04.SCIENCE AND TECHNOLOGY

The subject of Science plays an important role in developing well-defined abilities in cognitive, affective and psychomotor domains in children. It augments the spirit of enquiry, Creativity, objectivity and esthetic sensibility.

Upper primary stage demands that number of opportunities should be provided to the students to engage them with the processes of science like observing, recording observation, drawing, tabulation, plotting graphs etc., where as the secondary stage also expects abstraction and quantitative reasoning to occupy a more central place in the teaching and learning of science. Thus, the idea of atoms and molecules being the building blocks of matter makes its appearance, as does Newton's law of Gravitation.

The present syllabus has been designed around seven broad themes via, Food, Materials, the World of the Living, How things Work, Moving Things, People and Ideas, Natural Phenomenon and Natural Resources. Special care has been taken to avoid temptation of adding too many concepts than can be comfortably learnt in the given time frame. No attempt has been made to be comprehensive.

At this stage, while science is still a common subject, the disciplines of Physics, Chemistry and Biology begin to emerge. The students should be exposed to experiences based on hands on activities as well as modes of reasoning that are typical of the subject.

Distribution of Marks

Unit		Marks
1) Chemical substances (Nature and Behavior)	-	17
2) The World of the Living	-	23
3) How Things Work	-	15
4) Natural Resources	-	05
Total	**-**	**60**

Theory

Theme – **Materials**

Unit 1- Chemistry Substances Nature and Behavior **17 Marks**

Question	Marks
1 Question (Long Answer)(C)	5 marks
3 Question(Very Short Answer)	6 marks
3 Question (Objective)	3 marks
1 Question (Short Answer)	3 marks
8 QUESTIONS	**17 MARKS**

Chapter-1 Chemical Reaction and Equations

1. Chemical Equations
2. Types of Chemical Reactions
    a) Combination Reaction
    b) Decomposition Reaction

c) Displacement Reaction
d) Double Displacement Reaction
e) Oxidation and Reduction

3. Effect of oxidation Reaction in Everyday life
   a) Corrosion and b) Rancidity

Chapter-2 Acids, Bases and Salts

1) General Properties (physical and chemical properties) of acids, bases and salts with examples and their uses.
2) PH scale and Importance of PH in Everyday life.

Chapter-3 Metals and Non-metals

1) Physical and chemical Properties of Metals and Non-Metals
2) Reactivity Series
3) Metal and Non-Metal Reactions
4) Occurrence of Metals and their extraction
5) Corrosion of Metals and Prevention of corrosion

Chapter-4 Carbon and its Compounds

1) Bonding in carbon- the covalent Bond.
2) Saturated and Unsaturated Carbon Compounds.
3) Nomenclature of Carbon Compounds.
4) Chemical Properties of Carbon Compounds
5) Some Important carbon Compounds-
Ethanol and Ethanoic Acid. (only properties)
6) Soaps and Detergents : Cleaning action of Soaps (Micelles Formation)

Chapter-5 Periodic Classification of Elements

1) Early attempts at the classification of Elements
   a) Dobereiner's Trids
   b) Newlands law of octaves
   c) Mendeleev's Periodic Table
2) The Modern Periodic Table.
3) Trends in the Modern Periodic Table.

Theme – The World of the living (Biology)

Unit2- Our Environment **23 Marks**

Question	Marks
6 Question (Objective)	6 mark
3 Question (Very Short Answer)	6 marks
1 Question (Long Answer)	5 marks
2 Questions (Short Answer) (c)	6 marks
12 QUESTION	**23 MARKS**

Chapter-6 Life Processes

1. Basic concept of nutrition, respiration, transport and excretion in plants and animals.

Chapter-7 Control and Co-ordination

1. Nervous System, Reflex Action and Human Brain and Animal Hormones.
2. Coordination in Plants: Tropic Movements and plant Hormones.

Chapter-8 How to Organisms Reproduce

1. Importance of Variation
2. Modes of Reproduction : Asexual and Sexual (Both in Plants and Animals)
3. Reproduction in Human Beings:
   Male and Female Reproductive systems
4. Reproduction Health: Need and methods of family planning, safe sex vs HIV/AIDS.

Chapter-9 Heredity and Evolution

1. Heredity
2. Sex Determination
3. Evolution and Classification
4. Tracing Evolution Relationships
5. Fossils.

Chapter-15 Our Environment

1. Bio-degradable and Non-Biodegradable substances.
2. Eco-system and its components.
3. Food chain and Food Web.
4. Environmental problems and their solutions: Ozone layer and Management of Garbage.

Theme- **How things work**

Unite3- Effect of Current **15 Marks**

Question	Marks
2 Question (Objective)	2 mark
1 Question (Very Short Answer)	2 marks
1 Question (Long Answer) (c)	5 marks
2 Questions (Short Answer) (c)	6 marks
6 QUESTION	**15 MARKS**

Chapter-12 Electricity

1. Electric Current and circuit
2. Electric potential and potential difference
3. Ohm's Law
4. Series and Parallel combination of resistors.

5. Heating Effect of Electric Current
6. Electric Power
7. Inter relation between P,V,I and R.

Chapter-13 Magnetic Effects of Electric Current

1. Magnetic field and field lines
2. Magnetic field due to a current
   a) Straight conductor
   b) Circular loop
   c) Solenoid
3. Fleming's Right Hand Thumb Rule
4. Left Hand Rule
5. Electric Motor, Electromagnetic Induction
6. Electric Generator and Domestic Electric Circuit

Theme- **Natural Phenomena**

Convergence and Divergence of light

Chapter-10 Light- Reflection and refraction

1. Reflection of light
2. Spherical Mirrors: Concave and convex
3. Image Formation with Ray diagrams.
4. Mirror Formula and Magnification
5. Refraction of light through Glass Slab and lenses (convex and concave) and Image formation by lenses.
6. Lens formula and Magnification
7. Uses of Mirrors and Lenses
8. Power of Lens.

Chapter-11 The Human Eye and the Colorful World.

1. The Human Eye.
2. Power of Accommodation
3. Defects of Vision and Their correction
4. Refraction of Light Through Prism
5. Dispersion of light and scattering of light
6. Atmospheric Refraction
   a) Twinkling of Stars
   b) Tyndall Effect

Theme- **Natural Resources**

Unit4- Conservation of Natural Resources **05 Marks**

Question	Marks
1 Question (Objective)	1 mark
2 Question (Short Answer) (c)	4 marks
3 QUESTIONS	**05 MARKS**

Chapter-14 Sources of Energy

1. Different forms of Energy.
2. Leading to different Sources of Human use:
   Fossil fuels, solar energy, biogas, wind water and tidal energy.
3. Renewable and Non-renewable sources.

Chapter-16 Management of Natural Resources.

1. Conservation and Judicious use of natural resources.
2. Forests and Wild life
3. Stake holders and sustainable management
4. Dams and Water Harvesting
5. Cool and Petroleum.

PRACTICAL

LIST OF EXPERIMENTS

1. To Find the PH of the following samples by using PH paper/universal indicator.
   - i. Dilute Hydrochloric acid
   - ii. Dilute NaOH solution
   - iii. Dilute Ethanoic acid solution
   - iv. Lemon Juice
   - v. Water
   - vi. Dilute Sodium Bicarbonate Solution.
2. To study the properties of acids and bases HCl and NaOH by their reaction with
   - i. Litmus solution (Blue/Red)
   - ii. Zinc metal
   - iii. Solid Sodium Carbonate
3. To Determine the focal length of
   - i. Concave mirror
   - ii. Convex lens

   By obtaining the image of a distant object
4. To trace 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.
5. To study the dependence of current (1) on the potential difference (v) across a resistor and determine its resistance. Also plot a graph between V and I.
6. To determine the equivalent resistance of two resistors when connected in series.
7. To determine the equivalent resistance of two resistors when connected in parallel.
8. To prepare a temporary mount of a leaf peel to show stomata.
9. To show experimentally that carbon dioxide is given out during respiration.
10. To study (a) binary fission in Amoeba and (b) budding in yeast with the help of prepared slides.
11. To determine the percentage of water absorbed by raisins.
12. To prepare SO_2 gas, observe its following properties and draw inferences in respect of
    - i. Odour
    - ii. Solubility in water
    - iii. Effect on litmus paper
    - iv. Action on acidified potassium dichromate solution.
13. a) To observe the action of Zn, Fe, Cu and Al metals on the following salt solutions.
    - i. $ZnSO_4$(aq.)
    - ii. $FeSO_4$(aq.)
    - iii. $Cu\ SO_4$(aq.)
    - iv. $Al_2(SO_4)_3$ (aq.)

    b) Arrange Zn, Fe, Cu and Al metals in the decreasing order of reactivity based on the above result.
15. To study the following properties of acetic acid (ethanoic acid).
    - i. Odour
    - ii. Solubility in water

iii. Effect on litmus paper

iv. Action on acidified potassium dichromate solution.

Scheme of Examination:

External Examination (to be conducted by the Board) **(20 Marks)**

Prescribed Books :

1. **Vigyan** Published by H.P. Board of School Education.
2. **Science** Published by H.P. Board of School Education.