

LESSON PLAN [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY
Managed By Darbari Lal Foundation

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	Pd-01 35 min	November	Structure of Atoms	JJ Thomson's model of an atom
Expected Learning Outcome: Students will be able to – - describe Thomson's experiment to explain structure of atom - Define cathode and anode rays. - Differentiate between cathode and anode rays. - Draw the Thomson's model of an atom. - List the drawbacks of Thomson's model of an atom.						
Expected skill development: - Critical thinking and Communication - Observation skill						

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

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

Q1 Define an atom.

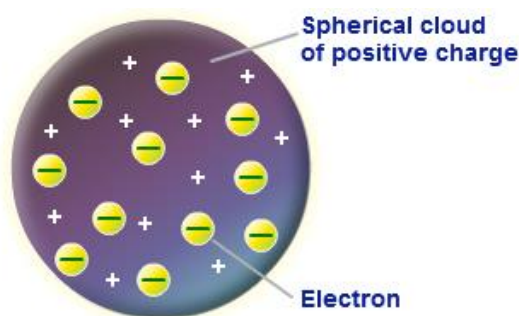
Q2 List at least two fundamental particles found in an atom.

Q3 What is the charge present on a neutron?

Q4 Who discovered the electrons? (5 min)

Content-

- JJ Thomson's discharge tube experiment will be explained by the students (20 min)
- Discovery of electron and proton will be discussed.
- Model of the atom will be drawn on the board.
- Drawback of the model will also be discussed



Thomson's Plum pudding model

Teaching Methodology * Discussion Illustration	
- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook 1) Define an atom. 2) List at least two fundamental particles found in an atom. 3) What is the charge present on a neutron? 4) Who discovered the electrons?	
Evaluation/Assessment: Oral Assessment through the questions asked in class	
Learners on the way Direct questions will be asked- Q What do you mean by cathode rays and anode rays?	Advanced Learners Q Prepare a presentation on cathode tube experiment.
Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.	
Common Misconceptions: Canal rays are negatively charged	Addressing the misconceptions: Canal rays are positively charged

- Home Assignment: (5 min)
 - Q1 On the basis of Thomson's model of an atom, explain how the atom is neutral as a whole.
 - Q2 Draw the Thomson's model of an atom .
 - Q3 What are the limitations of Thomson's model of the atom?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	Pd-02 35 min	November	Structure of Atoms	Rutherford's model of an atom
Expected Learning Outcome: Students will be able to – - List the postulates of Rutherford's model of an atom - Draw the model proposed by Rutherford - Enlist the drawback of the model - State the reasons for rejection of the model						
Expected skill development: - Critical thinking and communication - Use of scientific vocabulary. - Listening Skill - Drawing Skill - Observation Skill						

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- (5 min)

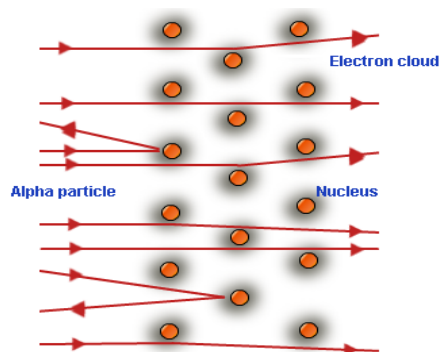
Q1 What are anode rays?

Q2 What are cathode rays?

Q3 Who gave the plum-pudding model of an atom/

Q4 Why is an atom electrically neutral in nature?

Introduction- Rutherford's Experiment



(20 min)

Scattering of α particles by a gold foil (Explanation by Mentor)

Observations- 1) Most of the α particles passed straight.

2) Some of the alpha particles were deflected through small angles

3) One out of 12000 particles rebounded back

Conclusion-

- 1) Most of the space inside the atom is empty.
- 2) Positive charge of the atom occupies very little space.
- 3) All the positive charged and mass of the gold atom were concentrated in a very small volume within the atom.

Feature Of Rutherford's Model Of An Atom-

- 1) There is a positively charged nucleus
- 2) Nearly all the mass of an atom resides in the nucleus
- 3) The electrons revolve around the nucleus in well defined orbits
- 4) The size of the nucleus is very small as compared to the size of the atom.

Teaching Methodology

* Discussion

* Individual attention

Drawbacks of the model will be discussed

Closure-

Think Line Why do you think Rutherford took gold foil for his experiment ? (5 min)

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
 - 1) Why do you think that 80% of the alpha particles passed straight through the foil?
 - 2) Why were some alpha particles deflected through small angles?
 - 3) Do you think alpha particles are heavy or light in nature?

- Evaluation/Assessment:
- Classroom Discussion
- Oral Questionnaire

Learners on the way
Direct questions will be asked-
Q What are alpha particles?
Q Which observation of Rutherford's scattering experiment led to the fact that there is large empty space inside the atom?

Advanced Learners
Q What do you think is the most important discovery made on the basis of alpha ray scattering experiment?

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

Common Misconceptions:
1) Alpha Particle are neutral in nature.
2) Nucleus contains only the protons.

Addressing the misconceptions:
Relevant discussion will be held in class

- Home Assignment:
 - Q1 On the basis of Rutherford's model of an atom, which sub atomic particle is present in the nucleus of an atom?
 - Q2 Draw the Thomson's model of an atom
 - Q3 Rutherford's alpha- particle scattering experiment was responsible for the discovery of
 - Q4 What do you think will be the observation if the alpha-particle scattering experiment is carried out using a foil of metal other than gold?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	Pd-03 35 min	November	Structure of Atoms	Bohr's model of an atom

Expected Learning Outcome:

Students will be able to –

- e) List the postulates of Bohr's model of an atom.
- f) Draw the model proposed by Bohr.
- g) State the reasons for the acceptance of the model.

Expected skill development:

- Critical thinking and communication
- Use of scientific vocabulary.
- Listening Skill
- Drawing Skill
- Observation Skill

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- (5 min)

Q1 Name the basic materials used by Rutherford for his experiment.

Q2 Why was his model rejected?

Q3 Who discovered the nucleus?

Introduction- Bohr Model of an Atom



Teaching Methodology

* Discussion

* Illustration

Questionnaire

Features Of Bohr's Model Of An Atom-

(20 min)

5) Only certain special orbits known as discrete orbits of electrons are allowed inside the atom.

6) While revolving in discrete orbits, the electrons do not radiate energy.

7) These orbits or shells are called energy levels.

8) The shells are represented by K,L,M,N or 1,2,3,4

Discovery of neutron will be discussed.

Rules followed for writing the number of electrons in different energy shells will be discussed.

Closure-

Think Line -Give reason-

(5 min)

a) Ions are more stable than atoms.

b) Sodium ion has completely filled K and L shells.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) 4) Why was Rutherford model of an atom rejected? 5) Who discovered the nucleus? 6) What were the discrete orbits known as? 7) Why was Bohr model accepted?	
- Evaluation/Assessment: - Pre Reading Assessment - Oral Questionnaire - Classroom Discussion	
Learners on the way Direct questions will be asked- Q Find the number of valence electrons in the atom of an element with atomic number 15. Q Why do helium, neon and argon have a zero valency?	Advanced Learners Exposure to the concept of s p d & f orbital's
Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book.	
Common Misconceptions: Need clarity between ground & excited state of an atom.	Addressing the misconceptions: Relevant discussion will be held in class

- Home Assignment:

Q1 Describe Bohr's model of an atom.

Q2 If K and L shells of an atom are full, then what would be the total number of electrons in an atom?

Q3-Draw a diagram to illustrate Bohr's model of an atom

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

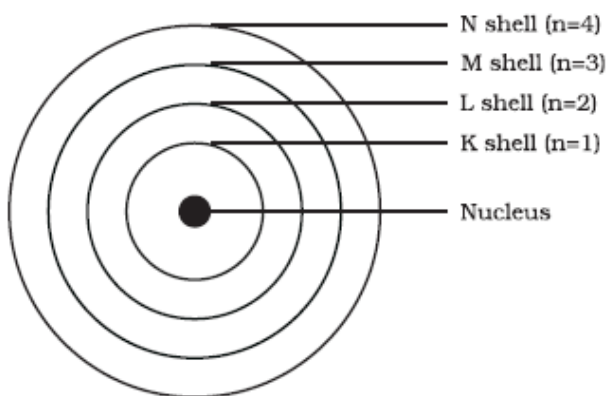
FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Warm Up+ Introduction-

- Rules for writing electronic configuration will be revised. (5 min)

Content (20 min)

- Students will be asked to draw the structure for first 10 elements(1-10 as per atomic number) in the class using red dots and black dots (bindi) of different size. (Activity)Black dot will represent nucleus and red dots will represent electrons.



Teaching Methodology

* Discussion Method

*Hands on activity

Questionnaire

(Closure)

(5 min)

Think Line- The atomic number of chlorine is 17. How many electrons are there in the L shell?

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
- Rules for writing electronic configuration will be revised

- Evaluation/Assessment:
Oral Questionnaire

Learners on the way
Special monitoring during drawing of structure of atoms

Advanced Learners
Pair work will be facilitated with the help of advanced learners.

Materials needed/Resources: Notebook, pencil, eraser, chalk, blackboard, duster, science NCERT book, big black bindi, small red bindi.

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 Assignment: Draw the structures of next 10 elements (11-20) with the help of black and red dots (bindi).

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	CHEMISTRY	Pd-05 35 min	November	Structure of Atoms	Isotopes And Isobars
Expected Learning Outcome: Students will be able to – a) define isotopes b) define isobars c) differentiate between isotopes & isobars d) compute the average percentage of the isotopes. e) list the applications of the different isotopes.						
Expected skill development: • Critical thinking and communication Skill • Computational Skill						

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

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

Q1 What is the atomic number of hydrogen, carbon and chlorine?

Q2 What is the atomic mass number of hydrogen, carbon and chlorine?

Q3 Can chlorine have any different mass number? (5 min)

Content- Isotopes can have mass numbers.

Definition of isotopes will be discussed by mentor.

Examples- ${}_1\text{H}^1, {}_1\text{H}^2, {}_1\text{H}^3$

${}_{17}\text{Cl}^{35}, {}_{17}\text{Cl}^{37}$

${}_6\text{C}^{12}, {}_6\text{C}^{13}, {}_6\text{C}^{14}$

Q4- Why do they have different mass numbers?

Explanation by mentor (10 min)

Q5-Can the elements have different atomic numbers also? Definition of isobars will be given by the mentor.

Example- $\text{Ar}_{18}, \text{Ca}_{20}$

Q6- Chlorine occurs in nature in two isotopic forms, with masses 35u and 37 u in the ratio of 3:1. Obviously, the question arises: what should we take as the mass of chlorine atom? Let us find out.

The average atomic mass of chlorine atom, on the basis of above data, will be

$$[(35 \times 75/100) + (37 \times 25/100)] = (105/4 + 37/4) = 142/4 = 35.5 \text{ u} \quad (15 \text{ min})$$

Applications-

- An isotope of uranium is used as fuel in nuclear reactors.
- An isotope of cobalt is used in the treatment of cancer.
- An isotope of iodine is used in the treatment of goiter.

Closure- Summarization of difference between isotopes and isobars and their applications (5 min)

Teaching Methodology

* Discussion,
Questionnaire

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)
 - What is the atomic number of hydrogen, carbon and chlorine?
 - What is the atomic mass number of hydrogen, carbon and chlorine?
 - Can chlorine have any different mass number?
 - Why do they have different mass numbers?
 - Can the elements have different atomic numbers also?

- Evaluation/Assessment:
- Oral Questionnaire
- Classroom Discussion

Learners on the way
Q Mention three points of difference between isotopes and isobars.

Advanced Learners
Q Why do isotopes have similar chemical properties?
Q What are isotones?

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

Common Misconceptions:
All the elements have isotopes

Addressing the misconceptions:
Relevant examples with reasons will be discussed in class.

- Home Assignment: (5 min)
 - Q1 For the symbol H, D and T tabulate three sub atomic particles found in each of them.
 - Q2 Write the electronic configuration of any one pair of isotopes and isobars.
 - Q3 The average atomic mass of a sample of an element X is 16.2u. What are the percentages of isotopes ${}_8\text{X}^{16}$ and ${}_8\text{X}^{18}$ in the sample?
 - Q4 If bromine atom is available in the form of, say, two isotopes ${}_{35}\text{Br}^{79}$ (49.7%) and ${}_{35}\text{Br}^{81}$ (50.3%), calculate the average atomic mass of bromine atom.