

**CBSE Class 9 Science Notes Chapter 3:** In Chapter 3 of CBSE Class 9 Science, we learn about "Atoms and Molecules." Here, we learn the tiny building blocks of everything around us. Atoms are like the LEGO pieces of matter, and they make up everything. We'll understand how atoms are made up of even smaller particles, like protons, neutrons, and electrons.

These parts give each atom its unique qualities. When atoms join together, they form molecules, like how individual LEGO pieces can make a larger structure. We'll also explore how chemicals combine in specific ways, following rules like the Law of Conservation of Mass and the Law of Definite Proportions. By understanding atoms and molecules, we can understand more about how everything in the world is put together.

## **CBSE Class 9 Science Notes Chapter 3 Atoms and Molecules Overview**

The CBSE Class 9 Science Notes for Chapter 3, "Atoms and Molecules," have been created by experts at Physics Wallah. These notes help students understand the basics of atoms and molecules. They explain the structure and behavior of atoms, as well as how they come together to form molecules.

The notes are designed to make learning easier for students by breaking down complex ideas into simpler ones. With these notes, students can learn about atoms and molecules in a clear and understandable way, which can help them succeed in their science studies.

## **CBSE Class 9 Science Notes Chapter 3 PDF**

You can find the PDF link for CBSE Class 9 Science Notes Chapter 3 on Atoms and Molecules below. By accessing this PDF, students can enhance their understanding of the fundamental principles of chemistry, making their learning experience more effective and productive.

**CBSE Class 9 Science Notes Chapter 3 PDF**

## **CBSE Class 9 Science Notes Chapter 3 Atoms and Molecules**

### **Law of Conservation of Mass**

This law, proposed by Antoine Lavoisier, states that in any chemical reaction, the total mass of the reactants equals the total mass of the products. In simpler terms, mass cannot be created or destroyed in a chemical reaction, but it can change forms.

## **Law of Constant Proportion**

Joseph Proust formulated this law, which states that a chemical compound always contains the same elements in the same proportion by mass. This means that the ratio of the masses of the elements in a compound is constant, regardless of the sample size.

## **Law of Multiple Proportions**

John Dalton proposed this law, which states that when two elements combine to form different compounds, the masses of one element that combine with a fixed mass of the other element are in a ratio of small whole numbers. This law helped in understanding the concept of atomic masses and molecular formulas.

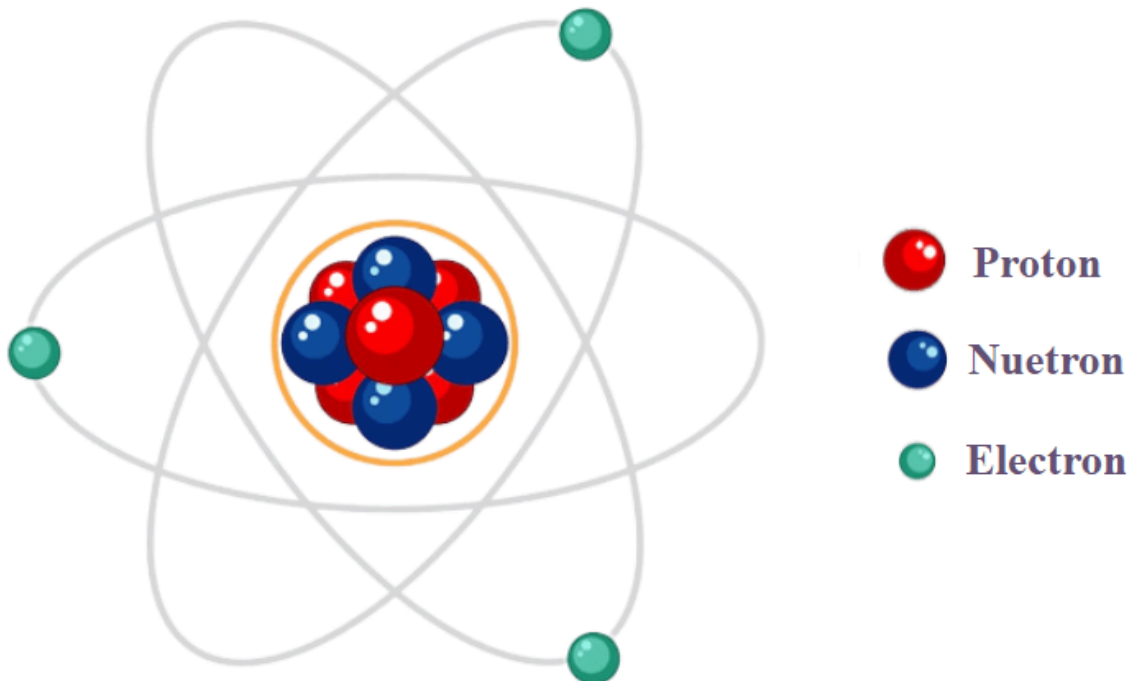
## **Dalton's Atomic Theory**

John Dalton's atomic theory is a fundamental concept in chemistry. It proposes the following postulates:

- All matter is composed of tiny particles called atoms, which are indivisible and indestructible.
- Atoms of the same element are identical in mass and properties, while atoms of different elements have different masses and properties.
- Compounds are formed by the combination of atoms of different elements in simple, whole-number ratios.
- Chemical reactions involve the rearrangement of atoms, but atoms themselves are not created or destroyed during the reaction.

## **Atom**

# Structure of Atom



An atom is the basic unit of an element, consisting of three main particles: electrons, protons, and neutrons. The nucleus, located at the center of the atom, contains the protons and neutrons, while the electrons orbit around the nucleus in shells or energy levels.

The atomic symbol of an element is represented by its standard symbol (e.g., "X" for the element), along with two important numbers: the atomic number (A), which indicates the number of protons in the nucleus and determines the element's identity, and the mass number (Z), which represents the total number of protons and neutrons in the nucleus.

The size of an atom is typically measured in nanometers, with the radius indicating the distance from the nucleus to the outermost electron shell.

Overall, atoms are the building blocks of matter, and understanding their structure is crucial to understanding the properties and behavior of elements and compounds.

## Atomic Mass

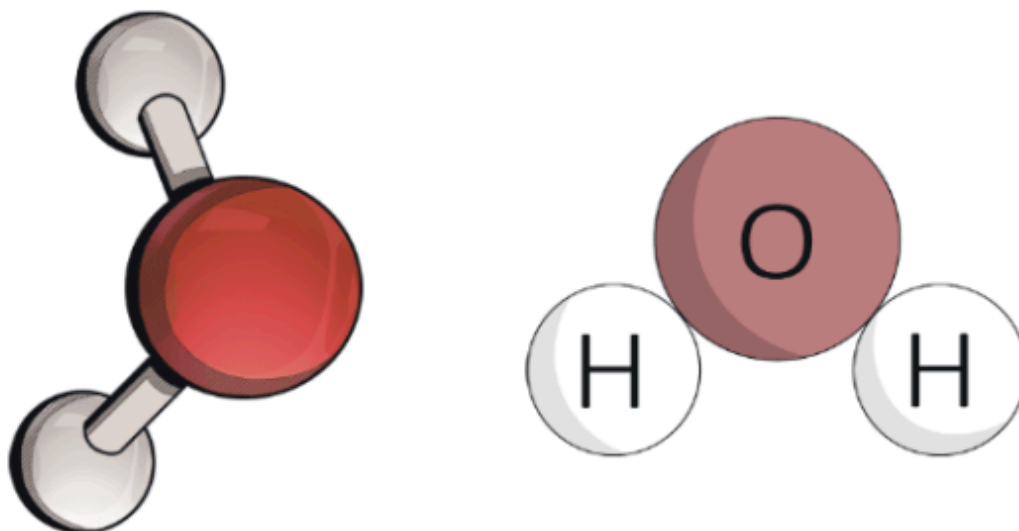
Atomic mass is a measure of the mass of an atom or a collection of atoms. It includes the combined mass of the electrons, protons, and neutrons within the atom. This mass is often expressed in atomic mass units (AMU), which are based on a standard unit defined by the mass

of a carbon-12 atom. The atomic mass of an element is the average mass of one atom of that element compared to 1/12th the mass of a carbon-12 atom. This helps scientists compare the masses of different atoms on a standardized scale.

## Valency

Valency is a property of an atom determined by the number of electrons in its outermost shell, known as valence electrons. Atoms tend to gain, lose, or share electrons to achieve a stable configuration, typically by completing their outermost shell with eight electrons, known as the octet rule. The valency of an atom is determined by the number of electrons it can gain, lose, or share to achieve this stable configuration.

## Molecule



A molecule is a group of atoms bonded together, representing the smallest unit of a chemical compound that can take part in a chemical reaction. The molecular mass of a molecule is the sum of the masses of all the atoms in the molecule. The number of atoms of each element in a molecule is determined by its chemical formula.

The atomicity of a molecule refers to the number of atoms of each element present in a single molecule of the substance. For example, oxygen gas (O<sub>2</sub>) has a molecular mass equal to twice the atomic mass of oxygen because each molecule contains two oxygen atoms, and its atomicity is 2.

# Compound

A compound is a substance formed when two or more elements chemically combine in a fixed mass ratio. These elements lose their individual properties and form a new substance with unique properties. The atoms in a compound are held together by chemical bonds, which can be ionic or covalent depending on the nature of the elements involved.

Ionic compounds are formed when atoms transfer electrons to each other, resulting in the formation of positively charged ions (cations) and negatively charged ions (anions). These ions are held together by strong electrostatic forces called ionic bonds. In an ionic compound, the positive and negative charges are balanced, resulting in a neutral overall charge.

On the other hand, covalent compounds are formed when atoms share electrons to achieve a stable electron configuration. This sharing of electrons creates covalent bonds, which are strong but less polar than ionic bonds. Covalent compounds can be further classified into polar covalent compounds, where electrons are unequally shared, and nonpolar covalent compounds, where electrons are shared equally.

## Ions

Ions play a crucial role in the formation of compounds. An ion is an atom or molecule that has a net electric charge due to the loss or gain of electrons. A negatively charged ion is called an anion, and a positively charged ion is called a cation. Ionic compounds are composed of ions held together by electrostatic forces, while covalent compounds consist of atoms linked by shared electrons.

## Molecular Mass

Molecular mass refers to the total mass of all the atoms present in a molecule. To calculate the molecular mass of a compound, the atomic mass of each element in the molecule is multiplied by the number of atoms of that element in the molecule, and then these masses are added together.

The concept of a mole is crucial in chemistry, as it represents a specific number of entities, such as atoms, molecules, or ions. This number is known as Avogadro's number, which is approximately  $6.022 \times 10^{23}$ . One mole of any substance contains Avogadro's number of particles.

Avogadro's number allows chemists to relate the number of particles in a substance to its mass. For instance, the number of moles of a substance can be calculated by dividing its mass by its molar mass, which is the mass of one mole of the substance.

Several important formulas are used in mole calculations. For example, the number of molecules in a substance can be determined by dividing the given mass of the substance by its molar mass and then multiplying by Avogadro's number. Similarly, the percentage composition of an element in a compound can be calculated by dividing the total weight of the element in the molecule by the gram molecular weight of the compound and multiplying by 100.

Molecular mass and mole calculations are fundamental concepts in chemistry that allow scientists to quantify the number of particles in a substance and relate it to its mass. These calculations are essential for understanding chemical reactions and determining the composition of compounds.

## Benefits of CBSE Class 9 Science Notes Chapter 3 Atoms and Molecules

- **Comprehensive Coverage:** These notes cover all the important topics related to atoms and molecules as per the CBSE Class 9 curriculum, ensuring that students have a thorough understanding of the subject matter.
- **Clarity and Conciseness:** The notes are presented in a clear and concise manner, making complex concepts easier to understand. They provide a structured approach to learning, helping students grasp the fundamentals effectively.
- **Use of Visual Aids:** Visual aids such as diagrams, charts, and illustrations are often included in these notes to enhance understanding. These aids help students visualize abstract concepts, making learning more engaging and memorable.
- **Revision Aid:** These notes serve as an excellent revision aid for students preparing for exams. They provide a quick overview of the key concepts and formulae, allowing students to revise the entire chapter efficiently.