

Sl No	Varga	Unit No	Theme	Chapter No	Chapter	Learning Outcomes
1	AK1	1	Arithmetic	1.1	Number System	Natural Numbers 1 to 99, Tens and Ones, Compare, Sort, Order, Ordinal numbers 1 to 10
				1.2	Addition	Simple addition by counting, One digit addition upto 99
				1.3	Subtraction	Simple subtraction by counting, One digit subtraction - larger number is 99, Relate counting, addition and subtraction with each other
		2	Geometry	2.1	Shapes	Observe, Identify, Classify, Build, Draw 2 D shapes
				3.1	Mensuration	Differentiate words used to describe measurement - long/short, thick/thin, far/near, big/small, tall/short, heavy/light, more/less
		3.2	Observe, Compare, Sort, Order length, weight, volume/capacity - measure length using body parts			
		3.3	Differentiate words used to describe position - inside/outside, on/under, near/far, above/below, Top/bottom etc			
4	Patterns	4.1	Patterns	Patterns and symmetry with shapes, Patterns in real life		
		4.2		Patterns with numbers, musical notes		
5	Time	4.3	Time	Patterns with art and architecture in real life		
		5.1		Tell time using hours and half hours (sapada, sandha, padana etc)		
6	Commercial Application	6.1	Money	Understand barter system and need for currency		
7	Bharitya Ganitam	7.1	Importance	Mangalaloka, Importance, Historical facts		
		7.2	Bhutasankhya	One name for numbers 1 to 10 in Bhutasankhya		
2	AK2	1	Arithmetic	1.1	Number System	Natural Numbers 1 to 999, Hundreds, Tens and Ones, Compare, Sort, Order, Ordinal numbers 1 to 20, skip counting
				1.2	Addition	Simple addition by counting, addition upto 999 using place values, krama, ukrama addition
				1.3	Subtraction	Simple subtraction by counting, subtraction upto 999 using place values - larger number is 999, krama, ukrama subtraction
		2	Geometry	2.1	Shapes	Relate counting, addition and subtraction with each other
				2.2		Observe, Identify, Classify, Build, Draw 2D shapes
		3	Mensuration	2.3	Capacity	Observe, Identify, Classify 3D shapes
				3.1		Shadows of 3D objects, Symmetry, Slack, Rotation, Reflection, Transformation
				3.2		Formal units of Weight/volume - litres, kg, g
		4	Patterns	3.3	Length	Formal units - cm, inch, foot etc
				4.1		Application of length with comparison, addition and subtraction
				4.2		Patterns and symmetry with shapes - 2D, 3D
				4.3		Patterns with numbers - arithmetic sequences (skip counting), Permutations of numbers with 3 digits,
		5	Time	4.4	Time	Magic Triangles
5.1	Patterns with art and architecture in real life - kolam/rangoli, dots, flowers, ropes etc					
6	Commercial Application	5.2	Money	Tell time using hours and half hours (sapada, sandha, padana etc)		
		6.1		Timekeeping with body parts		
7	Bharitya Ganitam	7.1	History	Exchange of money, Sharda pratihanda,		
		7.2		Application of addition, subtraction with currency		
		7.3		Mangalaloka, Importance, Historical facts		
3	P A D A M 1	1	Arithmetic	7.2	Bhutasankhya	One name for numbers 1 to 49 in Bhutasankhya (not all numbers but what is available and explainable)
				7.3	Katapayadi	Vamamala to Katapayadi numbers mapping
				1.1	Number System	Natural Numbers 1 to 9999, Thousands, Hundreds, Tens and Ones, Compare, Sort, Order, Ordinal numbers & Roman Numerals
				1.2	Addition	Discussion on zero, Whole numbers
				1.3	Subtraction	Place value addition - Krama, Ukrama, with/without carryover
				1.4	Multiplication	Place value subtraction - Krama, Ukrama, with/without borrowing
		2	Geometry	1.5	Division	Relationship between addition and subtraction
				1.6		Relationship between multiplication and Division
				2.1		Group counting, Times Tables of 2, 3, 4, 5, 10, Utsarana vidhi 4 digit with 1 digit multiplication
		3	Mensuration	2.1	Geometry	Observe Properties of multiplication
				2.1		Multi-step Real life problems using concepts of addition, subtraction, multiplication
				2.1		(Money, length, Number problems)
				2.1		Introduction to Division as sharing, as repeated subtraction, as inverse of times tables
4	Patterns	2.1	Geometry	Relationship between multiplication and Division		
		2.1		Introduction to Fractions 1/2, 1/3, 1/4 - Fractions as sharing		
		2.1		Reason with shapes and their attributes. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides)		
		2.1		Relate square, rectangle to faces of cube, cuboid, circle as 2D of sphere, 2D > 3D for cube, cuboid		
5	Time	2.1	Geometry	Concept of covering the space inside a shape using tiles, tangram, chitla etc		
		2.1		Maps - Tracing paths, Visualizing a path or route		
		2.1		Measure volume, weight - litres, kg, g		
		2.1		Operations like add/subtract on weight and volume		
6	Commercial Application	2.1	Geometry	Measure length in cm, km, meter etc		
		2.1		Operations like add/subtract on length (same units, no conversions)		
		2.1		Transform shapes Using graph paper (straight lines, lengths in graph units)		
		2.1		Reflection, Rotation, Symmetry of shapes (Matching only)		
7	Bharitya Ganitam	2.1	Geometry	Draw square/rectangle on graph papers with double or half side of a square/rectangle		
		2.1		Patterns and symmetry with shapes - 2D, 3D		
		2.1		Patterns with numbers - arithmetic sequences (skip counting), Permutations of numbers with 4 digits,		
		2.1		Magic Squares, 3x3 - Bharitya Ganitam - properties and puzzles		
7	Bharitya Ganitam	2.1	Geometry	Patterns with art and architecture in real life - kolam/rangoli, dots, flowers, ropes etc		
		2.1		Understand time based on natural events		
		2.1		Problems on real life application of time - add/subtract operations		
7	Bharitya Ganitam	2.1	Geometry	Real life Money problems in the chapters of addition, subtraction, multiplication		
		2.1		History		
		2.1		Mangalaloka, Importance, Historical facts		
7	Bharitya Ganitam	2.1	Geometry	Using the single Bhutasankhya names for numbers 1 to 49 + rules of Ankanam vamato gath, write multi-digit numbers in bhutasankhya		
		2.1		Vamamala to Katapayadi numbers mapping + rules of Ankanam vamato gath, write multi-digit numbers in Katapayadi		
		2.1				
7	Bharitya Ganitam	2.1	Geometry			
		2.1				
		2.1				

4	P A R D H A M 2	1	Arithmetic	1.4	Multiplication	Group counting, Times Tables upto 10, Utsarana vidhi, Sihana gunanam, Place value multiplication Observe Properties of multiplication Multi-step Real life problems using concepts of addition, subtraction, multiplication (Money, length, Number problems)		
				1.5	Division	Introduction to Division algorithms Relationship between multiplication and Division Divisibility Tests for 2, 3, 4, 5, 8, 9, 10, 11 Even/odd and prime /composite numbers Discussion about operations with zero and concept of infinity		
				1.6	Fractions	Fractions as $\frac{a}{b}$ (where $a < b$) - comparison of fractions with same denominator Representation on number line		
				1.7	Decimals	When denominator is a power of 10, fraction can be represented as a decimal.		
		2	Geometry	2.1	Geometry	Akshetram		
				2.2		Construct circles, Nets of Shapes like tetrahedron, pyramid, prism		
				2.3		Observe Symmetry, Transformation of shapes - Rotation, Reflection, Translation, Dilation, Perspective		
		3	Mensuration	3.1	Mensuration	Unit conversions using multiplication or division (kg, km, litres, g, m, cm, inch, foot etc) Indian units of length (krosa, vojana) Factors for formal units of weight and volume, length - kilo, mega, giga, milli, centi, deci		
				3.2		Real life applications including 4 arithmetic operations in contexts of distance, time intervals, capacity, weight		
				3.3		Concept of perimeter and circumference - observation of transformations on the perimeter using graph paper		
				3.4		Concept of measurement of angles		
		4	Patterns	4.1	Patterns	Bhadra Ganitam - Construct a 3x3 magic square		
				4.2		Number sequences with multiplication/division		
				4.3		Patterns in Permutations of numbers with 4 digits Patterns with shapes, musical notes, alphabets.		
5	Time	5.1	Time	Formal units of time - Conversions 1. seconds, minutes, hours 2. days, weeks, months, years				
6	Commercial Application	6.1	Commercial Application	Real life problems with arithmetic operations, Conversions of Rupees to paise and vice versa				
7	Data & Statistics	7.1	Data & Statistics	Collection of Data, Creating datasets				
		8.1	History	Mangalastika, Importance, Historical facts				
		8.2	Bhutasankhya	Learn other commonly used names for Bhutasankhya, Number to words, words to numbers				
8	Bharitiya Ganitam	8.3	Katapyadi	Number to meaningful words, words to numbers Word problems using operations where numbers are given in Bhutasankhya and Katapyadi				
5	V A K Y A M 1	1	Arithmetic	1.1	Number System	Whole Numbers 0 to Huge numbers, Place values upto Parardham and further, Compare, Sort, Order		
				1.2	Addition & Subtraction	Place value addition - Krama, Utkrama, with/without carryover Place value subtraction - Krama, Utkrama, with/without borrowing Relationship between addition and subtraction		
				1.3	Multiplication	Group counting, Times Tables upto 20, 6-digitX3-digit multiplication Observe Properties of multiplication Multi-step Real life problems using concepts of addition, subtraction, multiplication (Money, length, Number problems)		
				1.4	Division	Introduction to Division algorithms, division after apavartana Relationship between multiplication and Division Application of divisibility Tests, prime numbers, Prime factorization, HCF, LCM Discussion about operations with zero and concept of infinity		
				1.5	Fractions	Fractions as $\frac{a}{b}$ (where $a < b$) - comparison of fractions with same denominator, Representation on number line, $\frac{a}{b} = \frac{a \times 10}{b \times 10}$ Equivalent fractions, compare, sort, order fractions using equivalent fractions, Concepts of udvartana, apavartana		
				1.6	Decimals	When denominator is a power of 10, fraction can be represented as a decimal. Convert decimals to fractions and vice versa Representation on number line		
				1.7	Ratio	Use ratio to relate two quantities, Unitary method, Rate		
				1.8	Percentage	Introduction to Percentages, Equivalence of division, fractions, decimals, ratio and percentage		
				2	Geometry	2.1	Geometry	Comparison of properties of different types of quadrilaterals Verify Akshetram for a quadrilateral
						2.2		Interior Angles in triangles and quadrilaterals - extend to regular polygons - verify sum of interior angles using protractor
						2.3		Compound shapes - 2 D, 3 D, Construct Regular Polygons, Construction of perpendicular bisector, angle bisector
				3	Mensuration	3.1	Mensuration	Understand area with graph units, Area calculation using squares of graph units, area of regular shapes - square, rectangle,
						3.2		Understand combination of transformations - rotation + reflection of standard shapes (triangle, rectangle, square) Transformation - Rotation, Reflection, Expansion, Dilation, Translation using coordinate plane
				4	Patterns	4.1	Patterns	Bhadra Ganitam - Magic Squares - 4 X 4 - Construction
		4.2	Number Sequences, Meru Prastara, Chandas chitl, Permutations of 6-digit numbers Patterns with shapes, music, alphabets					
		5	Time	5.1	Time	Reading and creating timetable		
		6	Commercial Application	6.1	Commercial Application	Commercial applications of arithmetic operations, ratio, unit rate, proportion, percentage etc are in the respective chapters		
		7	Data & Statistics	7.1	Data & Statistics	Resistant to dataset - bar chart, pictograph, XY plane, tabular form		
				7.2	Data & Statistics	Identify metrics like maximum, minimum, average, deviation from average		
		8	Bharitiya Ganitam	8.1	History	Mangalastika, Importance, Historical facts		
				8.2	Bhutasankhya	Learn pariyayavachi names for Bhutasankhya from Amarakosa and other texts, Number to words, words to numbers		
				8.3	Katapyadi	Number to meaningful words, words to numbers Word problems using operations where numbers are given in Bhutasankhya and Katapyadi		

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1	Arithmetic	1.1	Number System	<p>Revision of what a fraction is, Fraction as a part of whole, Representation of fractions (factorially) and on number line, fraction as a division, proper, improper & mixed fractions, equivalent fractions, comparison of fractions,</p> <p>Decimal representation of fractions</p> <p>Natural numbers, whole numbers, properties of numbers (commutative, associative, distributive, additive identity, multiplicative identity), number line, How negative numbers arise, models of negative numbers, connection to daily life, ordering of negative numbers, representation of negative numbers on number line</p> <p>Students to see patterns, identify and formulate rules.</p> <p>What are integers, identification of integers on the number line, operation of addition and subtraction of integers, showing the operations on the number line (addition of negative integer reduces the value of the number) comparison of integers, ordering of integers.</p>	
		1.2	Arithmetic Operations with whole numbers, Fractions, Integers, Decimals	<p>Estimates sums, differences, products and quotients and verifies using approximation.</p> <p>Addition and subtraction of fractions (Avoid large and complicated unnecessary tasks), (Moving towards abstraction in fractions)</p> <p>Word problems involving addition and subtraction of decimals (two operations together on money, mass, length and temperature)</p> <p>Review of the idea of a decimal fraction, place value in the context of decimal fraction, inter conversion of fractions and decimal fractions (only terminating decimals at this stage).</p> <p>Uses informal and standard division algorithms.</p> <p>Multiplies and factors, why divisibility rules work. Divisibility tests for Co-prime numbers, prime factorisation.</p> <p>• HCF and LCM</p> <p>• Embedded in proper contexts and applications</p>	
		1.3	Factors & Multiples	<p>BODMAS, Squares, Cubes, Introduction to exponent notations</p>	
		1.4			
		2.1			
	2	Algebra	2.2	Algebra	<p>Applications of Ratio, Proportion, Percentages in the context of commercial applications</p> <p>Introduction to Algebra, Variables, Coefficients, Constants, Order/Degree</p> <p>Justify the need for Algebra</p> <p>Algebraic Equations with one variable (1st order)</p> <p>Relate Arithmetic and Algebra</p>
			2.3		
			2.4		
			3.1	Geometry	<p>Properties of Lines and Angles, Baudhayana Sulba theorem (Pythagoras), Properties of parallel lines, angles, when a transversal is drawn across parallel lines</p> <p>Construction and Definition of Medians, Altitudes, Angle Bisectors, Perpendicular Bisectors in a triangle</p> <p>Construction of triangles</p> <p>Relate Squares with Area calculations and as a unit</p>
	4	Mensuration	4.1	Geometry	
			4.2	Mensuration	<p>Perimeter, Area concepts - Square, Rectangle, Triangle</p> <p>Circumference of a circle</p> <p>Surface area using nets of solids</p>
			5.1	Bhadra Ganitam	<p>Magic squares (3x3) - Formation of a magic square with a given sum</p>
	5	Patterns	5.2	Arithmetic Progressions	<p>Arithmetic Series, Find the nth term, Sum of n terms</p>
			5.3	Patterns	<p>Number Patterns, Alphabets, Music, Shapes Patterns</p> <p>- Find the number of a given missing pattern, find the nth pattern, - Permutations taking 6 items at a time</p>
	6	Commerical Application	6.1	Commerical Application	<p>Unitary Cost, Simple Interest, Sale Purchase etc as a part of applications of Ratio, Proportions, Percentage</p>
			7.1	Data & Statistics	<p>Data - Identify, Collect, Organize, Represent</p>
	7	Data & Statistics	7.2	Data & Statistics	<p>Data - Metrics (Weighted Average, Mean, Median, Mode), Analysis</p>
			8.1	History	<p>Mangalastika, Importance, Historical facts</p>
	8	Bharitya Ganitam	8.2	Bhutasankhya	<p>References in Treatises, Learn bhutasankhya for huge numbers, Number to words, words to numbers</p>
			8.3	Katpapadi	<p>References in Treatises, Huge Numbers to meaningful words, words to numbers</p> <p>Word problems using operations where numbers are given in Bhutasankhya and Katpapadi</p>

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7	1	Arithmetic	1.1	Number System	<p>Rational Numbers - Compare, Sort, Order, Number Line</p> <p>Convert between different representations</p> <p>Exponents & Scientific Notation</p>
			1.2		<p>Addition & Subtraction of Rational Numbers</p> <p>Multiplication & Division of integers, fractions, decimal numbers, rational numbers</p>
			1.3		<p>Prime factors in the form of exponents</p> <p>More contexts with HCF & LCM</p> <p>BODMAS, PEMDAS</p>
			1.4		<p>Squares, Square Roots, Cubes, Cube Roots, Laws of Exponents with whole number powers</p>
			1.5		<p>Advanced Applications of Ratio, Proportions, Percentage in contexts of Simple Interest, Sale, Purchase, Bank, Compound Interest, Tax etc</p>
	2	Algebra	2.1	Algebra	<p>Algebraic expressions with *2 variables, maximum order of each term is 4</p> <p>Order of each term of an expression, degree, variables and constants, coefficients, like terms and unlike terms</p> <p>Polynomials, Monomial, Binomial, Trinomial</p> <p>Addition & Subtractions of like terms</p> <p>Multiplication with constant - e.g. (A, B are 2 expressions, evaluate 2A+3B</p> <p>Multiplication with single term variable - eg. 6xA + 7yB</p> <p>Factors of constant of 1 variable B= Bx A, find A</p> <p>Square of single variables - sq(6x) = 36x*2</p> <p>Cube of single variables = cube(6x) = 216x*3</p> <p>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations to solve problems linear equations in single variables</p>
			2.2		
			2.3		
	3	Geometry	3.1	Geometry	<p>Constructions - Squares, Triangles</p> <p>Congruence of Triangles</p>
	4	Mensuration	4.1	Mensuration	<p>Perimeter sums expressed as linear equations in one variable - Transformations of shapes with same perimeter, find the length/radius etc</p> <p>Formula for area of parallelogram, rhombus and triangle, trapezium, circle</p> <p>Formula for SA of Cuboid, cube, cylinder</p> <p>Solve real-world and mathematical problems involving area and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</p> <p>How Perimeter and Area changes when shapes are transformed (Doubled measures, shape changes etc)</p>
	5	Patterns	5.1	Patterns	<p>Bhadra Ganitam revision</p> <p>Sum of APs with increasing number of terms</p> <p>Patterns with Numbers, Music, Shapes, Alphabets etc - Lagakrya Pratyayam & Adhvabhaga Pratyayam</p> <p>Bandha kavivram patterns with poetry</p> <p>Number of possible combinations with a given set of digits and digit sum</p> <p>Significance of permutations</p>

6	Data & Statistics	6.1	Data & Statistics	Data - Represent, Metrics, Analysis Dataset representation using pie charts, bar graphs Standard Deviation, Measures of Center and Variances to compare two different dataset distributions
		7.1	History	Mangalastika, Importance, Historical facts
		7.2	Bhutasankhya	Representing numbers with a given maximum syllables, examples from treatises More exercises on word-to-number Number-to-word exercises to be kept minimal and simple
7	Bharitya Ganitam	7.2	Bhutasankhya	Representing numbers with a given maximum syllables, examples from treatises More exercises on word-to-number Number-to-word exercises to be kept minimal and simple
		7.3	Katapayadi	Representing numbers with a given maximum syllables, examples from treatises More exercises on word-to-number Number-to-word exercises to be kept minimal and simple Aryabhatya numbers: Examples of large numbers from treatises and exercises
KANDAM 2				
1	Arithmetic	1.1	Number System	Complete all operations (including BODMAS, Exponents) with Rational numbers (Integer exponents only) in real life contexts Scientific notation, Relate Division, Fractions, percentage, ratio, decimal with each other and convert between them
		1.2		Squares, Square roots, Cube, Cube Roots, Explore formula for nth root Explore irrational numbers and differentiate from rational numbers after learning Sqrt and Cbrt of 2,3, etc
2	Algebra	2.1	Algebra	Multiplication of algebraic expressions Standard Identities and formulas and their applications Division of algebraic expressions Revisit Laws of exponents from algebra point of view
		2.2		Applications of linear equations in a single variable to Real life contexts - graphical solutions, solving an equation for an unknown
3	Geometry	3.1	Geometry	Travel along a circle in the polar coordinate graph paper, observe the lengths of chapa jya and khanda jya & their directions (right-side vs left-side of the origin and above and below the origin) - with the angle increased in steps of 5 deg or 10 deg from 0 to 360 deg Introduce sine and cosine functions
		3.2		Area preserving transformation - Circle, Square, Semicircle, triangle Construction of a given quadrilateral (given its properties (sides and angles))
4	Mensuration	4.1		Understand congruence and similarity - Verify, properties - characteristics and proofs
		4.2	Mensuration	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. Area of a triangle in terms of its sides SA of Regular 3D objects - sphere, cylinder, cone - Formula Volume of cube, cuboid, cylinder, cone, sphere Use them to solve real-world and mathematical problems Volume preserving transformation - e.g. A cube, a sphere and a tetrahedron having the same volume
5	Patterns	5.1	Pattern	Geometric progression (GP) - (i) finding the nth term (ii) sum of n terms Sum of GPs with increasing number of terms Patterns with Aksharas, Music, Shapes etc Uddishta & Nashta from Sangharathakara
6	Data & Statistics	6.1	Data & Statistics	Analysis of data - Investigate patterns of association in bivariate data. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. Arriving at an approximate mathematical relationship between the constituent variables of a given data set Fitting a curve or line to a given data points Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
		7.1	History	Mangalastika, Importance, Historical facts
7	Bharitya Ganitam	7.2	Bhutasankhya	Representing numbers in a given meter (vritta), examples from treatises Only exercises on word-to-number to help the students appreciate
		7.3	Katapayadi	Representing numbers in a given meter (vritta), examples from treatises Only exercises on word-to-number to help the students appreciate Aryabhatya numbers: Examples of large numbers from treatises and exercises

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