

Name _____ Date _____

1A: States of matter

- 1 This question relates to explaining the properties of solids, liquids and gases. For each statement about a property, write 'solid', 'liquid' or 'gas'.

Property	State of matter
Has the highest kinetic energy	Gas
Vibrates in a fixed spot	
Fills an entire container	
Close arrangement of particles but with no regular ordering	
Very high density – a large number of particles are covered in a small area	
Can take the shape of the container but not change volume	

- 2 Complete the diagram in Figure 1.1 to show what happens to particles at different changes of state.

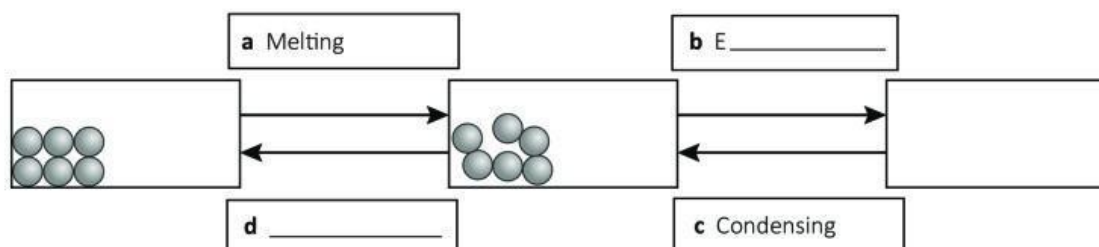


Figure 1.1

- 3 Explain the following energy changes:

Think about the terms endothermic (takes in energy), exothermic (gives out energy) and intermolecular forces. Consider what is happening to the kinetic energy of the particles.

For example, a gas turning into a liquid is exothermic because the particles need to give out energy to turn into a liquid (which is at a lower energy).

- a Liquid turning into a solid.

- b Liquid turning into a gas.

4 This question relates to the physical states of elements at different temperatures.

Element	Melting point (°C)	Boiling point (°C)
Hydrogen	-259	-253
Oxygen	-218	-183
Iron	1538	2861
Magnesium	650	1090
Sulfur	115	445
Carbon	3550	4027
Neon	-249	-246

a Which elements are a solid at 200 °C?

There are three, and they need to have a melting point above 200 °C.

b Which elements are a gas at 1500 °C?

There are five, and they need to have a boiling point below 200 °C.

c What state is neon in at -250 °C?

Think about whether -250 is higher than -249. Try placing the MP, BP and -250 °C on a vertical line. Where does -250 °C sit?

d What state is oxygen in at -200 °C?

Think about whether -200 is higher than -183. Try placing the MP, BP and -183 °C on a vertical line. Where does -183 °C sit?

5 This question relates to how changes of state of a substance can be represented graphically.

a Add the missing labels to the graph in Figure 1.2.

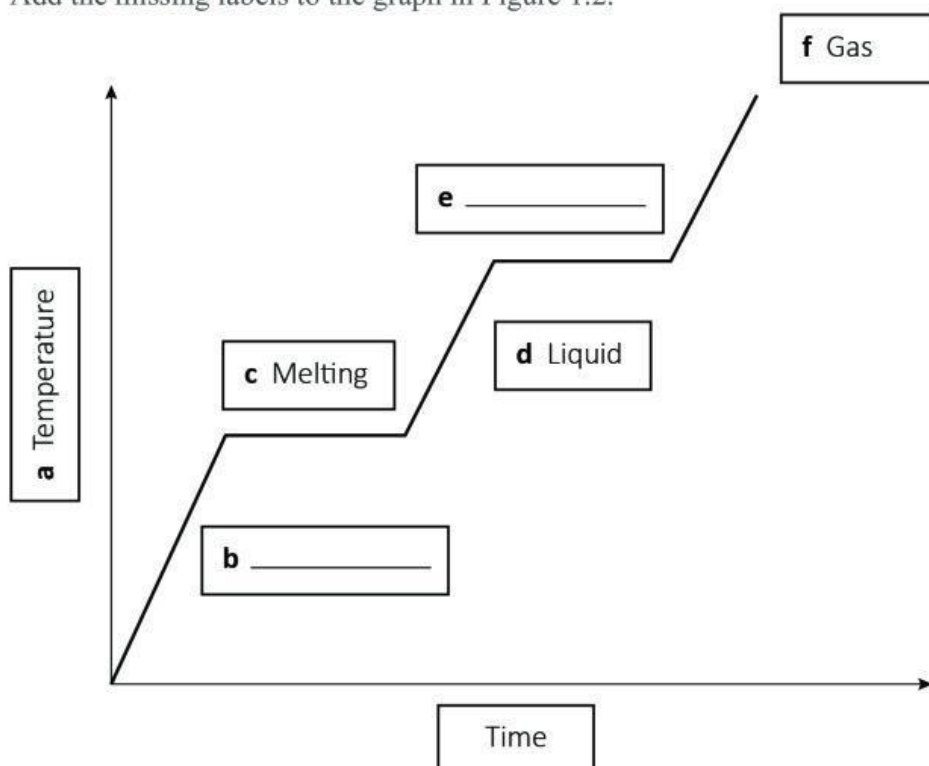


Figure 1.2

b Explain the increase in temperature at points b and d.

Think about kinetic energy.

c Explain why there is no change at points c and e.

Think about intermolecular forces. They interact with the particles. If there is a change in state, what needs to happen to these intermolecular forces to allow the change of state?

d How can you tell from the graph that the substance is pure?

Pure water melts at 0 °C. Think about what adding salt to pure ice (water) does to the purity and melting point.

6 This question relates to diffusion.

a Explain the term *diffusion*.

Include the words particles and concentration in your answer.

b Complete the diagram in Figure 1.3 to show how bromine liquid can be used to explain diffusion.

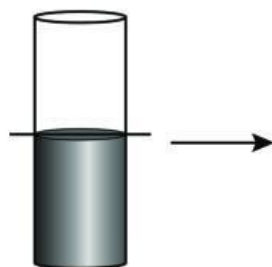


Figure 1.3

c Give **two** factors that can affect the rate of diffusion.

Think about how particles are more likely to move from one place to another more quickly.
