

Pre-Content/Content Post Content	Learning Outcomes/ Objectives	
	General	Specific
<u>Pre Content</u> They have the pre content knowledge of: Elements and compounds. Difference between elements and compounds and hence are aware of atoms and molecules. <u>Content</u> • Laws of Chemical Combination • Dalton's Atomic Theory • Atom and atomic mass • Ions • Framing of a chemical formula • Molecular Mass • Mole Concept <u>Post Content</u> Recapitulation of important concepts and discussion of problem based questions	Students will be able to: • develop the concept of laws of chemical combination. • explain that atoms of different elements chemically combine together in a definite proportion by mass to form compounds • define the Laws of Chemical combinations • list postulates of Dalton's Atomic theory. • explain atom as the smallest particle of the matter • differentiate between atomic mass and relative atomic mass • understand the concept of Ion formation. • understand the process of framing a chemical formula • develop definition of molecular mass and atomic mass • define mole. • predict the number of particles present in 1 mole • apply the concepts learnt	Students will be able to: • observe and understand that the total mass of the products and reactants in a chemical reaction is same. • apply the Law of Chemical combinations • correlate Dalton's atomic theory with law of constant proportion and law of conservation of mass. • identify the drawbacks of the theory. • differentiate between the molecules of elements and molecules of a compound • apply concept of relative atomic mass to understand the atomic mass of the given element • illustrate symbols and valencies of elements. • apply the knowledge of symbols and valencies to write chemical formula. • differentiate between molecular mass and atomic mass. • appreciate the significance of mole • solve numerical based on mole concept. • compute the numerical problems and construct chemical formulae

Home Work /Assignments

- NCERT exercise
- Worksheets from assignment booklet

Teacher's Activity	Student's Activity	Teacher's Observation and Remedial action taken
Teacher will: explain the laws of Chemical Combination through a video explain the postulates of Dalton's Atomic Theory <u>ANNEXURE 3A</u> illustrate the difference between molecules of elements and molecules of a compound <u>ANNEXURE 3B</u> explain the concept of Relative Atomic Mass using different types of pulses explain the concept of ions using example of NaCl using a video explain the method of framing the Chemical formulae by criss cross method explain the concept of molecular mass with the help of examples explain mole concept with the help of the video ask questions for recapitulation of concept	Students will: observe the video and solve the related questions apply the postulates and identify the drawbacks <u>ANNEXURE 3a</u> perform the activity, record the observations and complete the following worksheet. <u>ANNEXURE 3b</u> perform the activity and record the observations and complete the following worksheet apply the concept to propose more similar examples of ionic compounds frame chemical formulae of the given compounds using criss cross method apply the knowledge gained to calculate the molecular mass of the given compounds. apply the knowledge gained to solve problem based questions solve the problem based questions and practice NCERT back exercise	

Teaching Aids: Activities performed to show conservation of mass, ICR, Activity Worksheets, Assignment, reference books.

Methodology/Innovative Methods: Game for writing chemical formulas.

Interdisciplinary links: **Physics:** Law of conservation of Mass, **Mathematics:** Estimating the size of the atoms in nm, cm and meter.

Life Skills: understanding use of dozen and similar such measuring units.

ACTIVITY NO. -4

MAKING MOLECULES OF ELEMENTS AND COMPOUNDS

Subject	Science
Class	IX
Chapter/Unit	Atoms and Molecules
Topic	How do atoms exist?
Time	45 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

To construct and differentiate between molecules of the elements and molecules of the compounds

Skills:

Analyzing, Creating and Applying

What I have to do?

To predict chemical formulae of the given molecules of the elements and compounds and make their molecular structures using coloured spherical cut outs.

What do I require?

10 spherical cut outs of 4 different colours- yellow, green, red and blue for each group (symbolizing atoms of a given element), fevistik, Black rectangular cut out 15cm X 10cm in size (for making the molecular structures by pasting the spherical cut outs)

What do I need to know?

The molecules of an element are constituted by the same type of atoms. The number of atoms constituting a molecule is known as its atomicity. Depending upon the number of atoms present in a molecule, molecules can be monoatomic, diatomic, triatomic and polyatomic. Molecules of a compound consists of atoms of different elements in a definite proportion.

Teacher's Activity

Teacher will:

1. divide the class into groups of 5 each

2. provide 10 spherical cut outs of 4 different colours- yellow, green, red and blue to each group.



Yellow cut outs symbolize Carbon (C) Green cut outs symbolize Oxygen (O), Red cut outs symbolize Nitrogen (N) and Blue cut outs symbolize Hydrogen (H)

(NOTE: any other colours may be chosen depending upon the availability)

3. brief the activity and recapitulate the concept of molecules of elements and molecules of compounds.
4. assign the following **molecules of elements** to each group:
- a) Hydrogen
 - b) Nitrogen
 - c) Ozone
5. assign the following **molecules of compounds** to each group:
- a) Water
 - b) Ammonia
 - c) Carbon dioxide

How will I proceed?

Student's Activity

1. Write the chemical formulae of the assigned molecules of the elements on the Black rectangular cut out and make their molecular structures by pasting the required spherical cut outs symbolizing atoms present in that element adjacent to each other. Eg:

Hydrogen

Chemical formula- H_2



2. Write the chemical formulae of the assigned molecules of a compound on the Black rectangular cut out and make their molecular structure by pasting the required spherical cut outs symbolizing atoms present in that element adjacent to each other Eg:

Water

Chemical formula- H_2O



What have I observed?

S. No.	Name of the Molecule	Chemical Formula of the Molecule	Elements present
1	Hydrogen		
2	Nitrogen		
3	Ozone		
4	Water		
5	Ammonia		
6	Carbon dioxide		

What have I learnt?

Thus I learn, molecule of an element consists of _____ atoms whereas, molecule of a compound consists of _____ atoms.

What am I curious to learn?

- Let us research on the atomic size of the atoms of the elements chosen in the above activity. Do all atoms of the **different** elements have the same size?
- Let us research on the mass of the atoms of the **same** element (let us say Oxygen) chosen in the above activity? Do all atoms of an element carry the same atomic mass?

Let me evaluate myself

Q1. What do you understand by Atomicity?

Q2. How are molecules of an element different from molecules of a compound?

Q3. Why atoms cannot exist independently?

Q4. Predict the atomicity of Phosphorous and Sulphur

Q5. Out of the coloured spherical cut outs given in the above activity, make the molecular structure of three more chemical compounds other than the ones assigned in the activity

ANNEXURE 3B,3b

ACTIVITY-RELATIVE ATOMIC MASS AND MOLE CONCEPT

Class-IX

Duration: 40 Mins

Nature of the Activity: Group

Learning Outcome:

Students will be able to explore and understand the concept of Relative mass.

What we have to do?

To experimentally understand the concept of Relative Atomic Mass

What we require?

Red Lentil, Black Lentil, Red Gram, Green Gram, Digital balance and a Cup

What do we need to know?

Determining the mass of an individual atom is a difficult task therefore, Relative Atomic Masses are determined using the Law of Chemical Combination. We know that Relative Atomic Mass of an atom of an element is defined as its average mass of the atom compared to $1/12^{\text{th}}$ the mass of one carbon-12 atom.

How will you proceed?

➤ Teacher's Activity

Teacher will ask the students to recall the definition of Relative Atomic mass, divide the class into groups of four each and make necessary arrangements for the conduct of the activity.

➤ Student's Activity

1. Take the weighing cup from the Activity Kit and record its mass using the Digital balance.
2. Count 50 grains of Red Lentil, put it in the weighing cup and record its mass again.
3. Repeat the above step with each type of Lentil and record their masses.
4. Now use the mass of 50 smallest lentils and divide the mass of all other lentils by this number.
5. Compute the Relative masses compared to the smallest lentil

What have you observed?

Type of Lentil	Symbol	Mass of Empty Cup (g)	Mass of 50 Grains of each type of Lentil alone (g)	Mass of Cup and 50 Grains of each type of Lentil (g)	Relative Mass
Red Lentil	RL				
Black Lentil	BL				
Green Gram	GG				

Red Gram	RG				
----------	----	--	--	--	--

What have you learnt?

The Relative Mass of the smallest lentil is:

The Relative Mass of other types of lentils will be:

What would you be interested to know about?

1. For the above activity, what will you observe and conclude if, we put on the Digital balance each type of lentil which would show the mass equal to its relative mass?

2. How was the mass of an atom of each element computed initially?

3. Why was the above element chosen to compute the Relative Atomic Mass?

4. How is the Relative Atomic mass calculated now?
