Lesson Plan: Journey Inside the Atom (CBSE Class IX 2026-27)

Teacher:

Class: IX

Subject: Science (Subject Code - 086)

Theme/Unit: Matter - Its Nature and Behaviour

Chapter: 8 – Journey Inside the Atom

Estimated Number of Periods: 14

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1. Gist of the Lesson & Curricular Goals

- **Core Syllabus:** Discovery of the cell (Historical context of atoms); Atoms as the basic units of elements; Subatomic particles (electrons, protons, neutrons); Atomic Models (Thomson's, Rutherford's, and Bohr's); Distribution of electrons in elements (up to 18 elements); Symbols; Valency; Atomic number; Mass number; Isotopes; Isobars.
- **Educational Aim:** To explore the world of matter at the atomic level (CG-1) and understand the evolution of scientific knowledge through history (CG-7), developing the capacity to use scientific conventions and models to explain chemical behavior.

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2. Teaching-Learning Plan & Pedagogy

Key Concepts	Competencies (C) & Learning Outcomes	Teaching-Learning Activities (Pedagogy)	Assessment Strategies
Historical Roots & Subatomic Particles	**C-1.1:** Differentiates between subatomic particles. **C-6.1:** Discusses Indian contributions.	• **Contextual Learning:** Discuss Acharya Kanada's concept of *parmanus* and Dalton's indivisible atom. • **Compare &**	• **[Demonstrate Knowledge - VSA]:** *Name* the scientist who discovered the neutron. • **[Application - SA]:** *Distinguish* between protons

		Contrast: Chart the relative charges and locations of electrons (J.J. Thomson), protons (Rutherford), and neutrons (Chadwick).	and electrons based on their charge and position in the atom.
Evolution of Atomic Models	**C-7.1:** Describes scientific discoveries that explain how the structure of the atom evolved.	• **Visual Mapping:** Draw and compare Thomson's "plum pudding/watermelon" model, Rutherford's planetary model, and Bohr's stationary energy levels. • **Discussion:** Discuss why Rutherford's model failed (stability of accelerating electrons) and how Bohr's concept of fixed shells resolved it.	• **[Formulate & Analyze - Case-Based]:** *Evaluate* the results of the gold foil experiment to explain why the nucleus must be small, dense, and positively charged. • **[Demonstrate Knowledge - SA]:** *State* the postulates of Bohr's model of an atom.
Atomic Number, Mass Number & Symbols	**C-1.1:** Calculates subatomic particles using atomic and mass numbers. • *Outcome:* Students will use IUPAC symbols	• **Numerical Practice:** Calculate $A = p^+ + n^0$ (Mass Number) and define Z (Atomic Number) as the number of protons.	• **[Application - Objective]:** *Determine* the number of neutrons in an atom with mass number 41 and atomic number 20.

	accurately.	• **Game-Based Learning:** Design an educational game to identify the first 18 elements using atomic number clues and standard IUPAC symbols.	• **[Demonstrate Knowledge - VSA]:** *Write* the IUPAC symbol for Iron and Sodium.
Electron Distribution & Valency	**C-1.3:** Illustrates how electrons are distributed in energy levels. • *Outcome:* Students will explain valence electrons and valency.	• **Board Work:** Use the $2n^2$ rule and the octet rule to write electronic configurations (K, L, M, N shells) for elements 1 through 18. • **Concept Mapping:** Link the number of valence electrons to the combining capacity (valency) of an atom (e.g., Sodium = 1, Carbon = 4).	• **[Application - SA]:** *Illustrate* the electronic configuration of a Magnesium atom (Atomic Number 12) with a diagram. • **[Analyze & Evaluate - Assertion-Reasoning]:** *Examine* why atoms with completely filled outermost shells are chemically inert.
Isotopes & Isobars	**C-1.1:** Differentiates chemical species. • *Outcome:* Students will define isotopes/isobars and calculate average atomic mass.	• **Compare & Contrast:** Compare Hydrogen's isotopes (Protium, Deuterium, Tritium) to show they have the same Z but different A due to neutrons. Define Isobars (same A, different Z).	• **[Demonstrate Knowledge - VSA]:** *Define* isobars. • **[Application - LA]:** *Calculate* the average atomic mass of Bromine given the abundances of

		• **Mathematical Application:** Calculate the weighted average atomic mass of Chlorine using its natural isotopic abundance (75% Cl-35 and 25% Cl-37).	Br-79 and Br-81.

3. Assessment Structure & Weightage

Assessments are strictly modeled on the CBSE 2026-27 Theory Question Paper Design (80 marks):

- **Demonstrate Knowledge and Understanding (50%):** Assessed via questions asking students to *state, name, list, identify, define, suggest, describe, outline, and summarize* (e.g., naming subatomic particles, stating Bohr's postulates).

- **Application of Knowledge/Concepts (30%):** Assessed via questions asking students to *calculate, illustrate, show, adapt, explain, and distinguish* (e.g., calculating neutron numbers, illustrating electron distribution, explaining isotopes).

- **Formulate, Analyze, Evaluate and Create (20%):** Assessed via questions asking students to *interpret, analyze, compare, contrast, examine, evaluate, discuss, and construct* (e.g., evaluating Rutherford's conclusions, analyzing weighted average atomic mass).

4. Digital Integration & Portfolio Enrichment (Internal Assessment - 20 Marks)

- **Subject Enrichment (5 Marks):** Since there is no wet-lab practical prescribed for this specific theoretical chapter, students will work collaboratively in groups to *construct* 3D models of atoms (like Carbon or Oxygen) using eco-friendly materials (clay, wire, beads), accurately placing the correct number of protons, neutrons, and electrons in their respective K, L, and M shells.

- **Digital Integration Strategy:** To reinforce abstract atomic structures ahead of Periodic Assessments, utilize interactive digital simulators (such as the PhET "Build an Atom" simulation via the DIKSHA portal). Students can digitally drag protons into a virtual nucleus and instantly see the element's name change, while adding neutrons will demonstrate the creation of unstable or stable isotopes.

- **Portfolio Task (5 Marks):** Students will *examine* the societal impact of atomic science. They will research and prepare a brief, factual report on the peaceful applications of isotopes, specifically highlighting India's contributions through the Bhabha Atomic Research Centre (BARC) in areas such as medical radiation therapy (e.g., Cobalt-60 for cancer) or energy generation. This will be securely added to their academic portfolio.