L_1_General_Ed

I. MATHEMATICS

UNIT I: NUMBER SYSTEMS

REAL NUMBERS

Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring/terminating decimals.

Examples of nonrecurring / non terminating decimals such as √2, √3, √5 etc. Existence of non-rational numbers (irrational numbers) such as √2, √3 and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, every point on the number line represents a unique real number.

Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized).

Definition of *n*th root of a real number.

Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)

Rationalization (with precise meaning) of real numbers of the type (& their combinations)

$\frac{1}{a + b\sqrt{x}}$ & $\frac{1}{\sqrt{x} + \sqrt{y}}$ where *x* and *y* are natural number and *a*, *b* are integers.

UNIT II : ALGEBRA

POLYNOMIALS

Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros/roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorization of ax2 + bx + c, a ≠ 0 where a, b, c are real numbers, and of cubic polynomials using the Factor Theorem. Recall of algebraic expressions and identities. Further verification of identities of the type (x + y + z)2 = x2 + y2 + z2 + 2xy + 2yz + 2zx, (x □ y)3 = x3 □ y3 □ 3xy (x □ y), x³ □ y³ = (x □ y) (x² □ xy + y²) x3 + y3 + z3 — 3xyz = (x + y + z) (x2 + y2 + z2 — xy — yz — zx) and their use in factorization of polymonials. Simple expressions reducible to these polynomials.

UNIT III: GEOMETRY

INTRODUCTION TO EUCLID'S GEOMETRY

History - Geometry in India and Euclid's geometry. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem, for example.

(Axim) . Given two distinct points, there exists one and only one line through them.

(Theorem) . (Prove) two distinct lines cannot have more than one point in common.

LINES AND ANGLES

1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180^o and the converse.
2. (Prove) If two lines intersect, the vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.
4. (Motivate) Lines, which are parallel to a given line, are parallel.
5. (Prove) The sum of the angles of a triangle is 180^o.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.

TRIANGLES

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).
3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruene).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.
5. (Prove) The angles opposite to equal sides of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between 'angle and facing side' inequalities in triangles.

UNIT IV: COORDINATE GEOMETRY

COORDINATE GEOMETRY

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $Ax + By + C = 0$ by writing it as $y = mx + c$.

UNIT V: MENSURATION

AREAS

Area of a triangle using Hero's formula (without proof) and its application in finding the area of a quadrilateral.

UNIT II: ALGEBRA (Contd.)

LINEAR EQUATIONS IN TWO VARIABLES

Recall of linear equations in one variable. Introduction to the equation in two variables. Prove that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III: GEOMETRY (Contd.)

QUADRILATERALS

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sides are equal, and conversely.
3. (Motivate) In a parallelogram opposite angles are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse.

AREA

1. Review concept of area, recall area of a rectangle.
2. (Prove) Parallelograms on the same base and between the same parallels have the same area.
3. (Motivate) Triangles on the same base and between the same parallels are equal in area and its converse.

CIRCLE

1. Through examples, arrive at definitions of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle.

2. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
3. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
4. (Motivate) There is one and only one circle passing through three given non-collinear points.
5. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center(s) and conversely.
6. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
7. (Motivate) Angles in the same segment of a circle are equal.
8. (Motivate) If a line segment joining two points subtendes equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
9. (Motivate) The sum of the either pair of the opposite angles of a cyclic quadrilateral is 180o and its converse

CONSTRUCTIONS

Construction of bisectors of line segments & angles, 60o, 90o, 45o angles etc., equilateral triangles.
Construction of a triangle given its base, sum/difference of the other two sides and one base angle.
Construction of a triangle of given perimeter and base angles.

UNIT V: MENSURATION (Contd.)

SURFACE AREAS AND VOLUMES

Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/ cones.

UNIT VI: STATISTICS AND PROBABILITY

STATISTICS
Introduction to Statistics : Collection of data, presentation of data — tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons, qualitative analysis of data to choose the correct form of presentation for the collected data. Mean, median, mode of ungrouped data.

PROBABILITY
History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real - life situations, and from examples used in the chapter on statistics).

II SCIENCE

THEME : FOOD

UNIT : FOOD

Plant and animal breeding and selection for quality improvement and management; use of fertilizers, manures; protection from pests and diseases; organic farming.

THEME : MATERIALS

UNIT :

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; 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 (four types in animals; meristematic and permanent tissues in plants).

THEME : MOVING THINGS, PEOPLE AND IDEAS

UNIT : 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, equations of motion by graphical method; elementary idea of uniform circular motion.

Force and Newton's laws: Force and motion, Newton's laws of motion, inertia of a body, inertia and mass, momentum, force and acceleration. Elementary idea of conservation of momentum, action and reaction forces.

Gravitation : Gravitation; universal law of gravitation, force of gravitation of the earth (gravity), acceleration due to gravity; mass and weight; free fall

THEME : MATERIALS

UNIT : MATTER - NATURE AND BEHAVIOUR

Particle nature, basic units : atoms and molecules. Law of constant proportions. Atomic and molecular masses.

Mole Concept : Relationship of mole to mass of the particles and numbers. Valency. Chemical

formula of common compounds.

Structure of atom : Electrons, protons and neutrons; Isotopes and isobars.

ATTER - NATURE AND BEHAVIOUR

Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state-melting (absorption of heat), freezing, evaporation (Cooling by evaporation), condensation, sublimation.

Nature of matter:
Elements, compounds and mixtures. Heterogenous and homogenous mixtures, colloids and suspensions.

THEME: THE WORLD OF THE LIVING

UNIT: ORGANIZATION IN THE LIVING WORLD.

Biological Diversity: Diversity of plants and animals - basic issues in scientific naming, basis of classification. Hierarchy of categories / groups, Major groups of plants (salient features) (Bacteria, Thalophyta, Bryo phyta, Pteridophyta, gymnosperms and Angiosperms). Major groups of animals (salient features) (Non-chordates upto phyla and chordates upto classes).

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: MOTION, FORCE AND WORK

Floatation: Thrust and pressure. Archimedes' principle, buoyancy, elementary idea of relative density.

Work, energy and power: Work done by a force, energy, power; kinetic and potential energy; law of conservation of energy.

Sound: Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo and SONAR.
Structure of the human ear (auditory aspect only).

THEME: NATURAL RESOURCES
UNIT: OUR ENVIRONMENT

Physical resources: Air, Water, Soil.
Air for respiration, for combustion, for moderating temperatures, movements of air and its role in bringing rains across India.
Air, water and soil pollution (brief introduction). Holes in ozone layer and the probable damages.

Bio-geo chemical cycles in nature: water, oxygen, carbon, nitrogen

III SOCIAL STUDY

UNIT I: INDIA AND THE CONTEMPORARY WORLD – I

Themes

Two themes from the first sub-unit and one each from the second and third subunits could be studied.

Sub-unit 1.1: Events and processes.

In this unit the focus is on three events and processes that have in major ways shaped the identity of the modern world. Each represents a different form of politics, and a specific combination of forces. One event is linked to the growth of liberalism and democracy, one with socialism, and one with a negation of both democracy and socialism.

Two themes of the following:

1. **French Revolution:** (a)The Ancient Regime and its crises. (b) The social forces that led to the revolution. (c) The different revolutionary groups and ideas of the time. (d) The legacy. Compulsory (Chapter-1)
2. **Russian Revolution:** (a) The crises of Tzarism. (b) The nature of social movements between 1905 and 1917. (c) The First World War and foundation of Soviet state. (d) The legacy. (Chapter 2)
3. **Rise of Nazism.** (a) The growth of social democracy (b) The crises in Germany. (b) The basis of Hitler's rise to power. (c) The ideology of Nazism. (d) The impact of Nazism. (Chapter 3)

Sub-unit 1.2: Economies and Livelihoods

The themes in this section will focus on how different social groups grapple with the changes in the contemporary world and how these changes affect their lives.

Any one theme of the following:

Pastoralists in the modern world: (a) Pastoralism as a way of life. (b) Different forms of pastoralism. (c) What happens to pastoralism under colonialism and modern states? (Chapter 5)

Forest society and colonialism : (a)Relationship between forests and livelihoods. (b) Changes in forest societies under colonialism. (Chapter 4)

Farmers and peasants : (a) Histories of the emergence of different forms of farming and peasant societies. (b) Changes within rural economies in the modern world. (Chapter 6)

Sub-unit 1.3: Culture, Identity and Society

The themes in this unit will consider how issues of culture are linked up to the making of contemporary world.

Any one of the following:

1. **Sports and politics:** The story of cricket (a) The emergence of cricket as an English sport. (b) Cricket and colonialism. (c) Cricket nationalism and de-colonialization. (Chapter 7)
2. **Clothes and cultures.** (a) A short history of changes in clothing. (b) Debates over clothing in colonial India. (c) Swadeshi and the movement for Khadi. (Chapter 8)

UNIT 2: INDIA - LAND AND THE PEOPLE

1. **India:** location, relief, structure, major physiographic units. (Chapter 1&2)
2. **Drainage:** major rivers and tributaries, lakes and seas, role of rivers in the economy, pollution of rivers, measures to control river pollution. (Chapter 3)
3. **Climate:** factors influencing the climate; monsoon- its characteristics, rainfall and temperature distribution; seasons; climate and human life. (Chapter 4)
4. **Natural Vegetation:** vegetation types, distribution as well as altitudinal variation, need for conservation and various measures. (Chapter 5)
5. **Wild Life:** major species, their distribution, need for conservation and various measures. (Chapter 5)
6. **Population:** size, distribution, age-sex composition, population change-migration as a determinant of population change, literacy, health, occupational structure and national population policy: adolescents as under-served population group with special needs. (Chapter 6)

Map Work

Project/Activity

Learners may identify songs, dances, festivals and special food preparations associated with certain seasons in their particular region, and whether they have some commonality with other regions of India.

Collection of material by learners on the flora and fauna of the region in which their school is situated. It should include a list of endangered species of the region and also information regarding efforts being made to save them.

Posters

River pollution

Depletion of forests and ecological imbalance.

UNIT - 3: DEMOCRATIC POLITICS I

1. What is democracy? Why democracy?

What are the different ways of defining democracy? Why has democracy become the most prevalent form of government in our times? What are the alternatives to democracy? Is democracy superior to its available alternatives? Must every democracy have the same institutions and values? Designing of Democracy in India

How and why did India become a democracy? How was the Indian constitution framed? What are the salient features of the Constitution? How is democracy being constantly designed and redesigned in India? (Chapter 3)

Electoral politics in democracy

Why and how do we elect representatives? Why do we have a system of competition among political parties? How has the citizens' participation in electoral politics changed? What are the ways to ensure free and fair elections? (Chapter 4)

2. Institutions of parliamentary democracy

How is the country governed? What does Parliament do in our democracy? What is the role of the President of India, the Prime Minister and the Council of Ministers? How do these relate to one another? (Chapter 5)

3. Citizens' rights in democracy

Why do we need rights in a constitution? What are the Fundamental Rights enjoyed by the citizen under the Indian constitution? How does the judiciary protect the Fundamental Rights of the citizen? How is the independence of the judiciary ensured? (Chapter 6)

UNIT - 4: UNDERSTANDING ECONOMIC DEVELOPMENT – I

1. **The economic story of Palampore:** Economic transactions of Palampore and its interaction with the rest of the world through which the concept of production (including three factors of production (land, labour and capital) can be introduced. (Chapter 1)
2. **People as Resource :** Introduction of how people become resource / asset; economic activities done by men and women; unpaid work done by women; quality of human resource ; role of health and education; unemployment as a form of nonutilisation of human resource; socio- political implication in simple form (Chapter 2)
3. **Poverty as a challenge facing India :** Who is poor (through two case studies: one rural

one urban); indicators; absolute poverty (not as a concept but through a few simple examples) – why people are poor ; unequal distribution of resources; comparison between countries; steps taken by government for poverty alleviation (Chapter 3)

4. **Food Security : Source of foodgrains:** variety across the nation - famines in the past - the need for self sufficiency - role of government in food security - procurement of foodgrains – overflowing of granaries and people without food – publi distribution system - role of cooperatives in food security (foodgrains, milk and vegetables ration shops, cooperative shops, two-three examples as case studies) (Chapter 4)

SUGGESTED ACTIVITIES / INSTRUCTIONS:

Theme I: Give more examples of activities done by different workers and farmers. Numerical problems can also be included. Some of the ways through which description of villages are available in the writings of Prem Chand, MN Srinivas and RK Narayan. They may have to be referred.

Theme II: Discuss the impact of unemployment Debate on whether all the activities done by women should be included or not. Is begging an economic activity? Discuss. Is it necessary to reduce population growth or family size? Discuss.

Theme III: Visit a few farms in a village and collect the details of foodgrains cultivated;

Visit a nearby ration shop and collect the details of goods available;

Visit a regulated market yard and observe how goods are transacted and get the details of the places where the goods come and go.

UNIT - 5: DISASTER MANAGEMENT

1. Introduction to Disaster Management

2. Common Hazards - Prevention and Mitigation

3. Manmade disasters - Nuclear, Biological and Chemical.

4. Community Based Disaster Management.