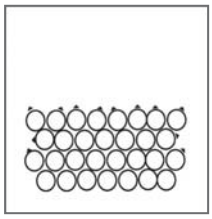
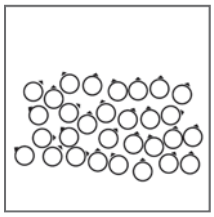
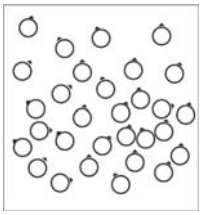
10 Complete the following table by referring to their melting and boiling points listed on page 53.

Substance	Temperature (°C)	State	Substance	Temperature (°C)	State
H_2Te	-50	10.1	Br_2	0	10.5
HF	18	10.2	Br_2	60	10.6
HCℓ	-80	10.3	I_2	116	10.7
$Cℓ_2$	10	10.4			

Summary

Solid	Liquid	Gas
		
• Particles only vibrate. • Extremely small spaces between the particles • Very strong forces between the particles • Diffusion does not occur. • Cannot be compressed. • Retains its shape. • Particles set in a crystal lattice. • Has a specific melting point under certain circumstances.	• Particles move randomly, but in restricted fashion. • Smaller spaces between the particles than in gases • Forces between the particles are weaker than in solids. • Diffusion occurs. • There are collisions between the particles, causing pressure. • Fills the base of the container. • Liquids exert pressure in all directions. • Has a specific boiling point and freezing point under certain circumstances.	• Particles move randomly and quickly. • Huge open spaces between the particles • Weak or negligible forces between particles • Diffusion occurs. • More intense collisions occur between particles than in liquids, causing pressure. • Is compressible. • Gas exerts pressure in all directions. • Has a specific condensation point under certain circumstances.

- Freezing point: This is the temperature at which a liquid changes completely into a solid.
- Melting point: This is the temperature at which a solid changes completely to a liquid.
- Boiling point: This is the temperature of a liquid at which the vapour pressure is equal to the atmospheric pressure of the surroundings.
- During a state change:
  - physical properties as well as the potential energy of the substance changes.
  - chemical composition remains the same.
- Sublimation: a solid changes directly into a gas.
  - Example: dry ice: $CO_2(s) \rightarrow CO_2(g)$

Summary

1. Condensation	2. Freezing
Just before condensation: • Particles move more slowly. • They are no longer far apart. • Collisions are less intense. Following the state change: • Spaces between the particles decrease. • Forces between the particles are stronger. • Particles move slower.	Just before freezing: • Particles move extremely slowly. • There are only vibrations. • Particles are very close together. Following the state change: • Extremely small spaces between the particles • Forces between the particles are stronger. • Arrangement is orderly and particles only vibrate.
4. Evaporation	**3. Melting**
Just before evaporation: • Particles move extremely fast. • Particles are far apart. • Severe collisions due to high velocity Following the state change: • Spaces between the particles are large. • Forces between the particles are weak. • Arrangement is random.	Just before melting: • Particles vibrate faster. • Particles are further apart. Following the state change: • Spaces between the particles increase. • Forces between the particles become weaker. • Arrangement is less orderly.

Kinetic molecular theory

Solid	Liquid	Gas
Composed of small particles.	Composed of small particles.	Composed of small particles.
Only vibrate.	Restricted movement.	Move freely.
Very small spaces between the particles; this is the reason why solids cannot be compressed.	Spaces are larger than in solids; this explains why there can be minimal compression in liquids.	Huge spaces between the particles; a gas can be compressed easily.
Strong attractive forces, this leads to a specific shape.	Attractive forces Particles can glide over each other, allowing the liquid to flow.	No attractive forces Particles are far apart and therefore exert extremely weak attractive forces. The particles move freely, enabling the gas to fill a container.
Only vibrate in the crystal lattice due to strong intermolecular forces.	Collisions Diffusion can occur.	Collisions Diffusion can occur when two gases are put together.