Lesson Plan: Atomic Foundations of Matter (CBSE Class IX 2026-27)

Teacher:

Class: IX

Subject: Science (Subject Code - 086)

Theme/Unit: Matter - Its Nature and Behaviour

Chapter: 9 – Atomic Foundations of Matter

Estimated Number of Periods: 14

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1. Gist of the Lesson & Curricular Goals

- **Core Syllabus:** Law of conservation of mass; Law of constant proportion; Dalton's Atomic theory; Molecules of elements and covalent compounds; Ions, Ionic compounds, and their properties; Writing chemical formulae; Molecular mass; Formula unit mass.

- **Educational Aim:** To explain how compounds (including carbon compounds) are formed based on atomic structure and valency properties (CG-1), developing capacities to describe and represent chemical interactions using symbols, rules, and mathematical equations.

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2. Teaching-Learning Plan & Pedagogy

Key Concepts	Competencies (C) & Learning Outcomes	Teaching-Learning Activities (Pedagogy)	Assessment Strategies
Laws of Chemical Combination	**C-8.2:** Formulates hypotheses and represents data. • *Outcome:* Students will demonstrate the Law of	• **Mandatory Practical (Activity 9.2 & 9.3):** Weigh vinegar and baking soda separately, then mix them in a closed system (balloon over a flask) to prove mass	• **[Demonstrate Knowledge - VSA]:** *State* the Law of Conservation of Mass. • **[Application - SA]:** *Calculate* the

	Conservation of Mass and explain Dalton's Atomic Theory.	remains constant during a reaction. • **Contextual Learning:** Discuss Proust's Law of Constant Proportions using the example of water (1:8 ratio of H:O) and ancient uses of cinnabar (HgS).	mass of carbon dioxide formed when 2.4 g of carbon reacts completely with oxygen.
Covalent Bonding	**C-1.1:** Explains how compounds are formed based on valency. • *Outcome:* Students will draw electron dot structures of molecules and write formulas using prefixes.	• **Visual Mapping:** Draw the sharing of valence electrons to form single bonds (e.g., H_2, Cl_2) and double bonds (e.g., O_2). • **Rule Application:** Practice naming covalent compounds using prefixes like mono-, di-, tri- (e.g., CCl_4 as carbon tetrachloride).	• **[Application - Objective]:** *Identify* the number of shared electron pairs in an oxygen molecule. • **[Demonstrate Knowledge - SA]:** *Illustrate* the formation of a water molecule (H_2O) showing shared electrons.
Ionic Bonding & Properties	**C-1.1:** Differentiates between chemical species (cations/anions). • *Outcome:*	• **Scientific Inquiry (Activity 9.4):** Test the solubility of salt, sugar, and camphor in water vs. kerosene. Test the electrical	• **[Analyze & Evaluate - Assertion-Reasoning]:** *Evaluate* why solid sodium chloride does not conduct electricity

	Students will explain electron transfer, define ionic bonds, and test electrical conductivity.	conductivity of these aqueous solutions using a 9V battery circuit. • **Concept Mapping:** Trace the transfer of the 1 valence electron from Na to Cl, forming Na^+ and Cl^- held together by electrostatic forces in a 3D crystal lattice.	but its aqueous solution does. • **[Application - LA]:** *Explain* the formation of a chloride anion from a chlorine atom.
Writing Chemical Formulae	**C-1.1:** Uses scientific conventions and valency to write formulas. • *Outcome:* Students will apply the criss-cross method for monoatomic and polyatomic ions.	• **Board Work:** Step-by-step criss-cross method. Practice writing formulas for compounds containing polyatomic ions, emphasizing the use of brackets (e.g., $Al_2(SO_4)_3$). • **Game-Based Learning:** Use flashcards of cations and anions to form neutral compounds.	• **[Demonstrate Knowledge - VSA]:** *Write* the chemical formula for calcium carbonate. • **[Formulate & Analyze - SA]:** *Construct* the formulas for compounds formed by combining Al^{3+} with CO_3^{2-}.
Molecular &	**C-1.1:** Calculates	• **Numerical**	• **[Application -**

Formula Unit Mass	molecular and formula unit mass. • *Outcome:* Students will calculate the total mass of molecules and ionic crystal units.	**Practice:** Calculate Molecular Mass for covalent compounds (e.g., CO_2) by adding atomic masses. Calculate Formula Unit Mass for ionic compounds (e.g., $NaCl$).	**SA]:** *Calculate* the formula unit mass of calcium nitrate, $Ca(NO_3)_2$.

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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., stating Dalton's postulates, naming polyatomic ions).

- **Application of Knowledge/Concepts (30%):** Assessed via questions asking students to *calculate, illustrate, show, adapt, explain, and distinguish* (e.g., calculating formula mass, illustrating electron sharing, explaining electrical conductivity).

- **Formulate, Analyze, Evaluate and Create (20%):** Assessed via questions asking students to *interpret, analyze, compare, contrast, examine, evaluate, discuss, and construct* (e.g., evaluating experimental data to verify conservation of mass, constructing complex chemical formulas).

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

- **Subject Enrichment (Practical Work - 5 Marks):** Evaluated strictly on the execution of Activity 9.2 (Law of Conservation of Mass). Students will be assessed on their accurate use of the digital weighing balance, their ability to set up a closed system (balloon over flask) to trap gases, and how they document the initial vs. final mass in their practical records.

- **Digital Integration Strategy:** To reinforce molecular-level structures ahead of Periodic Assessments, utilize digital simulation tools (such as the PhET "Build a Molecule"

simulation via the DIKSHA portal). Students can digitally connect atoms to view 3D molecular geometries and observe how single and double covalent bonds form physically in space.

- **Portfolio Task (5 Marks):** Students will *examine* the Law of Constant Proportions by analyzing water. They will prepare a brief write-up explaining why 9g of purified water, whether collected from a local river, a borewell, or the ocean, will always decompose into exactly 1g of hydrogen and 8g of oxygen. They will creatively connect this to Proust's historical experiments with copper carbonate and add the report to their academic portfolio.