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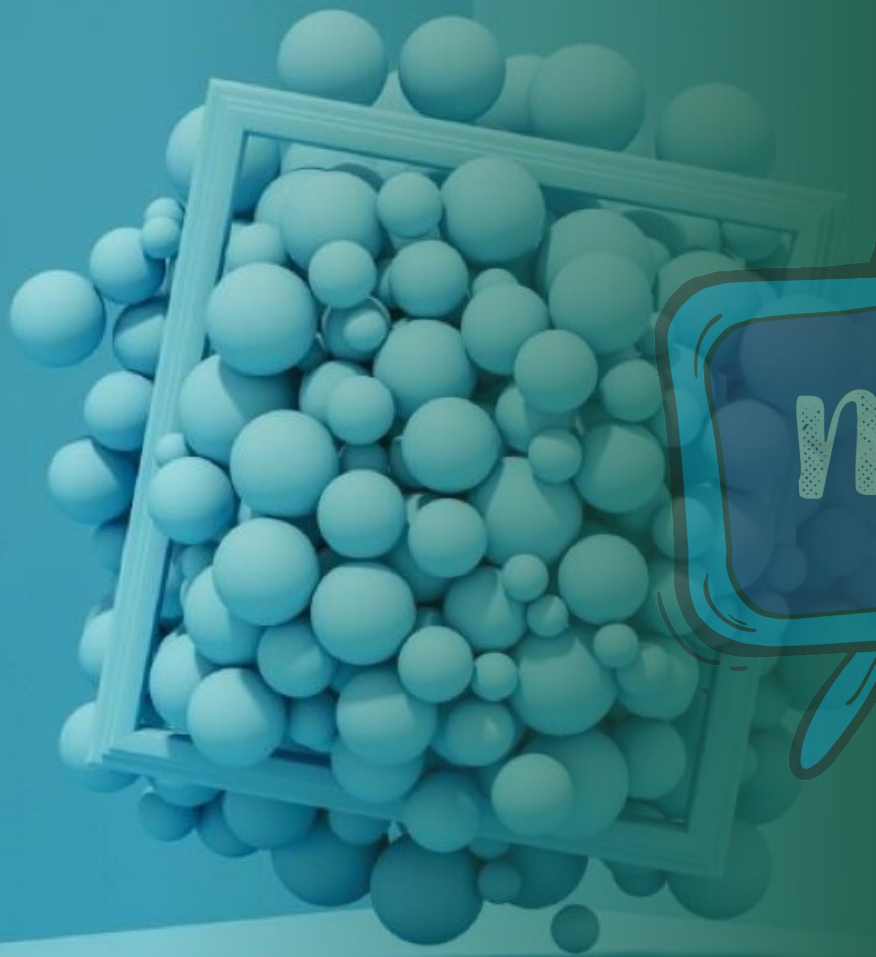

Class–9

SCIENCE

Chapter – 1

Matter in Our Surroundings

Part – 4

Evaporation

Deeksha Pahilajani

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OVERVIEW

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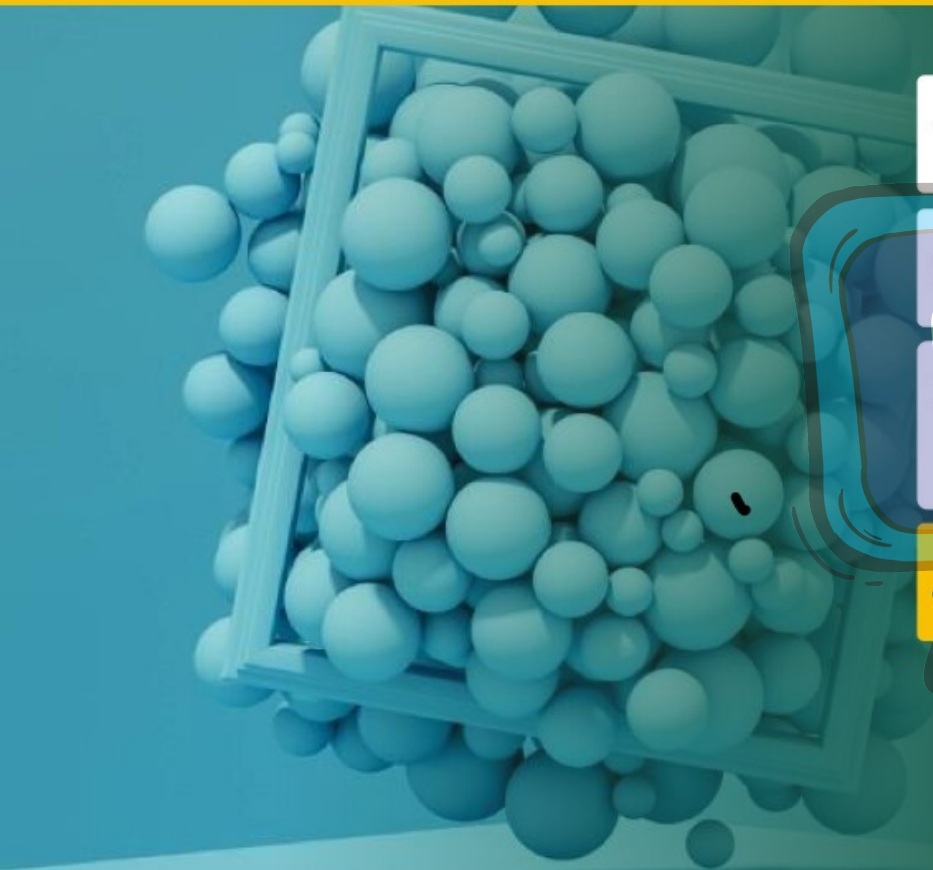

1. Matter
2. States of Matter
3. Interconversion of States of Matter–Effect of Temperature
4. Evaporation

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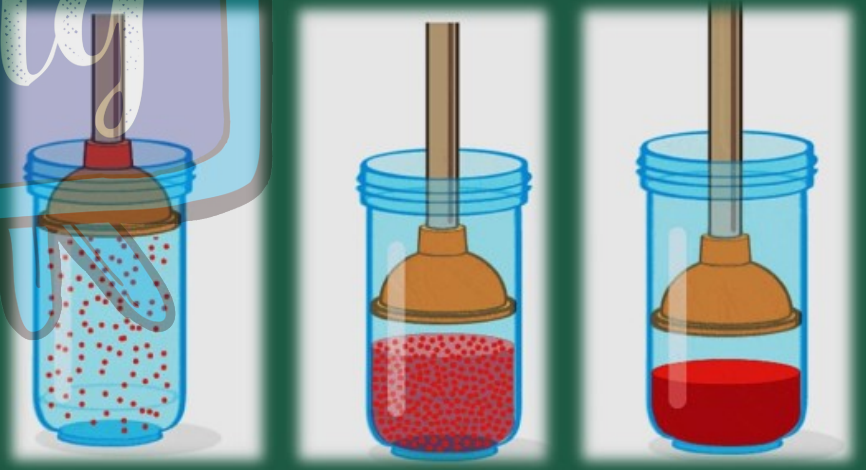
EFFECT OF CHANGE OF PRESSURE

☛ By applying pressure, particles of matter can be brought close together.



Gas Liquid Solid

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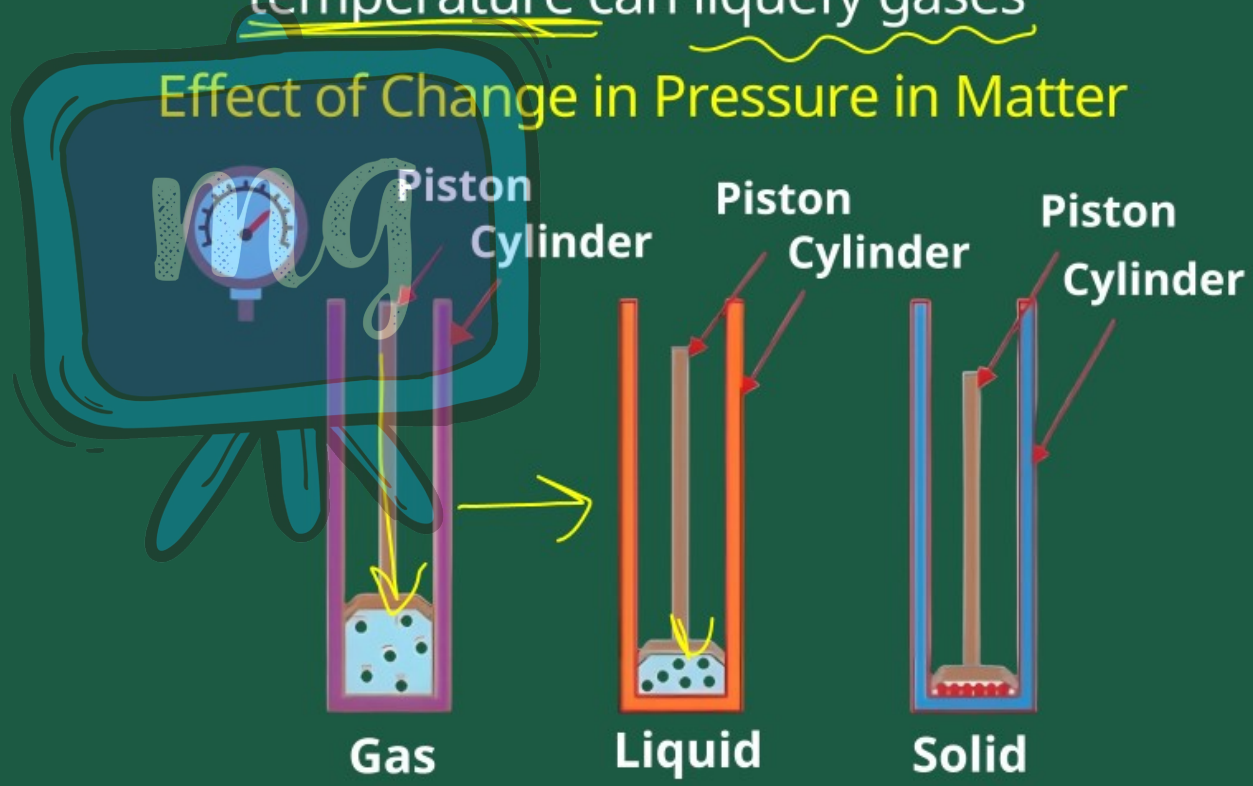
Gas → high

Liquid → less

Liquid Low KE

- Applying pressure and reducing temperature can liquefy gases

Effect of Change in Pressure in Matter



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Gas ⇌ Solid

DRY ICE-SOLID CARBON DIOXIDE

- Solid CO_2 is stored under high pressure
- It gets converted directly to gaseous state on decrease of pressure to 1 atmosphere without coming into liquid state.

$-78^{\circ}C$



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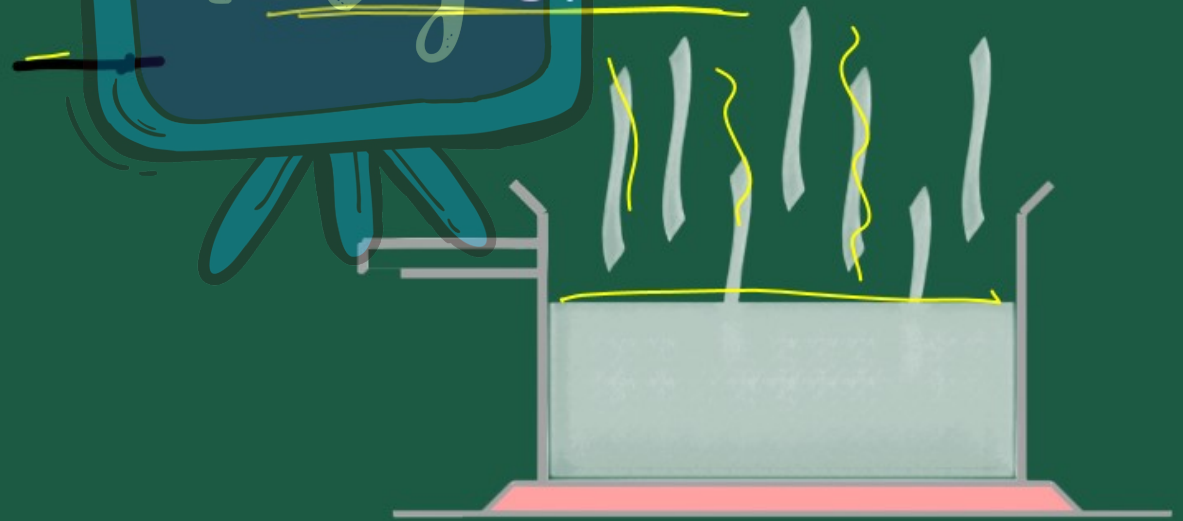
Liquid → Gas

EVAPORATION

☛ The phenomenon of change of a liquid into vapours at any temperature below its boiling point.



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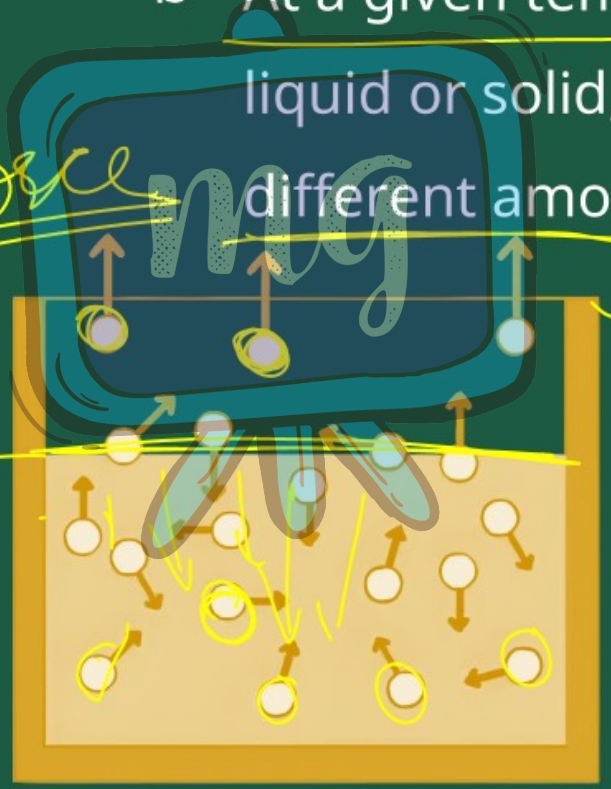
- Particles of matter are always moving.
- At a given temperature in any gas, liquid or solid, there are particles with different amounts of kinetic energy.



High Energy: Evaporating

Medium Energy: Pulled back into water

Lower Energy: Remain as liquid

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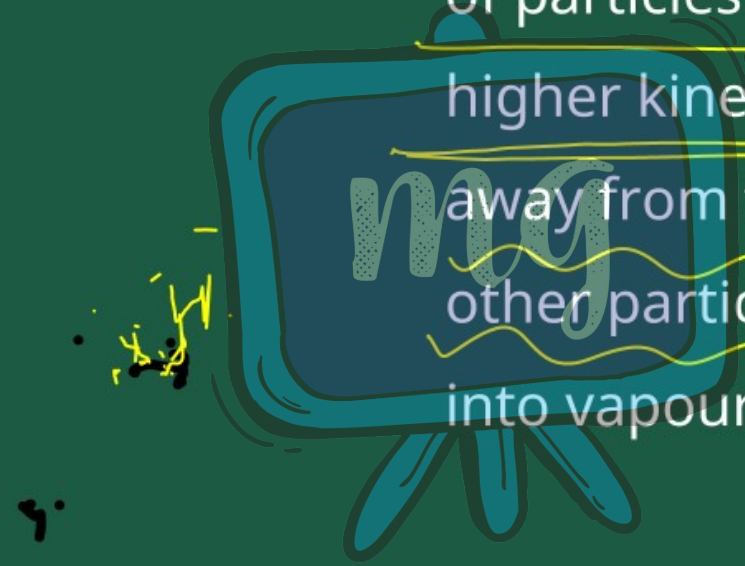
- In the case of liquids, a small fraction of particles at the surface, having higher kinetic energy, is able to break away from the forces of attraction of other particles and gets converted into vapour.



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EVAPORATION v/s BOILING

- Evaporation happens at any temperature. Boiling, on the other hand, happens at a specific boiling point.
- Evaporation is a surface phenomena whereas boiling is a bulk phenomena.

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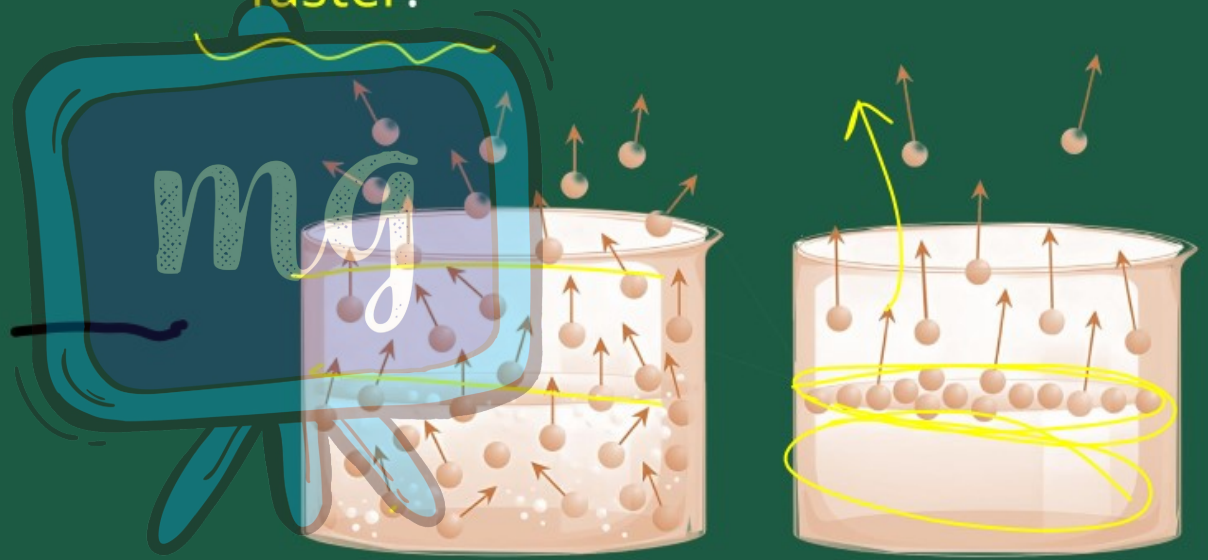
☛ Evaporation is slower while boiling is faster.



Boiling Evaporation

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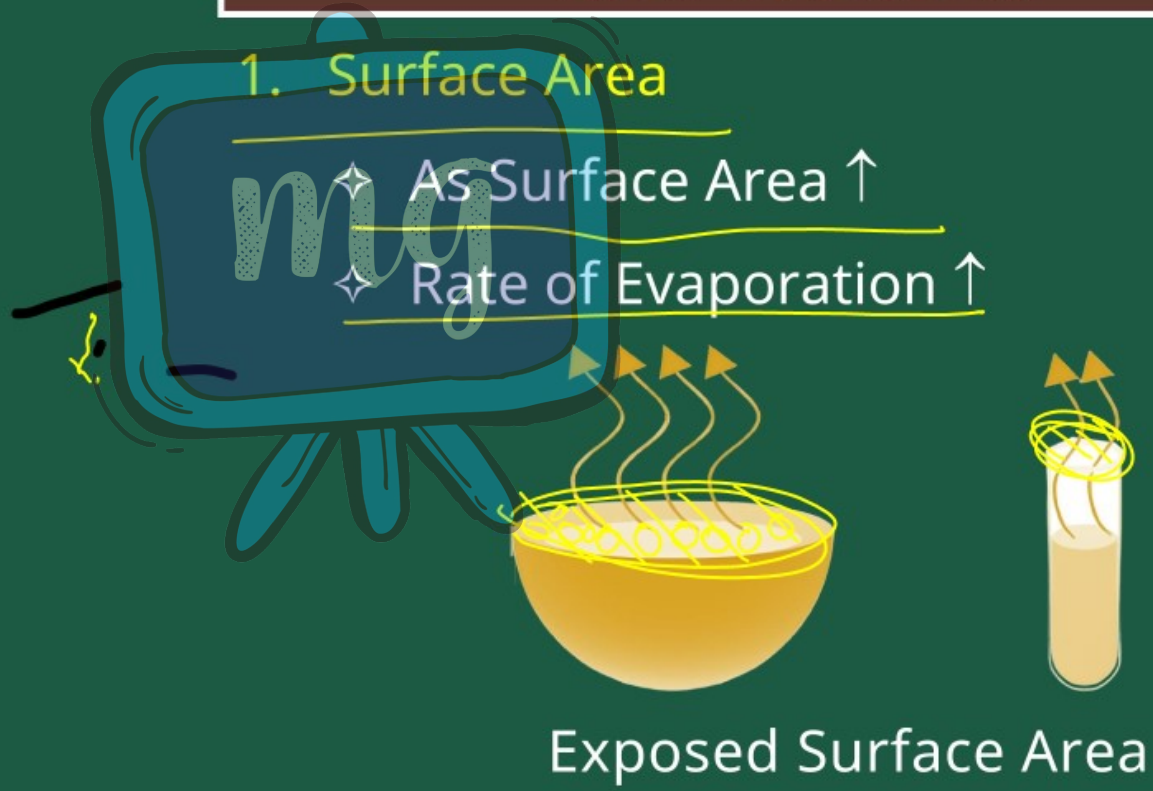
FACTORS AFFECTING EVAPORATION

1. Surface Area

- As Surface Area ↑
- Rate of Evaporation ↑



Exposed Surface Area

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2. Temperature

- As Temperature ↑
- Rate of Evaporation ↑

3. Humidity

- As Humidity ↑
- Rate of Evaporation ↓

4. Wind Speed

- As Wind Speed ↑
- Rate of Evaporation ↑

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HOW DOES EVAPORATION CAUSE COOLING?



- In an open vessel, the liquid keeps on evaporating.
- During evaporation, the particles of liquid absorb energy from the surrounding.
- This makes the surroundings cold.

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EVAPORATION CAUSES COOLING- EXAMPLES

What happens when you pour some acetone (nail polish remover) on your palm ?



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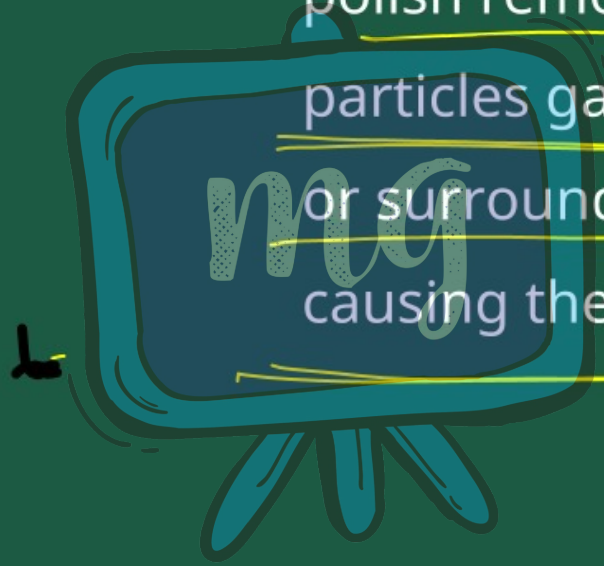

- When you pour some acetone (nail polish remover) on your palm, the particles gain energy from your palm or surroundings and evaporate causing the palm to feel cool.

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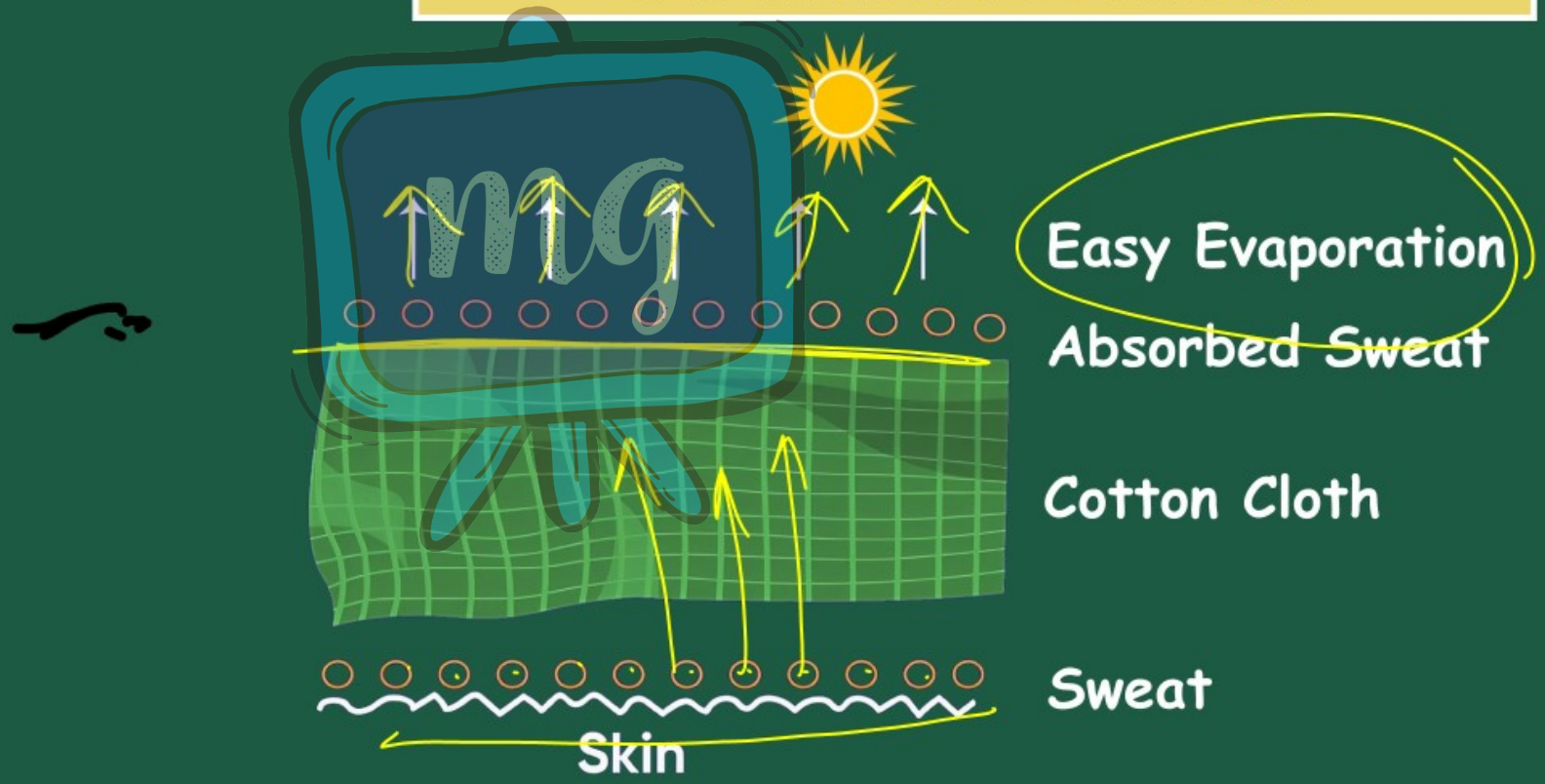
WHY SHOULD WE WEAR COTTON CLOTHES IN SUMMER?



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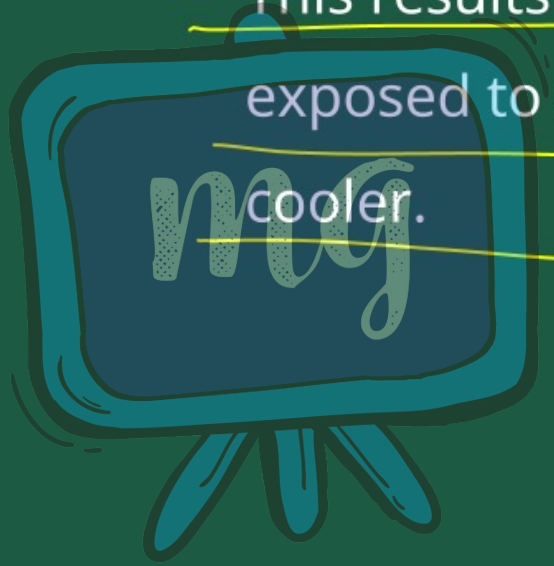
- Cotton clothes absorb sweat easily. This results in evaporation as it is exposed to air and leaves our body cooler.



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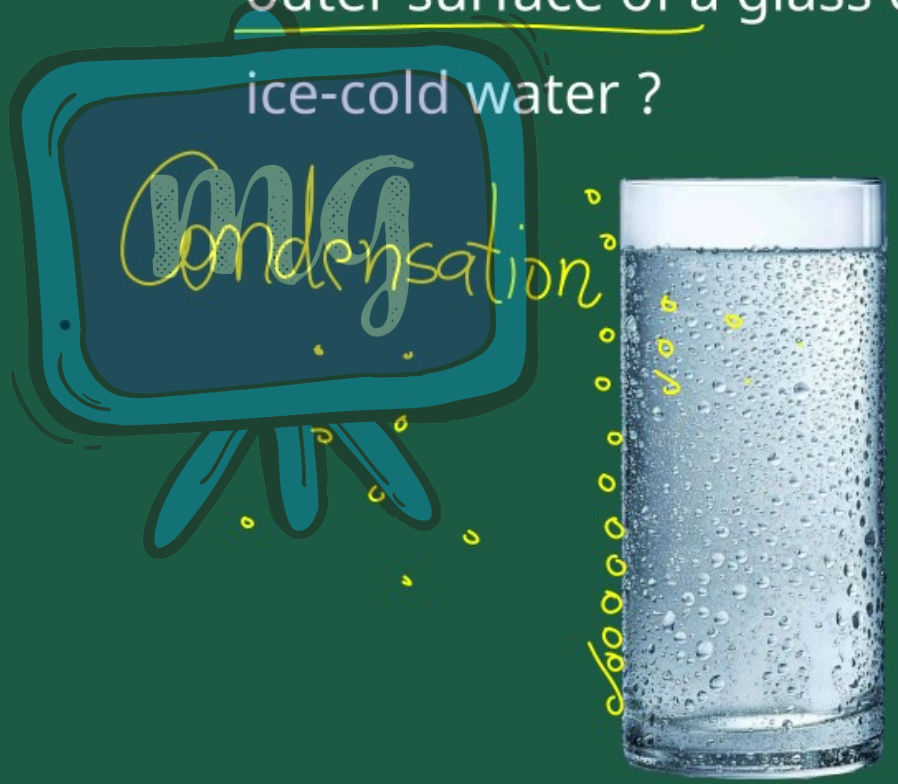
Liq ← Gas

Low High

☛ Why do we see water droplets on the outer surface of a glass containing ice-cold water ?



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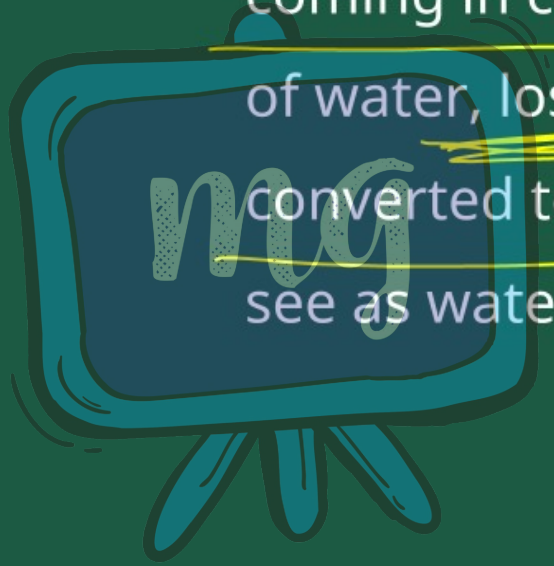
- The water vapour present in air, on coming in contact with the cold glass of water, loses energy and gets converted to liquid state, which we see as water droplets.



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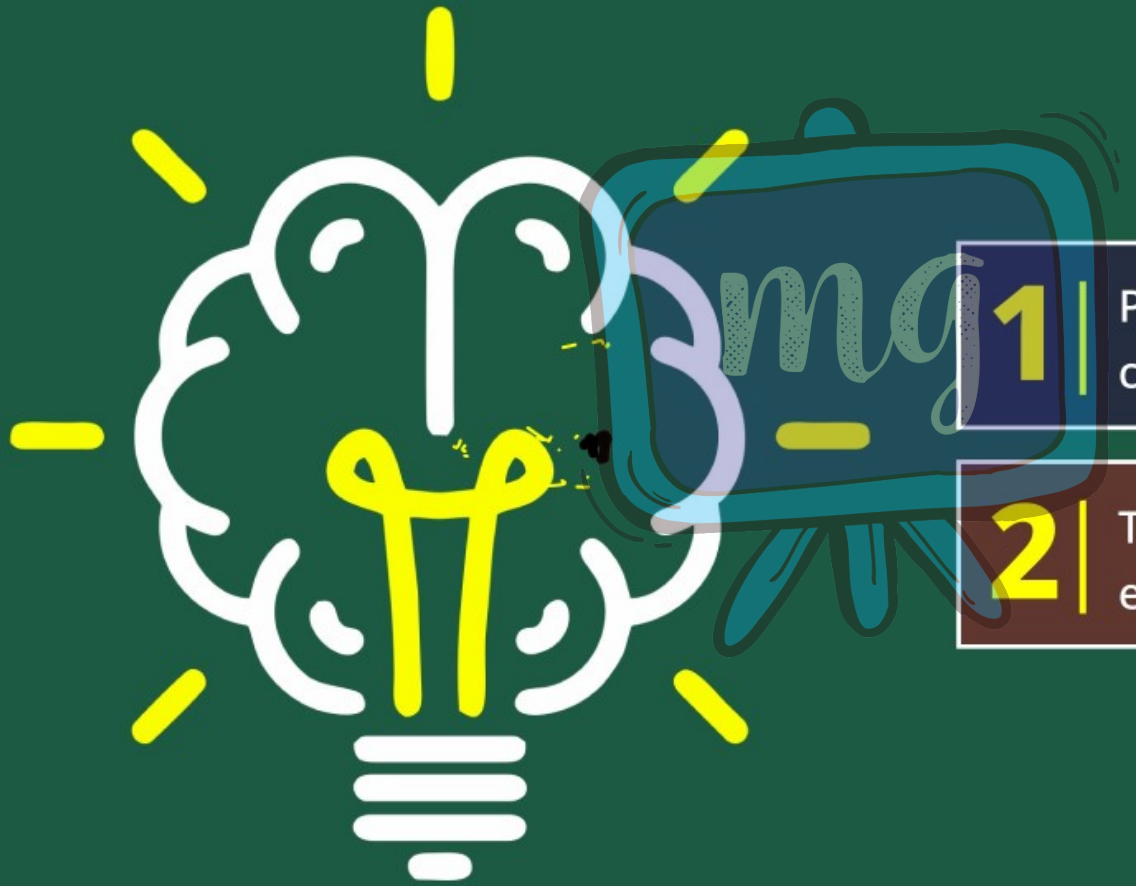
LEARNING OUTCOMES



1. Pressure changes causing change in state
2. The phenomenon of evaporation

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ASSESSMENT

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Gas → Liquid → Low Space less

High

Space more

1 | Which of the following conditions is most favourable for converting gas into liquid ?

A. High pressure, low temperature

B. Low pressure, low temperature

C. Low pressure, high temperature

D. High pressure, high temperature

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ASSESSMENT



2 Which of the following does not affect rate of evaporation ?

A Wind Speed

B Surface Area

C Temperature

D Insoluble Heavy Impurities

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3 Which of the following is most suitable for summer ?

A Cotton

B Nylon

C Polyester

D Silk

do not absorb sweat easily