Introduction

The National curriculum Framework 2005 (NCF 2005) is one of the most Comprehensive documents published in the last decade. It suggests radical changes in Curricula for the country and offers an excellent framework for preparing need based curricula. While revising the syllabi for Science and Technology, the position paper on science (NCF 2005) has selected "Learning without burden" as the main theme. It also recommends a pedagogy which is hands-on and inquiry based. The present syllabus of Science and Technology for Std. IX and X is based on the principles and themes suggested in NCF 2005. The Themes are cross-disciplinary in nature: Food, Materials, The world of the Living, How things work, Moving things; people and ideas; Natural Phenomena and Natural Resources. Some themes have been merged to consolidate content. As suggested in NCF 2005, unnecessary focus on enumeration has been avoided. More importance has been given to the processes in science rather than focusing on only factual information.

Since the themes are inter-linked to each other, the entire syllabus has been integrated into one paper. This will facilitate better understanding of the subject across disciplinary boundaries and at the same time expose students to many topics in Biology, Physics and Chemistry.

Objectives

1. To enable the students to "Learn without Burden".
2. To expose the students to a "hands-on way'' of learning science.
3. To correlate scientific principles to the student's experience.
4. To involve students in exploring topics through discussion and activity.
5. To imbibe the spirit of enquiry in students through valuable learning experiences through experiment.
6. To help the students become autonomous learners.

1. Materials

1.1 Acids and Bases: Acids, Bases and Salts: General properties, examples and uses.

1.2 Chemical Reactions: Types of chemical reactions: combination, decomposition, displacement double decomposition, precipitation, and neutralization.

1.3 Oxidation and Reduction: Oxidation and Reduction in terms of gain and loss of oxygen and hydrogen.

1.4 Metals and Non-Metals: Brief discussion on basic metallurgical processes. Properties of common metals. Elementary idea about bonding.

1.5 Carbon Compounds: Elementary idea about bonding. Saturated hydrocarbons, alcohols, carboxylic acids (properties only)

1.6 Common chemicals used in daily life: Soap, common salt, Washing soda, Baking soda, bleaching powder Plaster of Paris.

1.7 Classification of Elements: Brief historical account, Mendeleev's periodic table, gradation in properties.

2. The World of the Living

2.1 Life Processes: Definition of "Living things". Basic concept of nutrition, respiration, transport and excretion in plants and animals.

2.2 Control in the Living: Tropic movements in plants .Introduction to plant hormones; control and coordination in animals; voluntary, involuntary and reflex action, nervous system, chemical coordination, animal hormones.

2.3 Reproduction in the Living: Reproduction in plants and animals. Need for and methods of family planning. Safe Sex vs-. HIV/AIDS. Child bearing and women's health.

2.4 Heredity and Evolution: Heredity, origin of life- brief introduction, Basic concepts of evolution.

3. Moving things. People and Ideas

3.1 Electric Circuits: Potential and potential difference. Ohm's Law, Resistances in series and parallel. Power dissipated due to current. Inter relation between P, V, I and R.

3.2 Magnets: Magnetic field, field lines. Field due to a current carrying wire, coil, solenoid. Force on current carrying conductor. Fleming's Left Hand Rule, Electric motor, electromagnetic induction. Induced potential differences, induced current. Electric generator, principle and working.
Direct and Alternating current, Frequency of AC, Advantages of AC over DC, Domestic Electric Circuits.

4. Natural Phenomena

4.1. Light: Convergence and Divergence of Light.

4.2. Spherical Mirrors: Images formed by a concave mirror. Related concepts:
Centre of curvature, principal axis, optical centre, focus, focal length.

4.3 Refraction: appreciation of the concept of refraction. Laws of refraction. Velocity of light. Refractive index; twinkling of stars; dispersion of light. Scattering of light.

4.4 Lenses: Images formed by a convex lens; functioning of the lens in the human problems of vision and their remedies. Application of spherical mirrors and lenses.

5. Pollution

5.1 Types of pollution – air, water, (fresh and marine), soil, radiation, and noise.

5.2 Sources of pollution and major pollutants, oil spills

5.3 Effect of pollution on – environment, human health and other organisms

5.4 Abatement of pollution

6. Striving for a Better Environment

6.1 Use of efficient and eco-friendly technology

6.2 Sustainable use of resources.

6.3 Enforcement of acts, laws and policies

PRACTICALS
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 & NaOH by their reaction with
   (i) Litmus solution (Blue/Red)
   (ii) Zinc metal
   (iii) Solid Sodium carbonate

3. To determine the focal length of
   (a) Concave mirror
   (b) 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 (I) 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 light is necessary for photosynthesis.

10. To show experimentally that carbon dioxide is given out during respiration.

11. To study (a) Binary fission in Amoeba and (b) Budding in yeast with the help of prepared slides.

12. To determine the percentage of water absorbed by raisins.

13. To perform and observe the following reactions and classify them into;
    (i) Combination Reaction
    (ii) Decomposition Reaction
    (iii) Displacement Reaction
    (iv) Double Displacement Reaction

    1. Action of water on quick lime.
    2. Action of heat on Ferrous sulphate crystals
    3. Iron Nails kept in copper sulphate solution
    4. Reaction between Sodium sulphate and Barium chloride solutions.

14.
a) To observe the action of Zn, Fe, Cu and Al metals on the following salt solutions.
    i) $ZnS0_4$ (aq.)
    ii) $FeS0_4$ (aq.)
    iii) $CuS0_4$ (aq.)
    iv) $Al_2(S0)_3$ (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
    (iv) Reaction with sodium bicarbonate