Why solids, liquids and gases behave so differently

KS3 Ages 11-14 ⏰ 3 min read

What makes solids, liquids and gases different?

Everything around you is made of tiny, invisible particles called **atoms** and **molecules**. The way these particles are packed together and how they move around is what makes solids, liquids and gases behave in completely different ways.

A **solid** like ice, wood or a rock has particles that are packed very tightly together and held in place by strong forces. They vibrate a tiny bit, but they stay put. That's why solids keep their shape — the particles don't move around much.

Think of it like a crowded classroom where everyone has assigned seats. The students stay in the same spot and hardly move.

Liquids flow and take the shape of their container

In a **liquid** like water or milk, the particles are still quite close together, but they're not stuck in fixed positions. They can slide past each other and move around freely. This is why liquids can flow and pour — and why they always take the shape of whatever container you put them in.

Think of it like a queue at the cinema. People can move around and stand closer or further apart, but they stay roughly together in the space.

Gases spread out to fill all available space

In a **gas** like air or steam, the particles are far apart and zoom around at high speed, crashing into each other constantly. They have almost no attraction to each other, so they spread out to fill every available space.

Think of it like opening a door to a crowded room. Everyone rushes out and spreads through the whole building as fast as they can.

Temperature changes the state of matter

Here's something amazing: you can change a solid into a liquid, or a liquid into a gas, just by adding or removing **heat**. When you heat ice, it **melts** into water because the particles vibrate more and break free from their fixed positions. Heat water even more, and it **evaporates** into steam as the particles gain enough energy to zoom off as a gas. Cool things down, and the reverse happens — gases condense into liquids, and liquids freeze into solids.

Understanding states of matter helps explain everything from why puddles disappear in the sun to why we can inflate balloons with air. It all comes down to how fast those tiny particles are moving and how tightly packed they are!

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