

## Worksheet 1.5.5 Changing state

### 1 Changing state and the particle model >

Fill in the gaps using the words from the box below. Some words may be used more than once.

The particles in a solid are ..... and ..... When they are heated they gain ..... This causes the particles to move faster and overcome their ..... This is known as ..... The particles are now able to move from their positions slowly; they have become a ..... As more energy by heat is given to the particles, they move more ..... Eventually they have enough energy to overcome their ..... and escape from each other. This is known as .....; the particles have become a .....

kinetic energy	intermolecular forces	melting	boiling
gas	close together	liquid	vibrate quickly

### 2 Melting and boiling points >>

Position the cards from page 3 of this worksheet on the thermometer scale on page 4. Then use the scale to answer the following questions.

a) What state is mercury in at

i) 400 °C? ..... ii) 0 °C? .....

b) What state is oxygen in at

i) -200 °C? ..... ii) -100 °C? .....

### 3 Using the particle model



- a) Draw and annotate a particle diagram to show evaporation.
- b) Explain how boiling and evaporation are different.

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Oxygen m.p. = $-218\text{ }^{\circ}\text{C}$	Oxygen b.p. = $-183\text{ }^{\circ}\text{C}$	Nitrogen m.p. = $-210\text{ }^{\circ}\text{C}$
Nitrogen b.p. = $-195\text{ }^{\circ}\text{C}$	Magnesium m.p. = $649\text{ }^{\circ}\text{C}$	Magnesium b.p. = $1090\text{ }^{\circ}\text{C}$
Water m.p. = $0\text{ }^{\circ}\text{C}$	Water b.p. = $100\text{ }^{\circ}\text{C}$	Mercury m.p. = $-39\text{ }^{\circ}\text{C}$
Mercury b.p. = $357\text{ }^{\circ}\text{C}$		

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