before using. Ice straight out the freezer can stick to skin.

Be careful using water as it can make the floor slippery. Clean up any spillages as you go along to avoid any unwanted accidents.

This activity should be supervised at all times.

You will need

Ice cube tray

Water

A freezer

Selection of materials e.g. kitchen foil, towel, bubble wrap, black paper

Warm water

Small plates

Cold water

Spoon or dropper

Timer

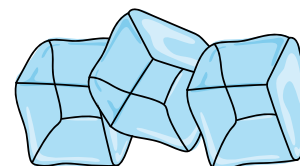
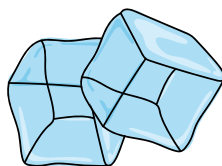
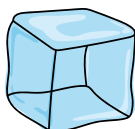
3 small items e.g. marbles / coins or small toys



Instructions

You'll need several ice cubes that are roughly the same size.

To make these, pour the same amount of water into each segment of the ice cube tray and leave in the freezer until frozen. Drop one of your small items into 3 of the segments.



Activity 1 Bubbles with water

For this activity you need to find a way to stop an ice cube melting. Take 3 ice cubes and three plates. Place one ice cube on each plate. Leave one ice cube uncovered. This is your control, and it allows you to see what happens to an ice cube without any protection from the environment.

Wrap the other two ice cubes in materials you think might stop heat from the sun reaching the ice. Place all the cubes in the same spot outside or on a window sill.

Check the ice cubes every 5-10 minutes and record how long each takes to melt completely.

Activity 2 Save the ice cube — Take 2

Without unwrapping the cubes, time how long each one takes to melt. Remember to leave a third ice cube uncovered as your control.

Time how long each takes to melt. What's the longest time you can keep an ice cube frozen for?

Activity 3 Icy Rescue

This time your challenge is to rescue small items from the ice. You will need to use the ice cubes you made with the small items inside them for this challenge.

Drop warm water onto one ice cube, cold water onto the other ice cube and leave the third to melt on its own.

Keep dripping water over the ice cubes until you can free the small items. Which item was rescued first? Why do you think that is?

Challenge

Dhiya needs to transport a tray of ice for a short journey. Can you create a container for her to use that will help keep the ice frozen.

Fill two ice cube trays with water and leave in a freezer until frozen.

Cover each tray of ice with different materials and leave them outside. Check every 10 minutes to see which ice melts first.

Top tip: Try using a different material for the top and the bottom of the tray. One idea is to cover the bottom with bubble wrap and the top with kitchen foil to reflect the heat from the sun.

Things to keep the same

- Size and amount of ice cubes
- Location of ice cubes

Things to change

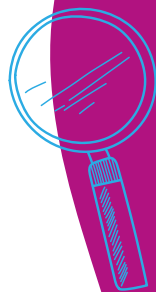
- Materials covering the ice cubes

What to measure

- How long the ice cubes take to melt.

Extra challenges

Design an ice bucket to help keep ice frozen for as long as possible.



What's happening?

Ice melts faster if it's in a warm environment as heat is transferred to the ice causing it to melt.

White paper or kitchen foil reflect heat from the sun away from the ice, but kitchen foil also conducts (transfers) heat so you need to make sure it isn't touching the ice.

If you leave a gap between the foil and the ice it will reflect sunlight away from the ice underneath and not transfer any heat to the ice!



Fun Fact

Did you know that water expands when it freezes?