

# States of Matter: Heating and Cooling

## Aim:

To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) by investigating how heating and cooling can change a material's state.

I can investigate materials as they change state.

## Success Criteria:

I can understand how heat can cause solids to change to liquids and vice versa.  
I can identify materials that melt at different temperatures.  
I can investigate the melting and freezing temperature of a material.

## Resources:

### Lesson Pack

Thermometers

Foil pie tins

Chocolate broken into equal sized squares

Three trays per group - each tray filled with a different temperature of water (approximately 5°C, 30°C and 40°C would work well)

Stopwatches

## Key/New Words:

Solid, liquid, particles, melt, freeze, thermometer, temperature.

## Preparation:

**Melting and Freezing Points Activity Sheet** - 1 per pair

Differentiated **Melting Chocolate Investigation Activity Sheet** - 1 per child

**Prior Learning:** The children will have learnt about changing state in lesson 1.

## Learning Sequence

	<b>What Makes Materials Change State?</b> Ask the children to choose the correct labels for the diagram on the <b>Lesson Presentation</b> . Explain the processes of melting and freezing, and how a material's particles behave when they change state using the information and diagrams on the <b>Lesson Presentation</b> . Address any misconceptions or issues.				
	<b>Melting and Freezing Points:</b> Explain freezing and melting points, using the diagram on the <b>Lesson Presentation</b> to illustrate this concept.				
	<b>Melting Points:</b> Children match materials with their melting and freezing points using the <b>Melting Points Activity Sheet</b> . Reveal the answers using the <b>Lesson Presentation</b> .				
	<b>Melting Chocolate:</b> Introduce the context for the investigation using the <b>Lesson Presentation</b> . Model the investigation by placing a square of chocolate in three different foil tins, and then floating the tins on trays of water, each of which has a different temperature. State that they will observe how long it takes the chocolate at each temperature to melt. Children should plan their investigation and make a prediction on their differentiated <b>Melting Chocolate Investigation Activity Sheet</b> and then conduct the investigation. <b>Look for children who have a good understanding of how materials change state by heating and cooling.</b>				
	Children use the pictures and underline the correct words and phrases to plan their investigation. They should present their results on a bar chart on the labelled axes.		Children use the prompts to plan their investigation. They should try to explain their prediction and conclusion. They will present their results on a bar chart that requires axes labelling.		Children plan their investigation without prompts. They should refer to the behaviour of the particles in their explanations. They should present their results and label their axes, considering suitable intervals to show the time taken.
	<b>Freezing Chocolate:</b> Children discuss Maya's idea on the Lesson Presentation with a partner. Their thoughts may depend on what the weather is like, leading to discussion of the freezing point of chocolate.				

## Taskit

**Bakeit:** Why not use some melted chocolate to make your own chocolate crispy cakes? Mix some cornflakes or rice crispies into the melted chocolate, spoon the mixture into cake cases and leave to freeze solid. Enjoy!

**Researchit:** Find out about how different materials are melted and their uses. For example, iron and glass.

**Makeit:** Can you make some frozen yoghurt or ice cream? Add your favourite fruits and put it in the freezer to change into a solid.