

## Is Matter Around Us Pure - Notes

### [Notes Important Questions](#)

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**Pure substance:-** The substance that is made up of single type of particle and that cannot be separated by any physical method is known as pure substance.

- **Types of pure substances:-**

- **Element:-** An element is a basic form of matter that cannot be broken down into simpler substances by chemical reactions. **Ex:-** Hydrogen, oxygen, gold etc.

- **Types of elements:-**

- Metals
- Non-metals
- Metalloids

- **Compound:-** A compound is a substance composed of two or more elements, chemically combined with one another in a fixed proportion. **Ex:-** H<sub>2</sub>O, NaCl, CO<sub>2</sub> etc.

**Mixture:-** The combination of two or more substances that are physical combined is called mixture.

#### Types of mixture:-

- **Homogeneous mixture:-** The mixture in which the constituents particles are uniformly mixed through out the mixture is called homogeneous mixture.
- **Heterogeneous mixture:-** The mixture in which the constituents particles are not uniformly mixed throughout the mixture is called heterogeneous mixture.

1.	Elements or compounds just mix together to form a mixture and no new compound is formed.	Elements react to form new compounds.
2.	A mixture has a variable composition.	The composition of each new substance is always fixed.
3.	A mixture shows the properties of the constituent substances.	The new substance has totally different properties.
4.	The constituents can be separated fairly easily by physical methods.	The constituents can be separated only by chemical or electrochemical reactions.

**Solution:-** A solution is a homogeneous mixture of two or more substances. **Ex:-** (i) Tincture of iodine i.e. mixture of iodine in alcohol. (ii) Aerated drinks like soda water is a solution of carbon dioxide in water. (iii) Air is a solution of gas in gas.

- **Solute:-** The component of the solution that is dissolved in the other component and which is present in smaller amount is called solute.
- **Solvent:-** The component of the solution that dissolves the other component in it and which is present in larger amount is called the solvent.
- **Solute + Solvent = Solution**

### Properties of a solution:-

- A solution is a homogeneous mixture.
- Particles of a solution are very small that we can't see by our naked eyes.
- A solution do not scatter a beam of light passing through it. So, the path of light is not visible in a solution.
- The solute particles cannot be separated from the mixture by the process of filtration.
- The solute particles do not settle down when left undisturbed that is, a solution is stable.

**Saturated Solution:-** At any particular temperature, a solution that has dissolved as much solute as it is capable of dissolving is called a saturated solution.

**Or,** The solution in which no more solute can be dissolved at a given temperature is called

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saturated solution.

**Solubility:-** The maximum amount of solute present in a saturated solution at a given temperature is called solubility.

**Concentration of solution:-** The amount of solute present in a given amount (mass or volume) of solution is called concentration of solution.

**Or,** The amount of solute dissolved in a given mass or volume of solvent is known as the concentration of the solution.

- **Concentration of solution=Amount of solute/Amount of solution**
- **Concentration of solution=Amount of solute/Amount of solvent**
- **Mass by mass percentage of a solution = (Mass of solute/Mass of solution) x 100**
- **Mass by volume percentage of solution = (Mass of solute/volume of solution) x 100**

**Suspension:-** A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium.

**Properties of suspension:-**

- A suspension is a heterogeneous mixture.
- The particles of a suspension can be seen by the naked eye.
- Particles of suspension scatter the beam of light passing through it & makes its path visible.
- The solute particles settle down when suspension is left undisturbed i.e. a suspension is unstable.
- The particles of a suspension can be separated by filtration.

**Colloidal Solution/Colloid:-** A colloidal solution is a heterogeneous mixture whose particles are uniformly spread throughout the mixture.

- **Dispersed phase:-** The solute like component in a colloid is called dispersed phase.
- **Dispersing medium:-** The component in which the dispersed phase is suspended is called dispersing medium.
- **Dispersed phase + Dispersing medium ? Colloidal Solution**

**Properties of colloidal solution:-**

- It is a heterogeneous mixture.
- The particles of a colloid are too small that we can't see by our naked eyes.
- Colloids are big enough to scatter a beam of light passing through it & make its path visible.
- They do not settle down when left undisturbed i.e. a colloid is quite stable.
- They cannot be separated from the mixture by filtration. They can be separated by the process of centrifugation.

**Common Examples of Colloids:-**

<b>Dispersed phase</b>	<b>Dispersing medium</b>	<b>Type of colloid</b>	<b>Example</b>
Liquid	Gas	Aerosol	Fog, clouds, mist
Solid	Gas	Aerosol	Smoke, automobile exhaust
Gas	Liquid	Foam	Shaving cream
Liquid	Liquid	Emulsion	Milk, face cream
Solid	Liquid	Sol	Milk of magnesia, mud
Gas	Solid	Foam	Foam, rubber, sponge, pumice
Liquid	Solid	Gel	Jelly, cheese, butter
Solid	Solid	Solid Sol	Coloured gemstone, milky glass

**Tyndall Effect:-** The phenomenon of scattering of a beam of light on passing through a colloidal solution so that its path becomes visible is called Tyndall effect.

**Methods to separate the components of a mixture:-**

**Evaporation:-** The method of separating the volatile component solvent from its non-volatile solute is called evaporation.

- **Principle:-** When mixture of volatile & non volatile components is heated then the volatile component gets converted into gaseous state.
- **Uses:-** It is used to obtain coloured component (dye) from ink.

**Centrifugation:-** The process of separating the mixture in which the denser particles are forced to the bottom & the lighter particles stay at the top when spun rapidly is called centrifugation.

- **Principle:-** The principle is that the denser particles are forced to the bottom & the lighter particles stay at the top when spun rapidly.
- **Uses:-**
  - Used in dairies & home to separate butter from cream.
  - Used in washing machines to squeeze out water from wet clothes.
  - Used in diagnostic laboratories for blood & urine tests.

**Mixture of two immiscible liquids can be separated by using separating funnel:-**

- **Principle:-** The principle is that immiscible liquids separate out in different layers depending on their densities.
- **Uses:-**
  - To separate mixture of oil & water.
  - To extract iron from its ore.

**Sublimation:-** The process used to separate a mixture that contains a sublimable volatile component from a non sublimable impurity is called sublimation.

- **Principle:-** It is based on the principle that when a mixture of sublimable volatile component & non sublimable component is heated then, the sublimable volatile component changes into gaseous state.
- **Uses:-** It is used to separate mixture of sublimable volatile component like ammonium chloride, camphor, naphthalene and anthracene from non sublimable component.

**Chromatography:-** The process used for separation of the solutes that dissolve in same solvent is called chromatography.

- **Principle:-** The component of a mixture that is more soluble in a given solvent rises faster with the solvent.
- **Uses:-**
  - It is used to separate colours in a dye.
  - It is used to separate pigments from natural colours.
  - It is used to separate drugs from blood.

**Distillation:-** The process used to separate the components of a mixture containing two miscible liquids that boil without decomposition and have sufficient difference in their boiling points is called distillation.

- **Principle:-** It is based on the principle that the component of miscible liquids having less boiling point rises first.
- **Use:-** It is used to separate two miscible liquids like acetone and water.

**Fractional Distillation:-** The method used to separate mixture of two or more miscible liquids having difference in boiling points less than 25 K is called fractional distillation.

- **Applications/Uses:-**
  - To separate different gases from air.
  - To separate different fractions from petroleum products.

**Crystallisation:-** Crystallisation is a process used to separate pure solid in the form of its crystals from a solution is called crystallisation.

- Crystallisation is better than evaporation as
  - some solids decompose or some may get charred on heating to dryness in evaporation.
  - some impurities may remain dissolved even after filtration. On evaporation these contaminate the solid.
- **Applications:-**
  - Used in the purification of salt that we get from sea water.

- Used in the separation of crystals of alum from impure samples.

**Alloys:-** Alloys are mixture of two or more metals or a metal & non-metal. **Ex:-** Brass is an alloy of 30 percent **Zinc** & 70 percent **Copper**.

- Alloys cannot be separated into their components by physical method but still it is considered as a mixture because
  - It shows the properties of its constituents particles.
  - It has variable composition.

**Physical Change:-** The change in which no new substance with different chemical properties is formed is called physical change.

- **Ex:-** Melting of ice, tearing of paper etc.

**Chemical Change:-** The change in which new substance with different chemical properties is formed is called chemical change.

- **Ex:-** Curding of milk, burning of paper etc.

? **Burning of candle** is considered both physical as well as chemical change because when we burn a candle, most of the wax melts which is a physical change but some of the wax reacts with oxygen and forms respective oxides which is a chemical change.