

STUDY COURSE MATERIAL

CHEMISTRY

SESSION-2020-21

CLASS-IX

TOPIC: IS MATTER AROUND US PURE?

DAY-1

❖ TEACHING MATERIAL

Matter

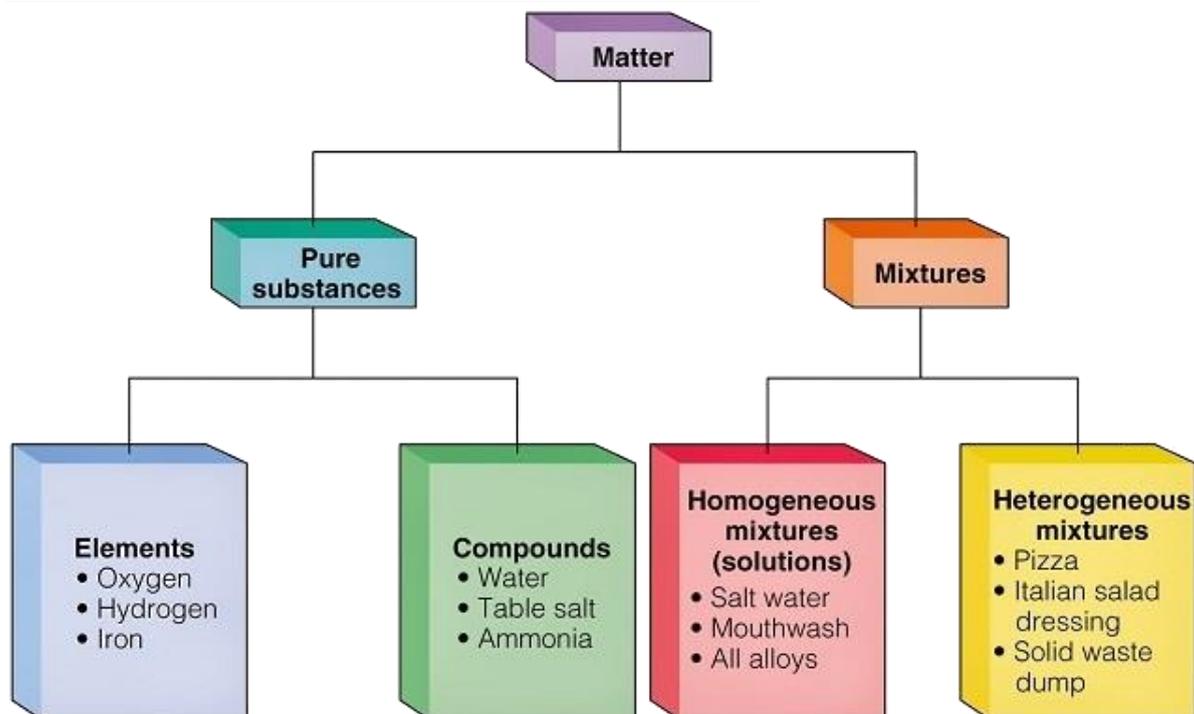
Anything which has mass and occupies space is called matter. It may be solid, liquid or gas.

Types of Matter

It is of two types :

1. Pure Substance
2. Impure substance

PURE SUBSTANCES AND MIXTURE



1. Pure Substance: It may be defined as a material which contains only one kind of atoms or molecules.

Pure substances are again of two types:

(a) Elements

(b) Compounds

(a) Elements:

- Pure substances which are made up of only one kind of atoms are known as elements.
- They cannot be split up into two or more simpler substances by any of the usual chemical methods.
- For example: Iron, gold, silver, carbon, oxygen, nitrogen and sodium etc.

Elements are further grouped into the following three categories:

(i) Metals, for example: Iron, copper, gold, sodium, silver, mercury, etc.

(ii) Non – metals, for example: Carbon, oxygen, sulphur, nitrogen, oxygen, hydrogen, etc.

(iii) Metalloids : Boron, silicon, germanium, etc.

Properties of Metals:

- These are lustrous (shine).
- They conduct heat and electricity.
- All metals are malleable and ductile.
- They are sonorous.
- All metals are hard except sodium and potassium.
- All metals are solids at room temperature except mercury which is a liquid

VIDEOS:-

Link 1: <https://www.youtube.com/watch?v=pWZlICXw3Ng>

LINK 2 : <https://www.youtube.com/watch?v=WBWf1T4V7xE>

LINK 3: <https://www.youtube.com/watch?v=OHhnm2p5G3o>

ASSIGNMENT:

1) CLASSIFY THE MATTERS AROUND YOU AS PURE SUBSTANCES AND MIXTURE. GIVE REASONS TO SUPPORT YOUR ANSWER .

DAY-2

❖ TEACHING MATERIAL

Properties of Non-metals:

- These are dull in appearance.
- They are poor conductors of heat and electricity except diamond which is a good conductor of heat and graphite which is a good conductor of electricity.
- They are neither malleable nor ductile.
- They are generally soft except diamond which is the hardest natural substance known.
- They may be solids, liquids or gases at room temperature.

Metalloids: The elements that have properties intermediate between those of metals and non-metals are called metalloids.

(b) Compounds:

- It is a form of matter formed by combining two or more elements in a definite ratio by mass.
- It Can be decomposed into its constituent elements by suitable chemical methods
- For example: Water (H_2O), oxygen (O_2), Nitrogen dioxide (NO_2), etc.

2. Impure Substance: It may be defined as a material which contains only one kind of atoms or molecules. It is also named as mixture.

Mixtures:-

A mixture is a material which contains two or more different kinds of particles (atoms or molecules) which do not react chemically but are physically mixed together in any proportion.

Types of mixture:-

It is of two types:-

(a) Homogeneous mixture

(b) Heterogeneous mixture

S. No.	Homogeneous mixture	Heterogeneous mixture
1.	All the components of the mixture are uniformly mixed.	All the components of the mixture are not thoroughly mixed.
2.	No separation boundaries are visible.	Separation boundaries are visible.
3.	It consists of a single phase.	It consists of two or more phases.
4.	Example: Sugar dissolved in water	Example: Air, sand and common salt.

❖ VIDEO-LINKS

LINK 1: <https://www.youtube.com/watch?v=eI-tmv4DLEk>

LINK 2: <https://www.youtube.com/watch?v=4mLst4JqyhU>

ASSIGNMENT:

- 1) Make a list of mixtures used in our day-to-day life and classify them as homogeneous and heterogeneous mixtures.
- 2) Air is considered as heterogeneous mixture. Justify the statement.

DAY-3

❖ TEACHING MATERIALS:-

*Difference between mixtures and compounds:

S. No.	Mixtures	Compounds
1.	Various elements just mix together to form a mixture and no new compound is formed.	Elements react to form new compounds.
2.	A mixture has a variable composition.	The compound has a fixed composition.
3.	A mixture shows the properties of its constituents.	Properties of a compound are totally different from those of its constituents.
4.	They do not have a fixed melting point, boiling point, etc.	They have a fixed melting point, boiling point, etc.
5.	The constituents can be separated easily by physical methods	The constituents can be separated only by chemical processes.

❖ VIDEO-LINKS

LINK 1: <https://www.youtube.com/watch?v=1CkPhAWrcSQ>

LINK 2: <https://www.youtube.com/watch?v=o6Iwj-ozLi0>

ASSIGNMENT:

Try the following questions:

Q1. Is air around us a compound or a mixture?

Q2. Water is a compound. Justify.

Q3. Differentiate between homogeneous and heterogeneous mixtures.

Q4. Give reasons for the following:

(a) Copper is used for making electric wires.

(b) Graphite is used for making electrode in a dry cell.

Q5. List any four characteristics by which compounds can be differentiated from mixtures

DAY-4

❖ TEACHING MATERIALS:

❖ **Solution:-**

A solution is a homogeneous mixture of two or more substances. For example: Lemon water, sugar solution, soda water, etc.

❖ **Components of Solution:-**

(1) **Solvent:** The component of the solution that dissolves the other component in it and is usually present in larger amount, such component of solution is called the solvent.

For example: Water, alcohol etc.

(2) **Solute:** The component of the solution that is dissolved in the solvent and is usually present in lesser quantity, such component is called the solute. For example: Salt, sugar, iodine etc.

❖ **Properties of solutions:-**

(i) It is a homogeneous mixture.

(ii) Particle size in a solution is less than 1 nm in diameter.

(iii) Particles of a solution cannot be seen even with a microscope.

(iv) A true solution does not scatter the light.

(v) Solution is stable.

(vi) The solute particles cannot be separated from the mixture by the process of filtration.

❖ **Types of solutions:**

❖ Various types of solutions are:

(i) Solid in a solid solution: Alloys.

(ii) Solid in a liquid solution: Sugar solution, salt solution.

(iii) Liquid in a liquid solution: Lemon water, vinegar (acetic acid in water)

(iv) Gas in a gas solution: Air.

(v) Gas in a liquid solution: Soda water.

❖ VIDEO-LINKS

LINK 1: <https://www.youtube.com/watch?v=SaNZAyqOeT0&pbjreload=10>

LINK 2: <https://www.youtube.com/watch?v=fAjvEoNMpL8>

DAY-5

❖ TEACHING MATERIALS:

❖ **Solubility:**

- ❖ The maximum amount of the solute which can be dissolved in 100 grams of a solvent at a particular temperature is known as its solubility in that particular solvent.

Conditions affecting solubility:

(i) **Temperature:** Solubility of solids in liquids increases with the increase in temperature, whereas solubility of gases in liquids decreases on increasing the temperature.

- ❖ (ii) **Pressure:** Solubility of gases in liquids increases on increasing the pressure, whereas the solubility of solids in liquids remains unaffected by the change in pressure.

❖ Concentration of a Solution

- ❖ It is defined as the mass of the solute in grams present in 100 grams of the solution.

- ❖ Mathematical expression for concentration of solution:

$$\text{Concentration of solution} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

- ❖ In case of liquid solute in liquid solvent concentration can be expressed as:

$$\text{Concentration of solution} = \frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$$

❖ VIDEO-LINKS

- LINK 1: <https://www.youtube.com/watch?v=TglqJ2CkHA>
- LINK 2: https://www.youtube.com/watch?v=qL5-lcc_TfY&pbjreload=10

EXERCISE:

Solve in text and exercise question with the help the link

<http://ncert.nic.in/textbook/textbook.htm>