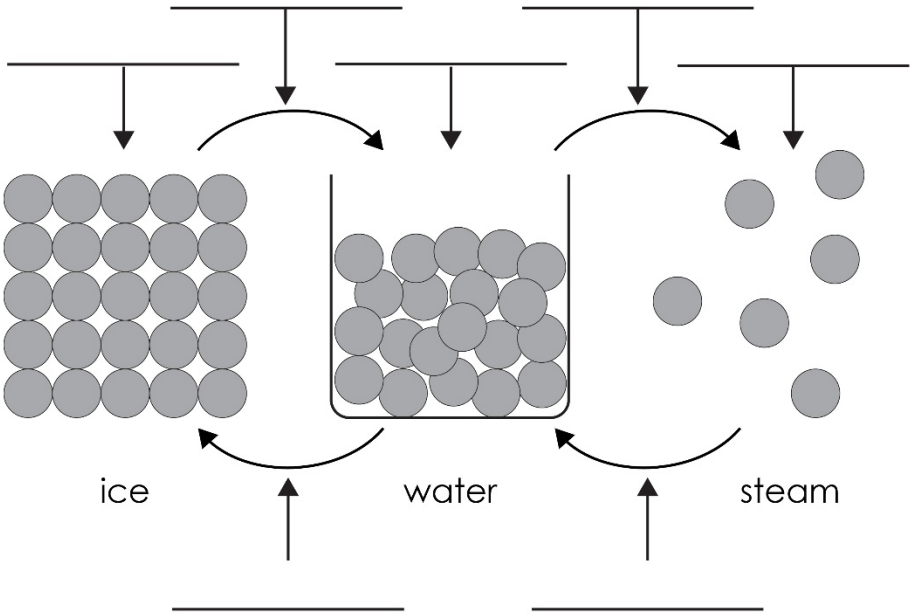
Particle model: knowledge check

1.1 Add the following labels to the diagram below.

boiling **condensing** **freezing** **gas**

liquid **melting** **solid**



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

Use the words to complete the sentences. You do not have to use all the words.

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

boiling **condensing** **freezing** **melting**

(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 particles have most kinetic energy?
Circle the correct answer.

solid **liquid** **gas**

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

decreases **increases** **stays the same**

The kinetic energy _____.

2.4 Describe the arrangement of particles in a solid.

regular **touching** **vibrate**

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?

all directions **one direction** **quickly** **slowly**

The particles in a gas move _____ in

_____.

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

kinetic **light** **quickly** **slowly**

When temperature is increased, the particles in a gas move more

_____ because they have more

_____ energy.

2.7 What is meant by melting point?

gas **liquid** **solid**

The melting point is the temperature at which a _____

becomes a _____.

2.8 What is meant by boiling point?

gas **liquid** **solid**

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?

gas **liquid** **solid**

(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)?

gas **liquid** **solid**

(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 in at 0°C and 100°C. Write **solid**, **liquid** or **gas** to indicate the state. Some are done for you.

Substance	Melting point (°C)	Boiling point (°C)	State at 0°C	State at 100°C
A	44	280	solid	liquid
B	30	2403	solid	
C	–39	357		liquid
D	–101	–35	gas	
E	–209	–183	gas	
F	–71	–62		gas
G	–7	59	liquid	
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: • solids • liquids • gases.			
I know the names of state changes.			
I understand the relative energy of particles in: • 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.			