

Elements, Compounds, Symbols and Formulae

Pure substance can be classified as **elements** or **compounds**.

Element: The basic form of matter that cannot be broken down into simpler substances by chemical reactions’.

Elements can be further classified as metals, non-metals, metalloids and noble gases.

Compound: Compounds are formed when two or more elements combine chemically in a fixed proportion.

1. Atom: Smallest particle of an element. It possesses all the properties of that element.

2. Molecule: Small particle capable of independent existence. Molecules may contain two or more atoms of same or different elements.

3. Dalton’s Atomic theory:

(i) Matter is made up of tiny particles called atoms.

(ii) Atoms can neither be created nor destroyed.

(iii) Atoms of different elements are different from each other.

(iv) Atoms combine in whole number ratio to form compounds.

4. Chemical symbol: Chemical symbol of an element denotes the name and one atom of that element.

| Element | Latin name | Symbol |
|-----------|------------|--------|
| Potassium | Kallium | K |
| Iron | Ferrum | Fe |
| Copper | Cuprum | Cu |
| Sodium | Natrium | Na |
| Lead | Plumbum | Pb |
| Tin | Stannum | Sn |

| | | |
|---------|-------------|----|
| Mercury | Hydrargerum | Hg |
| Gold | Aurum | Au |
| Silver | Argentum | Ag |

5. Molecular formula: Representation of a molecule with a help of chemical symbols of atoms present in it.

| Element | Molecular Formula | Number of atoms of the element |
|------------|-------------------|--------------------------------|
| Helium | He | 1 |
| Nitrogen | N ₂ | 2 |
| Oxygen | O ₂ | 2 |
| Hydrogen | H ₂ | 2 |
| Phosphorus | P ₄ | 4 |

- **Chemical formula**
 - A chemical formula is the representation of the composition of a molecule in terms of the symbols of elements present in that molecule.
- **Molecular formula** is a **chemical formula** that indicates the kinds of atoms and the numbers of each kind of atom in a molecule of a compound.
- To write the chemical formula of a compound, one should have prior knowledge of two things.
 - **The symbols of the constituent elements.**
 - **The combining capacity of the atom of each element constituting the compound.**
- **Uses of metals:**
 - In making machinery, automobiles, jewellery, trains, aeroplanes, cooking utensils, etc.
 - Gold is used for making jewellery, wires, and coins and in dentistry.
 - Silver is used for making coins, ornaments, very thin wires, table cutlery and in photographic films.

- Copper is used for making wires, utensils, statues, alloys and coins.
- Iron is used for construction of ships, buildings, automobiles and railway bridges etc.
- Tin is used for tinning food cans, and making alloys.
- Lead is used for making batteries, and alloys.
- Zinc is used in prevention of rusting, making brass and bronze and in dry cells.
- Aluminium is used in making wires, foils, and alloys.
- Mercury is used for making amalgams and in thermometers.
- Magnesium is used for making fire works, and alloys.
- **Uses of non-metals:**
 - They are used in fertilizers, in water purification process, crackers, etc. Oxygen, a non-metal, is essential for our life as all living beings inhale it during breathing.
 - Nitrogen dilutes the activity of oxygen in air. It is used by plants to manufacture proteins.
 - Oxygen is essential for respiration and combustion of fuels.
 - Chlorine is used for bleaching fabrics, sterilization of drinking water, and in manufacturing insecticides and pesticides.
 - Iodine is essential for proper functioning of human body, and in photographic films.
 - Graphite is used as pencil lead, dry lubricant, in electrolytic cells and nuclear reactors.
 - Helium is a noble gas which is used in weather observation balloons.
 - Argon is a noble gas which is used for filling electric bulbs.