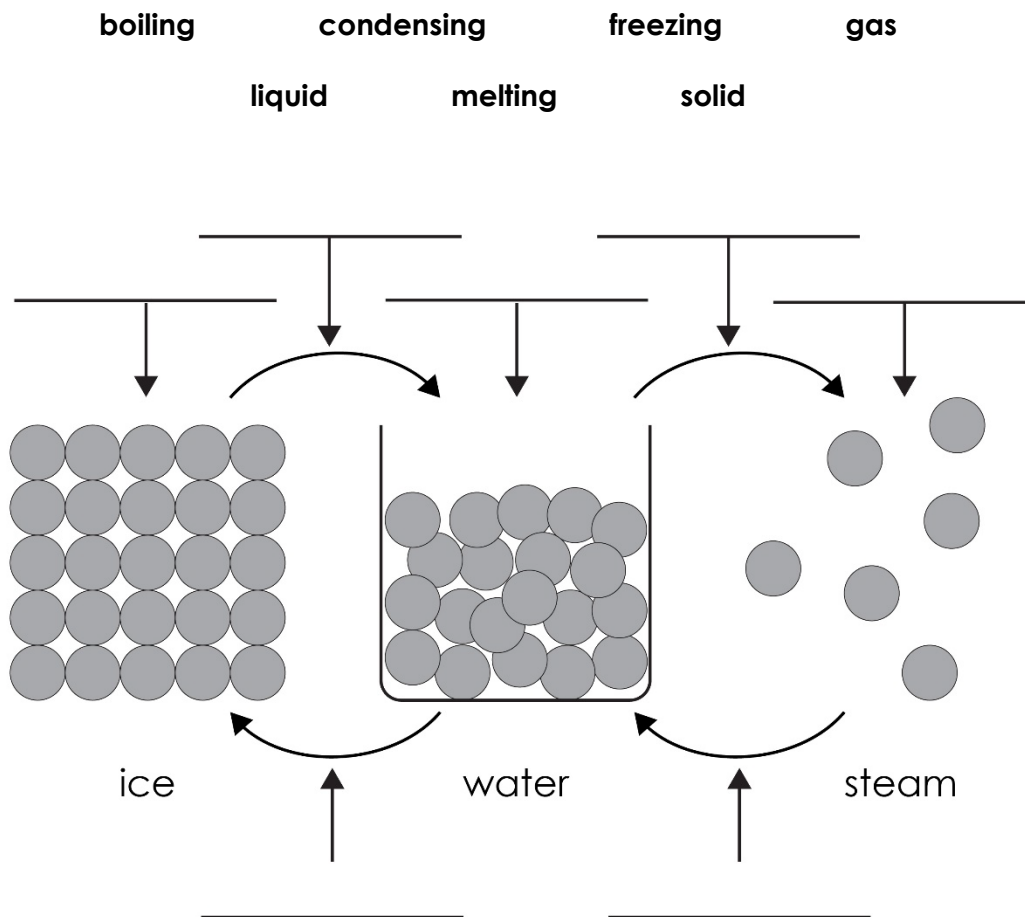




Particle model: knowledge check

1.1 Add the following labels to the diagram below.



1.2 Use the words to complete the sentences.

close together

regular

shape

vibrate

In solids, the particles are very close together in a

_____ pattern. The particles

_____ around a fixed position. Solids have a

fixed _____ . Solids cannot be easily

compressed because their particles are _____

with no space to move into.



1.3 Use the words to complete the sentences.

compressed **flow** **less** **more**
particles **randomly** **shape**

In liquids, the particles are very close together and are _____ arranged, but still touching. The particles move around each other and have _____ energy than in a solid but _____ than in a gas.

Liquids do not have a fixed _____. Liquids can _____ and take the shape of their container, because their _____ can move around each other. Liquids cannot be easily _____ because their particles are close together with little space to move into.

1.4 Use the words to complete the sentences.

energy **flow** **particles**
quickly **randomly** **space**

In gases, the particles are far apart and _____ arranged. The particles move _____ in all directions. The particles in a gas have much more _____ than the particles in a liquid or solid. Gases do not have a fixed shape and can _____ and completely fill their container. Gases can be compressed, because their _____ are far apart with _____ to move into.



Particle model: test myself

Choose suitable words to complete the sentences.

2.1 Write the words that describe the following changes of state.

- (a) Solid → liquid (eg ice to water) is known as _____.
- (b) Liquid → solid (eg water to ice) is known as _____.
- (c) Liquid → gas (eg water to steam) is known as _____.
- (d) Gas → liquid (eg steam to water) is known as _____.

2.2 In which state do the particles have most kinetic energy?

Particles have most kinetic energy in the _____ state.

2.3 What happens to the kinetic energy of the particles when a solid changes to a liquid?

The kinetic energy _____.

2.4 Describe the arrangement of particles in a solid.

The particles in a solid are in a _____ arrangement. All the particles are _____ and _____ around a fixed position.



2.5 How do the particles in a gas move?

The particles in a gas move _____ in
_____.

2.6 What happens to the movement of gas particles when the temperature is increased?

When temperature is increased, the particles in a gas move more
_____ because they have more
_____ energy.

2.7 What is meant by 'melting point'?

The melting point is the temperature at which a _____
becomes a _____.

2.8 What is meant by 'boiling point'?

The boiling point is the temperature at which a _____
becomes a _____.

2.9 If a substance has a melting point of 50°C and a boiling point of 170°C , in what state will it be at 100°C ?

- (a) Below 50°C , the substance is a _____.
- (b) Above 170°C , the substance is a _____.
- (c) So, at 100°C , the substance is a _____.



2.10 If a substance has a melting point of -220°C and a boiling point of -112°C , in what state will it be at room temperature (25°C)?

- (a) Below -220°C , the substance is a _____.
- (b) Above -112°C , the substance is a _____.
- (c) So, at 25°C , the substance is a _____.



Particle model: feeling confident?

3.1 Use the melting and boiling point data for the following substances to decide which state they are at 0°C and 100°C. Write **solid**, **liquid** or **gas** to indicate the state.

Substance	Melting point (°C)	Boiling point (°C)	State at 0°C	State at 100°C
A	44	280	solid	liquid
B	30	2403		
C	-39	357		
D	-101	-35		
E	-209	-183		
F	-71	-62		
G	-7	59		
H	302	669		
I	27	677		



Particle model: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I know the states of matter.			
I can describe the arrangement of particles in: <ul style="list-style-type: none"> • solids • liquids • gases. 			
I know the names of state changes.			
I understand the relative energy of particles in: <ul style="list-style-type: none"> • solids • liquids • gases. 			
I understand the changes in kinetic energy when substances change state.			
I understand that different substances have different melting and boiling points and know what these represent.			
I can use melting and boiling point data to deduce the state of a substance at a given temperature.			
Feeling confident? topics	I understand this well	I think I understand this	I need more help
I can use melting and boiling point data to identify the state of a substance at different temperatures.			