

2. Matter in our Surroundings

- Anything that has mass and occupies space is matter.
- There are three different physical states of matter in which a substance can exist namely solid, liquid and gas.
- A particular state of matter can be changed into other states by changing the temperature and/or pressure.
- A solid has a definite size and shape which do not change on their own.
- A liquid has a definite size or volume and it takes shape of the container in which it is kept.
- A gas has no shape or size of its own. It occupies entire volume of the container in which it is kept.
- Matter can be classified on the basis of its composition as element, compound or mixture.
- An element is a basic form of matter that cannot be chemically broken down into simpler substances.
- A compound is a pure substance made from two or more than two elements chemically combined together in a definite proportion by mass.
- A homogeneous mixture is a mixture where the substances are completely mixed together and are indistinguishable. A homogeneous mixture is called a solution.
- A heterogeneous mixture is a mixture where the substances remain separate and the composition is not uniform.
- A suspension is a heterogeneous mixture where the dispersed particles are large enough to settle out eventually.

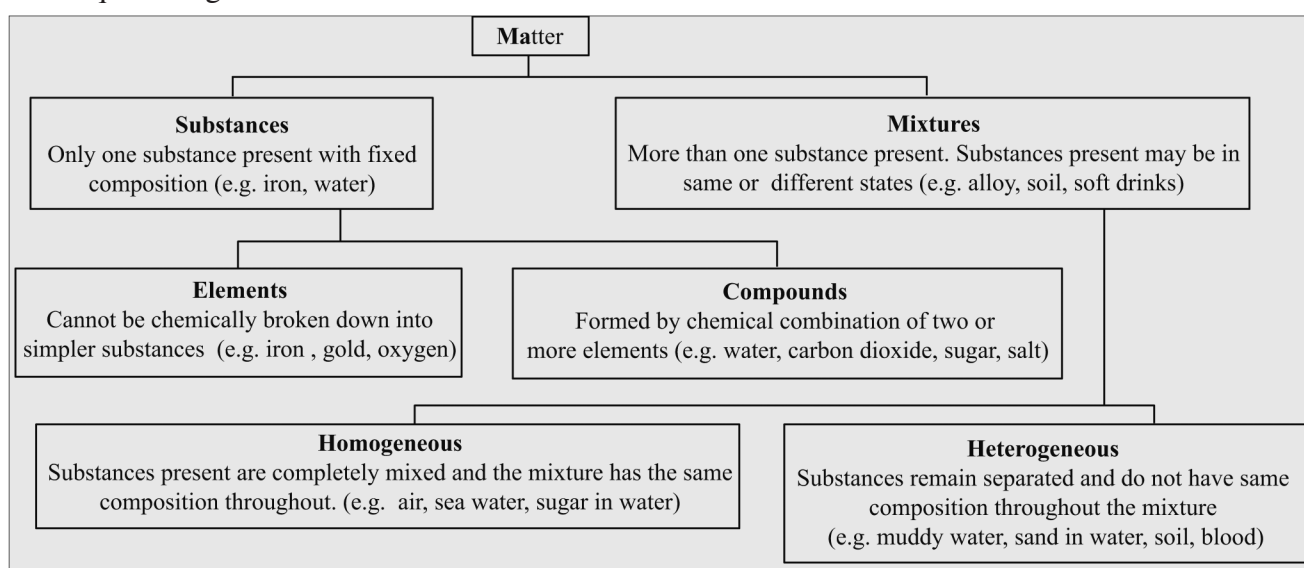
Build Your Understanding

Classification of matter

Matter can be classified as:

(i) by the physical state of matter as a solid, liquid and gas

(ii) by the chemical composition of matter as an element, compound and mixture



Solution and its concentration

The substance which is present in bigger quantity is normally taken as solvent and substance which is present in smaller quantity is normally taken as solute.

Concentration of a solution

It is defined as the mass of solute present in a definite volume of the solution. It may also be expressed in terms of percent by mass of solute in gram.

$$\% \text{ of solute} = \frac{\text{Mass of Solute}}{\text{Mass of Solution}} \times 100$$

A solution of 5% sugar by mass means that 100 gram of the solution contains 5 gram of sugar.

Suspensions

Materials of smaller particle size, insoluble in a solvent but visible to naked eyes form suspension. The size of particles in suspension is over 1000 nanometers.

Separation of mixtures

1. Separation by using separating funnel

The mixture of two immiscible liquids like oil and water can be separated by this method

2. Separation by evaporation

This method is used to separate solvent and solid from a solution by heating or by solar evaporation.

3. Separation by filtration

This method is used to separate solids from liquids in heterogeneous mixtures. In filtration, the solid material is collected as a residue on filter paper and the liquid phase is obtained as filtrate.

4. Separation by crystallization

Crystallization is a process of formation of solid crystals from a solution. The process begins by evaporating the liquid allowed to cool slowly to form crystals which can be separated by filtration.

5. Separation by distillation

This method is used to separate a liquid from a solution of a homogeneous mixture. In this process the mixture is boiled in a distillation flask and the vapours are condensed as liquid.

6. Separation based on Magnetic properties

This method is used to separate magnetic and non-magnetic substances from their mixture by using a magnet. For example, iron granules which are magnetic can be separated from non-magnetic substances like sand, sugar etc.



Stretch Yourself

1. How much amount of glucose will be used to prepare a 10% solution of glucose in water.
2. Which method will be used to separate salt from sea water.



Test Yourself

1. Explain the interconversion of states of matter with the variation of temperature.
2. Differentiate between homogeneous and heterogeneous mixture.
3. Name the method which is used in the separation of iron from sand.
4. What do you mean by suspension and also suggest the size of particles?