

SUBJECT: CHEMISTRY
TOPIC: STRUCTURE OF ATOM

DIARY-LESSON PLAN

Pre-Content/Content Post Content	Learning Outcomes/ Objectives	
	General	Specific
<u>Pre Content</u> We have learnt that atoms and molecules are the fundamental building blocks of matter. The existence of different kinds of matter is due to different atoms constituting them. We will now study whether the atom is really indivisible as stated by Dalton. Also, what makes atom of one element different from the atom of another element. <u>Content</u> • Charged particles in matter. • The structure of the atom: - Thomson's model of atom - Rutherford model - Bohr's model - Valency • Isotopes and Isobars <u>Post Content</u> recapitulation of important postulates of the models and valency	Students will be able to: • observe that rubbing two objects together makes them become electrically charged. • propose Thomson model of the atom. • analyze the raw material required for the Rutherford's experiment • propose the postulates the model • apply the valency concept • discover the terms isotopes and isobars • recall the important concepts	Students will be able to: • conclude that rubbing objects together makes them electrically charged. • connect electrons and protons to the charged particles. • compare the mass and charge of the electron and the proton. • connect it to Christmas pudding/ watermelon. • associate the positive part to the red part of the watermelon and seeds to the electron. • formulate the model. • identify the limitations of the model. • illustrate scattering of alpha particles experiment. • infer the conclusions on the basis of observations. • list the postulates of the model. • identify the drawbacks. • list the postulates of Bohr's model • draw the atomic structure of the elements. • tabulate the properties of proton, electron and neutron. • justify the stability of the atom. • compare the various models proposed. • compute the number of sub atomic particles • predict the valency of the elements • discover and define isotope and isobar. • select isotopes and isobars from the given elements. • distinguish between isotopes and isobars • compile the uses of isotopes and isobars. • apply the knowledge and concepts learnt

Home work/ Assignments: Question and Answers from NCERT textbook and worksheets.

Teacher's Activity	Student's Activity	Teacher's Observation and Remedial action taken
Teacher will: Introduce the chapter by recapitulation of Dalton's Atomic Theory explain Thomson's Atomic Model by relating with the Christmas pudding and a water melon using a video explain Rutherford's Atomic model using video <u>ANNEXURE4A</u> explain the activity depicting Bohr's Atomic Model and distribution of electrons in the valence shell of an atom. <u>ANNEXURE4B</u> explain the concept of valency as the combining capacity of an atom explain Atomic number, Mass number, Isotopes and Isobars with the help of examples. explain the calculation of average atomic mass of Chlorine isotope as an example ask questions for recapitulation of concepts	Students will: list the postulates of Dalton's Atomic Theory. draw the diagram for Thomson's Atomic Model and write down its limitations. (Integration of Art) draw diagram for Rutherford's Atomic Model and write down the Observations, conclusions and limitations of Rutherford's Atomic Model. (Integration of Art) <u>ANNEXURE4a</u> perform the activity, record the observations and complete the following worksheet (Integration of Art) <u>ANNEXURE4b</u> perform the activity, record observations and complete the following worksheet propose the uses of these isotopes and isobars. propose uses of isobars and isotopes calculate the average atomic mass of the given element on the basis of its presence in the environment solve the problem based questions and practice NCERT back exercise	

Teaching Aids: Working model of different atoms, Worksheets, activity, ICR, Internet, Reference books and text book .

Methodology/Innovative Methods: Simple activities to demonstrate charged particles in matter, working model of different elements **Interdisciplinary links: Medicine:** identify and name the various isotopes used in the treatment of different diseases like thyroid, cancer etc.

Physics : correlate the acceleration of a moving particle to the electron in the orbit.

ANNEXURE4A,4a

ACTIVITY -STATIC MODEL OF ELECTRON DISTRIBUTION IN AN ATOM IN DIFFERENT ORBITS

CLASS –IX

Duration-40 min

Nature of activity: Group

Learning outcome:

The students will be able to understand the electronic distribution of electrons in various orbits of an atom.

What we have to do?

To build a static model of electron distribution in different orbits of an atom.

What is required?

Wire, beads, card board and drawing pins.

What do we need to know?

The arrangement and distribution of electrons in different orbits was given by Bohr and Bury. The arrangement of electrons in different shells and sub-shells is known as the electronic configuration of a particular element

How will you proceed?

➤ **Teacher's activity.**

The teacher will arrange for 10 kits, each with wire, beads, card board and drawing pins and will explain how to arrange the beads to form different electronic configurations.

➤ **Student's activity**

1. Fix a drawing pin in the centre of a cardboard. This represents the nucleus of the atom of an element
2. Calculate the number of electrons in each orbit of the sodium atom.
3. Make a circular loop of wire with diameter of about 6 cm.
4. Insert two beads and close the ends.

5. This is the first orbit. Fix it on the cardboard so that drawing pin is in the centre of this loop.
6. Make another circular loop of diameter of about 10 cm. Insert 8 beads and close the ends. This is the second orbit.
7. Fix this on the cardboard in such a way that the drawing pin is in the centre of this loop also.
8. Make another loop of diameter, say 16 cm. Insert 1 bead and close the ends. This is third orbit.
9. Fix it on the cardboard so that the drawing pin is again at the centre of this loop.
10. By adding more beads, electronic configurations of Magnesium , Aluminium and argon can be made.

What have you learnt?

In an atom , the number electrons are always equal to number of _____

The maximum number of electrons which can be accommodated in M shell of an atom is _____

What have you observed?

S.no	Atomic particles	Location in the atom
1.	Electrons	
2.	Protons	
3.	Neutrons	

What would you be interested to know about?

Q.1. What is the electric charge on a proton and an electron?

Q.2. The electrons in the atom are attracted to the protons in the nucleus by which type of force?

ANNEXURE 4A,4b

BOHR'S ATOMIC MODEL AND THE VALENCY CONCEPT

Subject	Science
Class	IX
Chapter/Unit	Structure of atom
Topic	Valency
Time	45 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

To apply the concept of valency by constructing Bohr's Model of the given element.

Skills:

Analyzing, Creating and Applying

What I have to do?

To understand the concept of valency by constructing Bohr's Model of the given element

What do I require?

Compass, pencil, circular cut outs (can be obtained after punching a paper and colouring it further as per the instructions given by the teacher)/ coloured small size bindis can also be used. (maximum 20 per group)

What do I need to know?

The electrons present in the outermost shell of an atom are known as the valence electrons. From the Bohr-Bury scheme, we also know that the outermost shell of an atom can accommodate a maximum of 8 electrons. The combining capacity of the atoms of other elements, that is, their tendency to react and Atoms would thus react, so as to achieve an octet in the outermost shell. This was done by sharing, gaining or losing electrons. The number of electrons gained, lost or shared so as to make the octet of electrons in the outermost shell, gives us directly the combining capacity of the element, that is, help us in predicting the valency.

Teacher's Activity

Teacher will:

1. divide the class into 20 groups with 2 students in each group.

2. assign an element and a colour to each group one day before the activity so that the group can bring coloured circular cut outs on the day of the activity.
3. on the day of the activity, the teacher will begin the activity by giving a placard carrying the name of the element. Students will be guided by the teacher to write the symbol, atomic number and electronic configuration on the blank space provided on each placard. Thereafter, the teacher will brief the activity to the students
4. at the end of the activity, each group will be representing the electronic configuration created by them and present the element given to them.

SODIUM

ATOMIC NUMBER_____

**ELECTRONIC
CONFIGURATION**_____

SYMBOL

How will I proceed?

Student's Activity

1. Write the symbol, atomic number and electronic configuration of the given element on the blank space provided on the placard.
2. On the back side of the placard, draw the concentric circles representing the shells of the given element with the help of a compass and a pencil.

3. Paste the required number of circular cut outs in each concentric circle depending upon the number of electrons in each shell of the given element as shown in the picture below.
4. Identify the Valence electron of the given element.
5. By applying the previous knowledge related to the concept of valency to predict the valency of the given element and record your observations.

What have I observed?

S. No.	Name of the Element	Electronic Configuration	Valency
1			

What have I learnt?

Therefore, I conclude that number of valence electrons in the given element is/are_____ and the valency of the given element is_____.

What am I curious to learn?

- Let us collect the elements with the same valency and try to analyze their sizes. Do you notice any change in the size of the elements taken into consideration? Support your observation with a reason.

Let me evaluate myself

Q1. What do you understand by valence electrons?

Q2. How do valence electrons help in predicting the valency of an element?

Q3. How are cation and anions formed?

Q4. Why is the valency of noble gases zero?

Q5. One of the students in the class collected the placards of the elements from atomic number 1 to atomic number 10 and arranged them in the increasing order of their atomic numbers. Which two pairs of the elements will have the same valency?
