(Note: As per the CBSE 2026-27 Science Curriculum directives, the topics Motor, Electromagnetic Induction, and Electric Generator are to be assessed formatively only to reduce academic stress . The summative assessment focuses on the core principles and domestic circuits, while the formative topics are integrated into the Portfolio).

Lesson Plan: Magnetic Effects of Electric Current (CBSE Class X 2026-27)

Teacher:

Class: X

Subject: Science (Subject Code - 086)

Unit IV: Effects of Current (Unit Weightage: 13 Marks)

Chapter: 12 – Magnetic Effects of Electric Current

Estimated Number of Periods: 12

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1. Gist of the Lesson & Curricular Goals

- **Core Syllabus:** Magnetic field, field lines, field due to a current carrying conductor, coil, or solenoid. Force on a current carrying conductor, Fleming's Left Hand Rule, Direct current (DC), Alternating current (AC) frequency, Advantage of AC over DC, and Domestic electric circuits .

- **Formative Syllabus (Not for Board Exam):** Motor, Electromagnetic Induction, Electric Generator.

- **Educational Aim:** To explore physical phenomena through observation and understand the relationship between electricity and magnetism, applying these scientific principles to everyday technological and domestic applications.

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2. Teaching-Learning Plan & Pedagogy

Key Concepts	**Competencies (C) & Learning Outcomes**	**Teaching-Learning Activities (Pedagogy)**	**Assessment Strategies**
Magnetic Field &	**C-8.1:** Develops accurate models to	• **Demonstration:** Sprinkle iron filings	• **[Demonstrate Knowledge - VSA]:**

Field Lines	represent real-life phenomena. • *Outcome:* Students will map magnetic field lines and state their properties.	around a bar magnet on a glass sheet and tap it gently to reveal the magnetic field pattern. • **Discussion:** Explain why two magnetic field lines never intersect.	*Define* magnetic field lines. • **[Application - SA]:** *Illustrate* the magnetic field lines around a bar magnet, marking the poles and direction.
Field Due to a Current-Carrying Conductor	**C-8.2:** Designs and implements a plan for scientific inquiry. • *Outcome:* Students will determine the direction of the magnetic field for straight wires, circular loops, and solenoids.	• **Activity:** Pass a straight current-carrying wire through a cardboard sheet and use a compass needle to show concentric circular field lines (Right-Hand Thumb Rule). • **Compare & Contrast:** Compare the magnetic field of a current-carrying solenoid to that of a standard bar magnet.	• **[Demonstrate Knowledge - Objective]:** *Name* the rule used to find the direction of the magnetic field around a straight conductor. • **[Application - LA]:** *Explain* the magnetic field pattern produced by a current-carrying solenoid.
Force on a Conductor in a Magnetic Field	**C-2.1:** Explains the effect of forces. • *Outcome:* Students will apply Fleming's Left-Hand Rule to determine the direction of force on a conductor.	• **Demonstration:** The "Kicking Wire" experiment to physically demonstrate the force exerted on a current-carrying aluminum rod placed between the poles of a horseshoe magnet.	• **[Demonstrate Knowledge - SA]:** *State* Fleming's Left-Hand Rule. • **[Formulate & Analyze - Case-Based]:** *Determine* the direction of force on an electron beam entering a

		• **Kinesthetic Learning:** Practice hand positioning for Fleming's Left-Hand Rule (Thumb: Force, Forefinger: Magnetic Field, Middle finger: Current).	magnetic field at right angles.
AC, DC & Domestic Electric Circuits	**C-2.4:** Applies circuit understanding to everyday usage (safety measures). • *Outcome:* Students will distinguish between AC and DC and evaluate domestic wiring safety mechanisms.	• **Visual Mapping:** Draw a schematic diagram of a domestic circuit on the board, tracing the live (red), neutral (black), and earth (green) wires. • **Real-World Connection:** Discuss the necessity of fuses, miniature circuit breakers (MCBs), and earthing to prevent overloading and short-circuiting.	• **[Application - SA]:** *Distinguish* between Alternating Current and Direct Current. • **[Analyze & Evaluate - Assertion-Reasoning]: ***Evaluate* the importance of connecting the earth wire to metallic body appliances.

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3. Assessment Structure & Weightage

Summative 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 Fleming's rule, defining AC frequency).
- **Application of Knowledge/Concepts (30%):** Assessed via questions asking students to *calculate, illustrate, show, adapt, explain, and distinguish* (e.g., distinguishing AC/DC, illustrating magnetic fields).
- **Formulate, Analyze, Evaluate and Create (20%):** Assessed via questions asking

students to *interpret, analyze, compare, contrast, examine, evaluate, discuss, and construct* (e.g., evaluating safety devices, analyzing force direction).

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

- **Subject Enrichment (5 Marks):** Students will execute a hands-on activity to precisely draw the magnetic field lines of a bar magnet using a small magnetic compass, plotting points and joining them to form continuous lines. They will be assessed on the accuracy of their drawings and their ability to document the properties of the field lines in their practical record.
- **Digital Integration Strategy:** To reinforce invisible forces ahead of Periodic Assessments (5+5 Marks), utilize interactive physics simulators (like PhET via the DIKSHA portal) to allow students to digitally manipulate the number of turns in a virtual solenoid and instantly observe the corresponding changes in magnetic field strength and polarity.
- **Portfolio Task (5 Marks - Formative Assessment of Motor/Generator):** As mandated by the syllabus to assess the Electric Motor and Generator formatively , students will *construct* a simple, low-cost homopolar motor using a neodymium magnet, a AA battery, and a piece of copper wire. They will prepare a brief write-up *explaining* the underlying principle (force on a current-carrying conductor) and securely add this engineering project to their academic portfolio.