States of matter and the kinetic particle theory

- Solid: close, regular, **vibrate** about fixed positions. Liquid: close, irregular, **slide past** each other. Gas: far apart, random, move **fast in all directions**.
- Forces of attraction: strong in solids, weaker in liquids, very weak in gases.
- Heating → particles gain kinetic energy → vibrate or move faster → overcome forces of attraction.
- The temperature stays the same while a substance melts or boils.
- Evaporation: any temperature, surface only. Boiling: at the boiling point, all through the liquid.
- Particles never change size; the spaces between them change.

Changes of state

melting

solid → liquid (heat in)

freezing

liquid → solid (heat out)

boiling, evaporation

liquid → gas (heat in)

condensation

gas → liquid (heat out)

sublimation

solid → gas (iodine, dry ice)