

## Maths Course Structure - Class VII

### 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)  $a^m \cdot a^n = a^{m+n}$

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

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

## 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.,  $x^2y$  etc. (exponent  $\leq 3$ , 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. ( $90^\circ$ ,  $120^\circ$ ,  $180^\circ$ )
- Operation of rotation through  $90^\circ$  and  $180^\circ$  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 them.

### **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.

