CBSE Class 9 Science Chapter 2 Is Matter Around Us Pure?Notes

A substance is a pure single form of matter while a mixture contains more than one substance that is mixed in any proportion. The substance can either be element or a compound. Explore in detail CBSE class 9 science chapter 2 notes.

Topics Covered In Chapter Is Matter Around Us Pure

- **What Is A Mixture?**
- **What is a Solution?**
- **Separating the Components of a Mixture**
- **Physical and Chemical Changes**
- **What are the Types of Pure Substances?**

What Is A Mixture?

A mixture contains more than one substance (element and/ or compound) mixed in any proportion. They can be separated into pure substances using appropriate separation techniques.

Types Of Mixtures:

Based on the nature of components forming a mixture, we have the following types of mixtures:

- Homogenous mixture - have uniform composition throughout. Example - salt dissolved in water
- Heterogeneous mixture - contain physically distinct parts and have non-uniform compositions. Example- mixtures of sodium chloride and iron fillings, oil and water etc

What Is A Solution?

A solution is a homogeneous mixture of two or more substances. The major component of a solution is called the solvent, and the minor, the solute. The concentration of a solution is the amount of solute present per unit volume or per unit mass of the solution. Materials that are insoluble in a solvent and have particles that are visible to naked eyes form a suspension. A suspension is a heterogeneous mixture.

Example - A solution of sugar in water is solid in a liquid solution. In this solution, sugar is the solute and water is the solvent.

Properties of a solution:

- A solution is a homogeneous mixture.
- The particles of a solution are smaller than 1 nm (10-9 metre) in diameter. So, they cannot be seen by naked eyes.
- Because of very small particle size, they do not scatter a beam of light passing through the solution. 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.

Concentration of a solution

The Concentration of a solution can be expressed in the following three ways:

(i) Mass by mass percentage of a solution = (Mass of solute / Mass of solution) ×100

(ii) Mass by volume percentage of a solution = (Mass of solute / Volume of solution) ×100

(iii) Volume by volume percentage of a solution = (Volume of solute / Volume of solution) ×100

Suspension and Its Properties

A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium. Particles of a suspension are visible to the naked eye.

Properties of a Suspension

- Suspension is a heterogeneous mixture.
- The particles of a suspension can be seen by the naked eye.
- The particles of a suspension scatter a beam of light passing through it and make its path visible.
- The solute particles settle down when a suspension is left undisturbed, that is, a suspension is unstable. They can be separated from the mixture by the process of filtration. When the particles settle down, the suspension breaks and it does not scatter light any more

Colloidal Solution and Its Properties

Colloids are heterogeneous mixtures in which the particle size is too small to be seen with the naked eye, but is big enough to scatter light. Colloids are useful in industry and daily life. The particles are called the dispersed phase and the medium in which they are distributed is called the dispersion medium.

Because of the small size of colloidal particles, we cannot see them with naked eyes. But, these particles can easily scatter a beam of visible light. This scattering of a beam of light is called the Tyndall effect. Tyndall effect can also be observed when a fine beam of light enters a room through a small hole. This happens due to the scattering of light by the particles of dust and smoke in the air.

Properties of a colloid

- A colloid is a heterogeneous mixture.
- The size of particles of a colloid is too small to be individually seen by naked eyes.
- Colloids are big enough to scatter a beam of light passing through it and make its path visible.
- They do not settle down when left undisturbed, that is, a colloid is quite stable.

- They cannot be separated from the mixture by the process of filtration. But, a special technique of separation known as centrifugation can be used to separate the colloidal particles.

Physical and Chemical Changes

The properties that can be observed and specified like colour, hardness, rigidity, fluidity, density, melting point, boiling point etc. are the physical properties. The interconversion of states is a physical change because these changes occur without a change in composition and no change in the chemical nature of the substance. Chemical change brings change in the chemical properties of matter and we get new substances. A chemical change is also called a chemical reaction.

Types Of Pure Substances

On the basis of their chemical composition, substances can be classified either as elements or compounds.

Elements

Antoine Laurent Lavoisier defined an element as a basic form of matter that cannot be broken down into simpler substances by chemical reactions. Typically, elements can be divided into metals, non-metals and metalloids.

Properties of metals:

- They have a lustre (shine).
- They have silvery-grey or golden-yellow colour.
- They conduct heat and electricity.
- They are ductile (can be drawn into wires).
- They are malleable (can be hammered into thin sheets).
- They are sonorous (make a ringing sound when hit).
- Examples of metals are gold, silver, copper etc. Mercury is the only metal that is liquid at room temperature.

Properties of non-metals:

- They display a variety of colours.
- They are poor conductors of heat and electricity.
- They are not lustrous, sonorous or malleable.
- Examples of non-metals are hydrogen, oxygen, iodine, carbon (coal, coke),

Some elements have intermediate properties between those of metals and non-metals, they are called metalloids; examples are boron, silicon, germanium etc.

Compounds

It is a substance composed of two or more elements, chemically combined with one another in a fixed proportion.
The Physical and chemical nature of matter can be summarized as follows: