

Number System

(50 hrs)

(i) *Knowing our Numbers: Integers*

- Multiplication and division of integers (through patterns). Division by zero is meaningless
- Properties of integers (including identities for addition & multiplication, *commutative, associative, distributive*) (through patterns). These would include examples from whole numbers as well. Involve expressing commutative and associative properties in a general *form*. Construction of counterexamples, including some by children. Counter examples like subtraction is not commutative.
- Word problems including integers (all operations)

(ii) *Fractions and rational numbers:*

- Multiplication of fractions
- Fraction as an operator
- Reciprocal of a fraction
- Division of fractions
- Word problems involving mixed fractions
- Introduction to rational numbers (with representation on number line)
- Operations on rational numbers (all operations)
- Representation of rational number as a decimal.
- Word problems on rational numbers (all operations)
- Multiplication and division of decimal fractions
- Conversion of units (length & mass)
- Word problems (including all operations)

(iii) *Powers:*

- Exponents only natural numbers.
- Laws of exponents (through observing patterns to arrive at generalisation.)

$$(i) \quad a^m \cdot a^n = a^{m+n}$$

$$(ii) \quad (a^m)^n = a^{mn}$$

$$(iii) \quad \frac{a^m}{a^n} = a^{m-n}, \text{ where } m - n \in \mathbb{N}$$

$$(iv) \quad a^m \cdot b^n = (ab)^{mn}$$

Algebra**(20 hrs)****ALGEBRAIC EXPRESSIONS**

- Generate algebraic expressions (simple) involving one or two variables
- Identifying constants, coefficient, powers
- Like and unlike terms, degree of expressions e.g., $x^2 y$ etc. (exponent ≤ 3 , number of variables)
- Addition, subtraction of algebraic expressions (coefficients should be integers).
- Simple linear equations in one variable (in contextual problems) with two operations (avoid complicated coefficients)

Ratio and Proportion**(20 hrs)**

- Ratio and proportion (revision)
- Unitary method continued, consolidation, general expression.
- Percentage- an introduction.
- Understanding percentage as a fraction with denominator 100
- Converting fractions and decimals into percentage and vice-versa.
- Application to profit and loss (single transaction only)
- Application to simple interest (time period in complete years).

Geometry**(60 hrs)****(i)** *Understanding shapes:*

- Pairs of angles (linear, supplementary, complementary, adjacent, vertically opposite) (verification and simple proof of vertically opposite angles)
- Properties of parallel lines with transversal (alternate, corresponding, interior, exterior angles)

(ii) *Properties of triangles:*

- Angle sum property (with notions of proof & verification through paper folding, proofs using property of parallel lines, difference between proof and verification.)
- Exterior angle property
- Sum of two sides of a triangle is greater than its third side
- Pythagoras Theorem (Verification only)

(iii) *Symmetry*

- Recalling reflection symmetry
- Idea of rotational symmetry, observations of rotational symmetry of 2-D objects. (900, 1200, 1800)
- Operation of rotation through 900 and 1800 of simple figures.
- Examples of figures with both rotation and reflection symmetry (both operations)
- Examples of figures that have reflection and rotation symmetry and vice-versa

(iv) *Representing 3-D in 2-D:*

- Drawing 3-D figures in 2-D showing hidden faces.
- Identification and counting of vertices, edges, faces, nets (for cubes cuboids, and cylinders, cones).
- Matching pictures with objects (Identifying names)
- Mapping the space around approximately through visual estimation.

(v) *Congruence*

- Congruence through superposition (examples blades, stamps, etc.)
- Extend congruence to simple geometrical shapes e.g. triangles, circles.
- Criteria of congruence (by verification) SSS, SAS, ASA, RHS

(vi) *Construction (Using scale, protractor, compass)*

- Construction of a line parallel to a given line from a point outside it.(Simple proof as remark with the reasoning of alternate angles)
- Construction of simple triangles. Like given three sides, given a side and two angles on it, given two sides and the angle between

Mensuration

(15 hrs)

- Revision of perimeter, Idea of, Circumference of Circle

Area

Concept of measurement using a basic unit area of a square, rectangle, triangle, parallelogram and circle, area between two rectangles and two concentric circles.

Data handling**(15 hrs)**

- (i) Collection and organisation of data – choosing the data to collect for a hypothesis testing.
- (ii) Mean, median and mode of ungrouped data – understanding what they represent.
- (iii) Constructing bargraphs
- (iv) Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Tabulating and counting occurrences of 1 through 6 in a number of throws. Comparing the observation with that for a coin. Observing strings of throws, notion of randomness.