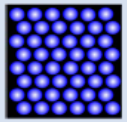
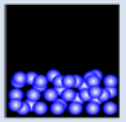
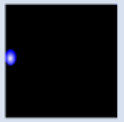
Kinetic Particle Theory

All matter has **internal energy**, which is defined as the sum of total **kinetic energy** and total **potential energy** due to the forces of attraction between particles.
U = PE + KE

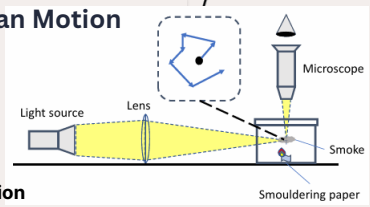
THE SCIENCE ACADEMY

	Solid	Liquid	Gas
Drawing			
Arrangement	Orderly manner in a rigid lattice	Randomly arranged	Randomly arranged
Packing	Closely Packed	Closely Packed	Widely Spaced
Movement	Vibrating about fixed positions	Roll and slide over each other	Move in all directions at various high speeds
Forces of Attraction	Very strong	Strong	Weak
Potential Energy	Very low	Low	High
Volume	Fixed	Fixed	Not fixed
Shape	Fixed	Not fixed	Not fixed

The kinetic particle theory states that all matter is made of **discrete** particles that are in **constant motion**.

Boiling vs Evaporation		
	Boiling	**Evaporation**
Temperature	Boiling Point ONLY	Any Temperature
Location	Throughout the liquid	Surface
Energy Source	Direct heat source	Surroundings
Bubbles	Observed	Not observed
Speed	Fast	Slow

Brownian Motion

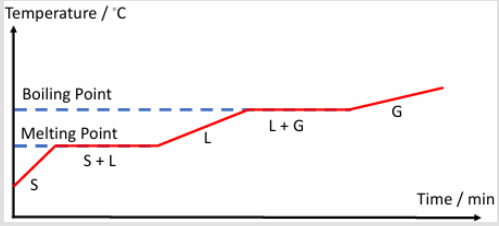


Observation
- Smoke Smouldering paper
- Smoke particles move in a jerky and erratic manner

Explanation
- Smoke particles are being bombarded on all sides by unseen air particles

Conclusion
- Air particles move in all directions at various speeds

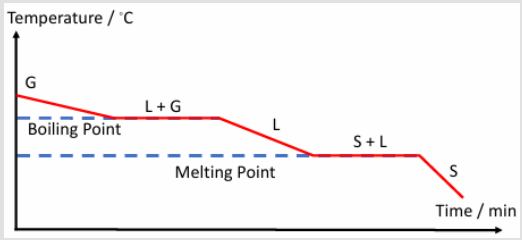
Heating Curve



Describe the energy changes that take place as the object is heated and temperature increases.
- As heat is supplied,
- The particles move more vigorously
- KE increases and thus temperature increases

Explain why there is no temperature change during melting/boiling.
- Asheatis supplied,
- Theparticles move further apart
- Theybreakfree of their forces of attraction
- Causing PEto increase • However, as there is no change in KE, the temperature remains the same

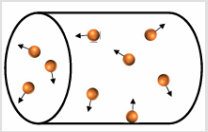
Cooling Curve



Describe the energy changes that take place as the object is cooled and temperature decreases.
- As heat is removed,
- the particles move less vigorously
- KE decreases and thus temperature decreases

Explain why there is no temperature change during condensation/freezing.
- As heat is removed,
- The particles move closer together
- forming bonds, causing PE to decrease
- However, as there is no change in KE, the temperature remains the same

Gases and Pressure



How do particles of a gas exert a pressure on the walls of a container?
- Gas particles move in all directions at various high speeds • Some particles collide with the container wall exerting a force on the wall
- The average force due to all collisions per unit area results in the pressure exerted by the gas

When volume decreases...
- There are more particles per unit volume
- Hence the frequency of collisions with the walls increase causing pressure to increase

When temperature increases
- The gas particles have a greater kinetic energy
- This causes more frequent and forceful collisions
- Hence pressure increases