Structure of matter

What is structure of matter in science?

Matter cannot be separated individually, but it is **an arrangement of several atoms**. Atoms are the smallest unit of matter that is having protons, neutrons, and electrons and cannot be divided. The arrangement of numerous atoms decides the size, shape, and color of matter.

Types of Matter

Matter can either be a pure substance or a mixture.

Pure substances can either be elements or compounds.

Mixtures can either be homogeneous or heterogeneous.

Elements

An element is matter made of only one kind of atom.

- There are 115 known elements.
- Ninety elements are naturally occurring.
- The elements are organized according to their properties in the Periodic Table.
- Examples – Hydrogen, Carbon, Nitrogen, Calcium, Sodium, Oxygen

Compounds

Compounds are 2 or more elements that are chemically combined.

- ☆ Compounds cannot be easily separated into their elements. Examples;

1. H2O Water
2. NaCl Salt
3. C6H12O6 Sugar/Glucose

H2 N2 O2

- ☆ The gases of hydrogen, nitrogen and

oxygen naturally exist as compounds of 2 atoms of their element.

Mixtures

Mixtures are made of different compounds that are mixed together.

Mixtures can be easily separated into the original compounds.

Homogeneous – substances evenly mixed

Heterogeneous – substances not evenly mixed

Structure and properties of matter

Atoms interact through the electromagnetic force and create molecules. Molecules can include atoms of the same or different elements. Each type of molecule has its own properties which also define how it reacts with other molecules. The use and role of each type of molecules in nature is based on its properties.

What is structure and properties of matter?

Physical properties of matter can be observed and measured without changing the kind of matter being studied.

These physical properties can be used to identify a substance;

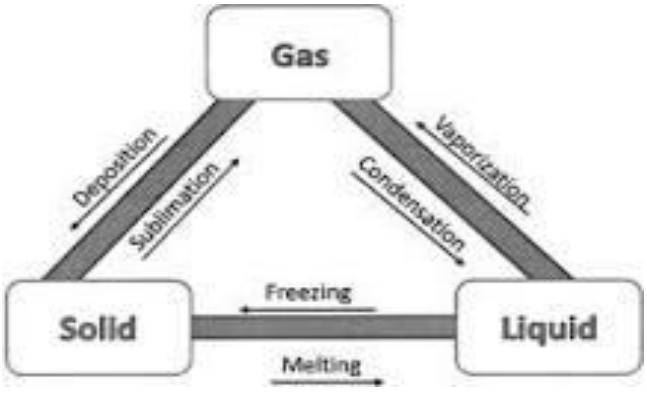
Melting point

- Boiling point
- Density (heaviness)
- Color
- pH

Chemical properties of matter are not usually visible and, a change in the matter does occur.

Chemical properties can also help identify a substance. Chemical properties can only be seen when there is a chemical reaction.

1. Burning
2. Rusting
3. Chemical Reactivity

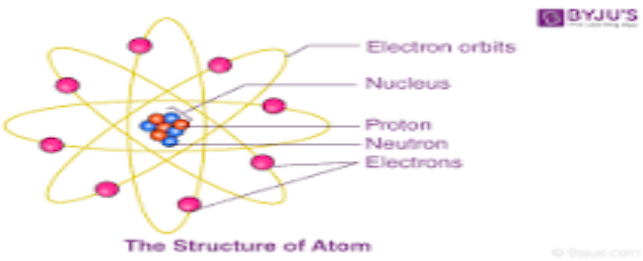


The three classical states, solid, liquid, and gas of matter, can be distinguished macroscopically in terms of the properties of **density, compressibility, and rigidity** related to the motion of atoms or molecules.

What are elements in structure of matter?

All matter is made up of substances called elements, which **have specific chemical and physical properties and cannot be broken down into other substances through ordinary chemical reactions**.

What is the atomic structure of matter?



Primarily, the atomic structure of matter is made up of **protons, electrons and neutrons**. The protons and neutrons make up the nucleus of the atom, which is surrounded by the electrons belonging to the atom. The atomic number of an element describes the total number of protons in its nucleus.

Which are the properties of matter?

Any characteristic that can be measured, such as an object's **density, colour, mass, volume, length, malleability, melting point, hardness, odour, temperature**, and more, are considered properties of matter.

Chemical reactions

Chemical reactions are the processes through which atoms and/or molecules interact and are combined. There are different types of chemical reactions but they are mainly categorized depending on whether the system releases or absorbs energy.