Particle model: knowledge check

1.1 Add the following labels to the diagram below.

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

liquid   **melting**   **solid**

ice   water   steam
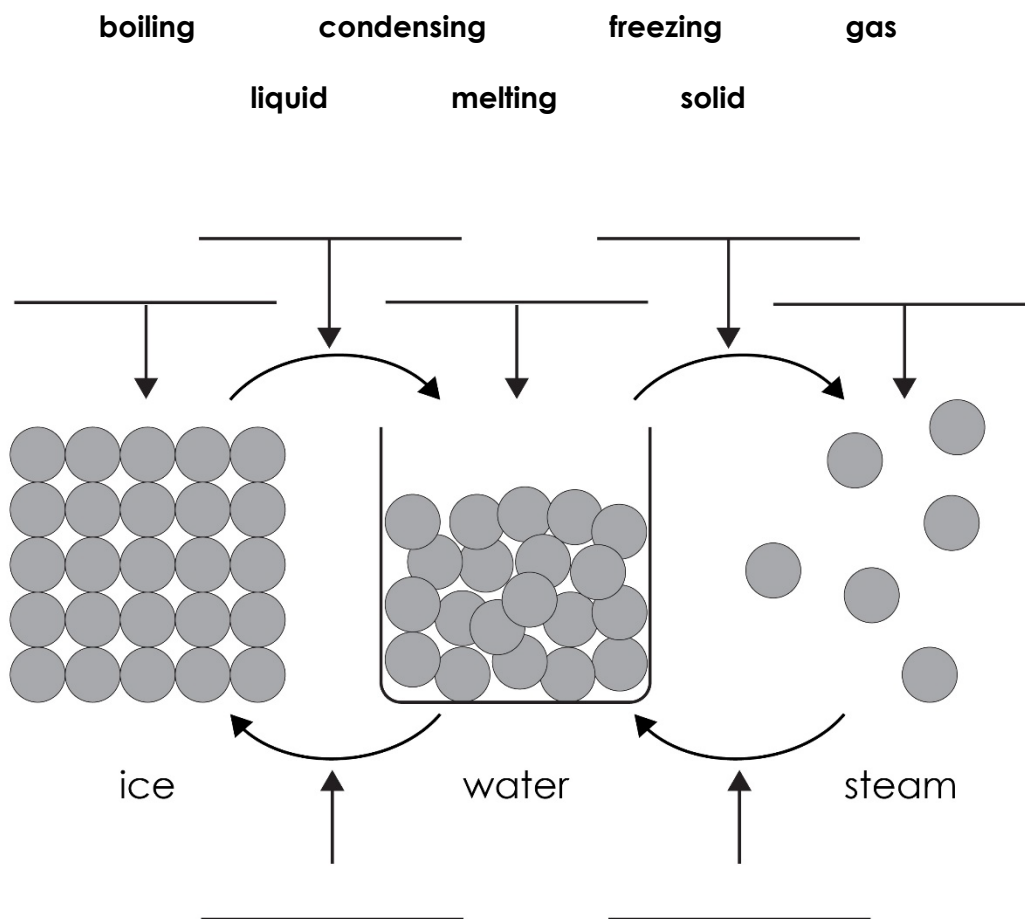
1.2 (a) How are particles arranged in a solid?

_____

(b) How do the particles in a solid move?

_____

(c) Why is it very difficult to compress a solid?

_____

1.3 (a) How are the particles arranged in a liquid?

_____

_____

(b) How do the particles in a liquid move?

_____

_____

(c) Do the particles in a liquid have more or less energy than the particles in:

i. a solid? _____

ii. a gas? _____

1.4 (a) How are the particles arranged in a gas?

_____

_____

(b) How do the particles in a gas move?

_____

_____

(c) Why is it easy to compress a gas?

_____

_____

Particle model: test myself

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 particles have most kinetic energy?

_____

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

_____

2.4 Describe the arrangement of particles in a solid.

_____

_____

_____

_____

2.5   How do the particles in a gas move?

_____

_____

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

_____

_____

_____

2.7   What is meant by 'melting point'?

_____

_____

_____

2.8   What is meant by 'boiling point'?

_____

_____

_____

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?

_____

_____

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)?

_____

_____

Particle model: feeling confident?

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

Substance	Melting point (°C)	Boiling point (°C)	State at –100°C	State at 0°C	State at 100°C
A	44	208			
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: • 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.			