CBSE Class 9 Science Notes Chapter 2: CBSE Class 9 Science Notes for Chapter 2, "Is Matter Around Us Pure," help students understand the basics of matter and its purity. In this chapter, students learn about different types of matter like elements, compounds, and mixtures.

They also learn how to separate mixtures using methods like filtration and distillation. The notes explain concepts like homogeneous and heterogeneous mixtures in simple terms. Students also learn about physical and chemical changes in matter and why purity is important in everyday life and industries.

With easy-to-understand explanations and examples, these notes make learning about matter and its purity fun and interesting for students.

CBSE Class 9 Science Notes Chapter 2 Is Matter Around Us Pure Overview

The CBSE Class 9 Science Notes for Chapter 2, "Is Matter Around Us Pure," are made by experts from Physics Wallah. They give a clear overview of the topic in easy words. These notes help students understand the basics of matter and its purity. They explain things step by step, making it simple to grasp. Whether it's knowing the difference between elements, compounds, and mixtures, or learning about separating mixtures, these notes cover everything. They're designed to make studying easier and help students do well in their CBSE Class 9 Science exams.

CBSE Class 9 Science Notes Chapter 2 PDF

You can access the PDF for CBSE Class 9 Science Notes Chapter 2, "Is Matter Around Us Pure," by clicking the link provided below. This PDF contains comprehensive notes that cover all the important topics discussed in the chapter. It includes explanations, examples, and diagrams to help you understand the concepts better. With this PDF, you can easily study and revise the chapter at your own pace, ensuring a thorough understanding of the material. Just click the link to access the PDF and start learning!

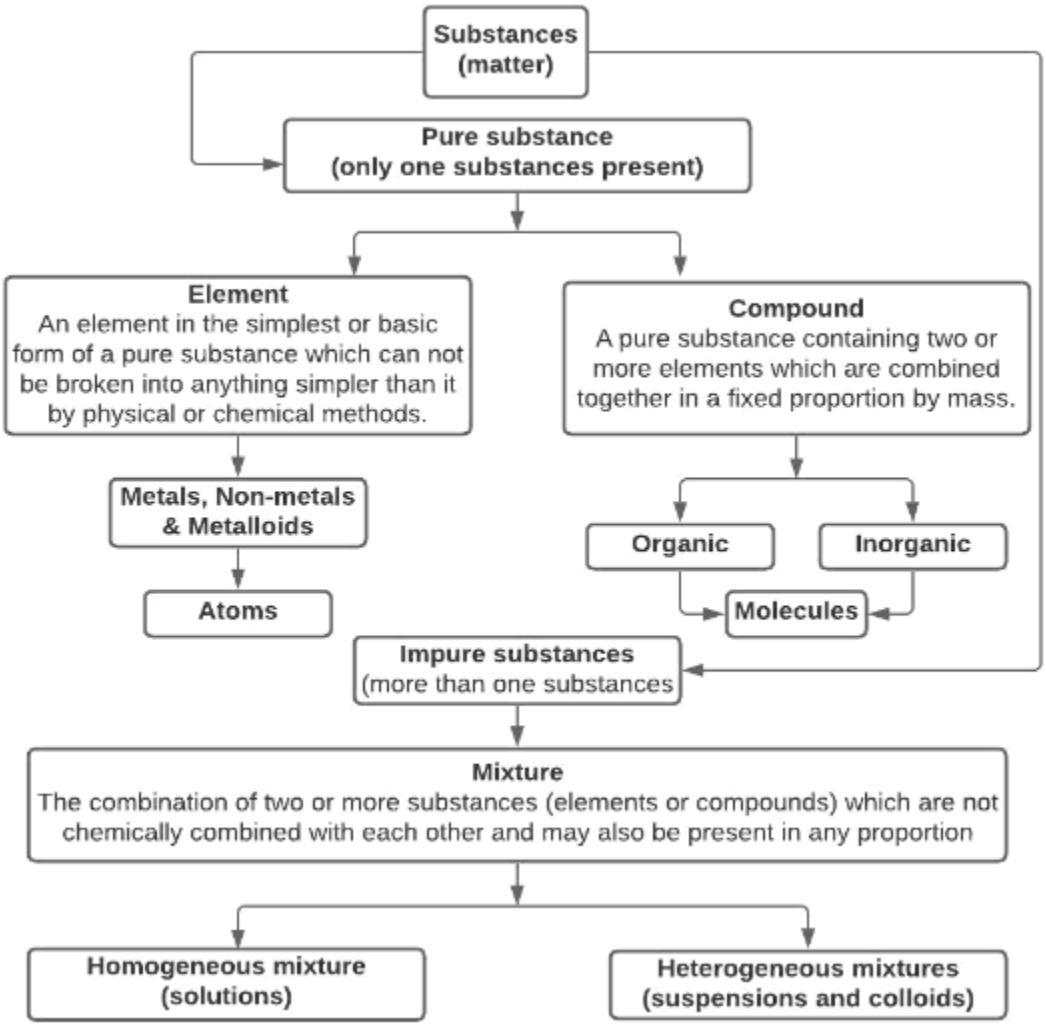
CBSE Class 9 Science Notes Chapter 2 PDF

CBSE Class 9 Science Notes Chapter 2 Is Matter Around Us Pure

Introduction

Matter consists of two or more components called substances. A substance is a form of matter that cannot be separated into other types of matter using physical methods, according to science.

A "pure substance" refers to a substance that contains only one component and nothing else. Substances are often combined with each other, resulting in what is known as a mixture.



Pure and impure substances

Pure substances consist of only one type of particle, such as water, sulphur, hydrogen, carbon, and others. They cannot be separated by any physical process because they have a constant composition, melting point, and boiling point.

On the other hand, impure substances are made up of two or more types of particles, which can be separated using physical methods. Mixtures containing impure substances include salt

solution, sugar solution, milk, seawater, air, sugarcane juice, soft drinks, sherbet, rocks, minerals, petroleum, LPG, biogas, tap water, tea, coffee, paint, wood, soil, and bricks. The composition and melting and boiling points of mixtures are not fixed, and they can be either homogeneous or heterogeneous.

Types of Pure Substances

Pure substances are broadly classified into two main types: elements and compounds.

1. **Elements:** Elements are the simplest form of pure substances, consisting of only one type of atom. They cannot be further broken down into simpler substances by physical or chemical methods. Examples of elements include hydrogen, oxygen, carbon, and iron. Elements can exist in different states of matter: solid, liquid, or gas, depending on factors such as temperature and pressure. They are further categorized into metals, non-metals, and metalloids based on their properties.
2. **Compounds:** Compounds are pure substances composed of two or more different types of atoms chemically combined in fixed proportions. Unlike elements, compounds can be broken down into simpler substances (elements or other compounds) by chemical reactions. Compounds have properties distinct from those of their constituent elements. Examples of compounds include water (H2O), sodium chloride (NaCl), carbon dioxide (CO2), and glucose (C6H12O6).

These two types of pure substances form the building blocks of all matter and play crucial roles in various chemical and physical processes.

Metals

Metals are elements known for their malleability, ductility, and ability to conduct electricity. Examples of metals include iron, copper, aluminium, zinc, silver, gold, platinum, chromium, sodium, potassium, and magnesium.

Non-Metals

In contrast to metals, non-metals have properties that are quite different. They are fewer in number but play essential roles in living organisms. Non-metals constitute about fourteen to fifteen percent of the elements in the periodic table. Examples include carbon, sulphur, phosphorous, hydrogen, and oxygen.

Metalloids

Metalloids are elements with properties that exhibit characteristics of both metals and non-metals. They occupy an intermediate position on the periodic table. Examples of metalloids include boron, silicon, germanium, arsenic, antimony, bismuth, tellurium, and polonium.

Illustration – 1:

To explain why copper is considered a metal and sulphur is not, two key characteristics are considered:

Copper:

1. Ductility and Malleability: Copper can be easily shaped into wires and thin sheets.
2. Conductivity: Copper conducts heat and electricity efficiently.

Sulphur:

1. Brittleness: Sulphur is not malleable or ductile and fractures into fragments when hammered.
2. Poor Conductivity: Sulphur does not conduct heat or electricity effectively.

Types of Mixture

Compounds:

A compound is a pure substance, similar to elements, but it indicates a chemically integrated mixture of two or more elements. It is defined as "a pure substance containing two or more elements mixed in a predetermined mass proportion." Examples of compounds include water (H_2O), carbon dioxide (CO_2), and ammonia (NH_3).

Compound Types:

Compounds are divided into two groups: inorganic compounds and organic compounds.

Inorganic compounds are usually made up of non-living materials like rocks and minerals. Examples include common salt, marble, washing soda, and carbon dioxide.

Organic compounds are derived from living organisms, such as plants and animals. They are characterized by the presence of carbon and are often referred to as "carbon compounds."

Compound Characteristics:

Pure compounds have the same constituents and properties different from the elements from which they are formed.

Compound formation involves a chemical process, resulting in distinct properties. For example, water (H2O) is formed by a chemical reaction between hydrogen and oxygen, resulting in a substance with properties different from its constituents.

Compounds cannot be separated mechanically, and their formation requires energy exchange.

Mixture

A mixture is a combination of two or more substances (elements or compounds) that are not chemically combined but may be present in any proportion.

There are two types of mixtures: homogeneous mixtures and heterogeneous mixtures.

Homogeneous mixtures:

Homogeneous mixtures exist in one single phase with no obvious borders of separation, and their composition is consistent throughout. Examples include saltwater and air.

Heterogeneous mixtures:

Heterogeneous mixtures do not have a homogeneous composition and have visible borders of separation between parts. Examples include sand and salt mixture and oil and water mixture.

These are the types of compounds and mixtures, along with their characteristics and examples.

The distinction between compounds and a mixture

The distinction between compounds and mixtures lies in their composition, properties, and how their components are combined.

Characteristic	Compounds	Mixtures
Composition	Composed of two or more elements chemically bonded	Composed of two or more substances physically combined
Properties	Have properties different from their constituent elements	Exhibit properties that are a combination of their constituent substances
Formation	Formed through chemical reactions	Formed through physical mixing
Separation	Cannot be separated into their constituent elements by physical means	Can be separated into their constituent substances by physical means

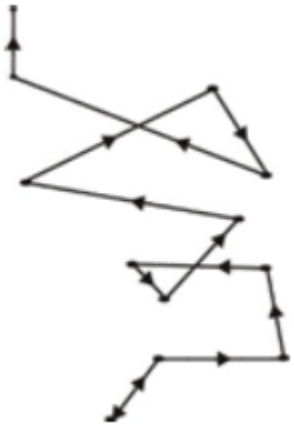
Solutions, Suspensions and Colloids

The matter around us is incredibly diverse, ranging from simple substances to complex mixtures. Understanding the distinctions between these forms of matter is essential for comprehending their behavior and properties.

Solutions: One of the most common forms of matter is solutions, which are homogeneous mixtures composed of a solute dissolved in a solvent. Solutions can vary in their composition, with some being saturated (containing the maximum amount of solute at a given temperature) and others being unsaturated (able to dissolve more solute). Solubility, or the ability of a solute to dissolve in a solvent, depends on factors such as temperature.

Suspensions: On the other hand, suspensions are heterogeneous mixtures where solid particles are dispersed throughout a liquid without dissolving. Unlike solutions, suspension particles are larger and can be observed with the naked eye or under a microscope. Suspensions are typically unstable and settle over time, forming a precipitate.

Colloids: Colloids are intermediate between solutions and suspensions, with particles that are larger than those in solutions but smaller than those in suspensions. These particles are evenly dispersed throughout the mixture, giving colloids a homogeneous appearance. Colloidal particles exhibit Brownian motion, a zigzag movement first observed by Robert Brown in 1828.



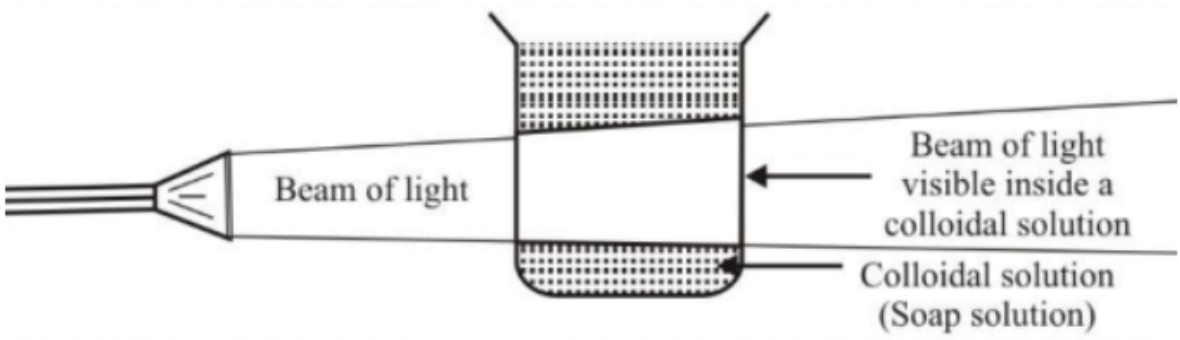
Understanding the properties and characteristics of solutions, suspensions, and colloids provides valuable insights into the behavior of different types of matter in our surroundings.

Tyndall effect: Scattering of light by colloidal particles

The Tyndall effect is a fascinating phenomenon observed when light passes through a colloidal solution. Colloidal particles, being larger than the molecules in true solutions, have the ability to

scatter light. When a beam of light is directed through a colloidal solution in a darkened environment, the path of the light becomes illuminated and visible when viewed from the side.

This occurs because the colloidal particles scatter the light in all directions, making the path of the beam visible. It's akin to seeing a beam of light in a dusty room, where the particles in the air scatter the light and make it visible. This scattered light entering our eyes allows us to perceive the path of the beam, showcasing the fascinating interplay between light and matter at the microscopic level.



Property	Suspension	Colloidal solution	True solution
1. Particle size	> 100 nm	1 to 100 nm	< 1 nm
2. Separation by ordinary filtration	Possible	Not possible	Not possible
3. Settling of particles	Settle of their own	Settle only on centrifugation	Do not settle
4. Appearance	Opaque	Generally transparent	Transparent

5.	Tyndall effect	Shows	Shows	Does not show
6.	Diffusion of particles	Do not diffuse	Diffuse slowly	Diffuse rapidly
7.	Brownian movement	May show	Show	May or may not shown
8.	Nature heterogeneous	Heterogeneous	Homogeneous	

Classification of Colloids

Colloids, fascinating mixtures with unique properties, are classified based on the physical states of both the dispersed phase (solute) and the dispersion medium (solvent). Here are the main types:

1. **Sol:** In this type, solid particles are dispersed within a liquid medium. An example is a paint.
2. **Solid sol:** Here, solid particles are dispersed within another solid medium. One example is alloys, like brass.
3. **Aerosol:** Aerosols consist of solid or liquid particles dispersed within a gas. Examples include smoke and mist.
4. **Emulsion:** In an emulsion, small droplets of one liquid are dispersed within another immiscible liquid. Mayonnaise and milk are classic examples.
5. **Foam:** Foam is created when gas bubbles are dispersed within a liquid or solid medium. Examples include whipped cream and foam insulation.
6. **Solid foam:** In solid foam, gas bubbles are dispersed within a solid medium. Styrofoam and pumice are examples.
7. **Gel:** Gels have a solid-like consistency but are actually composed of a liquid dispersed within a solid. Examples include gelatin and agar.

Separation of mixture

The separation of mixtures is crucial for isolating and purifying the components within them. Various methods are employed based on the nature of the mixture:

Sublimation: Used for substances that undergo sublimation, where they transition directly from solid to vapor without passing through the liquid phase. For example, separating ammonium chloride and common salt.

Filtration: Effective for separating solids from liquids or suspensions. It involves passing the mixture through a filter medium, which traps the solid particles while allowing the liquid to pass through.

Centrifugation: Utilized to separate suspended particles from a liquid by spinning the mixture at high speeds in a centrifuge. Denser particles settle at the bottom, forming a pellet, while the liquid remains above.

Evaporation: Involves heating a liquid mixture to evaporate the solvent, leaving behind the solute in solid form. This method is commonly used to recover dissolved solids from a solution.

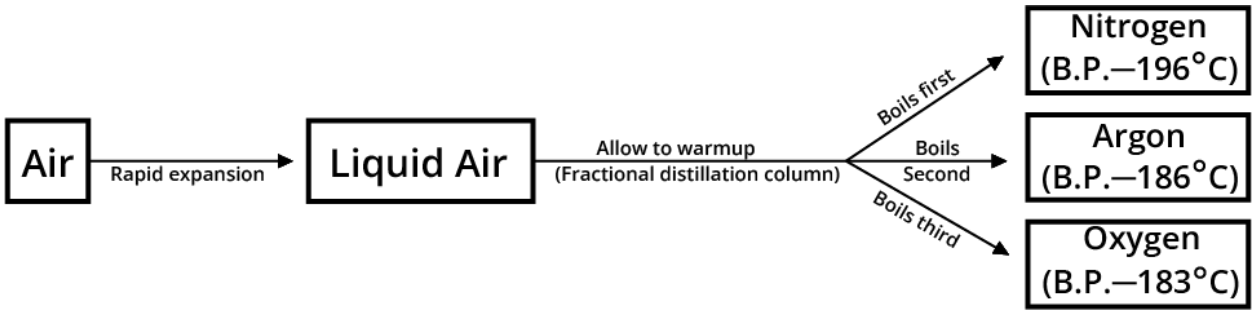
Crystallization: By allowing a supersaturated solution to cool or evaporate slowly, crystals of the solute form and can be separated from the solution.

Chromatography: Separates components based on differences in their affinity for a stationary phase and a mobile phase. This method is often used in chemical analysis and purification processes.

Distillation: Separates components of a mixture based on differences in their boiling points. The mixture is heated to vaporize the more volatile component, which is then condensed and collected.

Fractional Distillation: Similar to distillation but used for mixtures with closer boiling points. A fractionating column is employed to achieve better separation.

Separating Funnel: Used to separate immiscible liquids by allowing them to settle into distinct layers based on their densities, which can then be drained separately.



Benefits of CBSE Class 9 Science Notes Chapter 2 Is Matter Around Us Pure

- **Comprehensive Coverage:** These notes provide a thorough understanding of the concepts covered in the chapter, ensuring that students have a strong foundation in the subject matter.
- **Clarity of Concepts:** The notes present the information in a clear and concise manner, making it easier for students to grasp complex concepts and principles.
- **Easy Revision:** With organized and structured content, these notes facilitate quick and effective revision before exams, helping students consolidate their learning.
- **Exam Preparation:** The notes cover important topics, definitions, and key points that are likely to be tested in exams, thereby aiding students in their exam preparation.
- **Supplementary Learning:** Students can use these notes as a supplementary resource alongside their textbooks and classroom lectures, enhancing their understanding of the subject.
- **Self-Assessment:** The notes may include practice questions, examples, and solutions, allowing students to test their understanding and assess their progress.