

WEEK 4:

Chemicals 2:

1) Guide the students to identify hazardous chemicals:

- i) using your sense of smell is a reliable way of detecting hazardous chemicals or materials.
- ii) check the product's container label.
- iii) check the Safety Data Sheets (SDS) for hazardous substances.

2) Environmental problems created by chemical industries:

- i) Gas pollution
- ii) Water pollution
- iii) Soil pollution
- iv) Greenhouse emissions
- v) Depletion of natural resources
- vi) The production and use of chemicals contribute to climate change and can harm human health, wild life, and ecosystems.

3) Chemical symbols of elements and their valences:

Two ways to identify an element:

- a) symbol
- b) valency

Symbols of first 20 elements:

	Elements	Symbols	Valency
1	Hydrogen (vary)	H	1
2	Helium	He	zero
3	Lithium	Li	1
4	Beryllium	Be	2
5	Boron	B	3
6	Carbon (vary)	C	4
7	Nitrogen (vary)	N	4
8	Oxygen (vary)	O	2
9	Fluorine	F	1
10	Neon	Ne	0
11	Sodium	Na	1
12	Magnesium	Mg	2
13	Aluminium	Al	3
14	Silicon	Si	4
15	Phosphorous	P	3

16	Sulphur	S	2
17	Chlorine	Cl	1
18	Argon	Ar	0
19	Potassium	K	1
20	Calcium	Ca	2

Distinguish \ Differentiate between the term elements, compounds and mixtures:

A) Element is a pure substance.

1) It is the basic unit of matter and cannot be broken down into two or more simpler substances by any means.

2) It is mainly classified into metals, non- metals, metalloids and noble gases.

Examples: Iron, oxygen, hydrogen, gold, helium, carbon.

B) Compound is a pure substance.

1) It is formed by combination of two or more elements.

2) The elements are combined together in a fixed ratio.

3) It can be broken down into its elements by chemical means .

Examples: H₂O, NaCl, Na₂CO₃, (Commonly found in manufacturing paper, soap, glass).

Examples of compounds:

	Compound	Compound Element	Formula
1	Water	Hydrogen+ Oxygen	H ₂ O
2	Sand	Silicon + Oxygen	SiO ₂
3	Limestone	Calcium + Carbon + Oxygen	CaCO ₃
4	Common Salt	Sodium + Chloride	NaCl
5	Sugar(Sucrose)	Carbon + Hydrogen + Oxygen	C ₁₂ H ₂₂ O ₁₁
C) Mixture is an impure substance:			

1) It is formed by combination of two or more elements, compounds or both.

2) The substance are mechanically mixed together in any ratio.

Mixture can be separated with physical methods.

	Mixture	Constituents
1	Air	Oxygen, Carbon (iv) oxide, Nitrogen rare gases, dust.
2	Soil	Sand, Clay, Humus, Water, Air, Mineral salt.
3	Palm wine	Water, Sugar, Alkanol, Mineral salt, Vitamins, Yeast, Protein, Fat.
4	Urine	Urea, Water, Mineral salt.

5	Blood	Water, Protein, Fat, Hormones, Enzymes, Oil, Haemoglobin.
6	Crude oil	Petrol, Heavy oil, Gas oil, Kerosene, Gas, Bitumen.

Chemical Formulae and Chemical Equation:

Chemical Formula: Is an expression that states the number and type of atoms present in a molecule of a substance.

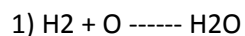
Examples: Chemical formula of table salt or sodium chloride is :

NaCl.

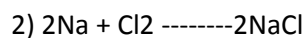
One sodium atom and one chlorine atom in each molecule.

The method of representing a chemical reaction with the help of symbols and formulae of substances involved is called chemical equation.

Examples of chemical equation:

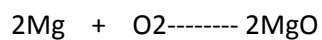


Reactants products



Reactants products

Evaluation:



1) How many reactants are there? 2) What is the product?

3)----- number of atoms of magnesium reacted with one molecule of oxygen gas?

Solution:

1) There are two reactants. 2) The product is two molecules of Sodium chloride.

2) Two atoms of magnesium react with one molecule of oxygen.