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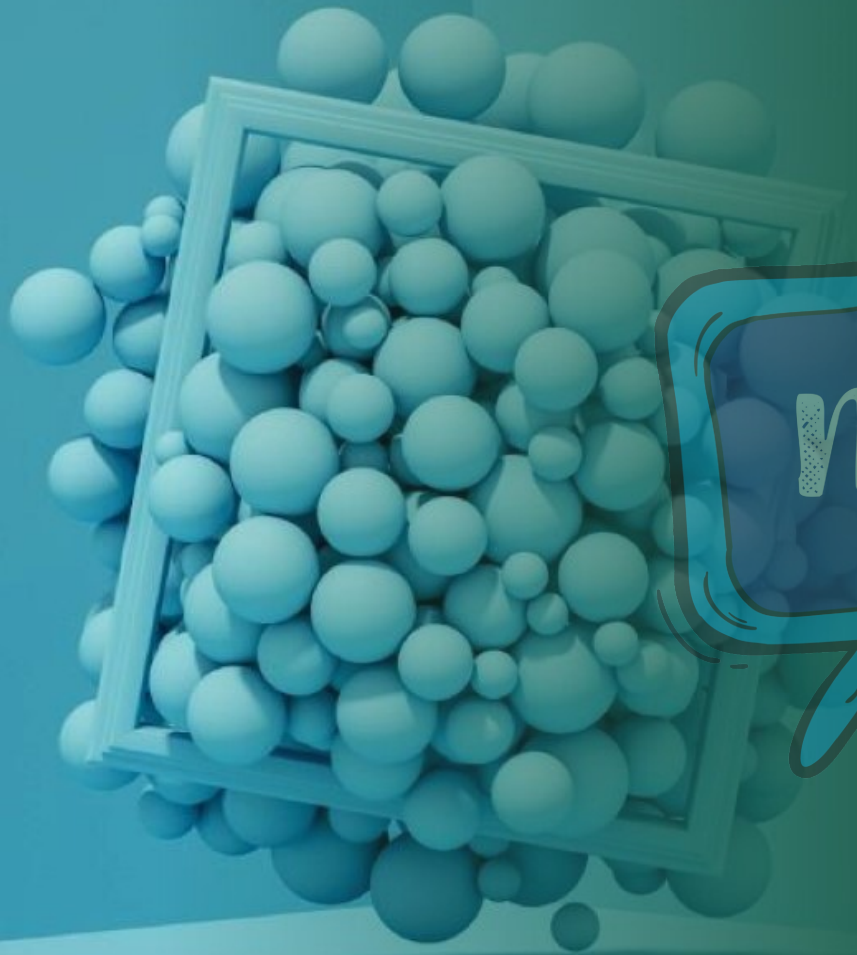

Class–9

SCIENCE

Chapter – 1

Matter in Our Surroundings

Part – 3

Interconversion of States of Matter–Effect of Temperature

Deeksha Pahilajani

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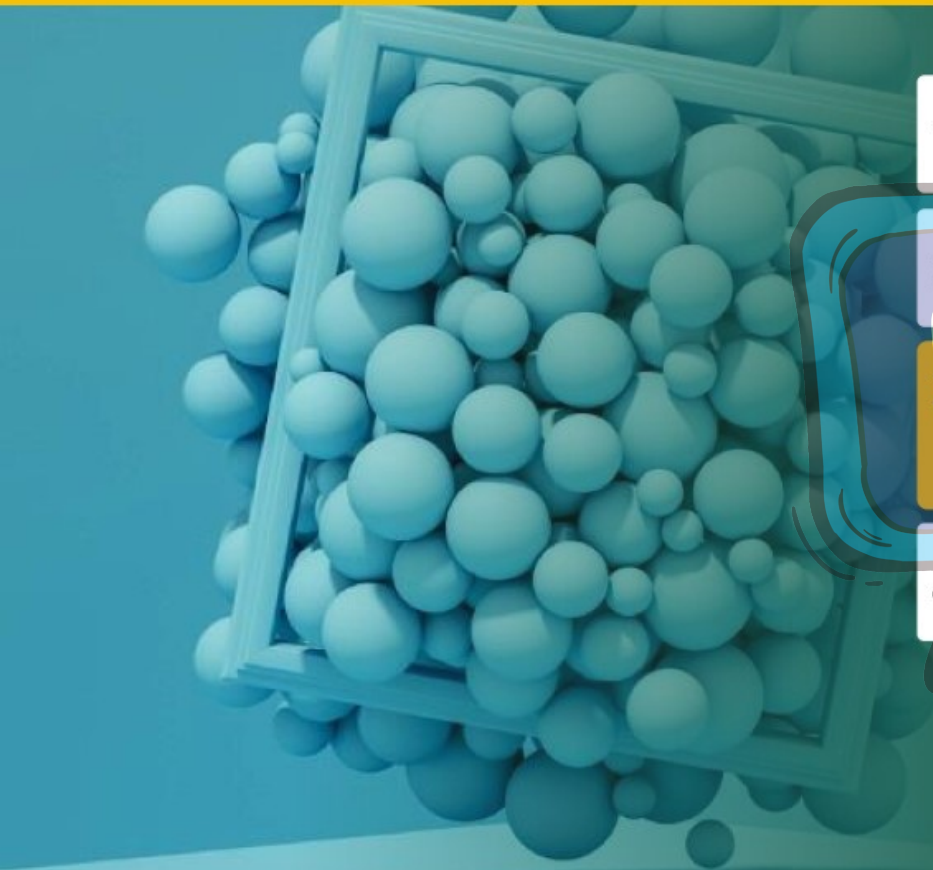
OVERVIEW



1. Matter
2. States of Matter
3. Interconversion of States of Matter–Effect of Temperature
4. Evaporation

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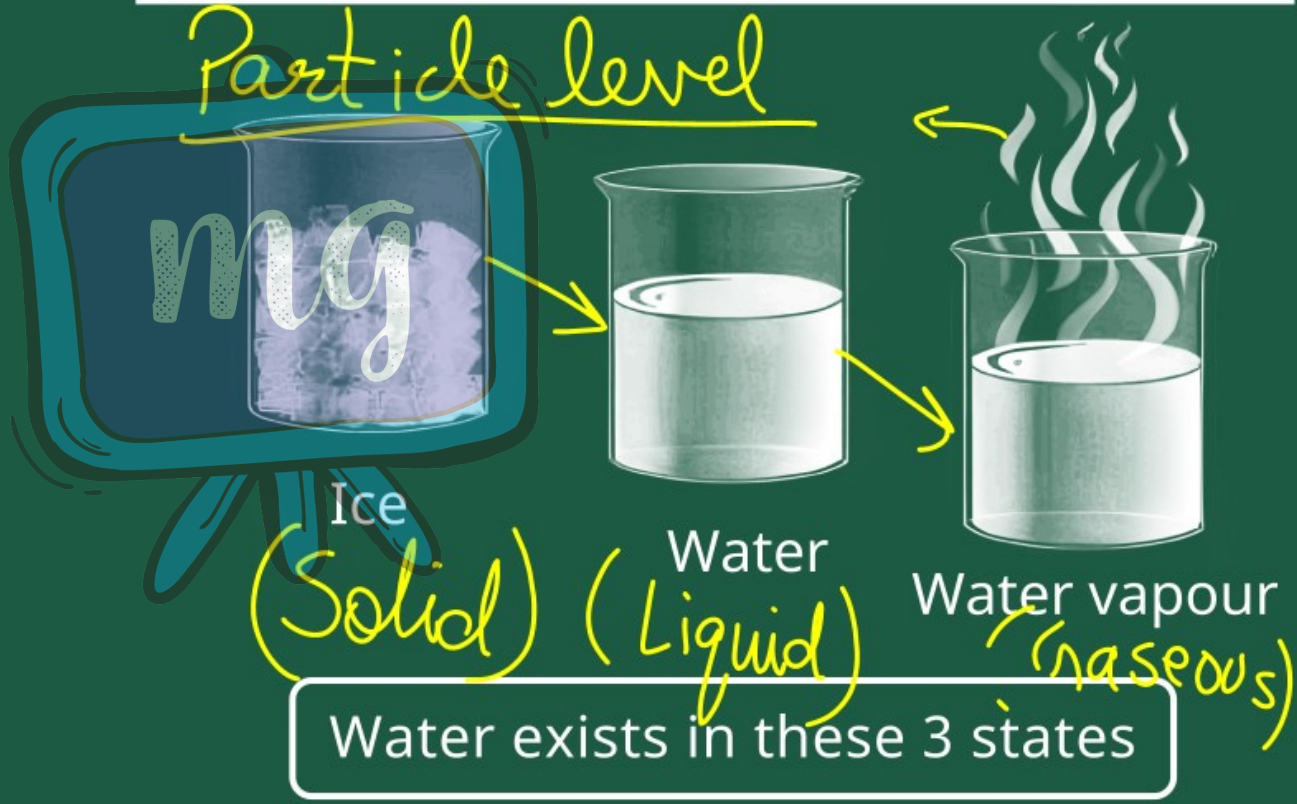
CAN MATTER CHANGE ITS STATE ?



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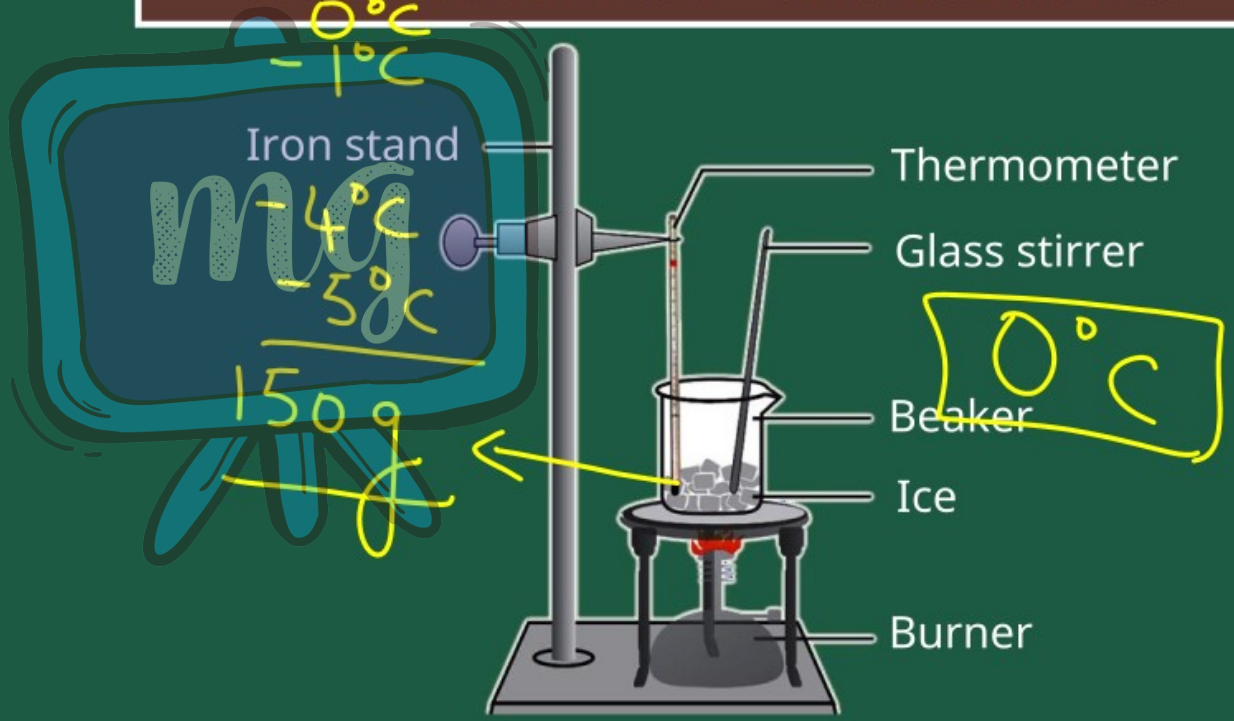
EFFECT OF CHANGE OF TEMPERATURE – EXPERIMENT



(a) Conversion of ice into water

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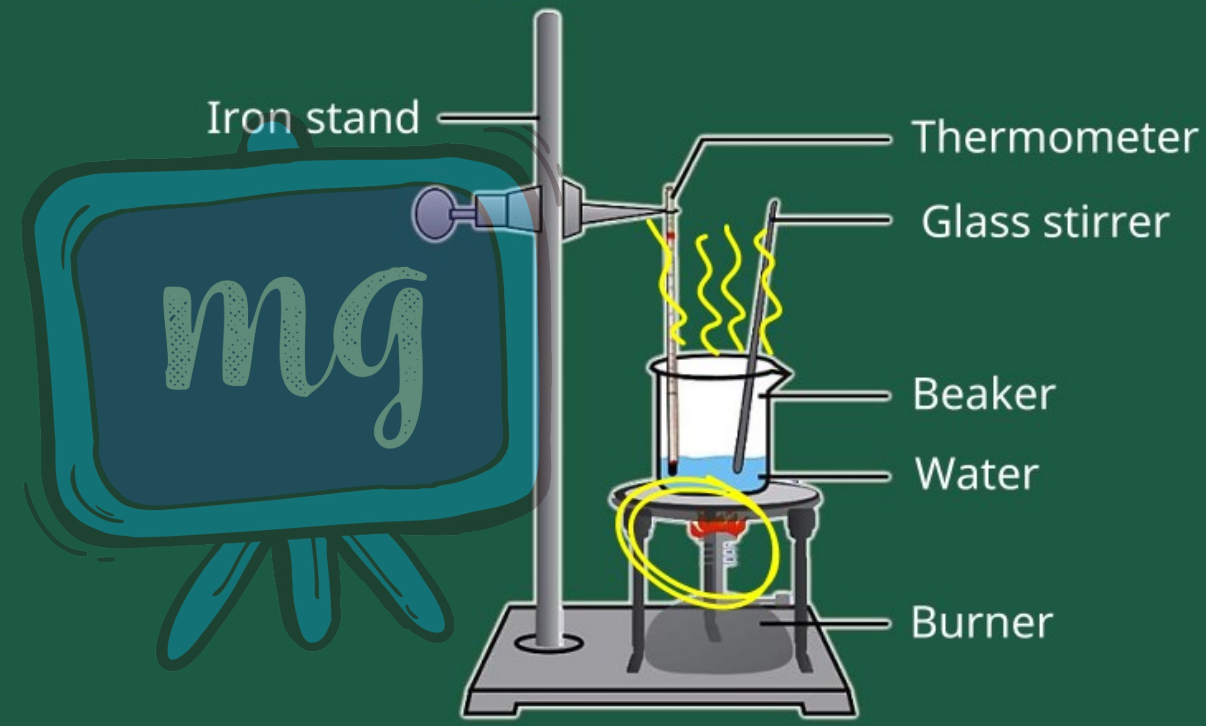
100°C



(b) Conversion of water into water vapour

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Ice $-5^{\circ}C$ → $0^{\circ}C$

Observation → $100^{\circ}C$

On increasing the temperature of ice or water-

- The K.E. of the particles increases.
- The particles start vibrating with greater speed.
- The energy supplied by heat overcomes the forces of attraction between the particles.

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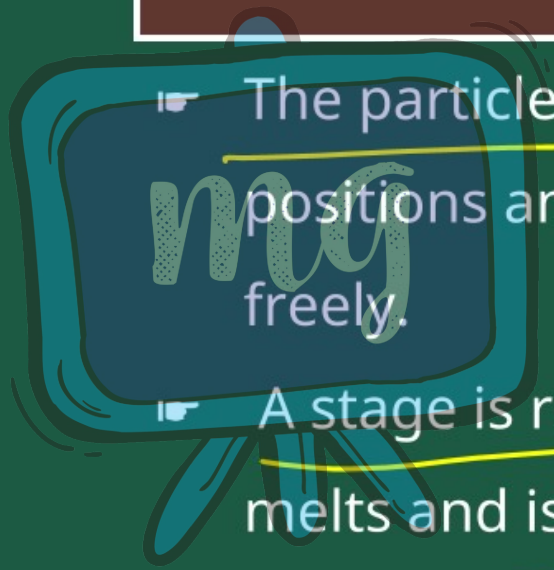
SOLIDS CONVERTING TO LIQUIDS



- The particles of solid leave their fixed positions and start moving more freely.
- A stage is reached when the solid melts and is converted to a liquid.

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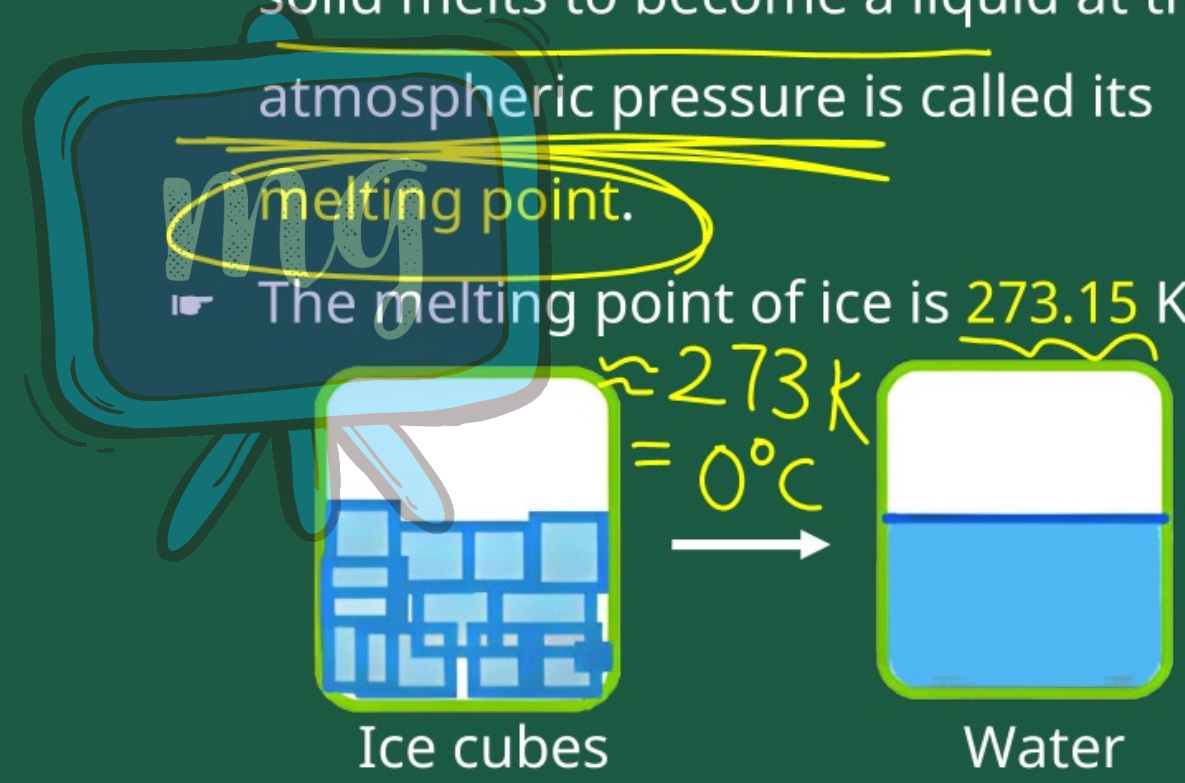
- The minimum temperature at which a solid melts to become a liquid at the atmospheric pressure is called its melting point.
- The melting point of ice is 273.15 K



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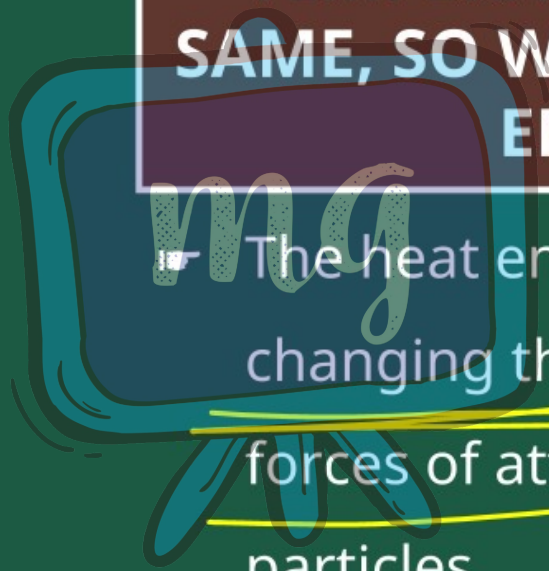
-5°C → 0°C

WHEN A SOLID MELTS, ITS TEMPERATURE REMAINS THE SAME, SO WHERE DOES THE HEAT ENERGY GO ?



- The heat energy gets used up in changing the state by overcoming the forces of attraction between the particles.

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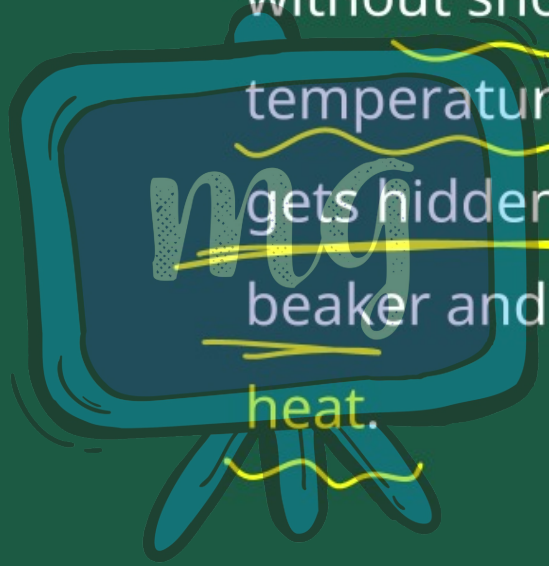
- As this heat energy is absorbed by ice without showing any rise in temperature, it is considered that it gets hidden into the contents of the beaker and is known as the latent heat.



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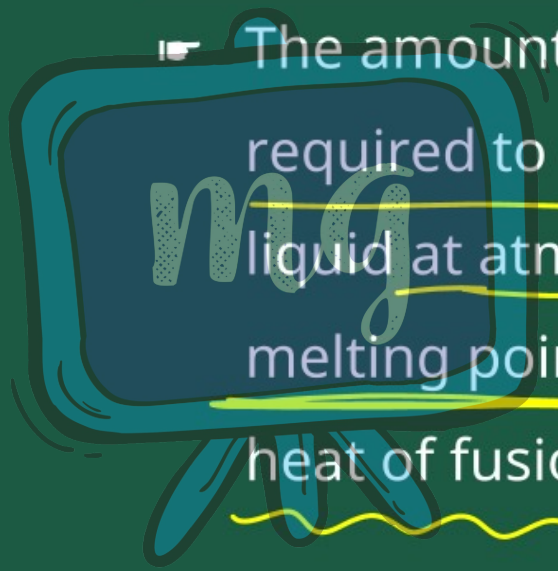
melting

LATENT HEAT OF FUSION



- The amount of heat energy that is required to change 1 kg of a solid into liquid at atmospheric pressure at its melting point is known as the latent heat of fusion.

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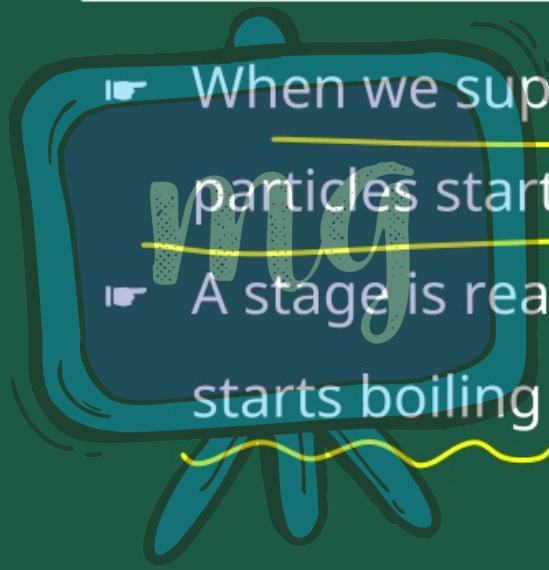
LIQUIDS CONVERTING TO GASES



- When we supply heat energy to liquids, particles start moving even faster.
- A stage is reached when the liquid starts boiling and is converted to a gas.

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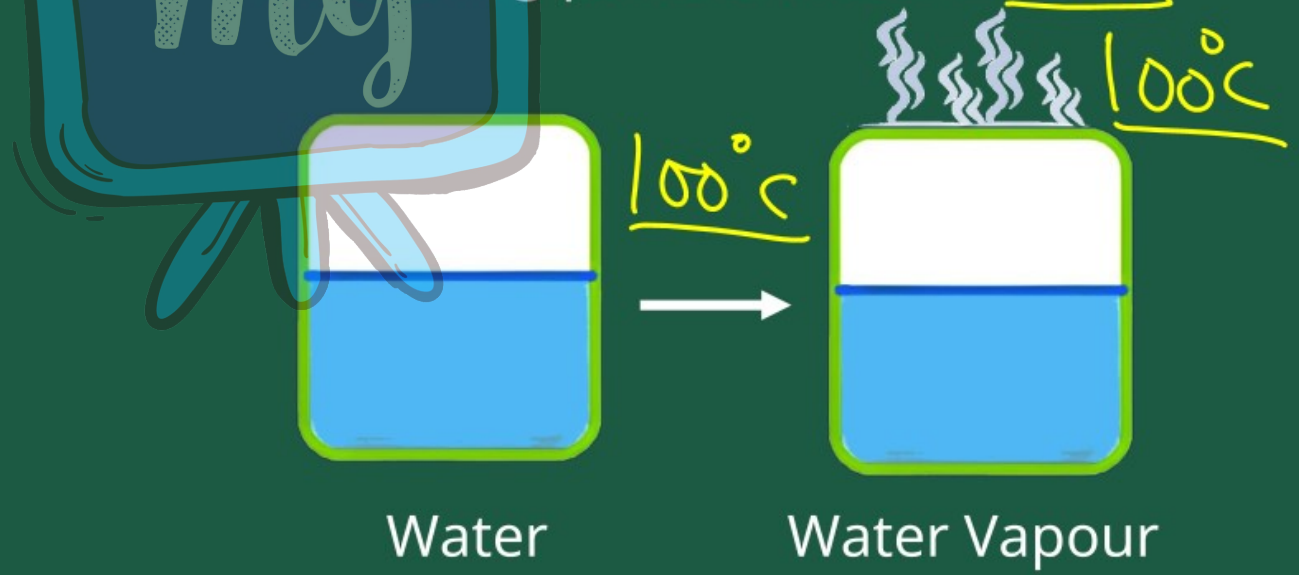
- The temperature at which a liquid starts boiling at the atmospheric pressure is known as its boiling point.
- The boiling point of water is 373 K



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LATENT HEAT OF VAPORISATION

☛ The amount of heat energy that is required to change 1 kg of a liquid into gas at atmospheric pressure at its boiling point is known as the latent heat of vaporisation.

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Ice (0°C) —0°C→ Water (0°C)

+ latent heat of fusion

less energetic particles

More energetic particles

Water (100°C) —100°C→ Water Vapour (100°C)

+ latent heat of vapourisation

less energetic particles

More energetic particles

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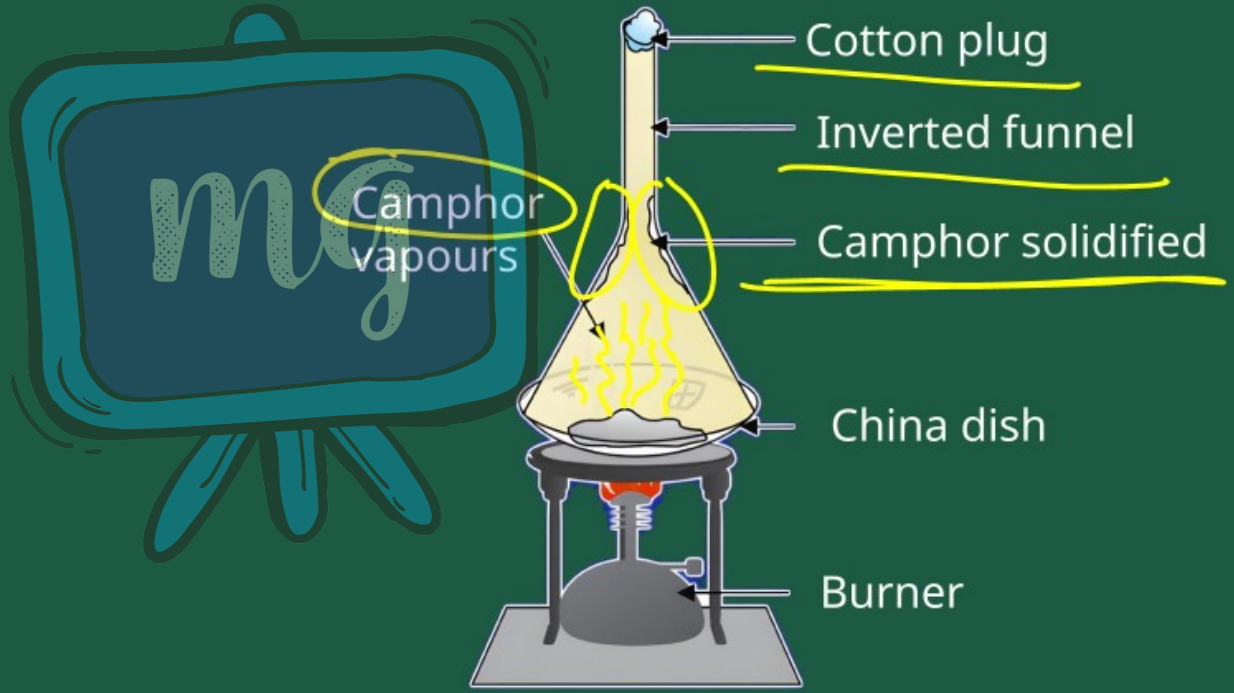
SUBLIMATION



Sublimation of camphor

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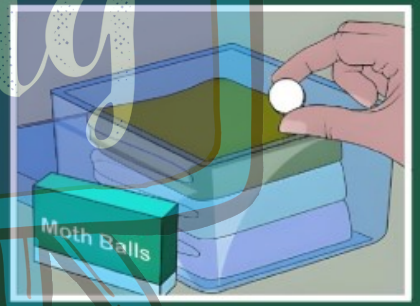
- A change of state directly from solid to gas without changing into liquid state is called sublimation.



Naphthalene



Ammonium Chloride

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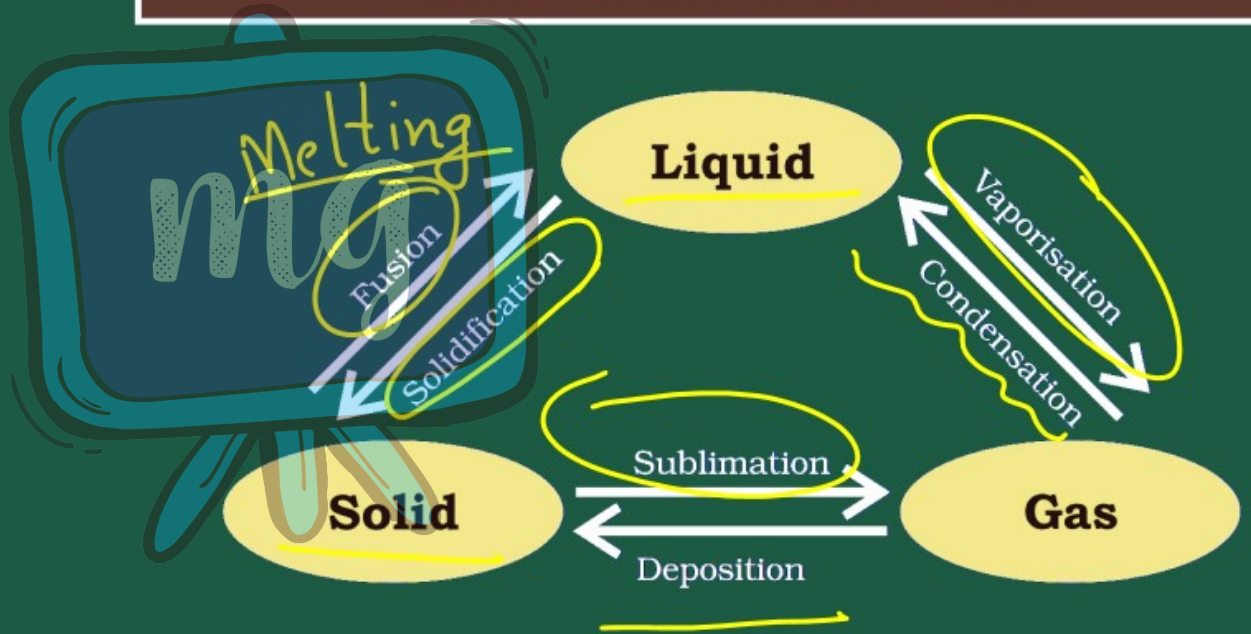
INTERCONVERSION OF THE THREE STATES OF MATTER



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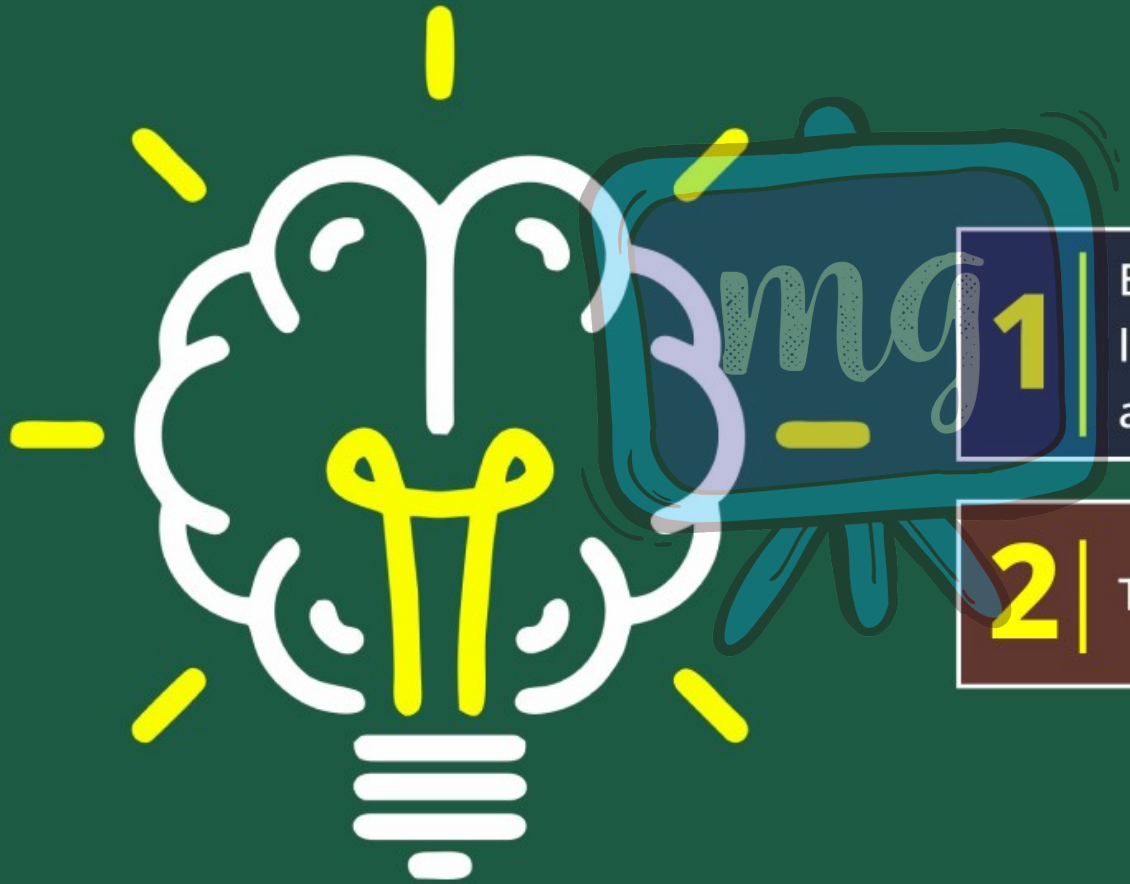
LEARNING OUTCOMES



1. Behavior of particles of solid, liquid and gas on increasing and decreasing temperature

2. The Process of Sublimation

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ASSESSMENT



1 | The boiling point of water at sea level is

A 0°C

B 273 K

C 373 K

D 273°C

⟹ Melting point = 100°C

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ASSESSMENT



2 The solid which undergoes sublimation is-

A Ice Cube

B Naphthalene

C Sodium Chloride

D Potassium Chloride

≠ Ammonium Chloride

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ASSESSMENT



3 Which of the following has highest energy ?

A Particles of ice at 0°C

B Particles of water at 0°C

C Particles of water at 100°C

D Particles of steam at 100°C