SCIENCE

Subject Code – 086

Class X (2026-27)

Introduction

Science is the study of the natural and physical world around us through a systematic process of observing, questioning, forming hypotheses, testing hypotheses through experiment, analysing evidence, and continuously revising our knowledge. It develops essential skills like curiosity, creativity, evidence-based thinking, and sound decision-making that help us lead rational and fulfilling lives. Learning Science provides valid knowledge about the world, and builds scientific values and capacities. It draws knowledge from Biology, Chemistry, Physics, Earth Science, Mathematics, Computational Sciences, and sometimes Social Science and Vocational Education to offer an interdisciplinary understanding of the role of science.

Science Education helps students to develop an understanding of the natural and physical world through systematic inquiry. Learning Science also develops important capacities, such as observation, questioning, analysis, inference, etc. This helps individuals to meaningfully participate in society and the world of work with a scientific temper, critical and evidence-based thinking, asking relevant questions, analysing practices and norms, and acting for necessary change.

Science Education aims to achieve:

- Scientific understanding of the natural and physical world;
- Capacities for scientific inquiry;
- Understanding the evolution of scientific knowledge;
- Interdisciplinary understanding between Science and other curricular areas;
- Understanding of the relationship between Science, Technology, and Society;
- Scientific temper, and
- Creativity.

Together, the NEP 2020 and NCF-SE 2023 envision science classrooms that encourage curiosity, creativity, collaboration and connection with the real world, ultimately nurturing not just future scientists, but responsible, informed and critically thinking citizens.

Learning standards (Curricular Goals and Competencies) describe what students should know, understand, and be able to do in Science. In Grades 9 – 10, Science is taught using an integrated approach that combines Biology, Chemistry, Physics, and Earth Science. This helps students understand the connections between disciplines and relate Science to their observations and experiences. At this stage, scientific inquiry skills are developed alongside conceptual understanding, with content selected both for disciplinary relevance and real-life usefulness. Students must deepen their understanding of the world, explore scientific questions through discussion and experimentation, and communicate their learning in various ways. It is important to note that the Curricular Goals are interdependent and not separate.

Learning standards are organised into four levels: broad curricular aims define the overall objectives for Science Learning by the end of each schooling stage; more specific Curricular Goals guide the design of the science curriculum for each stage and topic; Competencies

represent measurable scientific skills and knowledge-based on these goals, assessed at the end of each stage; and detailed Learning Outcomes (LOs) are granular milestones of learning and usually progress in a sequence leading to the attainment of a competency. These LOs enable teachers to plan their content, pedagogy, and assessments towards achieving specific competencies.

Curricular Goals (CGs) and Competencies (Cs)

CG 1 – Explores the world of matter, its interactions, and properties at the atomic level

C 1.1 – Describes classification of elements in the Periodic Table, and explains how compounds (including carbon compounds) are formed based on the atomic structure (Bohr's model) and properties (valency).

C 1.2 – Investigates the nature and properties of chemical substances (distillation, crystallisation, chromatography, centrifugation, types and properties of mixtures, solutions, colloids, and suspensions)

C 1.3 – Describes and represents chemical interactions and changes using symbols and chemical equations (acid and base, metal and non-metal, reversible and irreversible)

CG 2 – **Explores the physical world around them, and understands scientific principles and laws based on observations and analysis**

C 2.1 – Applies Newton's laws to explain the effect of forces (change in state of motion — displacement and direction, velocity and acceleration, uniform circular motion, acceleration due to gravity) and analyses graphical and mathematical representations of motion in one dimension

C 2.2 – Explains the relationship between mass and weight using universal law of gravitation, and connect it to the laws of motion

C 2.3 – Manipulates the position of object and properties of lenses (focus, centre of curvature) to observe image characteristics and correspondence with a ray diagram, and extends this understanding to a combination of lenses (telescope, microscope)

C 2.4 – Manipulates and analyses different characteristics of the circuit (current, voltage, resistance) and mathematises their relationship (Ohm's law), and applies it to everyday usage (electricity bill, short circuit, safety measures)

C 2.5 – Defines work in scientific terms, and represents the relationship between potential and kinetic energy (conservation of energy) in mathematical expressions

C 2.6 – Demonstrates the principle of mechanical advantage by constructing simple machines (system of levers and pulleys)

C 2.7 – Describes the origin and properties of sound (wavelength, frequency, amplitude) and differences in what we hear as it propagates through different instruments

C 2.8 – *Explores interconnected systems and phenomena that support and affect life on Earth (hydrosphere, biosphere, atmosphere, geosphere, cryosphere and their interrelationships, earth processes, hazards, etc.)

*Additional Competency for Earth Science

CG 3 – **Explores the structure and function of the living world at the cellular level**

C 3.1 – Explains the role of cellular components (nucleus, mitochondria, endoplasmic reticulum, vacuoles, chloroplast, cell wall), including the semi-permeability of cell membrane in making cell the structural basis of living organisms and functional basis of life processes

C 3.2 – Analyses similarities and differences in the life processes involved in nutrition (photosynthesis in plants; absorption of nutrients in fungi; digestion in animals), transport (transport of water in plants; circulation in animals), exchange of materials (respiration and excretion), and reproduction

C 3.3 – Describes the mechanisms of heredity (in terms of DNA, genes, chromosomes) and variation (as changes in the sequence of DNA)

CG 4 – **Explores interconnectedness between organisms and their environment**

C 4.1 – Applies the knowledge of cellular diversity in organisms along with the ecological role organisms play (autotrophic or heterotrophic nutrition) to classify them into five kingdoms

C 4.2 – Illustrates different levels of organisations of living organisms (from molecules to organisms)

C 4.3 – Analyses different levels of biological organisation from organisms to ecosystems and biomes along with interactions that take place at each level

C 4.4 – Analyses patterns of inheritance of traits in terms of Mendel's laws and its consequences at a population level (using models and/or simulations)

C 4.5 – Analyses evidences of biological evolution demonstrating the consequences of the process of natural selection in terms of changes — in allele frequency in population, structure, and function of organisms

CG 5 – **Draws linkages between scientific knowledge and knowledge across other curricular areas**

C 5.1 – Explores how literature and arts have influenced Science

C 5.2 – Examines a case study related to the use of Science in human life from the perspective of Social Sciences and Ethics (for example, Marie Curie, Jenner, treatment of patients with mental illnesses, the story of the atomic bomb, green revolution and GMOs, conservation of biodiversity)

C 5.3 – Applies scientific principles to explain phenomena in other subjects (sound pitch, octave, and amplitude in music; use of muscles in dance form and sports)

CG 6 – **Understands and appreciates the contribution of India through history, and the present time to the overall field of Science, including the disciplines that constitute it**

C 6.1 – Knows and explains the significant contributions of India to all matters (concepts, explanations, methods) that are studied within the curriculum in an integrated manner

CG 7 – **Develops awareness of the most current discoveries, ideas, and frontiers in all areas of scientific knowledge in order to appreciate that Science is ever evolving, and that there are still many unanswered questions**

C 7.1 – States concepts that represent the most current understanding of the matter being studied, ranging from mere familiarity to conceptual understanding of the matter as appropriate to the developmental stage of the students

C 7.2 – States questions related to matters in the curriculum for which current scientific understanding is well-recognised

CG 8 – **Explores the nature of Science by doing Science**

C 8.1 – Develops accurate and appropriate models (including geometric, mathematical, graphical) to represent real-life events and phenomena using scientific principles, and use these models to manipulate variables and predict results

C 8.2 – Designs and implements a plan for scientific inquiry (formulates hypotheses, makes predictions, identifies variables, accurately uses scientific instruments, represents data — primary and secondary — in multiple modes, draws inferences based on data, and understanding of scientific concepts, theories, laws and principles, and communicates findings using scientific terminology)

COURSE STRUCTURE
CLASS X (2026-27)
(Annual Examination)

Time: 03 Hours Marks: 80

Unit No.	Unit	Marks
I	Chemical Substances-Nature and Behaviour	25
II	World of Living	25
III	Natural Phenomena	12
IV	Effects of Current	13
V	Natural Resources	05
	Total	**80**
	Internal assessment	**20**
	Grand Total	**100**

Theme: Materials

Unit I: Chemical Substances - Nature and Behaviour

Chemical Reactions and Equations: Chemical reactions, Chemical equation, Balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, endothermic exothermic reactions, oxidation and reduction.

The following topics are included in the syllabus but will be assessed only formatively to reinforce understanding without adding to summative assessments. The reduces academic stress while ensuring meaningful learning. Schools can integrate these with existing chapters as they align well. Relevant NCERT textual material is enclosed for reference.

Periodic Classification of Elements: Döbereiner's Triads, Newlands' Law of Octaves, Mendeléev's Periodic Table, Modern Periodic Table and the Modern, Metallic and Non-metallic Properties.

Acids, Bases and Salts: Acids and Bases – definitions in terms of furnishing of H^+ and OH^- ions, identification using indicators, chemical properties, examples and uses, neutralization, concept of pH scale (Definition relating to logarithm not required), importance

of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching Powder, Baking soda, Washing soda and Plaster of Paris.

Metals and Non-metals: Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds; Basic metallurgical processes; Corrosion and its prevention.

Carbon and its Compounds: Covalent bonds – formation and properties of covalent compounds, Versatile nature of carbon, Hydrocarbons – saturated and unsaturated Homologous series. Nomenclature of alkanes, alkenes, alkyne and carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes). Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

Theme: The World of the Living

Unit II: World of Living

Life processes: 'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plantsand animals.

Control and co-ordination in animals and plants: Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous system; Voluntary, involuntary and reflex action; Chemical co-ordination: animal hormones.

Reproduction: Reproduction in animals and plants (asexual and sexual) reproductive health - need and methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.

Heredity: Heredity; Mendel's contribution- Laws for inheritance of traits: Sex determination; brief introduction.

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Evolution: Acquired and Inherited Traits, Speciation, Evolution and Classification, Tracing Evolutionary Relationships, Fossils, Evolution by Stages, Human Evolution

Theme: Natural Phenomena

Unit III: Natural Phenomena

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification.

Refraction; Laws of refraction, refractive index.

Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivationnot required); Magnification. Power of a lens.

Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.

Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life (excluding colour of the sun at sunrise and sunset).

Theme: How Things Work

Unit IV: Effects of Current

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R.

Magnetic effects of current: Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

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Motor, Electromagnetic Induction, Electric Generator

Theme: Natural Resources

Unit V: Natural Resources

Our environment: Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable substances.

Note for Teachers:

1. The topics Periodic Classification of Elements; Heredity and Evolution; and Electric Effects of Electric Current will not be assessed in the year-end examination.
2. Learners may be assigned to read these topics/chapter and encouraged to prepare a brief write up in their Portfolio. Teachers should provide joyful and experiential opportunities. This may be for Internal Assessment and credit may be given for Periodic Assessment/Portfolio.
3. The NCERT text books present information in boxes across the book. These help students to get conceptual clarity. However, the information in these boxes would not be assessed in the year-end examination.

PRACTICALS

Practical should be conducted alongside the concepts taught in theory classes.

LIST OF EXPERIMENTS

1. A. Finding the pH of the following samples by using pH paper/universal indicator: **Unit-I**

a) Dilute Hydrochloric Acid

b) Dilute NaOH solution

c) Dilute Ethanoic Acid solution

d) Lemon juice

e) Water

f) Dilute Hydrogen Carbonate solution

B. Studying the properties of acids and bases (HCl & NaOH) on the basis of their reaction with: **Unit-I**

a) Litmus solution (Blue/Red)
b) Zinc metal
c) Solid sodium carbonate

2. Performing and observing the following reactions and classifying them into: **Unit-I**

a) Combination reaction

b) Decomposition reaction

c) Displacement reaction

d) Double displacement reaction

- Action of water on quicklime
- Action of heat on ferrous sulphate crystals
- Iron nails kept in copper sulphate solution
- Reaction between sodium sulphate and barium chloride solutions

3. Observing the action of Zn, Fe, Cu and Al metals on the following salt solutions:

Unit-I

a) $ZnSO_4$ (aq)

b) $FeSO_4$ (aq)

c) $CuSO_4$ (aq)

d) $Al_2 (SO_4)_3$ (aq)

Arranging Zn, Fe, Cu and Al (metals) in the decreasing order of reactivity based on theabove result.

4. Studying the dependence of potential difference (V) across a resistor on the current (I) passing through it and determine its resistance. Also plotting a graph between V and I.

Unit-IV

5. Determination of the equivalent resistance of two resistors when connected in series and parallel. **Unit-IV**

6. Preparing a temporary mount of a leaf peel to show stomata. **Unit- II**

7. Experimentally show that carbon dioxide is given out during respiration. **Unit-II**

8. Study of the following properties of acetic acid (ethanoic acid): **Unit- I**

   a) Odour

   b) solubility in water

   c) effect on litmus

   d) reaction with Sodium Hydrogen Carbonate

9. Study of the comparative cleaning capacity of a sample of soap in soft and hard water. **Unit- I**

10. Determination of the focal length of: **Unit-III**

    a) Concave mirror

    b) Convex lens by obtaining the image of a distant object.

11. Tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence andinterpret the result. **Unit - III**

12. Studying (a) binary fission in *Amoeba,* and (b) budding in yeast and Hydra with the help of prepared slides. **Unit-II**

13. Tracing the path of the rays of light through a glass prism. **Unit-III**

14. Identification of the different parts of an embryo of a dicot seed (pea, gram or red kidney bean). **Unit-II**

PRESCRIBED BOOKS:

- Science-Text book for class X- NCERT Publication
- Assessment of Practical Skills in Science- Class X- CBSE Publication
- Laboratory Manual-Science-Class X, NCERT Publication
- Exemplar Problems Class X – NCERT Publication
- Reading Material – Science – Class X (2026-27) – CBSE

Question Paper Design (Theory)

Class X (2025-26)

Science (086)

Theory (80 marks)

Competencies	Total
Demonstrate Knowledge and Understanding	50 %
Application of Knowledge/Concepts	30 %
Formulate, Analyze, Evaluate and Create	20 %

Note:

- Typology of Questions: VSA including objective type questions, Assertion – Reasoning type questions; SA; LA; Source-based/ Case-based/ Passage-based/ Integrated assessment questions.
- An internal choice of approximately 33% would be provided.

Internal Assessment (20 Marks)

- **Periodic Assessment** - 05 marks + 05 marks
- **Subject Enrichment** (Practical Work) - 05 marks
- **Portfolio** - 05 marks

Suggestive verbs for various competencies

- **Demonstrate Knowledge and Understanding**

  State, name, list, identify, define, suggest, describe, outline, summarize, etc.

- Application of Knowledge/Concepts

  Calculate, illustrate, show, adapt, explain, distinguish, etc.

- Formulate, Analyze, Evaluate and Create

  Interpret, analyze, compare, contrast, examine, evaluate, discuss, construct, etc.