(iv) Mathematics

Class – I

Topic	Content	Expected Learning Outcomes	Mode of Transaction
I. Shapes and Figures	• Introduction to spatial orientation • Introduction to shapes in real objects and its attributes • Introduction to elementary shapes • Sorting object groups into shapes	• To build a sense of spatial orientation. • To understand spatial relationship. • Understand the meaning of and use appropriate spatial vocabulary • Ex. Top, Bottom, On, Under, Inside, Outside, Above, Below, Near, Far, Before, After • To correlate concrete things to their shapes • To Learn vocabulary related to nature of shapes • Ex. Shapes, flat, round, corner, edge, surface, plain, long & short. • To know elementary names of shapes like square, circle, oval, rectangle, triangle • To observe and describe objects from the surroundings having different sizes and shapes like pebbles, boxes, balls, pipes, bottle caps, pencil, eraser. • To collect objects from the surrounding sort and classify on the basis of shapes, and other observable properties.	• Observing things • Sorting objects • Telling stories • Simulation exercises • Drawing activities • Tracing activities • Colouring • Sensory activities
II. Numbers	• Numbers from 1 to 9 • Concept of “Zero” • Numbers from 10 to 20 • Addition (of single digit numbers	• To count the number of objects in a collection. In two similar collection of objects • To match object through one to one correspondence • To recognize and speaks	• Singing songs • Counting, grouping, taking away • Comparing • writing • Drawing

Topic	Content	Expected Learning Outcomes	Mode of Transaction
	whose sum is less than 20) • Subtraction of numbers without conversion • Numbers from 20 to 99 • Place value as “Tens” and “Ones”	numbers from 1 to 9. • To make the group of objects according to a given number. • To use numbers from 1 to 9 in counting and comparison. • To understand the concept of “nothing” give the symbol zero to represent it. • To read and write numerals from 1 to 9. • To learn addition using real objects up to a sum of 18 • To use the symbol ‘+’ to represent addition. • To learn vocabularies like total, together, altogether etc., to denote addition. • To understand subtraction as “taking away” using real objects. • To understand subtracting as canceling using pictures. • To use vocabularies like difference, take away, less etc., to denote subtraction. • To approach zero through the subtraction pattern (such as 5 – 1 = 4, 5– 2 = 3, 5 – 5 = 0). • To approach zero through real life situation (such as there are 5 chocolates all of them were eaten up, how many remaining?). • To learn sense of numbers up to 20. • To read and write numbers from 10 to 20. • To make the group of objects according to a given number. • To group objects into a	• Playing games • Relating to life situation • Visualizing

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		group of 'tens' and 'ones' • To learn intuitively build a notion of place value. • To count the number of tens and ones in a given number. • To represent numbers tens and ones through pictures. • To learn numbers by rote from 21 to 99. • To read and writes numerals for Twenty-one to Ninety nine. • To read numbers represented as groups of tens and ones 21 to 99. • To identify the predecessor and successor up to 99. • To identify numbers" in between" Ex: 24, _ _ , 26. • To skip count by twos forward to backward up to Ninety-nine. • To skip count by threes forward to backward up to Ninety-nine. • To add two single digit numbers up to sum of 10 mentally.	
III. Measurements	• Introduction to Length, Mass, Volume • Comparison of Objects Using Length, Mass, Volume through Non Standard Units • Time • Earlier Later, Shorter, Longer	• To build notion of length, mass, and volume. • To build intuitive notion of comparisons of lengths/masses/sizes of different objects. • To describe lengths using terms like near, far, thin, thick, longer/taller, shorter, high, and low. : similarly terms like lighter and heavier • To measure lengths of object that use in non-standard units. • To establish an intuitive	• Observing • Comparing • Visualizing • Conversation activity • Guessing activity • Play way activity • Sequencing activity

Topic	Content	Expected Learning Outcomes	Mode of Transaction
	• Money	need for standardization. • To distinguish between events occurring in time using terms -earlier and later. • To get the qualitative feel for long & short duration, of school days v/s holidays. • To narrate the sequence of events in a day. • To Able to identify common currency notes and coins. (up to rupees 20)	
IV. Patterns	• Patterns in Shapes • Patterns in Numbers	• To identify the patterns in shapes • To make pattern through shapes. • To identify the patterns in numbers. (using elementary examples)	• Observing • Drawing • Following the number sequence • Colouring
V. Study of Data	• Handling – Simple Data (shapes and numbers) • Organizing simple data (shape and numbers)	• To collect, represent and interpret simple data such as Mode of transport to School, Favorite TV program, Numbers of brothers and sisters etc.,	• Observing • Counting • Tabulating • Surveying

Class - II

Topic	Content	Expected Learning Outcomes	Mode of Transaction
I. Shapes and Figures	Identifying the Dimension of shapes in everyday object • Introduction to spatial orientation	**2-D and 3-D Shapes** • To identify 2-D shapes viz., rectangle, square, triangle, circle by their names. • To describe intuitively the properties of these 2-D	• Day – to day life situation examples. • Review exercises. • Practical examples.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
	• Introduction to shapes of objects in real life and its attributes • Introduction to elementary shapes • Sorting object groups into shapes.	shapes. • To describe qualitatively the properties of these 2-D shapes. • To observe objects in the environment and gets an intuitive feel for their geometrical attributes. • To sort similar shapes of different sizes. • To draw straight line shapes by paper folding and other such simple aids. • To make patterns and shapes with straight and curved lines. • To learn names such as cuboid, cylinder, cone, sphere and recognize objects. • To draw the 2-D outlines of 3-D objects. • To describe intuitively the properties of these 2-D shapes. • To recognize objects by observing their outlines.	• Practical examples.
II. Numbers	• Writing numbers up to 99 • Place value and comparing the numbers • Addition & Subtractions up to 99 • Multiplication	• To read and write numerals for numbers up to ninety-nine. • To count and regroup objects into tens and ones. • To understand place values. • To apply the concept of place value to compare numbers. • To arrange numbers up to hundred in ascending and descending order. • To introduce odd and even numbers.	• Using self learning kit. • Review exercise. • Using self learning kit and real life situations. • Using repeated additive property with life oriented situations.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		• To skip count numbers backwards and forwards in twos, threes and fives. • To be able to form the greatest and the smallest two digit numbers with and without repetition of given digits. • To learn ordinal and cardinal numbers. • To learn addition and subtraction • To add and subtract two digit numbers beginning from concrete representations to abstract • To add and subtract numbers by drawing representations of tens and ones without and with regrouping. • To add zero to a number and subtract zero from a number. • To understand properties of addition through patterns. • To be able to write stories to describe situations that correspond to the given addition and subtraction facts. • To estimate and check the reasonableness of answers to addition and subtraction problems. **Multiplication** • To learn the concept of multiplication as repeated addition. • To learn examples involving repeated addition. • To learn activities of making equal groups in concrete and abstract contexts.	

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		Mental Arithmetic • To add and subtract single digit numbers mentally. • To add and subtract multiples of ten mentally.	
III. Measurements	• Weight , Volume (capacity) • Length (using Standard units) • Time (days, months, years) • Money(up to Rs.100)	**Measures** • To measure lengths of objects in the environment using non-standard units (like hand span); short distances in their environment using foot, rope, etc. • To get an intuitive feel for weights of objects by feeling them. • To sort objects from lightest to heaviest by feeling. • To understand the need for standard units and a simple balance. • To compare weights of given objects using simple balance. • To compare and sequences containers in terms of capacity by pouring things like water, sand, etc. • To do elementary activities in measurements using their water bottles, tumblers, bowls, etc. and compare volumes. • To get familiar with the days of the week and months of the year. • To get an idea of different annual calendars based on culture. • To get a feel for sequence of seasons that are context specific. • To sequence the events of their school day, school week, school year.	• Real life situations. • Real life situations. • Application of practical knowledge. • Story problems in real life situations.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		• To identify currency - notes and coins up to Rs. 100. • To put together amounts of money up to Rs. 50 in only whole number of rupees. • To add and subtract small amounts of money mentally, with no paise involved. • To transact an amount using 3-4 notes.	
IV. Patterns	• Patterns in shapes • Patterns in numbers • Block patterns	• To observe, draw, and extend patterns in sequence of shapes and numbers. • To explore patterns in different ways of splitting a number. • To create block patterns by using motifs from common objects and to create patterns of regular shapes.	• Review activities. • Review exercise. • Project.
V. Study of Data	• Simple data (Shapes and numbers) • Organizing simple data (Shapes and numbers)	• To collect simple data (like foot wear sizes) through survey and measurement. • To represent the data using appropriate pictorial form • To interpret pictures and draw inferences from the data at the appropriate level.	• Classroom activities. • Life oriented situations.

Class - III

Topic	Content	Expected Learning Outcomes	Mode of Transaction
I. Shapes and Figures	• Creating 2 – D shapes • Tangram • Introduction to map • Drawing 3 – D objects	• To make shapes involving straight and curved lines through paper folding, paper cutting, stencils, etc. • To identify and groups together similar 2-D shapes. • To learn terms like sides, corners and diagonals. • To describe various 2-D shapes using their attributes. • To make shapes on the dot-grid using straight lines and curves. • To solve tangram puzzles and to create shapes using other such pieces. • To fill a given region using patterns of a tile of a given shape. • To distinguish between shapes that can be tessellated and that cannot be. • To get an understanding of a map; able to read and draw simple maps of their classroom, school, Chennai, etc (not necessarily scaled) just to understand spatial relationships. • To be able to draw 3-D objects.	• Through paper folding. • Through Activity & puzzles. • Through simple maps of village. • Project.
II. Numbers	• Numbers sequence up to 1000 • Addition and Subtraction with in 1000 • Multiplication tables (2,3,4,5 and 10)	• To read and write 3-digit numbers. • To understand place values up to a thousand. • To be able to identify examples that require order of magnitude of tens, hundreds and thousands.	• Use beads, spike abacus, pictures, & real objects. • Teach numbers. through activity. • Through exercise.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
	• Multiplication of 2-digit number by a single digit number • Introduction to division by grouping and sharing	• To identify odd and even with respect to ones place upto three digit numbers. • To be able to skip counts in different ways starting from any number. • To be able to sort an array of arbitrary numbers not necessarily in sequence into ascending and descending order . • To be able to forms greatest and smallest numbers using given digits. **Addition and Subtraction** • Able to add and subtract (3 digit) numbers by writing them vertically in the following two cases: (Sum should not exceed 1000) - Without Regrouping. - With regrouping. • Able to use the place value in standard algorithm of addition and subtraction. • Able to solve addition and subtraction problems in different situations presented through pictures and stories. • To write stories for addition and subtraction facts. • To estimate the sum and difference of two given two digit numbers less than 50.	• Project. • Using 'I'-learning mathematical kit teach Addition, subtraction, multiplication and division through activity. • Using real objects to construct the multiplication tables 2, 3,4, 5 & 10. • Learning Division through activity using real objects • Through Exercise. • Through project.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		Multiplication • To understand the concept of multiplication as repeated addition by working many patterns. • Able to understand and use the sign of multiplication. • Able to construct the multiplication tables of 2, 3, 4, 5 and 10 • To use multiplication table in situations. • To understand graded sequence of multiplication beginning from multiplication of: single digit by single digit, two digit numbers by single digit using standard algorithm. **Division** • To understand the concept of division from the context of equal grouping and sharing. • To understand division as repeated subtraction • Able to relate division with inverse of multiplication. • Able to solve simple division problems involving multiplication and division - by grouping - by using multiplication tables.	

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		Mental Arithmetic • Able to add and subtract single digit numbers and two digit numbers up to a sum of 50 mentally. • Able to double two digit numbers mentally (result not exceeding two digits).	
III. Measurements	• Length (using standard units - cm., m.,) • Weight (using non-standard) • Volume (capacity) -(using non-standard) • Time (calendar, hours, min, AM, PM) • Money (addition, subtraction)	**Length** • Able to appreciate the need for a standard unit. • To measure length of objects in their environment using simple aids. • To express appropriate standard units of length by choosing between centimeters and meters. • To understand order of magnitude between cm. , m., and km. as units. • To estimate the length of given object in standard units and verifies by measuring. • To use a ruler. • Able to understand numerical relationship between centimeter and meter. **Weight** • Able to weigh objects using non-standard Units. • To understand the concept of conservation of weight that applies in a simple balance. **Volume**	• Through activity based learning using non – standard and standard units measure) the length, weight and volume of real objects. • Using the original clock to read the time through exercise. • Using pictures of Indian Money.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
		• Able to measure and compare the capacity of different containers in terms of non-standard units. **Time** • To read the time from a digital and analogue clock correct to the hour. • To read a calendar to find a particular day and date. • To sequence simple events in their lives chronologically. **Money** • To understand the relationship between rupee and paise • To add and subtract amounts involving rupees and paise amounts of multiples of 10 without carry over. • To make rate charts and bills.	
IV. Fractional Numbers	• Introduction of fraction	• To identify half, one fourth and three fourths of a whole. • To identify the symbols 1/2, 1/4, 3/4. • Able to explain the meanings of 1/2, 1/4 and 3/4 through illustrations or grouping objects. • Able to understand equivalence of 2/4 and ½ and of 2/2, 3/3, 4/4 and 1.	• Through paper folding. • Through activity by using pictures and real objects. • Through Exercise.

Topic	Content	Expected Learning Outcomes	Mode of Transaction
V. Patterns	• Pattern in geometrical shapes • Pattern in numbers	• To recognize simple symmetries in shapes and patterns. • To create patterns and designs from straight lines and other geometrical shapes. • Able to identify patterns in the numerals for odd and even numbers and in adding odd and even numbers. • Able to identify patterns in multiplication with, and dividing by 10s.	• Through observation of real objects. • Through Activity using geometrical shapes and figures. • Project.
VI. Study of Data	• Tally marks for simple data • Pictographs for simple data	• To undertake simple surveys and gathers data • To record data using tally marks. • To collect data and represent it in terms of pictograph choosing appropriate scale and unit for display through pictographs. • To interpret and draw inferences from the data.	• Through Activity, Through Exercise and project work.

Class - IV

Topic	Content	Expected Learning Outcomes	Mode of Transaction
I. Shapes and Figures	• Circle • Introduction to perimeter and Area • Reflection and Symmetry	• To learn names of shapes like triangle, square, rectangle, pentagon, circle etc., • To recognize these shapes in the objects	• Observing the pictures. • Colouring the shapes. • Using match sticks to form

		around them. • Able to draw circles using objects like bangles , tin caps etc., • Able to draw a circle free hand and with compass. • To learn terms like centre, radius and diameter of a circle. • Uses Tangram to create different shapes. • Able to fill space using tiles of geometrical shapes chooses a tile among a given number of tiles that can tile a given region both intuitively and experimentally. • To learn the concept of perimeter and area. • Able to explore intuitively the area and perimeter of simple shapes using graph paper and measuring. • To learn the concept of reflection and symmetry in simple shapes. • Able to explore qualitatively reflections through mirror, inkblots, paper folding etc., • To visualize and draw 3-D objects.	shapes. • Joining the dots. • Drawing circle using string and compass. • Paper folding activity to find centre and radius. • Group activity to arrange tangram. • Paper folding activity to learn about symmetry. • Drawing the pictures. • Visualizing the picture cards. • Picture cards and square papers to find area and perimeter. • Solving puzzles on area.
II. Numbers	• Number Sequence up to 10000 • Comparing numbers • Addition and subtraction within 10,000 • Multiplication (up to 2 digit number by 2 digit number and 3	• To read and write 4 – digit numbers (including odd and even numbers) • To write numbers with respect to place value expansion. • Able to sequence an arbitrary array of numbers in ascending and descending order. • Able to form greatest	• Knowing place value using abacus. • Comparison of numbers by group activity. • Solving Riddle. • Brainstorming for introduction of addition. • Word problems are solved by

	digit number by single digit number) • Division: up to 4 digit number by single digit number.	and smallest numbers using given digits • Adds and subtracts up to four digit numbers by writing them vertically in the following two cases: without grouping, with grouping(sum should not exceed 10,000). • Able to do elementary multiplication of 2-digit by 2-digit and 3- digit by single digit numbers. • Able to write tables up to 10 × 10. • To divide a given number by another number in various ways. • To apply the four operations to life situations. • To frame word problems. • To estimate sums, differences and products of simple two digit numbers to nearest tens or hundreds. **Mental Arithmetic** • Able to add and subtract multiple of 10 and 100, mentally.	using life situation pictures • Using number cards to find addition and subtraction • Framing problems for the given pictures. • Framing tables using pictures. • Day – to - day life situation examples learning through multiplication division.
III. Measurements	• Length (m., cm., addition, subtraction, conversion and estimation of distance) • Weight (Using standard units Kg., gm., addition subtraction) • Volume (Using	• To understand relationship between metre and centimetre; • Able to Convert metre into centimetres and vice versa. • To solve problems involving length and distances. • Able to estimate length of an objects in their surrounding up to 1 meter and distance between two given	• Introduction of measurements by conversation technique. • Using real objects to find measurements. • Activities involving hands on experiences. • Lab activity to enhance the measurements. • Using

	standard units Lt., mlt., addition subtraction) • Time (calendar, clock) • Money – conversion of rupees to paise, addition, subtraction and multiplication.	locations in their environment up to 100 meters. • To learn to weigh objects using a balance and standard units. • Able to estimate the weight of an object and verifies using a balance. • Able to measure volumes of given liquid using containers marked with standard units. • Able to estimate the volume of a liquid contained in a vessel and verifies by measuring. • Able to compute the number of weeks in a year. • Able to correlate the number of days in a year with the number of days in each month. • To read clock time to the nearest hours and minutes. • Able to express time, using the terms, ‘a.m.’ and ‘p.m.’ • Able to estimate the duration of familiar events. • Able to compute the number of days between two given dates. • Able to convert rupees to paise. • To add and subtract simple amounts of money in denominations of rupees and paise which are multiples of ten using column addition and subtraction with regrouping.	brainstorming strategy purchase of materials for particular amount given. • Using picture cards. • Activities are involving scientific facts. • To identify the measure for consumerable product – the project is given. • Estimating capacity through Lab activity. • Lab activity is given as individual activity o regulate daily habits. • picture cards are used to identify a.m.and p.m. • By reading calendar learning the relation between days and weeks, days and year • play way method is used to write the denominations for the given amount. • For addition and subtraction problems are solved.

		• To learn to use operations to find totals, change, multiple costs and unit cost. • Able to estimate roughly the totals	
IV. Fractional Numbers	• Compare fractions • Equivalent fraction • Addition and subtraction of like fraction.	• Able to find the fractional part of a whole • Able to find the fractional part of a collection. • To compare fractions and identifies greater and smaller • Able to identify equivalent fractions • Able to do addition and subtraction of like fractions with same denominators up to 9	• Using picture cards to learn the concept of fraction. • Colouring activity to learn fractions. • Lab activity is framed for equivalent fractions. • Addition and Subtraction of fractions are explaining through life situations.
V. Patterns	• Pattern in numbers (multiplication and division) • Pattern in geometry (symmetry)	• Able to identify patterns in multiplication and division: • Able to identify patterns in multiples of 9. • To cast out nines from a given number to check if it is a multiple of nine. • Able to identify patterns in multiplication and division by 10s, 100s. • Able to identify symmetry in geometrical patterns.	• Observation of picture cards. • Completion of patterns. • Using puzzles. • Fun with numbers. • Special activities are framed for the number '9'. • Play way method for number patterns. • Brainstorming strategy for number patterns.
VI. Study of Data	• Pictograph	• To learn to do survey and collect simple data. • To represent data in the form of pictures like pictograms, etc,. • To read and interpret pictures and draws	• Data collection through project method. • Representation of data through pictograph and circle chart.

		Inferences.	• Survey method is used to learn data.

Class - V

Topic	Content	Expected Learning Outcomes	Mode of Transaction
I. Shapes and Figures	• Drawing 3–D shapes from 2–D Shapes • Types of angle	• To get the perspective while observing drawings of 3-D objects in 2-D. • Able to explore intuitively rotations and reflections of familiar 2-D shapes. • Able to explore intuitively symmetry in familiar 3-D shapes. • Able to make the shapes of cubes, cylinders and cones using nets especially designed for this purpose. • To get the feel of an angle through observation of objects in their environment and paper folding. • To learn the names of angles like acute, obtuse and right angle. • Able to identify right angles in the environment. • Able to classify angles into right, acute and obtuse angles. • To represent right angle, acute angle and obtuse angle by drawing through tracing.	• Simple way of drawing 3D from 2D(cube & cuboids). • Drawing perfective view of 3D from 2D (cuboids). • Forming different types of nets through thick sheets of paper specially deigned for the purpose. • Paper folding activity rotation, lines of symmetry. • Drawing line of symmetry. • Rotation of 2D shapes for understanding rotation. • Drawing 2D shapes through reflection. • Tracing the path activity . • Making angle tester and test it to measure angles. • Group activity for making difference shapes using clocks alphabets posture and life

			situation.
II. Numbers	• Numbers up to 10,00,000 • Place value and comparing numbers • Four operations • Factors and multiples. • Mental Arithmetic	• To know numbers up to 1,00,00,000 • To determine place value in numbers up to 1,00,00,000. • Able to sequence an arbitrary array of numbers up to five digits in ascending and descending orders. • To form greatest and smallest numbers using five digits. • To understand the role of place value in addition, subtraction and multiplication algorithms. • To learn to use standard division algorithm. • To understand the meaning of factors and multiples. • Able to estimate sums, differences, products and quotients up to two digits numbers and verifies using approximation.	• Completing number sequence through patterns up to 1crore. • Using abacus to understand place value up to 1 crore . • Comparison of numbers by observing the numbers of digits and using place value activity. • Importance of place value in addition, subtraction multiplication and division. • Using self learning materials for division. • Activity for using estimation in day to day life.
III. Measurements	• Conversion of units (mm., cm, m., km., mg., g., kg., ml., lt.,,) • Four fundamental operation on length, weight and capacity • Time (addition, subtraction) Money: four fundamental	• Able to solve word problems involving length, weight and volume. • Able to relate commonly used larger and smaller units of length, weight and capacity and converts one to the other. • To understand the volume of a solid body: qualitatively and also by informal	• Importance of standard units and conversion of units day to day life activity. • Procedure of to do sums on four operations. • Statement sums from day to day life on four fundamental operations.

	operations.	measurement. • To learn to use addition and subtraction in finding time intervals in simple cases. • To apply four operations in solving problems involving money.	
IV. Fractional Numbers	• Types of fractions • Comparing of fraction. • Addition and subtraction of unlike fraction. • Introduction of decimals.	• Revision of definition of fraction as part of the whole and part of a collection. • To learn terminologies like numerator and denominator. type of fractions : Proper , Improper, mixed , like, unlike, equivalent • Able to compare like fractions with denominators up to 20. • Able to do addition and subtraction of like fraction with denominator up to 20. • Able to do multiplication of fractions by single digit numbers and other fractions.	• Introducing fractions, addition ,subtraction, of fractions from life situations. • Using number line life situations paper folding and drawing for different types of fractions. • Drawing paper folding and patterns in drawing for addition, subtraction, multiplication.
V. Patterns	• Pattern in square numbers. • Pattern in tiles	• Able to identify patterns in square numbers. • Able to make border strip and tiling patterns.	• Using multiplication table adding odd numbers and patterns to introduce square numbers. • Observing tile patterns and border strips from the surroundings.

			• Project work for making tile patterns and border strips.
VI. Study of Data	• Table the data. • Pictograph.	• To collect two-dimensional quantitative data and to represent the data in the form of a table. • To draw a pictograph to represent a data.	• Introducing collection of data and from life situations. • Project work for collecting data and representing it in the of table and pictograph.