2025-26
SCIENCE (033)
Class- IX & X

The Learning Standards (Curricular Goals and Competencies) for Science as an integrated curricular area, in alignment with the National Curriculum Framework 2023 are as follows:

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 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 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 2 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
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 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 the 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 (e.g., Marie Curie, Jenner, treatment of patients with mental illness, 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 times 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 to be inadequate

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, communicates findings using scientific terminology)

It is important to note that the Curricular Goals are interdependent, and not separate curricular pieces of study.
(Reference: National Curriculum Framework for School Education – 2023.)
The competencies, as defined by the NCFSE 2023, are designed to encompass the entire secondary stage (classes IX-XII). Attainment of the competencies shall be done through transaction of the curriculum using appropriate pedagogy; these shall be assessed through an integrated evaluation scheme.

CLASS- IX

TOTAL MARKS- 100 ¡ 80 (Theory) + 20 (Internal Assessment)À

THEORY: 80 Marks **Time: 3:00 Hrs.**

Unit No.	Unit	Marks
I	Matter- Its Nature and Behaviour	25
II	Organization in the Living World	22
III	Motion, Force and Work	27
IV	Food; Food Production	06
	Total	**80**

Theme: Materials

UNIT- I : Matter- Its Nature and Behaviour

Matter in Our Surroundings:

Definition of matter: Particulate Nature of Matter; States of Matter: solid, liquid and gas and their characteristics; change of state- melting (absorption of heat), freezing, evaporation (cooling by evaporation), condensation, sublimation.

Is Matter Around Us Pure: Elements, compounds and mixtures. Heterogeneous and homogenous mixtures, colloids and suspensions. Physical and chemical changes (excluding separating the components of a mixture); Pure and Impure substances.

Atoms and Molecules: Atoms and molecules, Law of Chemical Combination, Chemical formula of common compounds, Atomic and molecular masses.

Structure of atom: Sub-atomic particles: Electrons, protons and neutrons, Models of atom; Valency, Atomic Number and Mass Number, Isotopes and Isobars.

Theme: The World of the Living
UNIT- II: Organization in the Living World

Cell - Basic Unit of life: Cell as a basic unit of life; prokaryotic and eukaryotic cells, multicellular organisms; cell membrane and cell wall, cell organelles and cell inclusions; chloroplast, mitochondria, vacuoles, endoplasmic reticulum, Golgi apparatus; nucleus, chromosomes - basic structure, number.
Tissues, Organs, Organ System, Organism: Structure and functions of animal and plant tissues (only four types of tissues in animals; Meristematic and Permanent tissues in plants).

NOTE- The following additional topics are also included in the syllabus, but will not be assessed in the examinations. Subject teachers can integrate these with existing chapters as they align well.

Health and Diseases: *Health and its failure. Infectious and Non-infectious diseases, their causes and manifestation. Diseases caused by microbes (Virus, Bacteria and Protozoans) and their prevention; Principles of treatment and prevention. Pulse Polio programmes.*

Theme: Moving Things, People and Ideas
UNIT- III: Motion, Force and Work

Motion: Distance and displacement, velocity; uniform and non-uniform motion along a straight line; acceleration, distance-time and velocity-time graphs for uniform motion and uniformly accelerated motion, elementary idea of uniform circular motion.
Force and Newton's laws: Force and Motion, Newton's Laws of Motion, Action and Reaction forces,Inertia of a body, Inertia and mass, Momentum, Force and Acceleration

NOTE- The following additional topics are also included in the syllabus, but will not be assessed in the examinations. Subject teachers can integrate these with existing chapters as they align well.

-Elementary idea of conservation of Momentum

Gravitation: Gravitation; Universal Law of Gravitation, Force of Gravitation of the earth (gravity),Acceleration due to Gravity; Mass and Weight; Free fall.
Floatation: Thrust and Pressure. Archimedes' Principle; Buoyancy.
Work, Energy and Power: Work done by a Force, Energy, power; Kinetic and Potential energy; Lawof conservation of energy (excluding commercial unit of Energy).
Sound: Nature of sound and its propagation in various media, speed of sound, range of hearing inhumans; ultrasound; reflection of sound; echo.

Theme: Food
UNIT- IV: Food Production

Plant and animal breeding and selection for quality improvement and management; Use of fertilizersand manures; Protection from pests and diseases; Organic farming.

INTERNAL ASSESSMENT : **20 Marks**

1- Physics Practical 03 Marks
2- Chemistry Practical 03 Marks
3- Biology Practical 03 Marks
4- Sessional Work 03 Marks
5- Viva Voce 03 Marks
6- Continuous Assessment (Unit Test) 05 Marks

(There will be total 4 Unit Tests to be conducted throughout the year (two Unit Tests before half yearly examination and two after half yearly examination). At the time of half yearly result preparation best of two Unit Tests (I & II) marks will be taken and converted to the weightage of 05 marks. Likewise best of two Unit Tests (III & IV) marks will be taken and converted to the weightage of 05 marks for the annual result preparation.)

PRACTICALS

Practicals should be conducted alongside the concepts taught in theory classes.
(LIST OF EXPERIMENTS)

1. Preparation of: **Unit-I**
   a) a true solution of common salt, sugar and alum
   b) a suspension of soil, chalk powder and fine sand in water
   c) a colloidal solution of starch in water and egg albumin/milk in water and distinguish between these on the basis of
      - transparency
      - filtration criterion
      - stability

2. Preparation of **Unit-I**
   a) A mixture
   b) A compound
   using iron filings and sulphur powder and distinguishing between these on the basis of:
      (i) appearance, i.e., homogeneity and heterogeneity
      (ii) behaviour towards a magnet
      (iii) behaviour towards carbon disulphide as a solvent
      (iv) effect of heat

3. Perform the following reactions and classify them as physical or chemical changes: **Unit-I**
   a) Iron with copper sulphate solution in water
   b) Burning of magnesium ribbon in air
   c) Zinc with dilute sulphuric acid
   d) Heating of copper sulphate crystals
   e) Sodium sulphate with barium chloride in the form of their solutions in water

4. Preparation of stained temporary mounts of (a) onion peel, (b) human cheek cells & to record observations and draw their labeled diagrams. **Unit-II**

5. Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants, striped,smooth and cardiac muscle fibers and nerve cells in animals, from prepared slides. Draw their labeleddiagrams. **Unit-II**

6. Determination of the melting point of ice and the boiling point of water. **Unit-I**

7. Verificationof the Laws of reflection of sound. **Unit-III**

8. Determination of the density of solid (denser than water) by using a spring balance and a measuring cylinder.**Unit-III**

9. Establishing the relation between the loss in weight of a solid when fully immersed in- **Unit-III**
   a) Tap water
   b) Strongly salty water with the weight of water displaced by it by taking at least two differentsolids.

10. Determination of the speed of a pulse propagated through a stretched string/slinky (helicalspring).**Unit-III**

11. Verification of the law of conservation of mass in a chemical reaction. **Unit-III**

CLASS- X

TOTAL MARKS- 100 ¡ 80 (Theory) + 20 (Internal Assessment)À

THEORY: 80 Marks **Time: 3:00 Hrs.**

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**

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.

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 plants and 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 - needand methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.

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

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 ofspherical 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 10 conductor, Fleming's Left Hand Rule, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

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.

INTERNAL ASSESSMENT :	**20 Marks**
1- Physics Practical	03 Marks
2- Chemistry Practical	03 Marks
3- Biology Practical	03 Marks
4- Sessional Work	03 Marks
5- Viva Voce	03 Marks
6- Continuous Assessment (Unit Test)	05 Marks

(There will be total 3 Unit Tests (two Unit Tests before half yearly examination and one after half yearly examination) and a pre-board examination. At the time of half yearly result preparation best of two Unit Tests (I & II) marks will be taken and converted to the weightage of 05 marks. In annual board examination, marks of the best out of 3 Unit Tests will be taken and converted to the weightage of 05 marks for the board result preparation.)

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**

(i) Dilute Hydrochloric Acid
(ii) Dilute NaOH solution
(iii) Dilute Ethanoic Acid solution
(iv) Lemon juice
(v) Water
(vi) 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

(i) Action of water on quicklime
(ii) Action of heat on ferrous sulphate crystals
(iii) Iron nails kept in copper sulphate solution
(iv) 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**

i) $ZnSO_4(aq)$
ii) $FeSO_4(aq)$
iii) $CuSO_4(aq)$
iv) $Al_2(SO_4)_3(aq)$

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**

i) Odour
ii) solubility in water
iii) effect on litmus
iv) 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**

i) Concave mirror
ii) 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 and interpret 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:

- f0Kku (Science)-Textbook for class IX-NCERT Publication
- f0Kku (Science)-Text book for class X- NCERT Publication
- Laboratory Manual-Science-Class IX, NCERT Publication
- Laboratory Manual-Science-Class X, NCERT Publication
- Exemplar Problems Class IX – NCERT Publication
- Exemplar Problems Class X – NCERT Publication

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