



## Mathematics → Class I

Mathematics is about a certain way of thinking and reasoning.

### GEOMETRY

#### SHAPES & SPATIAL UNDERSTANDING

- ❖ Develops and uses vocabulary of spatial relationship (Top, Bottom, On, Under, Inside, Outside, Above, Below, Near, Far, Before, After)

#### SOLIDS AROUND US

- ❖ Collects objects from the surroundings having different sizes and shapes like pebbles, boxes, balls, cones, pipes, etc.
- ❖ Sorts, Classifies and describes the objects on the basis of shapes, and other observable properties.
- ❖ Observes and describes the way shapes affect movements like rolling and sliding.
- ❖ Sorts 2 - D shapes such as flat objects made of card etc

### Numbers

#### DEVELOPING A SENSE OF NUMBERNESS, COUNTING

#### AND OPERATIONS OF NUMBERS 1 - 9 AND ZERO

- ❖ Observes object and makes collections of objects.
- ❖ Arranges the collection of objects in order by - Matching and - One to one correspondence
- ❖ Counts the number of objects in a collection.
- ❖ Makes collection of objects corresponding to a specific number.
- ❖ Recognises and speaks numbers from 1 to 9.
- ❖ Uses numbers from 1 to 9 in counting and comparison. (Real objects and repeated events like clapping to be used for counting)



- ❖ Reads and writes numerals from 1 to 9.
- ❖ Adds and subtracts using real objects and pictures.
- ❖ Adds and subtracts the numbers using symbols '+' and '-'.
- ❖ Approaches zero through the subtraction pattern (such as  $3 - 1 = 2$ ,  $3 - 2 = 1$ ,  $3 - 3 = 0$ ). NUMBERS FROM (10 - 20)
- ❖ Forms Number sequence from 10 to 20.
- ❖ Counts objects using these numbers.
- ❖ Groups objects into a group of 10s and single objects.
- ❖ Develops the vocabulary of group of 'tens' and 'ones'.
- ❖ Shows the group of tens and ones by drawing.
- ❖ Counts the number of tens and ones in a given number.
- ❖ Writes the numerals for eleven to nineteen.
- ❖ Writes numerals for ten and twenty.
- ❖ Compares numbers upto 20. ADDITION AND SUBTRACTION (UPTO 20)
- ❖ Adds and subtracts numbers upto 20. NUMBERS FROM 21 - 99
- ❖ Writes numerals for Twenty-one to Ninety nine.
- ❖ Groups objects into tens and ones.
- ❖ Draws representation for groups of ten and ones.
- ❖ Groups a number orally into tens and ones. MENTAL ARITHMETIC
- ❖ Adds two single digit numbers mentally.
- ❖ Money
- ❖ Identifies common currency notes and coins.
- ❖ Puts together small amounts of money.
- ❖ Measurement
- ❖ LENGTH
- ❖ Distinguishes between near, far, thin, thick, longer/taller, shorter, high, low.
- ❖ Seriates objects by comparing their length.
- ❖ Measures short lengths in terms of non-uniform units (in the



- ❖ context of games e.g. 'Gilli Danda' and 'marble games').
- ❖ Estimates distance and length, and verifies using nonuniform units (e.g. hand span etc.)

### **WEIGHT**

- ❖ Compares between heavy and light objects. TIME
- ❖ Distinguishes between events occurring in time using terms - earlier and later.
- ❖ Gets the qualitative feel of long & short duration, of school days v/s holidays.
- ❖ Narrates the sequence of events in a day.

### **Data Handling**

- ❖ Collects, represents and interprets simple data such as measuring the arm length or circumference of the head using a paper strip.

### **Patterns**

- ❖ Describes sequences of simple patterns found in shapes in the surroundings and in numbers, e.g. stamping activity using fingers and thumb.
  - ❖ Completes a given sequence of simple patterns found in shapes in the surroundings and in numbers
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## Mathematics → Class II

Mathematics is about a certain way of thinking and reasoning.

### GEOMETRY

#### SHAPES & SPATIAL UNDERSTANDING 3-D and 2-D Shapes

- ❖ Observes objects in the environment and gets a qualitative feel for their geometrical attributes.
- ❖ Identifies the basic 3-D shapes such as cuboid, cylinder, cone, sphere by their names.
- ❖ Traces the 2-D outlines of 3-D objects.
- ❖ Observes and identifies these 2-D shapes.
- ❖ Identifies 2-D shapes viz., rectangle, square, triangle, circle by their names.
- ❖ Describes intuitively the properties of these 2-D shapes.
- ❖ Identifies and makes straight lines by folding, straight edged objects, stretched strings and draws free hand and with a ruler.
- ❖ Draws horizontal, vertical and slant lines (free hand).
- ❖ Distinguishes between straight and curved lines.
- ❖ Identifies objects by observing their shadows.

#### Numbers

- ❖ Reads and writes numerals for numbers up to ninety-nine.
- ❖ Expands a number with respect to place values.
- ❖ Counts and regroups objects into tens and ones.
- ❖ Uses the concept of place value in the comparison of numbers.
- ❖ Counts in various ways: - Starting from any number. - Group counting etc.
- ❖ Arranges numbers upto hundred in ascending and descending order. Forms the greatest and the smallest



two digit numbers without repetition of given digits.

- ❖ Indicates and identifies the position of an object in a line.

### **ADDITION AND SUBTRACTION**

- ❖ Adds and subtracts two digit numbers by drawing representations of tens and ones without and with regrouping.
- ❖ Adds zero to a number and subtracts zero from a number.
- ❖ Observes the commutative property of addition through patterns.
- ❖ Solves addition, subtraction problems presented through pictures and verbal description.
- ❖ Describes orally the situations that correspond to the given addition and subtraction facts.
- ❖ Estimates the result of addition and subtraction and compares the result with another given number.

### **PREPARATION FOR MULTIPLICATION AND DIVISION**

- ❖ Discussion of situations involving repeated addition and situations involving equal sharing.
- ❖ Activities of making equal groups.

### **MENTAL ARITHMETIC**

- ❖ Adds and subtracts single digit numbers mentally.
- ❖ Adds and subtracts multiples of ten mentally.

### **MONEY**

- ❖ Identifies currency - notes and coins.
  - ❖ Puts together amounts of money not exceeding Rs 50/-.
  - ❖ Adds and subtracts small amounts of money mentally.
  - ❖ Transacts an amount using 3-4 notes.
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## MEASUREMENT

### LENGTH

- ❖ Measures lengths & distances along short & long paths using uniform (non-standard) units, extends to longer lengths

### WEIGHT

- ❖ Compares two or more objects by their weight.
- ❖ Appreciates the need for a simple balance.
- ❖ Compares weights of given objects using simple balance.

### CAPACITY (VOLUME)

- ❖ Compares and orders containers in terms of internal volume (capacity).
- ❖ Orders given containers as per their capacities on the basis of perception & verifies by pouring out etc.

### TIME

- ❖ Gets familiar with the days of the week and months of the year.
- ❖ Gets a feel for sequence of seasons (varying locally).
- ❖ Sequences the events occurring over longer periods in terms of dates/days.

### DATA HANDLING

- ❖ Collects data through measurement.
- ❖ Represents the data followed by discussion (e.g. heights of children).
- ❖ Collects and presents the data on birthdays.
- ❖ Draws inferences from the data at the appropriate level.

### PATTERNS

- ❖ Observes and extends patterns in sequence of shapes and numbers.
- ❖ Searches for patterns in different ways of splitting a number.
- ❖ Creates block patterns by stamping thumbprints, leaf



- prints,vegetable prints, etc.
- ❖ Creates patterns of regular shapes by stamping.



## Mathematics → Class III

### Geometry

#### SHAPES & SPATIAL UNDERSTANDING

- ❖ Creates shapes through paper folding, paper cutting.
- ❖ Identifies 2-D shapes
- ❖ Describes the various 2-D shapes by counting their sides, corners and diagonals.
- ❖ Makes shapes on the dot-grid using straight lines and curves.
- ❖ Creates shapes using tangram pieces.
- ❖ Matches the properties of two 2-D shapes by observing their sides and corners (vertices).
- ❖ Tiles a given region using a tile of a given shape.
- ❖ Distinguishes between shapes that tile and that do not tile.
- ❖ Intuitive idea of a map. Reads simple maps (not necessarily scaled)
- ❖ Draws some 3D-objects.

### NUMBERS

#### NUMBER SEQUENCE UPTO 1000

- ❖ Reads and writes 3-digit numbers.
- ❖ Expands a number w.r.t. place values.
- ❖ Counts in different ways - starting from any number.
- ❖ Compares numbers.
- ❖ Forms greatest and smallest numbers using given digits.

#### ADDITION AND SUBTRACTION

- ❖ Adds and subtracts numbers by writing them vertically in the following two cases: - without regrouping. - with regrouping.
- ❖ Uses the place value in standard algorithm of addition





and subtraction.

- ❖ Solves addition and subtraction problems in different situations presented through pictures and stories.
- ❖ Frames problems for addition and subtraction facts.
- ❖ Estimates the sum of, and difference between, two given numbers

### **MULTIPLICATION**

- ❖ Explains the meaning of multiplication (as repeated addition).
- ❖ Identifies the sign of multiplication.
- ❖ Constructs the multiplication tables of 2, 3, 4, 5 and 10
- ❖ Uses multiplication facts in situations.
- ❖ Multiplies two digit numbers using standard algorithm and Lattice multiplication algorithm.

### **DIVISION**

- ❖ Explains the meaning of division from context of equal grouping and sharing.
- ❖ Relates division with multiplication.
- ❖ Completes division facts: - by grouping - by using multiplication tables

### **MENTAL ARITHMETIC**

- ❖ Adds and subtracts single digit numbers and two digit numbers mentally.
- ❖ Doubles two digit numbers mentally (result not exceeding two digits).

### **Money**

- ❖ Converts Rupee. to Paise using play money.
- ❖ Adds and subtracts amounts using column addition, and subtraction without regrouping.
- ❖ Makes rate charts and bills.

### **MEASUREMENT**



## **LENGTH**

- ❖ Appreciates the need for a standard unit.
- ❖ Measures length using appropriate
- ❖ Standard units of length by choosing between centimetres and metres.
- ❖ Estimates the length of given object in standard units and verifies by measuring.
- ❖ Uses a ruler
- ❖ Relates centimetre, and metre.

## **WEIGHT**

- ❖ Weighs objects using non standard Units.
- ❖ Appreciates the conservation of weight.

## **VOLUME**

- ❖ Measures and compares the capacity of different containers in terms of non-standard units.
- ❖ Appreciates the conservation of volume.

## **TIME**

- ❖ Reads a calendar to find a particular day and date.
- ❖ Reads the time correct to the hour.
- ❖ Sequences the events chronologically.

## **Data Handling**

- ❖ Records data using tally marks.
- ❖ Collects data and represents in terms of pictograph choosing appropriate scale and unit for display through pictographs.
- ❖ Draws conclusions from the data by discussing with the teacher.

## **Patterns**

- ❖ Identifies simple symmetrical shapes and patterns.
  - ❖ Makes patterns and designs from straight lines and
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other geometrical shapes.

- ❖ Identifies patterns in the numerals for odd and even numbers and in adding odd and even numbers.
  - ❖ Partitions a number in different ways.
  - ❖ Identifies patterns in his surroundings
  - ❖ Identifies patterns in multiplication with, and dividing by 10s.
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## Mathematics → Class IV

Mathematics is about a certain way of thinking and reasoning.

### GEOMETRY

#### SHAPES & SPATIAL UNDERSTANDING

- ❖ Draws a circle free hand and with compass.
- ❖ Identifies centre, radius and diameter of a circle.
- ❖ Uses Tangrams to create different shapes.
- ❖ Tiles geometrical shapes: using one or two shapes.
- ❖ Chooses a tile among a given number of tiles that can tile a given region both intuitively and experimentally.
- ❖ Explores intuitively the area and perimeter of simple shapes.
- ❖ Makes 4-faced, 5-faced and 6 faced cubes from given nets especially designed for the same.
- ❖ Explores intuitively the reflections through inkblots, paper cutting and paper folding.
- ❖ Reads and draws 3-D objects, making use of the familiarity with the conventions used in this.
- ❖ Draws intuitively the plan, elevation and side view of simple objects.

### NUMBERS

#### NUMBERS AND OPERATIONS

- ❖ Writes multiplication facts.
- ❖ Writes tables upto  $10 \times 10$ .
- ❖ Multiplies two and three digit numbers using lattice algorithm and the standard (column) algorithm.
- ❖ Divides a given number by another number in various ways such as: - by drawing dots. - by grouping. - by using multiplication facts. - by repeated subtraction.
- ❖ Applies the four operations to life situations.



- ❖ Frames word problems.
- ❖ Estimates sums, differences and products of given numbers

### MENTAL ARITHMETIC

- ❖ Adds and subtracts multiples of 10 and 100, mentally.
- ❖ Completes multiplication facts by adding partial products, mentally (e.g.  $7 \times 6 = 5 \times 6 + 2 \times 6$ ).

### FRACTIONAL NUMBERS

- ❖ Identifies half, one fourth and three- fourths of a whole.
- ❖ Identifies the symbols- $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{3}{4}$
- ❖ Explains the meaning of  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{3}{4}$ .
- ❖ Appreciates equivalence of various fractions

### MONEY

- ❖ Converts Rupees to Paise.
- ❖ Adds and subtracts amounts using column addition and subtraction with regrouping.
- ❖ Uses operations to find totals, change, multiple costs and unit cost.
- ❖ Estimates roughly the totals and total cost.

### MEASUREMENT

#### LENGTH

- ❖ Relates metre with centimetre;
- ❖ Converts metre into centimetres and vice versa.
- ❖ Solves problems involving length and distances.
- ❖ Estimates length of an object and distance between two given locations.

#### WEIGHT

- ❖ Weighs objects using a balance and standard units.
- ❖ Determines sums and differences of weights.
- ❖ Estimates the weight of an object and verifies using a balance.



## VOLUME

- ❖ Measures volumes of given liquid using containers marked with standard units.
- ❖ Determines sums and differences of volumes.
- ❖ Estimates the volume of a liquid contained in a vessel and verifies by measuring.

## TIME

- ❖ Computes the number of weeks in a year.
- ❖ Correlates the number of days in a year with the number of days in each month.
- ❖ Justifies the reason for the need of a leap year.
- ❖ Reads clock time to the nearest hours and minutes.
- ❖ Expresses time, using the terms, 'a.m.' and 'p.m.'
- ❖ Estimates the duration of familiar events.
- ❖ Finds approximate time elapsed
- ❖ by (to the nearest hour) forward counting. • Computes the number of days between two dates.

## Data Handling

- ❖ Collects data and represents in the form of bar graphs;
- ❖ Draws Inferences by discussing with the teacher.

## Patterns

- ❖ Identifies patterns in multiplication and division: multiples of 9,
- ❖ Casts out nines from a given number to check if it is a multiple of nine.
- ❖ Multiplies and divides by 10s, 100s.
- ❖ Identifies geometrical patterns based on symmetry.



## Mathematics → Classes V

Mathematics is about a certain way of thinking and reasoning.

### GEOMETRY

#### SHAPES & SPATIAL UNDERSTANDING

Gets the feel of perspective while drawing a 3-D object in 2-D.

- ❖ Gets the feel of an angle through observation and paper folding.
- ❖ Identifies right angles in the environment.
- ❖ Classifies angles into right, acute and obtuse angles.
- ❖ Represents right angle, acute angle and obtuse angle by drawing and tracing.
- ❖ Explores intuitively rotations and reflections of familiar 2-D shapes.
- ❖ Explores intuitively symmetry in familiar 3-D shapes.
- ❖ Makes the shapes of cubes, cylinders and cones using nets especially designed for this purpose.

#### NUMBERS AND OPERATIONS

- ❖ Finds place value in numbers beyond 1000.
- ❖ Appreciates the role of place value in addition, subtraction and multiplication algorithms.
- ❖ Uses informal and standard division algorithms.
- ❖ Explains the meaning of factors and multiples.

#### MENTAL ARITHMETIC

Estimates sums, differences, products and quotients and verifies using approximation.

#### FRACTIONAL NUMBERS

- ❖ Finds the fractional part of a collection.
- ❖ Compares fractions.
- ❖ Identifies equivalent fractions.



- ❖ Estimates the degree of closeness of a fraction to known fractions
- ❖ Uses decimal fractions in the context of units of length and money.
- ❖ Expresses a given fraction in decimal notation and vice versa

### **MONEY**

- ❖ Applies the four operations in solving problems involving money.

### **MEASUREMENT**

#### **LENGTH**

- ❖ Determines area and perimeter of simple geometrical figures.
- ❖ Applies the four operations in solving problems involving length, weight and volume.
- ❖ Relates commonly used larger and smaller units of length, weight and volume and converts one to the other.
- ❖ Applies simple fractions to quantities.
- ❖ Converts fractional larger unit into complete smaller units.
- ❖ Appreciates volume of a solid body: intuitively and also by informal measurement.
- ❖ Uses addition and subtraction in finding time intervals in simple cases.

#### **DATA HANDLING**

- ❖ Collects two-dimensional quantitative data. represents the data in the form of a table.
- ❖ Draws a bar graph or a pictograph to present a data.

#### **PATTERNS**

- ❖ Identifies patterns in square numbers, triangular numbers.
- ❖ Relates sequences of odd numbers between consecutive square numbers.





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- ❖ Makes border strip and tiling patterns