Your notes

KS3 Science: revision notes

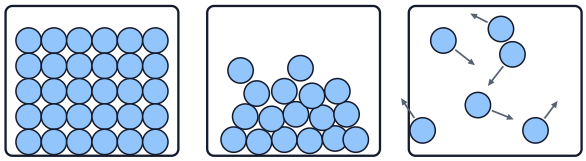
C1.1 Particles

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The particle model

- All matter is made of tiny **particles**.
- How the **particles** are arranged and how they move decides whether something is a solid, liquid or gas.



Solid
regular pattern, touching
vibrate in fixed places

Liquid
close together, random
move past each other

Gas
far apart, random
move fast in all directions

Solids

- **Particles** are close together in a regular pattern.
- They vibrate on the spot but can't move around.
- Solids have a fixed shape and volume. They can't flow or be squashed.

Liquids

- **Particles** are close together but in a random arrangement.
- They can slide past each other, so liquids flow and take the shape of their container.
- Liquids have a fixed volume and are very hard to squash.

Gases

- **Particles** are far apart and move quickly in all directions.
- Gases have no fixed shape or volume. They spread out to fill any container and can be squashed.
- **Gas pressure** is caused by **particles** colliding with the walls of their container.

Changes of state

- **Melting** (solid → liquid), **freezing** (liquid → solid), evaporating or boiling (liquid → gas), condensing (gas → liquid), **sublimation** (solid → gas).
- Heating gives **particles** more energy, so they move faster.
- The mass stays the same when a substance changes state.
- **Diffusion** (**particles** spreading out) is faster in gases than in liquids, and faster when it is warmer.

Density

- **Density** = mass ÷ volume. It is measured in g/cm^3 (or kg/m^3).
- Example: a block with a mass of 60 g and a volume of 20 cm^3 has a **density** of $60 \div 20 = 3$ g/cm^3.
- Solids are usually denser than liquids because their **particles** are packed more closely. Gases have very low densities.
- Objects less dense than water (1 g/cm^3) float. Ice floats because it is slightly less dense than liquid water.
- To find the volume of an irregular object, lower it into water and measure how much the water level rises (displacement).

Investigations

- The **independent variable** is what you change. The **dependent variable** is what you measure. **Control variables** are kept the same to make it a fair test.
- Repeat readings and calculate a mean to make results more reliable.

Key terms

Particle	A tiny piece of matter, such as an atom or molecule.
Melting	A solid turning into a liquid.
Freezing	A liquid turning into a solid.
Evaporation	A liquid turning into a gas at its surface, below its boiling point.
Condensation	A gas turning into a liquid.
Sublimation	A solid turning straight into a gas.

Your notes

Diffusion	Particles spreading from where there are lots of them to where there are fewer.
Gas pressure	The force from gas particles colliding with the walls of a container.
Density	How much mass there is in a certain volume (mass divided by volume).
Independent variable	The variable you change in an investigation.
Dependent variable	The variable you measure in an investigation.
Control variable	A variable kept the same to make a fair test.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. How do the particles in a solid move?
2. Which state can be squashed easily?
3. What is it called when a liquid turns into a solid?
4. What is it called when a gas turns into a liquid?
5. Why can liquids flow?
6. What happens to particles when a substance is heated?
7. What causes gas pressure?
8. What is diffusion?

Answers

1. They vibrate in fixed positions
2. Gas
3. Freezing
4. Condensing
5. Their particles can slide past each other
6. They move faster
7. Particles colliding with the container walls
8. Particles spreading from high to low concentration

What to do next

Practise 15 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.