

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-01	September	Atoms and Molecules	Symbol, Atomic Number, Mass Number of elements.
Expected Learning Outcome: Students will be able to – - List the postulates of Dalton's Atomic Theory - State and write the atomic symbols of first 20 elements of the periodic table. - State and write the atomic number and mass number for the first 20 elements of the periodic table.						
Expected skill development: - Observation skill - Analytical skill - Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm up- Review of the previous topics will be done through the following questions-

Q1- Define an atom.

Q2- State the law of conservation of mass.

(5 min)

Introduction- John Dalton provided the basic theory about the nature of matter-

Postulates-

- 1) All matter is made of very tiny particle called atoms.
- 2) Atoms are indivisible particles, which cannot be created or destroyed in a chemical reaction.
- 3) Atoms of given elements are identical in mass and chemical properties.
- 4) Atoms of different elements have different masses and chemical properties.
- 5) Atoms combine in the ratio of small whole numbers to form compounds.
- 6) The relative number and kinds of atoms are constant in a given compound.

(10 min)

- Atomic symbols of some commonly used elements will be discussed in the class (iron, copper, gold, silver, lead, zinc etc.)

Atom + Atom $\longrightarrow$ Molecule

(identical /non identical)

Molecule- The smallest particle of an element or a compound that is capable of an independent existence and shows all the properties of that substance

- Mono atomic and atomic states of an atom will be discussed.

(10 min)

Content- Structure of the atom will be discussed –



Teaching Methodology

- * Discussion Method
- * Questionnaire

Atomic symbols, Atomic Number, and Mass Number for the first 20 elements will be given.

(Closure)

Think Line- Write any two observations that support the fact that atom are divisible? (5min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

Q1- Define an atom.

Q2- State the law of conservation of mass.

- Evaluation/Assessment:

Oral assessment through the questions asked in the lesson plan.

Learners on the way
Q. $\overset{A}{Z}X$ What does this symbol represent ?

Advanced Learners
Q. Why is it not possible to see an atom with naked eyes?

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster.

Common Misconceptions: Symbols of the elements sometimes differ from their English names.

Addressing the misconceptions: Symbols for some elements have been derived from their Latin names.

- Home Assignment:

Q1- State the postulates of Dalton's atomic theory

Q2- Define a molecule.

Q3 Define the atomic mass unit

(5 min)

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-02	October	Atoms and Molecules	Laws of chemical combinations
Expected Learning Outcome: Students will be able to – a) Define an atom b) Differentiate between an atom and a molecule c) State and write the 'law of conservation of mass' d) State and write the 'law of constant proportion'.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up Calibration of the previous knowledge will be done through the following questions-5 min

Q1- What is an atom?

Q2- What is the difference between an atom and a molecule?

Q3- What is the difference between molecule of an element and the molecule of a compound.(5mins)

Introduction- Discussion on the activity

- Reaction between sodium chloride and silver nitrate.

Content- **Law of conservation of mass-** Matter can neither be created nor destroyed in a chemical reaction.
(10 min)

Law of constant proportion/law of definite proportion-

In a pure chemical compound, the elements are always combined in a fixed proportion by mass. Ex Water, prepared from any source contains hydrogen and oxygen in the ratio 2:16(1:8) by mass. Examples of CO_2 & NH_3 may be discussed for better understanding.

(Closure)

(10 min)

Think Line- What is the difference between molecules 2O and O_2 ?

(C.W.)

Q1- Define an atom.

Correct Ans- An atom is the smallest particle which takes part in a chemical reaction and may or may not exist independently.

Incorrect Ans- An atom is the smallest particle found in the matter/element.

Teaching Methodology

* Discussion Method

* Questionnaire

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook
Q1- What is an atom?

Q2- What is the difference between molecules 2O and O₂ ?

Q3-What is the difference between molecule of an element and the molecule of a compound.

- Evaluation/Assessment:
oral assessment through the questions asked in the lesson plan
Classroom Discussion

Learners on the way

Q What is the difference between an atom and a molecule ?

Advanced Learners

Which postulate of Dalton's Atomic Theory is the result of Law of Conservation of mass ?

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.

Common Misconceptions:
Students might face difficulty in understanding the difference between ratio by mass and ratio by volume.

Addressing the misconceptions:
Relevant examples will be discussed.

- Home Assignment:

(5 min)

Q1. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of ethanoic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g of sodium ethanoate. Show that these observations are in agreement with the law of conservation of mass.

sodium carbonate + ethanoic acid → sodium ethanoate + carbon dioxide + water

Q2. Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?

Q 3. Which postulate of Dalton's atomic theory can explain the law of definite proportions? (5 min)

**LESSON PLAN [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-03	October	Atoms and Molecules	Atomic number and Mass number of elements

Expected Learning Outcome:

Students will be able to –

- Predict the atomic numbers of elements.
- Calculate the number of protons, electrons and neutrons of an elements.
- Draw the structure of an atom showing the distribution of electrons in different shells.

Expected skill development:

- Observation skill
- Analytical skill
- Critical thinking and communication

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up

Q1- What is the atomic number of chlorine?

Q2- What is the atomic symbol of sodium?

Q3- Draw the structure of an atom showing the position of protons, electrons and neutrons(on black-board)

(5 min)

Introduction- Discussion on historical development of atomic numbers and mass numbers of elements.

(10 min)

Content

Discuss on the fact that atomic number is a more fundamental property than atomic mass number.

1) Atomic number = number of protons

2) Mass number = number of protons + number of neutrons.

Numerical based on the above two formulae will be solved.

Q1- A certain particle X has 17 protons, 17 electrons and 18 neutrons.

a) What is the atomic number of X ?

b) What is the mass number of X?

c) Identify the element.

Teaching Methodology

* Discussion Method

* Questionnaire

Q2- Write the number of protons and neutrons of an element, whose atomic mass is 27 and atomic number is 13. Identify the element also.

Rules regarding the electronic configuration of elements will be discussed in class. (10 min)

(Closure)

Think Line- What are the number of protons , neutrons and electrons in ${}_8\text{O}^{16}$ and ${}_{18}\text{Ar}^{40}$? What are the atomic number and mass number of each? (5 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook
- Q1- What is the atomic number of chlorine?
- Q2- What is the atomic symbol of sodium?

Q3- Draw the structure an atom showing the position of protons, electrons and neutrons(on black-board)

- Evaluation/Assessment:
- Oral Assessment through the questions asked in the lesson plan
- Pre-reading Assessment
- Classroom discussion

Learners on the way
Q. Name two elements with same number of protons and neutrons?

Advanced Learners
Q. When 3.0 g of carbon is burnt in 8.00 g oxygen, 1.00 g of carbon dioxide is produced. What mass of carbon dioxide will be formed when 3.00 g of carbon is burnt in 50.00 g of oxygen? Which law of chemical combination will govern your answer?

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.

Common Misconceptions:
Students might consider that atomic number of elements is always equal to the number of electrons.

Addressing the misconceptions:
Relevant examples will be picked up
 $\text{Na} = \text{No. Of electrons} = 11$
 $\text{Na}^+ = \text{No. of electrons} = 10$

- Home Assignments:

(5 min)

Q1. Define the atomic mass unit.

Q2. Why is it not possible to see an atom with naked eyes?

Q3. A 0.24 g sample of compound of oxygen and boron was found by analysis to contain 0.096 g of boron and 0.144 g of oxygen. Calculate the percentage composition of the compound by weight.

LESSON PLAN [2019 - 2020]



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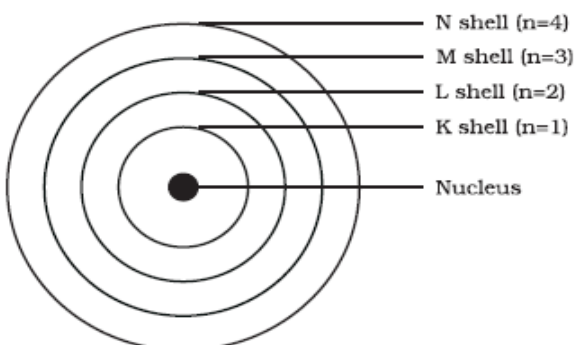
Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-04	October	Atoms and Molecules	Electronic configuration of Elements
Expected Learning Outcome: Students will be able to – a) State and write the electronic configuration for the first 20 elements of the periodic table.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up+ Introduction :-

- Rules for writing electronic configuration of an atom are : (10 min)
- i) Maximum number of electrons in an orbit is calculated by $2n^2$ rule , where n is the number of orbit and may be equal to 1,2,3...
- ii) Electron occupies the next orbit only after filling the inner orbit completely.
- iii) The maximum number of electrons in outermost orbit will not be more than 8.

(Students will be shown how to write configuration for first three elements)



Teaching Methodology

* Discussion Method

Questionnaire

- Students will be asked to write the electronic configuration for first 10 elements in the class.(15 min)

Closure – With the think line mentioned below

(5 min)

Think Line- An atom of an element has three electrons in the third shell which is the outermost shell ?

Write its electronic configuration, number of protons , number of electrons and identify the element .

Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook Q- Write electronic configuration of elements having atomic number from 1 to 10.	
Evaluation/Assessment: Written assignment	
Learners on the way Q. Write electronic configuration of S , Mg , N ,Ne .	Advanced Learners Q. Draw the atomic structure of i) an element with same number of subatomic particles ii) an atom with same number of electrons in L and M shell ?
Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book	
Common Misconceptions: Students might place the electrons present in a particular shell very close to each other. They might fill up 9 or 7 electrons in L,M shells.	Addressing the misconceptions: Keep all the electrons present in a particular orbit equidistant.

- Home Assignments:

Write electronic configuration of elements having atomic number from 11 to 20. (5min)

LESSON PLAN [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-05	October	Atoms and Molecules	Valency
Expected Learning Outcome: Students will be able to – a) Define valency, valence electrons and valency shell. b) State and write the electronic configuration of different elements. c) Compute the valency of different elements (1-20) d) Define poly atomic ions						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up+ Introduction- Review of the previous class will be done by asking the students to draw and fill up the following table in their notebook-
(C.W.)

ATOMIC NUMBER	SYMBOL OF ELEMENTS	ELECTRONIC CONFIGURATION	VALENCY
FOR ELEMENTS (1-20)			

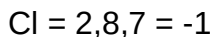
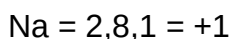
(15 min)

(Note- The valency column will be filled up at the end of the class)

Content- Explanation by mentor on-

- How to complete the valency via octet rule and doublet rule.
- Formation of cation and anion.

(5 min)



- Polyatomic ions- A group of atoms carrying a charge is known as polyatomic ion eg., PO_4^{3-} , CO_3^{2-} , OH^- (10 min)

Teaching Methodology

* Discussion

* Questionnaire

(Closure)

Think Line-

What is the difference between sulphate and sulphite?

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook
Q1- Compute the valency of first 20 elements of the periodic table.
Q2- Define polyatomic ion.
Q3- What is the valency of hydroxide ion/
Q4- Calculate the valency of Na, Al, F, Si.

- Evaluation/Assessment:
- Oral Assessment
- Observing the facial expressions and body language

Learners on the way
Write two monovalent and two divalent ions?

Advanced Learners
Write the valency of cuprous and cupric ions?

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.

Common Misconceptions:
The symbol '+' stands for gain of electrons and symbols '-' stands for loss of electrons.

Addressing the misconceptions:
The symbol '+' stands for loss of electrons and symbols '-' stands for gain ion of electrons

- Home Assignments:
Q1- Differentiate between an atom and an ion.
Q2 What are polyatomic ions? Give examples.
Q3 Draw a table for some common simple and polyatomic ions.

(5 min)

LESSON PLAN [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-06	October	Chemical Equations and Reactions	Writing Formulae of simple compounds
Expected Learning Outcome: Students will be able to – e) Predict and write the atomic symbols of elements. f) List the valency of different elements. g) Deduce the chemical formulae of different chemical compounds.						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm up-

Q1- List the valency of the following elements- N, C, S, Cl, Ne

Q2- What is octet rule?

Q3- How is a cation different from an anion?

Q4- Define polyatomic ion. (5min)

Introduction- Activity- Students will be asked to exchange their pencils and then proceed ahead with the topic.

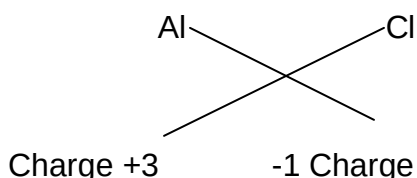
Content- Explanation by mentor -How to write the formulae of a given compound-

1) Aluminium Chloride

Instruction- (10 min)

- 1) Identify the elements
- 2) Write the atomic number, electronic configuration and valency of each elements.
- 3) Exchange the valency

4) Deduce the chemical formula of the compound.



Formula- AlCl_3

Teaching Methodology

- * Discussion
- * Questionnaire

(CLOSURE)

Q- Elucidate the chemical formulae of the following compounds- (C.W.)

1) Aluminium Chloride

2) Aluminium Oxide

(3) Calcium Oxide

4) Sodium Nitrate

5) Calcium Hydroxide

6) Sodium Carbonate

7) Ammonium Sulphate

8) Sodium Chloride

9) Aluminium Sulphate

10) Sodium Hydrogen Carbonate (15 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
 - Q1- List the valency of the following elements- N, C, S, Cl, Ne.
 - Q2- What is the octet rule?
 - Q3 Write the names of the compound represented by the following formulae :
 - a) CaCO_3 b) MgCl_2 c) H_2SO_4 d) $\text{C}_2\text{H}_5\text{OH}$
 - Q4- Define a polyatomic ion.

- Evaluation/Assessment:
- Written Assessment
- Classroom Discussion

Learners on the way
 Q1 Elucidate the chemical formulae of the following compounds :
 (1) Aluminum hydroxide (2) Aluminum Phosphate
 (3) Sodium Phosphate (4) Calcium Carbonate

Advanced Learners
 Q1 How is cation different from an anion?

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.

Common Misconceptions:
 Students frame the chemical formula without exchanging the valency.

Addressing the misconceptions:
 Relevant examples will be discussed. Ex- Sodium Oxide

- Home Assignments: (5 min)
 - Q1 Write the chemical formulae of the following: (a) Magnesium chloride (b) Calcium oxide (c) Copper nitrate (d) Aluminium chloride (e) Calcium carbonate.

LESSON PLAN [2019 - 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	35 min Pd-07	November	Atoms and Molecules	Molecular Mass
Expected Learning Outcome: Students will be able to – h) Identify elements present in a compound i) Recall the molecular mass of elements j) Compute the molecular mass of compounds						
Expected skill development: • Observation skill • Analytical skill • Critical thinking and communication						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm up-

Students will be asked to recall the atomic mass number of first 20 elements and write it in their notebook. (5min)

Introduction- Activity- Explanation by mentor

To calculate the molecular mass of water-

$$\begin{aligned}
 \text{H}_2\text{O} &= 2 \times \text{H} + 1 \times \text{O} && (\text{C.W.}) \\
 &= 2 \times (1) + 1 \times (16) \\
 &= 2 + 16 \\
 &= 18\text{u}
 \end{aligned}$$

Teaching Methodology

- * Discussion
- * Questionnaire

U stands for unified mass

Content – Calculate the molecular mass of the given compounds. (C.W)

- | | | |
|---------------------|------------------------|----------|
| 1) Carbon dioxide | 2) Hydrogen Chloride | |
| (3) Sodium Chloride | 4) Potassium Hydroxide | |
| 5) Sulphuric acid | 6) Nitric acid | |
| 7) Limestone | 8) lime | |
| 9) Slaked Lime | 10) Baking Soda | (20 min) |

(Closure) (5 min)

Think Line – State two examples in each case and write their chemical formulae:

- i) Molecules having same kind of atoms
- ii) Molecules having two different kinds of atoms
- iii) Molecules having three different kinds of atoms

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) - Atomic mass number of first 20 elements will be asked from the students. - Questionnaire will be given. (written)	
- Evaluation/Assessment: - Written Assessment - Questionnaire	
Learners on the way Q. Calculate the molar mass of the following substances : (a) Hydrochloric acid, HCl (b) Nitric acid, HNO₃ (c) Acetic acid (d) potassium hydroxide	Advanced Learners Q. Find the ratio by mass of the combining elements of the following compounds : a) CaCO₃ b) MgCl₂ c) H₂SO₄ d) C₂H₅OH
Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.	
Common Misconceptions: Students multiply the number of atoms with the atomic number	Addressing the misconceptions: Relevant examples will be discussed.

- Home Assignments: (5 min)
 - Q1. Calculate the molecular masses of H₂, O₂, Cl₂, CO₂, CH₄, C₂H₆, C₂H₄, NH₃, CH₃OH.
 - Q 2. Calculate the formula unit masses of ZnO, Na₂O, K₂CO₃, given atomic masses of Zn = 65 u, Na = 23 u, K = 39 u, C = 12 u, and O = 16 u.
 - Q3 Give the names of the elements present in the following compounds. (a) Quick lime (b) Hydrogen bromide (c) Baking powder (d) Potassium sulphate.
 - Q 4. Calculate the molar mass of the following substances. (a) Ethyne , C₂H₂ (b) Sulphur molecule, S₈ (c) Phosphorus molecule, P₄ (Atomic mass of phosphorus = 31)