

2 States of matter – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)		
solid	_____	_____	_____
liquid	_____	_____	_____
gas	_____	_____	_____
particles	_____	_____	_____
vibrate	_____	_____	_____
kinetic energy	_____	_____	_____
Temperature	_____	_____	_____
absolute zero	_____	_____	_____
pressure	_____	_____	_____

Recall

You know that matter can be a **solid** , a **liquid** or a **gas** . The IGCSE course explains this with the idea that everything is made of tiny moving **particles** .

- The particles are always moving.
- How they move and how close they are decides the state.

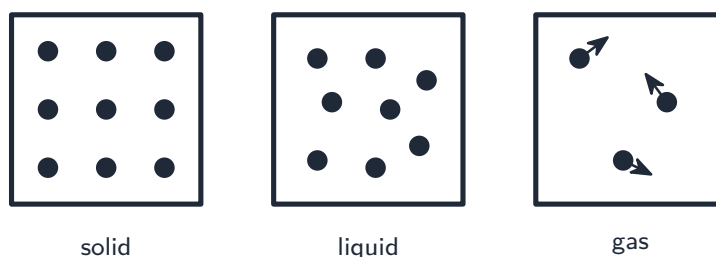
Nothing here is hard — it just adds the particle model.

New ideas

Read these first, then do the Practice.

■ 1 The three states

State	Shape	Particles
solid	fixed	close, in a pattern, just vibrate
liquid	takes the container's shape	close, slide past each other
gas	fills the container	far apart, fast, random



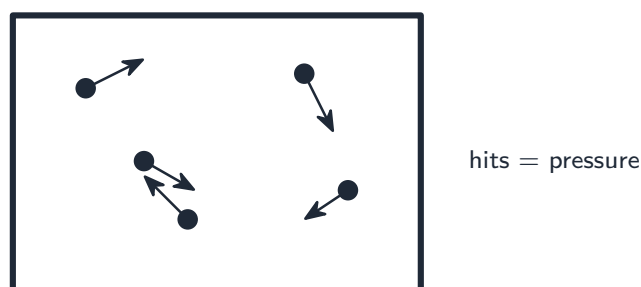
■ 2 Temperature and energy

Heating a substance makes its particles move **faster** (more **kinetic energy**). **Temperature** measures the average kinetic energy of the particles.

The lowest possible temperature is **absolute zero**, -273°C .

■ 3 Gas pressure

Gas particles hit the walls of their container. Each hit is a tiny push. The **pressure** is the total force of all these hits per unit area.



- heat a gas $\rightarrow$ faster particles hit harder and more often $\rightarrow$ pressure rises.
- squeeze a gas smaller $\rightarrow$ more hits per second on each area $\rightarrow$ pressure rises.

Watch out: temperature measures the **average** kinetic energy of the particles, not the total. When a gas is squeezed at constant temperature the particles do **not** speed up — there are simply more wall-hits per second on each unit of area.

Practice

Try these in order.

2.1 In which state are the particles (a) far apart and fast, (b) fixed in a pattern? [2]

2.2 What does *temperature* measure, in terms of particles? [1]

2.3 State the value of absolute zero in °C. [1]

2.4 Explain, in terms of particles, how a gas exerts pressure on its container. [2]

2.5 A gas is squeezed into a smaller volume at constant temperature. Explain why its pressure rises. [2]

2.6 Challenge. A sealed jar of gas is **heated** (its volume fixed). Explain, in terms of particles, why the pressure rises — give **two** reasons. [2]