

An illustration of three children, a boy and two girls, looking at three glass jars on a table. The jars contain different models of matter: a solid, a liquid, and a gas. The boy on the left is resting his chin on his hand, looking curious. The girl in the middle is smiling. The girl on the right is pointing at the gas jar. The jars are labeled with their respective states of matter: Solid, Liquid, and Gas.

The Particle Model of Matter

Grade 5 Science: How tiny particles explain solids, liquids, and gases

Learning Intentions and Success Criteria

- We are learning to explain the states of matter using the particle model.
- I can describe how particles are arranged and how they move in solids, liquids, and gases.
- I can explain how attractive forces between particles differ across the three states.
- I can represent solids, liquids, and gases using drawings of particles.

Particles in Solids, Liquids, and Gases

Solids

Particles are close together and vibrate in place. Attractive forces are strongest here.

Liquids

Particles have spaces between them and can slide past each other.

Gases

Particles have large spaces between them and move constantly in all directions. Attractive forces are weakest here.

Describing Matter: Mass, Volume, and Density

Mass and Volume

Mass is the amount of matter in a solid, liquid, or gas, measured in grams (g) or kilograms (kg). Volume is the amount of space matter takes up, measured for liquids in millilitres (mL) or litres (L).

Density

Density compares an object's mass to its volume. An object with more mass than volume is denser. A less dense object floats on a denser liquid.

Compressibility: Squeezing Air and Water

1

What is compressibility?

The ability of a liquid or gas to reduce in volume when under pressure.

2

Try squeezing air

Push down on a sealed syringe or balloon full of air. It compresses easily because gas particles have large spaces between them.

3

Try squeezing water

Push down on a sealed syringe full of water. It barely compresses because liquid particles are already close together.

4

Connect to the particle model

Compare the compressibility of air and water using particle spacing to explain the difference.

Wrapping Up the Particle Model

All matter is made of tiny moving particles with spaces between them. The arrangement and movement of these particles, along with the strength of attractive forces between them, explain why solids, liquids, and gases behave differently and why properties like mass, volume, density, and compressibility vary between them.

If you cooled a gas down until its particles moved much slower and squeezed closer together, what state of matter might it become, and why?