

Chapter - 1 Matter in Our Surrounding

• Anything which has mass and occupy space is called matter
ex - Table, chair, air

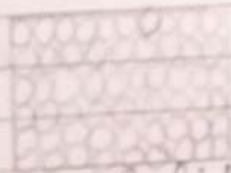
• Matter is made up of small particles called molecules

• States of matter

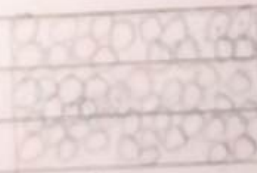
- ★ Solid -
- ★ Liquid
- ★ Gas

★ Plasma

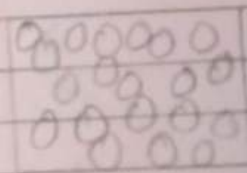
★



Solid



liquid



gas

★ Inter particle space

Space between small particles (molecules) of matter is called interparticle space

★ Interparticle force

Force ~~act~~ of attraction acting between the particles of matter / molecules is called interparticle force

- Interparticle space is vice-verse to interparticle force
Ex- In solid, if the interparticle space is less and so the interparticle force is high

★ Characteristics of Particles of Matter

1) Particles of matter have space / interparticle space between them

Ex- Act 1.2

2) Particles of matter are very very small

Ex - Act 1.2

3) Particles of matter are continuously moving

Ex- When you spray a room freshener in a room the smell of the freshener can be smelled outside of the room. Because the particle moves from one room to other.

4) Particles of Matter Attract Each Other

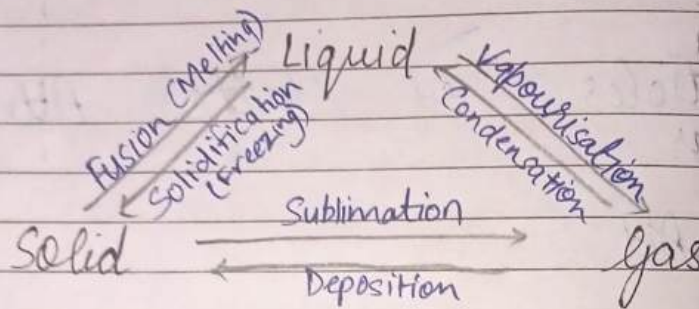
Ex- Attraction

* Diffusion

The process in which ^{more} particles of ^{two} matter intermingle ~~is~~ ^{is} called diffusion.

Eg: Mixing of water vapours into air ^{after} during evaporation

P.T.O



Interconversion of state of matter

Sr	Property	Solid	Liquid	Gas
1	Interparticle space	very less	less	maximum
2	Interparticle force	very strong	less strong	weak
3	State of motion	minimum	more	maximum
4	Shape	definite	indefinite	indefinite
5	Volume	definite	indefinite	indefinite
6	Rigidity	high	fluid	fluid
7	Density	high	moderate	low
8	Compressibility	very low	low	very high
9	Diffusion	very slow	slower	high
10	Fluidity	No	can flow	can flow
11	Kinetic energy	zero	more	very high

*a) Effect of change in Temperature

- By increasing the temperature a solid can be converted into liquid state and liquid can be converted into gaseous state and by decreasing the temperature a gas can be converted into liquid state and a liquid can be converted into solid state

) Solid to liquid change (melting/fusion)

The process in which a solid substance changes into liquid on heating

is called melting / fusion

Ex- Ice changes into water on heating

* Melting Point - The temperature at which a solid substance starts melting/melts and changes into a liquid at atmospheric pressure is called melting point of substance

Ex - Melting point of ice is 0°C
Melting point of wax is 63°C
Melting point of iron is 1535°C

2) Liquid to gas change (Vaporisation / boiling)

* The process in which a liquid substance changes into gas on heating is called boiling / vaporisation / vaporization

Ex - Boiling of water

* Boiling Point - The temperature at which a liquid substance starts boiling/boils and changes into gas rapidly into a gas at atmospheric pressure is called boiling point of the liquid

Ex - Boiling point of water is 100°C
Boiling point of alcohol is 78°C

3) Gas to Liquid change (Condensation)

The process of changing of a gas or a vapour into liquid by cooling is called condensation.

Ex - Steam changes into water

→ Condensation is the reverse of boiling

4) Liquid to Solid change (Freezing / Solidification)

The process of changing of a liquid into a solid state by cooling is called freezing / solidification.

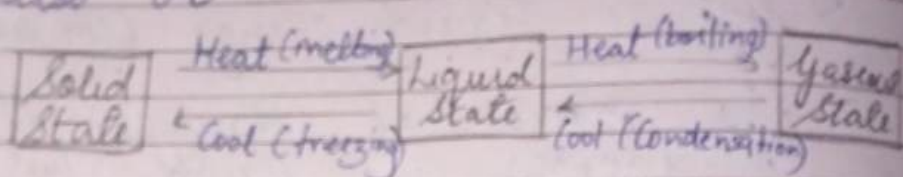
Ex - Freezing of water

→ Freezing is the reverse of melting

* Freezing point - The temperature at which liquid freezes and changes into a solid is called freezing.

point of a liquid

ex - Freezing point of water is 0°C .
the melting point of water is also 0°C



* Latent heat (hidden heat)

The heat energy which has to be supplied to change the state of substance is called its latent heat. Latent heat does not increase the temperature. It is called latent heat because it becomes hidden in the substance undergoing the change of state and does not show the presence by increasing temperature.

• Types of latent heat (hidden heat)

1) Latent heat of fusion (solid to liquid change)

The latent heat of fusion of a solid is the quantity of

heat in joules required to convert 1kg of the solid to liquid at its melting point, without any change in temperature

Ex- The latent heat of fusion of the ice is 3.34×10^5 (joules/Kilogram)
J/Kg

2) Latent heat of vaporisation (liquid to gas)

The latent heat of vapourisation of a liquid is quantity of ^{heat} in joules required to convert 1kg of liquid to gas at its boiling point without any change in temperature

Ex- The latent heat of vapourisation of water is 22.5×10^5 J/Kg

3) Solid to gas change (Sublimation)

The process in which a solid directly converts into a gas on heating is called Sublimation

Ex- Iodine, Camphor, ~~Naphthalene~~ ^{Na} Naphthalene balls, dry ice and Ammonium chloride are directly converted into gases

a) Gas to solid change (deposition) -

The changing of vapours into solid on cooling is known as deposition

Ex - Conversion of carbon-dioxide gas into dry ice

b) Effect of change of Pressure

The physical state of matter can also be changed by increasing the pressure or decreasing the pressure.

Ex - Gases can be changed into liquids or solids by increasing the pressure accompanied by lowering the temperature and some solids can be changed into gases on decreasing the pressure and higher the temperature

P.T.O

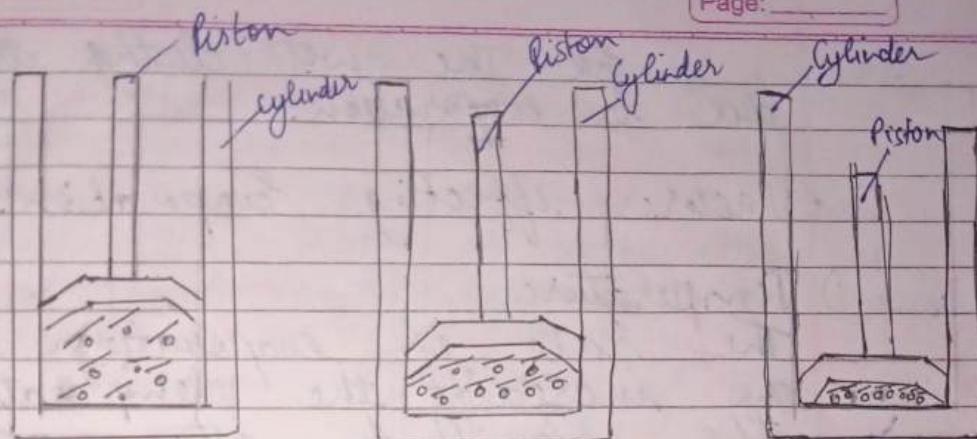


Fig 1.8 By applying pressure, particles of matter can be brought up closer

* ~~Evaporation~~ Evaporation

The process of a liquid changing into vapour or gas even below its boiling point is called evaporation.

→ In this process some of the liquid at the surface turns into vapour. Thus, when a liquid turns into a vapour, it is said to evaporate.

→ Whatever be the temperature at which the evaporation takes place the latent heat of vapourisation must be supplied whenever a liquid changes into vapour.

Ex- The wet clothes dry due to evaporation.

• Factors effecting Evaporation

i) Temperature

The rate of evaporation increases on increasing the temperature of the liquid. In other words rate of evaporation of a liquid increases on heating.

ii) Surface area of the liquid

The rate of evaporation increases on increasing the surface area of the liquid.

Ex- If the tea kept in a cup and a saucer, then the tea kept in the saucer will evaporate more rapidly than the cup.

(iii) Humidity of air

The amount of water vapour present in air is called humidity.

→ When the amount of water vapours present in air is large, the

dry

air appears to be damp and we say that humidity is high.

→ When the humidity of air is low than the rate of evaporation is high and water evaporates more rapidly.

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liquid

→ When the humidity of air is high than the rate of evaporation is low and water evaporates very slowly

d

iii) Wind Speed

increases
area

The rate of evaporation of liquid increases with the increasing wind speed.

ex - ~~then~~ ^{With} the increasing wind speed wet clothes dry more quickly due to high speed of wind.

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• Cooling cause by evaporation

? We have studied that whenever a liquid evaporates, it must be supplied the latent heat of vapourisation from anything which it touches by losing heat this anything gets cooled.

humidity

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the

Ex- After a hot sunny day, people sprinkle water on the roof or open ground because the large latent heat of vapourisation of water helps to cool the hot surface.

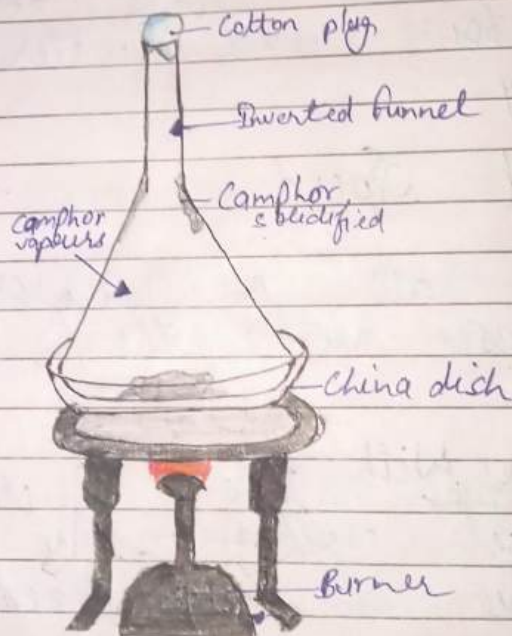


Fig Sublimation of camphor

Holiday Homework

- 1) Give reason for the following,
1) The smell of hot sizzling food reaches you several meters away, but to get the smell from cold food you have to go close?

Ans You can smell hot sizzling food from several meters away because due to the temperature aromatic smell of food diffuses and reaches your nose and smell it while in case of cold food due to low temperature no smell evaporates and diffusion. Thus you have to go close to smell the food.

- 2) How does the water kept in earthen pot (matka) become cool during summer?

Ans The (matka) earthen pot has small pores ~~which~~ during summer due to high temperature the water evaporates and go through pores giving a cooling effect and thus keeping water inside the matka cool.

III) Why are we able to sip ^{hot} tea or milk faster from a saucer rather than a cup?

Ans We can sip hot tea or milk easily from a saucer rather than a cup. Because in a saucer the surface area increases which increases the rate of evaporation giving a cooling effect which makes the tea or milk cool and easy to sip from a saucer.

IV) Naphthalene balls disappear with time without leaving any solid?

Ans Naphthalene balls disappear with time without leaving solid due to a process called Sublimation. Sublimation is a process in which solid substance change directly into gaseous state instead of going to liquid state first. Naphthalene balls at room temperature state starts to change in gaseous state due to less interparticle force.

Q) We can get the smell of perfume sitting several meters away?

Ans When we spray perfume the particles of perfume diffuse with ^{air} spreading all over thus making it smell from several meters.

Q) An almirah is a solid at room temperature

Ans An almirah is typically made out of iron or wood. In case of iron, iron it has a

high melting point, more interparticle force, more density, less compressibility and more rigidity. In case of wood also it has more interparticle force, more density, more rigidity and less compressibility making it as a solid at room temperature.

VII Why is that on increasing wind speed the rate of evaporation increases?

Ans With wind speed increase the rate of evaporation increases. As high wind speed the air filled with humidity is pushed making it easy to evaporate water. If the air ~~be~~ be filled with water vapour the evaporation will slow down but due to wind it is blown away and thus making space for more water to evaporate.

VIII To

Ans

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9) De

10) Pl

11) Kin

VIII) Tabulate the differences in the characteristics of states of matter

Ans Properties	Solid	Liquid	Gas
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