Lesson Plan 4
Class – VII
Subject: Science
Topic: Structure of Matter

KPI DEFINITION ADDRESSED TO THE LESSON PLAN
KPI 1- To develop the understanding of some complex scientific concepts
KPI 2- Promoting analytical thinking in order to establish connectivity with the real-world situation and compare the different properties of elements, compounds and mixtures
KPI 3- Application of scientific concepts in doing experiments

TOPIC- Structure of Matter

START DATE-

KNOWLEDGE	UNDERSTANDING	APPLICATION	ANALYSIS	SYNTYHSIS	EVALUATION
S 3, 7	S 1, 2, 4,5,	S 6			
		B 1, 2,	B 3		
Act **1**	Act **2, 3**	Act **4**			
				As 1,	As . 2

Brief Description of the lesson: This topic emphasizes on the difference between elements, compounds and mixtures and the various tools for chemical communication like symbols, formulae and chemical equations. It also tells about the concept of valency and atomicity. By this the learner will be able to apply the concept to the applications of substances as elements, compounds and mixtures being used.

UN Sustainable Goals to be achieved (if any): Industry, innovation and infrastructure.

Objectives:
I - Specific Objectives
To enable the students to-

1) Categorize a given substance as element, compound and mixtures. (Comparing-U) **KPI 2**
2) Differentiate between Compound and mixtures. (Comparing-U) **KPI 1**
3) Recall the steps for writing the chemical formulae. (Recalling- K)
4) Describe about the balancing of chemical equations. (Explaining-U) **KPI 1**
5) Explain the concept of valency and atomicity. (Explaining-U) **KPI 1**
6) Calculate the atomicity of some common elements. (Executing-Ap) **KPI 3**
7) Know some common elements and their symbols. (Recalling-K**) KPI 1**
8) Make the formulae by using the symbols and valency concept. (Executing-Ap) **KPI 3**
9) Analyse diagrams and descriptions to classify matter as compounds or mixtures, KPI2

II - Behavioral Objectives
To enable the students to-

1) Take safety measures before and after using the burner. (Executing-Ap) **KPI 2**
2) Select suitable method for separation of mixtures. (Differentiating- An) **KPI 1**

Process / Activities
Activity (to introduce the lesson)
Warm up activity

At the beginning of the lesson, the class will do a Think-Pair-Share to discuss the objective.

Introduction
Objective Class Activity 1

1. Give each pair of students a bag containing either the mixture or the compound.
2. Ask them to separate the substance on the table.

Student Activity

1. Ask the students to explain how they separated their substance.
2. Talk about why some groups could not separate their substances.
3. Explain that over the next few days they will be learning how to differentiate between elements, compounds, and mixtures.

   The teacher will help to clear any misconceptions about elements and compounds. A couple major misconceptions are students may incorrectly assume that only elements (not compounds) are pure substances

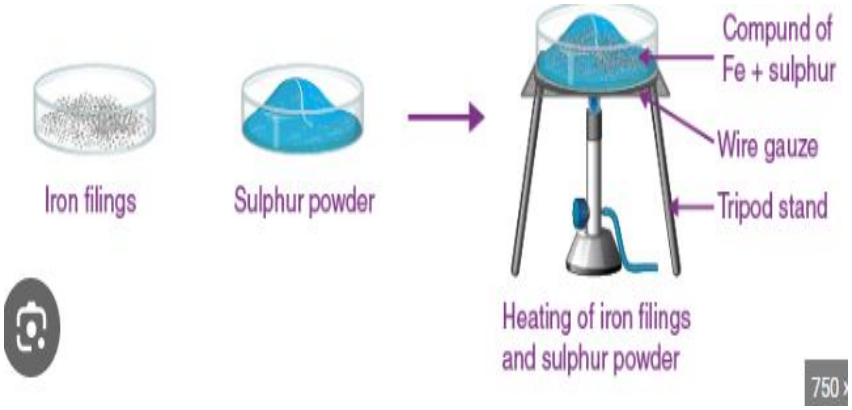
Activity 2- Take some iron and sulphur powder in a china dish. Mix them thoroughly Now, bring a magnet near them.

Probing questions:
1. Do both the substances react chemically?
2. What happens on bring a magnet near the mixtures?

The concept of elements, compound and mixtures will be introduced.

Difference between compound and mixtures
Activity 2- To understand the difference between compound and mixtures. (Inferring-U) **KPI 1**

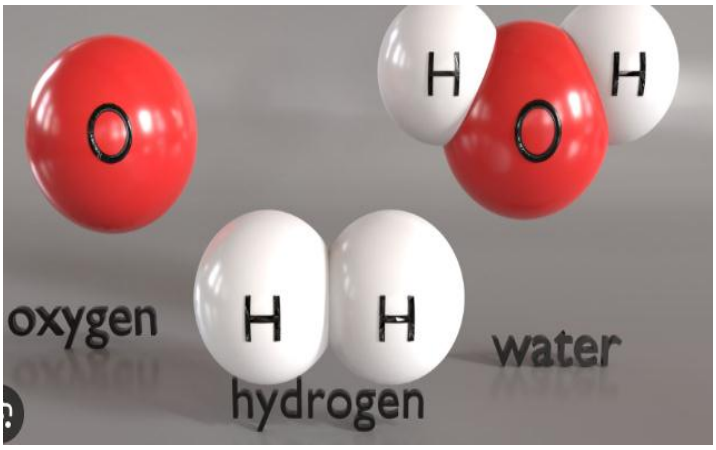
The activity will be including the following steps-
Experiment- Take 8 g of sulphur and 14 g of iron in a china dish and heat the mixture after some time the mixture will begin to glow and give off heat. A black substance called iron sulphide is formed. The particles of iron and sulphur cannot be seen separately. What happens when magnet is brought close to this substance.



1. How can you form iron sulphide from a mixture of iron and sulphur?
2. What are the differences between atoms and molecules?
3. What is the formula of iron sulphide?

The activity will enable the students to understand the difference between compound and mixtures.

Activity 3 Model making activity to show them the arrangement of atoms and molecules. (explaining-U)
Skills: Analysis, Observation



Explanation by the mentor about the atoms and molecules through some examples.

Activity 5: Explanation on writing a formulae and balanced chemical equation through following steps. (U- Explaining)

Element	Symbol	Element	Symbol
Hydrogen	H	Sodium	Na
Helium	He	Magnesium	Mg
Lithium	Li	Aluminium	Al
Beryllium	Be	Silicon	Si
Boron	B	Phosphorus	P
Carbon	C	Sulphur	S
Nitrogen	N	Chlorine	Cl
Oxygen	O	Argon	Ar
Fluorine	F	Potassium	K
Neon	Ne	Calcium	Ca

VALENCES SHOWN BY COMMON ELEMENTS AND RADICALS					
Aluminum	Al	+3	Lead	Pb	+2
Ammonium	NH_4	+1	Magnesium	Mg	+2
Barium	Ba	+2	Mercuric	Hg	+2
Calcium	Ca	+2	Mercurous	Hg	+1
Cupric	Cu	+2	Nickel	Ni	+2
Cuprous	Cu	+1	Potassium	K	+1
Ferric	Fe	+3	Silver	Ag	+1
Ferrous	Fe	+2	Sodium	Na	+1
Hydrogen	H	+1	Zinc	Zn	+2
Acetate	$C_2H_3O_2$	−1	Iodide	I	−1
Bicarbonate	HCO_3	−1	Nitrate	NO_3	−1
Bisulfate	HSO_4	−1	Nitrite	NO_2	−1
Bromide	Br	−1	Oxide	O	−2
Carbonate	CO_3	−2	Permanganate	MnO_4	−1
Chlorate	ClO_3	−1	Phosphate	PO_4	−3
Chloride	Cl	−1	Sulfate	SO_4	−2
Hydroxide	OH	−1	Sulfide	S	−2
Hypochlorite	ClO	−1	Sulfite	SO_3	−2

AMMONIUM CHLORIDE

Step 1: Write the symbols and valencies.

Symbols	
Ammonium	Chloride
NH_4^+	Cl

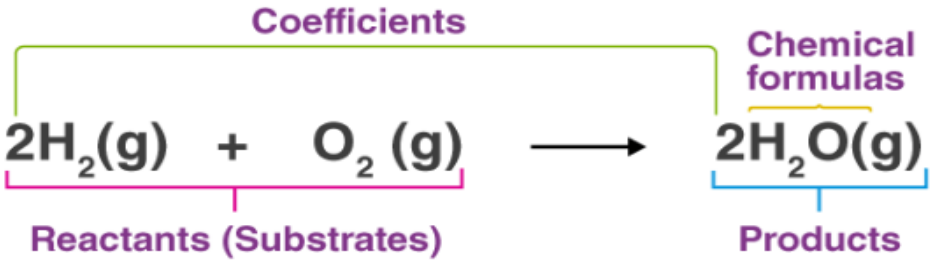
Valencies	
Ammonium	Chloride
1^+	1^-

Step 2: NH_4^+ Cl^-

Step 3: NH_4^+ Cl^-

Step 4: NH_4Cl

Step 5: Hence the formula of ammonium chloride is NH_4Cl where ammonium is positive radical formed by more than one atom(one atom of nitrogen and four atoms of hydrgen carrying a positive change as a whole)



Digital Content to be used:

Video demonstration on Structure of matter https://youtu.be/sYZ3ETjK8_Y

Video showing method of making model of some atoms and molecules https://youtu.be/uoFSvsrA7X0

Expected Learning Outcomes
Students will be able to
1. Compare the properties of elements, compound and mixtures. (Recalling-K)
3. Identify some common elements and their symbols. (Recognizing-K)
4. Understand the need of balanced chemical equations.
5. Express the electron structures of cations, anions, and ionic compounds

4. Utilize the essential concepts of chemistry that will serve as foundation blocks to learning chemical components and processes.

5. Understand fundamental chemical principles related to the composition of matter and the concept of molecular identity

6. Students can write the chemical formulae of some compounds and balance the chemical equations

7. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behaviour in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.

Assessment Activity:
1 Demonstration of videos showing the model construction followed by model making by students
Video showing method of making model of some atoms and molecules https://youtu.be/uoFSvsrA7X0
Group Activity: Model making of any compound or molecule like water , methane, ammonia and carbon dioxide etc.
Parametres of Model making (Visual and Performing arts)

	4	3	2	1
Visual Appearance	Appropriate materials were selected. They were creatively portrayed in ways that enhanced understanding about the subject matter.	Appropriate materials were selected. There was an attempt to use materials in a creative way.	Most materials selected were appropriate. Not much clear with the basic requirement.	Inappropriate materials were selected. Lacking in pre-requisite knowledge.
Construction	Great care was taken in the construction process so that the model is neat and attractive.	Construction was careful and accurate for the most part, but 1-2 details could have been refined for a more attractive product.	Construction demonstrated some effort, but 3-4 details could have been refined for a more attractive product.	Construction appears careless and many details need refinement for a strong or attractive product.
Scientific understanding	The student demonstrates a total understanding.	The student demonstrates a proficient understanding.	The student demonstrates a basic understanding.	The student shows a minimal understanding.

2.Class test will be taken after the completion of chapter.
Review of the Lesson Plan: To be done when the lesson gets over
Problems faced –
Success-
Failure-
Real Learning Outcomes-
Students Response / Participation-
Teachers Learning to be added.