Matter Around Us

Improve your learning

Q. 1. A. Describe an activity which provides the evidence for the motion of particles

Answer : Activity 4: Diffusion of Incense Stick in Air

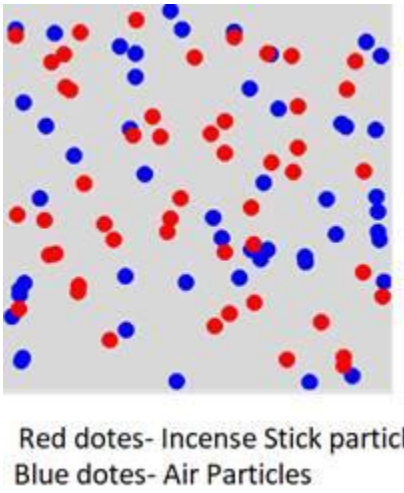

Fig.1

As We lights the Incense stick. Scent in the vapor form. Vapor particles of scent mixed with air and reach each corner of the room, which is called diffusion. This activity shows us the particles of matter are movable.

Q. 1. B. Describe an activity which provides the evidence for attraction between particles

Answer : Activity 8: Force of attraction between particles of matter

Trying to break nail and water stream. We cannot break the Water stream because there is attraction between particles. As you can see in fig.2 solid have very Strong Forces of attraction which restrict the motion of particles that's why its shape and size are fixed. In liquids weaker forces of attraction than solids that's why volume is not fixed. Gases have the weakest forces of attraction. That's why Gas particles have the highest mobility. Mobility of liquid particles is very high than Solid particles.

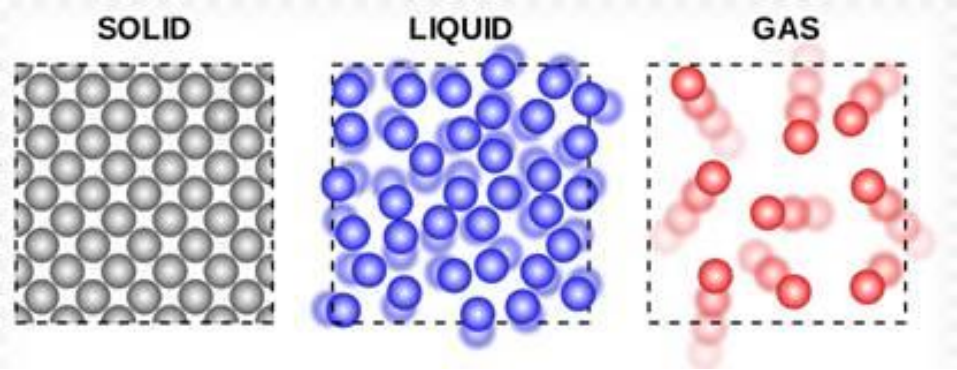

Fig.2

Q. 1. C. Describe an activity which provides the evidence for inter-particle space

Answer : Activity : Solution of Salt and water

As we dissolve sugar in water. We can see there is no change in the level of water. Water particles have inter-particles spaces. Sugar particles occupy those spaces. That's why there is no change in the level of water. This activity shows us matter has inter-particle space.

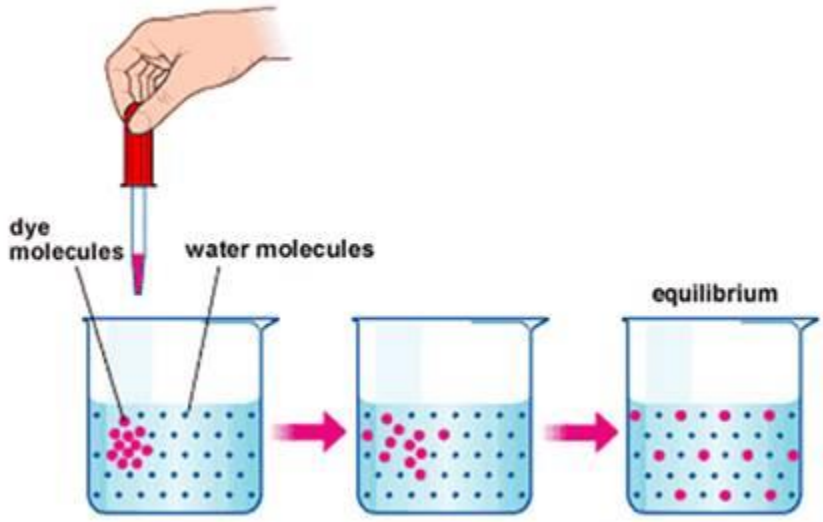

Fig.3

Q. 2. Name the characteristics of matter that are demonstrated by diffusion.

Answer : 1. Particles of matter have spaces between them. You can see in this Fig.1 air particles have spaces between them

2. Particles of matter can move. Particles move from high Concentration to low concentration. As we light the incense stick in room we can smell its fragrance everywhere in the room.

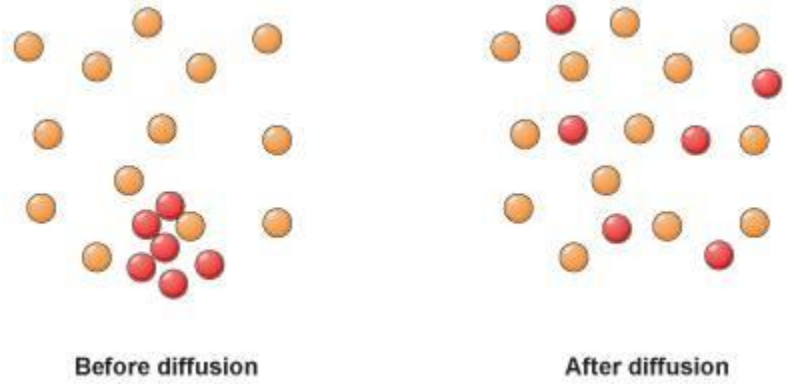

Fig.4 Diffusion in gases

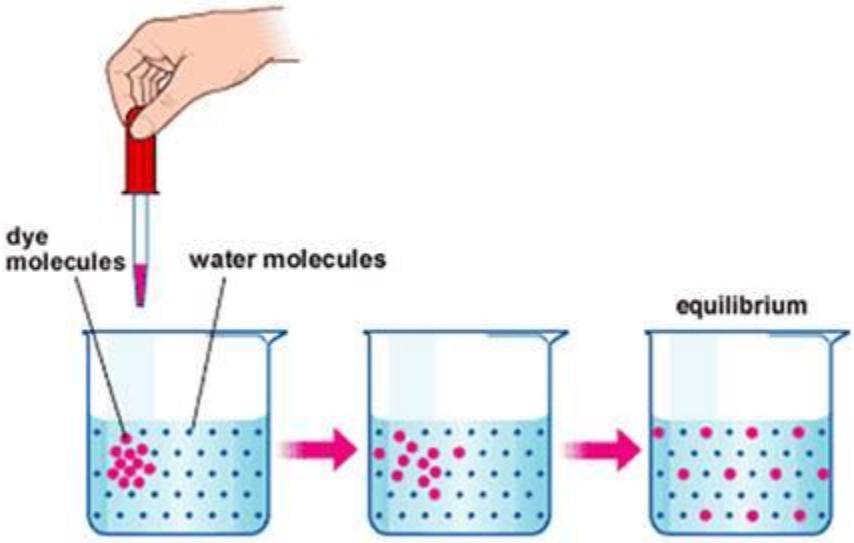

Fig.5 Diffusion in liquids

Q. 3. "When sugar is dissolved in water there is no increase in volume". Is it true or false?

Answer : There is no increase in volume. Particles of water have some spaces between them. As we dissolve sugar, Sugar particles occupy the free space between water particles. If add more and more sugar then it will reach the solubility limit of water then no more sugar will be soluble so sugar will deposit, then it will increase the volume

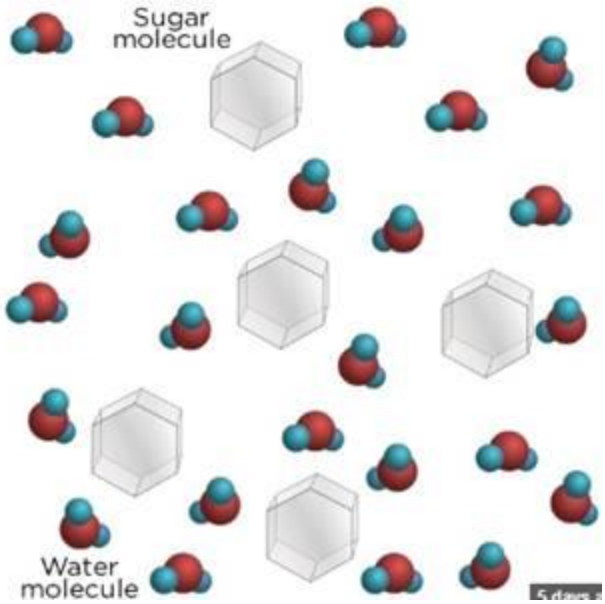

Fig.6

Q. 4. Is there any change in mass when a substance changes its state? Explain with example.

Answer : No. Mass is neither created nor destroyed.

Explanation: If I have 50grams of ice and I put it in a beaker I allow it to melt. The mass of liquid will be same i.e. 50grams.

Q. 5. Do all substances change from solid to liquid and liquid to gas on heating? Explain.

Answer : No. Some Solids do not convert into liquid eg Naphthalene balls, woods. It depends on the molecular energy of the solid. Bond Dissociation energy of naphthalene balls particles are very low that's why it does not convert into liquid. Woods have tightly packed structure. Dry ice is a frozen CO_2 at -78.5^0C CO_2 particles have weak wan der val forces. That's why it converts into gas from solid state.

Fig.7

Q. 6. Define the following terms:

a) melting point
b) boiling point
c) evaporation

Answer : (a) **Melting Point:**

Temperature at which solid starts to melt. Melting point is the temperature at which solid and liquid state exists in Equilibrium. This process is called melting.

(b) **Boiling Point:**

Temperature at which liquid starts to boil at atmospheric pressure. Vapor pressure of liquid equal to the atmospheric pressure. This process is known as boiling.

(c) **Evaporation:**

Evaporation is the process of a substance in a liquid state changing to a gaseous state due to an increase in temperature and/or pressure. It is Surface phenomenon Liquid molecules collide each other and transfer energy to each other, When Liquid molecule at surface absorbs enough energy to overcome the vapor pressure.

Fig.8

Q. 7. Correct the following statements.

a) Water boils at 100°C under atmospheric pressure. 14 Matter Around us
b) a liquid evaporates above its boiling point
c) solids have the largest inter-particle space.
d) gases have the strongest inter-particle forces.

Answer : (a) Water boils at 100°C when pressure around the water is atmospheric pressure, that is 1atm = 1.01×10^5 Pa.

(b) a liquid evaporates below its boiling point. In this process Liquid Molecule collide each other and transfer energy to each other, so that molecule at surface absorbs enough energy to overcome the vapor pressure.

(c) Solids have Lowest inter particle space. That's why Solids have fixed shape and size.

(d) Gases have the weakest inter particle Forces. That's why gases do not have fixed size and shape.

Q. 8. Why do we prefer to sip hot tea with a saucer rather than a cup?

Answer : The rate of vaporization increases with an increase in surface area. Saucer has higher surface area so it is easy to sip hot tea with saucer. So there will be more hot particles form into vapor and cool down the tea. In the cup due to less surface area less hot particles will be at the surface, so there will be less hot particles convert into vapor and cool down of tea will take more time.

Q. 9. When water solidifies to ice then heat is

a) Liberated
b) Absorbed
c) No change
d) Depending on the condition heat may absorbed or liberated.

Answer : Liberated

When water liberates heat its temperature decreases. If at 0°C water further liberates energy then solidifies to ice. This process is known as freezing.

Q. 10. Convert the following temperatures to the Celsius scale.

(a) 283k
(b) 570k

Answer : a) Temperature in kelvin = Temperature in Celsius + 273

T(K) = 273 + T(°C)

Using same formula,

283 = 273 + T(°C)

T(°C) = 283-273

T(°C) = 10°C

b) Using above formula,

T(K) = 273 + T(°C)

T(°C) = T(k)-273

T(°C) = 570-273

T(°C) = 297°C

Q. 11. Convert the following temperatures to the Kelvin scale.

(a) 27°c
(b) 367°c

Answer : a) Using above Formula,

T(K) = 273 + T(°C)

T(K) = 273 + 27

T(K) = 300K (K represents kelvin(unit))

b) Using above Formula,

T(K) = 273 + T(°C)

T(K) = 640K

Q. 12. How can we smell perfume sitting several metres away from the source?

Answer : When perfume is released from the bottle it quickly turns into vapor. Vapor particles have less force of attraction than liquid. That's why rate of diffusion of gas is very high than liquid. Thus we can get the smell of perfume sitting several metres away from the source.

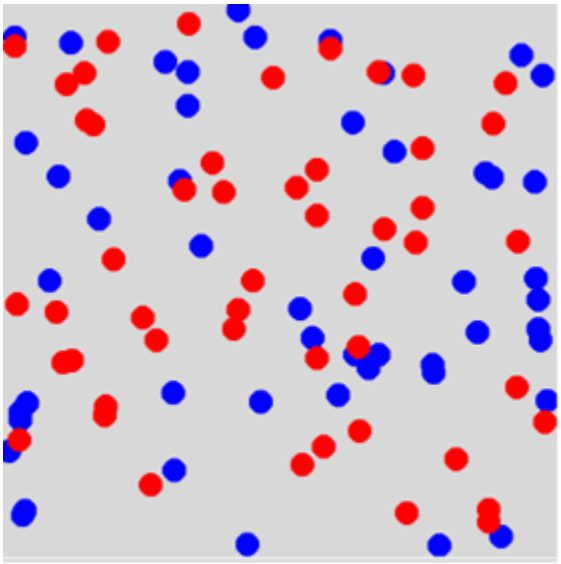

Fig.9

Q. 13. Steam produces more severe burns than boiling water. Think why?

Answer : At Boiling temperature of liquid does not change. It absorbs energy to convert into vapor. That's why Steam has more Energy than Water at boiling temperature.

Q. 14. Fill in the blanks.

a) Temperature does not change while a solid substance is …….. or a liquid

substance is…….
b) A vapour on cooling changes into …….and on further cooling changes into……..
c) Matter changes from one state to another either raising the …… or lowering the ……
d) A change in which a solid on heating directly changes into vapour state is called ……
e) The inter particle spaces are …… in gaseous and …… in solids.

Answer : (a) Melting, boiling

At melting and boiling temperature substance absorbs heat to change its phase.

(b) Liquid, Solid

As Vapor loses heat it converts into liquid, on further cooling its temperature decreases and it will convert into solid.

(c) Temperature, Pressure

Water boils when its surrounding pressure is equal to its vapor pressure. If I keep temperature constant and change its pressure so that it's surrounding pressure equals to the vapor pressure. It will boil.

(d) Sublimation

(e) Highest, Lowest

Q. 15. Match the following.

a) conversion of liquid into gas ( )	(i) gas
b) Non- compressible ( )	(ii) solid
c) maximum expansion ( )	(iii) particle
d) constituents of matter ( )	(iv) evaporation

Answer : (a) (iv)

Conversion of liquid into gas is called evaporation.

(b) (ii)

Solids are non-compressible.

(c) (i)

Gas particles have the weakest inter particle forces.

(d) (iii)

Every matter is made up of particle.

Q. 16. How do you appreciate sweating mechanism of human body to control the temperature of the body?

Answer : 1. The sweating mechanism of human body control's the temperature of the body it is really awesome.

2 When your body temperature rises above 98.6 or your body recognizes that the temperature in the surrounding air is higher than the temperature in your body, it's time to sweat. Sweat evaporates from your skin taking a little bit of your body heat with it. But sweat will only evaporate in an environment where there isn't much water in the air. In a place with high humidity, there're already lots of water molecules in the air.

So your sweat won't evaporate very much because the humid air can't hold very many more water molecules. As more sweat evaporates from your body, the air close to you becomes more humid, making it harder for your sweat to evaporate. One thing to keep in mind about sweat is hydration. Your body uses a lot of its water to make and release all the sweat it takes to cool you down. If you don't replace that water you can become dehydrated.

Q. 17. Make a model to explain the structure of particles in solids, liquids and gases.

Answer : 1. Take some beads for solids

2. Arrange those balls without spaces because solid particles are tightly arranged without any spaces. E.g. woods, box, bench etc

3. For liquids leave some space because Liquid particles have some space between them. E.g. Petrol, water etc.

4. for gases leave very much gap because gas particles have the weakest force of attraction so they have very large spaces between them. E.g. oxygen air etc.

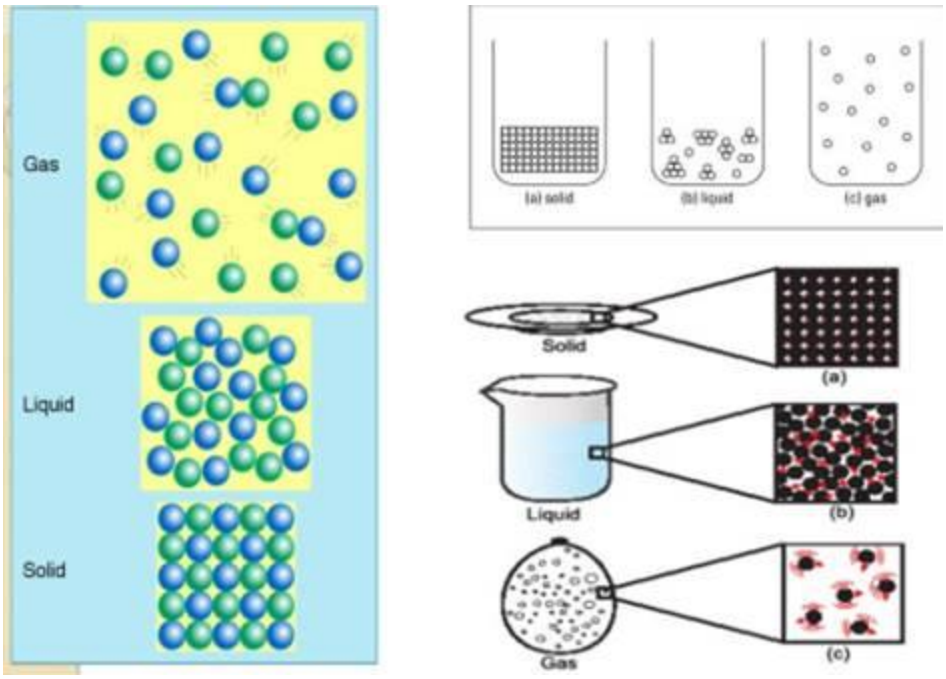

Fig.10