Science 14

Unit A: Properties of matter

Physical properties and moving particles

Ice on a windowsill becomes liquid water

- The same water sample can be ice, liquid or vapour as the temperature changes.
- Rust on a steel nail is a new substance, so rusting is a chemical change.

Physical and chemical properties

- Melting ice is a physical change because the substance is still water.
- Rust on a nail is a chemical change because a new substance forms.

Key terms

physical property

A description you can observe while the substance stays the same substance, such as state, density, colour or melting point.

chemical property

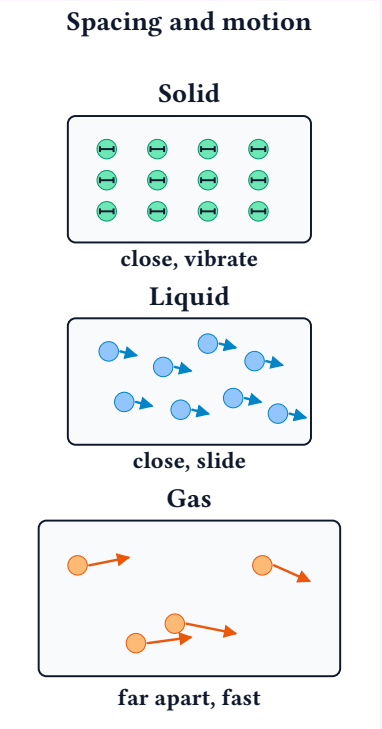
A description of how a substance changes into a different substance, such as the ability to rust or to burn.

particle model

The model that matter is made of tiny particles in motion, with spacing and speed that differ in solids, liquids and gases.

Spacing and motion explain the phase

- Solid particles stay close and vibrate in place, so the sample holds its shape.
- Gas particles are far apart and move quickly, so a gas fills the container.



Melting point and rust

- The melting point of ice describes water that is still water.
- Rusting describes iron becoming a new substance.

Visible rust

- Seeing a colour change is the observation.
- A new substance is what makes rusting chemical.



Copper density and propane

- Density of copper describes copper that is still copper.
- The ability of propane to burn describes a change into new substances.

Recording the property beside the particle picture

- A lab table lists the physical property and whether the substance stayed the same.
- The particle sketch shows spacing and motion for the phase you observed.

Image credits

Ahmed Saad, Some rusty nails in a beam, CC BY 3.0