2 States of matter – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	**中文**	**Write it 3 times** (English)		
solid	固体			
liquid	液体			
gas	气体			
particles	粒子			
vibrate	振动			
kinetic energy	动能			
Temperature	温度			
absolute zero	绝对零度			
pressure	压强			

Recall

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

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

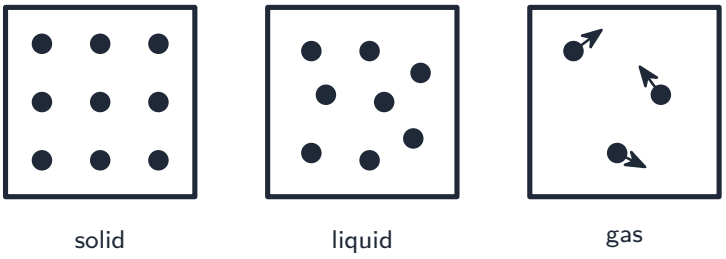
Nothing here is hard – it just adds the particle model.

New ideas

Read these first, then do the Practice.

■ 1 The three states

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



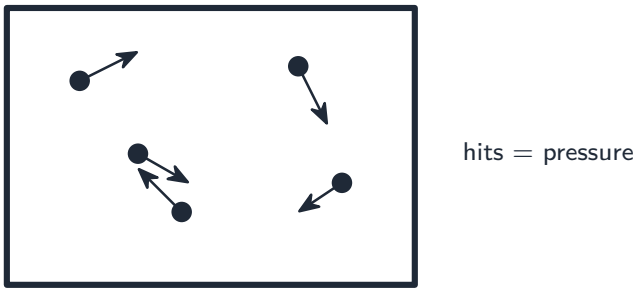
■ 2 Temperature and energy

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

The lowest possible temperature is **absolute zero** 绝对零度, $-273\,^{\circ}\mathrm{C}$.

■ 3 Gas pressure

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



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