

Fundamentals of Chemistry

Matter and its composition. Law of conservation of mass

Chemistry and Matter

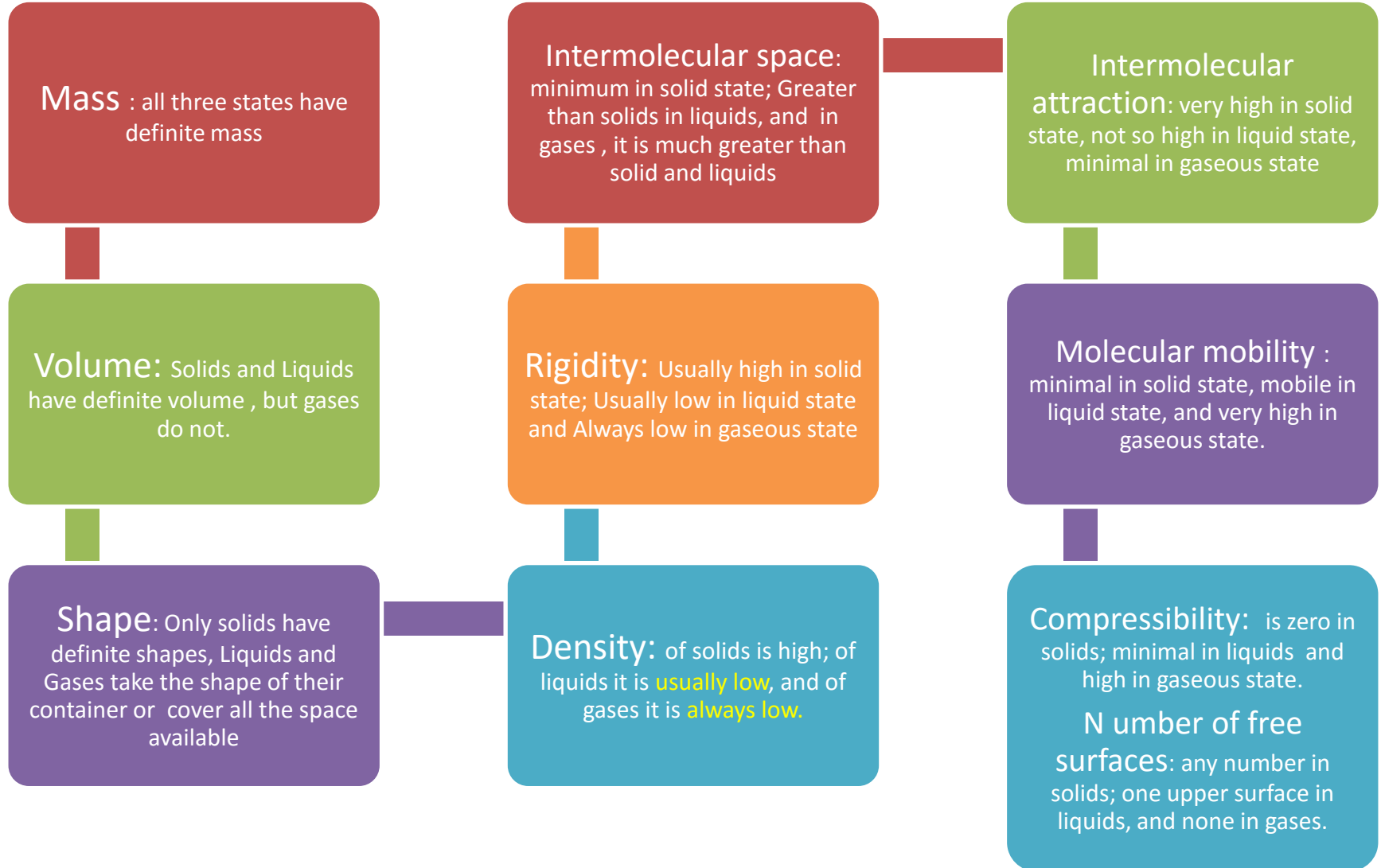
Chemistry is the study of matter , its classification, properties, structure and reactions. It deals with non-living matter only.

Matter comprises of atoms and molecules, that take part in chemical reactions

Non-living Matter exists in the form of 92 natural elements plus 20 man made elements. Matter exists in three states of solids, liquids, and gases.

A fourth state of matter is called 'Plasma'. This exists only in extremely high temperatures as a very hot gaseous matter. In nature it exists in stars and our Sun. Modern technology creates it for TV etc., by passing electricity through gases at very low pressure taken in a glass tube.

Characteristics of matter



Kinetic Molecular Theory of Matter

Intermolecular Force and Cohesion:

Intermolecular force is the force of attraction between the **molecules of matter** or **various substances**.

Cohesion is the force of attraction between similar molecules or those of the same substance.

The Theory gives better understanding of the three states of matter on basis of three aspects.

(1) **State of packing** of particles or molecules in solids, liquids, and gases

(3) **Intermolecular forces** in solids hold the particles together very strongly; in liquids the forces are just strong enough to keep the molecules within boundaries; in gases these forces are very weak.

(2) **Energy associated** as particles in solids only vibrate and do not move, those in liquids move freely, while particles in gases have maximum kinetic energy due to their motion.

Law of conservation of matter and changes in states of matter

The following Physical and Chemical Changes can be observed in the three states of matter :

- a) Melting point.
- b) Freezing point
- c) Evaporation
- d) Boiling point
- e) Condensation
- f) Sublimation

Law of conservation of mass states that “In all physical and chemical changes , the total mass of the reactants is equal to that of the products.”

- Ice to water to steam is physical change
- De-composition of food, or loss of size of naphthalene balls that become smaller and smaller due to sublimation, are chemical changes

Sublimation is the process through which substances change from solid state directly to vapour state, without the liquid state, is called Sublimation.

- Evaporation is the process by which liquids slowly convert into vapour state , at a temperature below its boiling point.
- Melting is the process of conversion of a solid matter into a liquid state , at a particular temperature.