Revised Syllabus for Classes VI to X – 2011

Class – VI	Class – VII	Class – VIII	Class – IX	Class – X
Number System (60 hrs) **(i) Knowing our Numbers:** Consolidating the sense of numberless up to 5 digits, Size, estimation of numbers, identifying smaller, larger, etc. Place value (recapitulation and extension), connectives: use of symbols =, <, > and use of brackets, word problems on number operations involving large numbers up to a maximum of 5 digits in the answer after all operations. This would include conversions of units of length & mass (from the larger to the smaller units), estimation of outcome of number operations. Introduction to a sense of the largeness of, and initial familiarity with, large numbers up to 8 digits and approximation of large numbers) • International system of	**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, (closure, commutative, associative, inverse, distributive) (through patterns). These would include examples from whole numbers as well. Involve expressing 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	**Number System (50 hrs)** **(i) Rational Numbers:** • Properties of rational numbers. (including identities). Using general form of expression to describe properties Appreciation of properties. • Consolidation of operations on rational numbers. • Representation of rational numbers on the number line • Between any two rational numbers there lies another rational number (Making children see that if we take two rational numbers then unlike for whole numbers, in this case you can keep finding more and more numbers that lie between them.) • Word problem (higher logic, two operations, including ideas like area) **(ii) Squares, Square roots,**	**Number System** **Real numbers** Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring / terminating decimals. Examples of nonrecurring / non terminating decimals such as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ etc. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}$, $\sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by a unique point on the number line, and conversely, every point on the number line represents a unique real number. Existence of $\sqrt{x}$ for a positive real number x (visual proof to be emphasized). Definition of	**Number System** **1.Real numbers:** Euclid's division lemma, Fundamental Theorem of Arithmetic – statements after reviewing work done earlier and after illustrating and motivating through examples. Proofs of results – irrationality of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, decimal expansions of rational numbers in terms of terminating / non-terminating recurring decimals. **2. Sets:** Sets and their representations empty sets. Finite and infinite sets equal sets. Subsets, subsets of the set of real numbers (especially intervals with notations). Power set, Universal set, Venn diagrams. Union and intersection of sets. Difference of set. Compliment of set.

numbers (Millions..) **(ii(a) Playing with Numbers:** Simplification of brackets, Multiples and factors, divisibility rule of 2, 3, 4, 5, 6, 8, 9, 10, 11. (All these through observing patterns. Children would be helped in deducing some and then asked to derive some that are a combination of the basic patterns of divisibility.) Even/odd and prime/composite numbers, Co-prime numbers, prime factorisation, every number can be written as products of prime factors. HCF and LCM, prime factorization and division method for HCF and LCM, the property LCM × HCF = product of two numbers. *LCM & HCF of coprimes. All this is to be embedded in contexts that bring out the significance and provide motivation to the child for learning these ideas. ii(b) Importance of Zero, and its properties **(iii) Whole numbers**	• Fraction as an operator "of" • Reciprocal of a fraction and its use • Division of fractions • Word problems involving mixed fractions (related daily life also) • Introduction to rational numbers (with representation on number line) *difference between fraction and rational numbers. • 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)	**Cubes, Cube roots.** Introduction • Square and Square roots • Square roots using factor method and division method for numbers containing (a) no more than total 4 digits and (b) no more than 2 decimal places • Cubes and cubes roots (only factor method for numbers containing at most 3 digits) • Estimating square roots and cube roots. Learning the process of moving nearer to the required number. **(iv) Playing with numbers** • Writing and understanding a 2 and 3 digit number in generalized form (100a + 10b + c , where a, b, c can be only digit 0-9) and engaging with various puzzles concerning this. (Like finding the missing numerals represented by alphabets in sums involving any of the four operations.)	n^{th} root of a real number. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particulars cases, allowing learner to arrive at the general laws). Rationalisation (where precise meaning) of real numbers of the type (and their combinations) Where x and y are natural numbers and a, b are integers.	

Natural numbers, whole numbers, properties of numbers (closure, commutative, associative, distributive, additive identity, multiplicative identity), number line. Seeing patterns, identifying and formulating rules to be done by children. (As familiarity with algebra grows, the child can express the generic pattern.). Utility of properties in fundamental operations **(iv) Negative Numbers and Integers** How negative numbers arise, models of negative numbers, connection to daily life, ordering of negative numbers, representation of negative numbers on number line. Children to see patterns, identify and formulate rules. 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		Children to solve and create problems and puzzles. • Number puzzles and games • Deducing the divisibility test rules of 2, 3, 5, 9, 10 for a two or three-digit number expressed in the general form. • Logic behind divisibility laws of 2,3,4,5,6,7,8,9		

negative integer reduces the value of the number) comparison of integers, ordering of integers. **(v) Fractions:** Revision of what a fraction is, Fraction as a part of whole, Representation of fractions (pictorially and on number line), fraction as a division, proper, improper & mixed fractions, equivalent fractions, like , unlike fractions, comparison of fractions, addition and subtraction of fractions , word problems (Avoid large and complicated unnecessary tasks). (Moving towards abstraction in fractions) Like and Unlike fraction. Review of the idea of a decimal fraction, place value in the context of decimal fraction, inter conversion of fractions and decimal fractions (avoid recurring decimals at this stage), word problems involving addition and subtraction of decimals (two operations together on money,				

mass, length, temperature)				
Algebra (15 hrs) **INTRODUCTION TO ALGEBRA** • Introduction to variable through patterns and through appropriate word problems and generalizations (example 5 × 1 = 5 etc.) • Generate such patterns with more examples. • Introduction to unknowns through examples with simple contexts (single operations) • Number forms of even and odd (2n, 2n+1)	**(20 hrs)** **Exponents and powers** **Introduction** Meaning of x in a^x where a έ Z • Laws of exponents (through observing patterns to arrive at eneralization.) **(ii)** $a^m a^n = a^{m+n}$ (ii) $(a^m)^n = a^{mn}$ (iii) $a^m/a^n = a^{m-n}$, where m-n ∈ N (iv) $a^m.b^m = (ab)^m$ (v) number with exponent zero vi)Decimal number system vii) Expressing large number in standard form **ALGEBRAIC EXPRESSIONS** Introduction 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≤ 3, number of variables) • Addition, subtraction of	**(20 hrs)** **Exponents & powers** **(ii) Powers** • Integers as exponents. • Laws of exponents with integral powers **(ii) Algebraic Expressions** • Multiplication and division of algebraic exp.(Coefficient should be integers) • Some common errors (e.g. 2 + x ≠ 2x, 7x + y ≠ 7xy) • Identities (a ± b)2 = a2 ± 2ab + b2, a2 – b2 = (a – b) (a + b) Factorisation (simple cases only) as examples the following types a(x + y), (x ± y)2, x2 – y2, (x + a).(x + b) **Simple equations** • Solving linear equations in one variable in contextual problems involving multiplication and division (word problems) (avoid	Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Zero / roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorisation of ax^2+bx+c, a ≠ 0 where a, b, c are real numbers and of cubic polynomials using the Factor Theorem. Recall of algebraic expressions and identities. Further identities of the type: And their use in factorization of polynomials. Simple expressions reducible to these polynomials. **Linear Equations in Two Variables** Recall of linear equations in one variable. Introduction to the equation in two variables. Prove that a linear equation in	**Algebra** **1. Polynomials** Zeros of a polynomial. Relationship between zeros and coefficients of a polynomial with particular reference to quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients. **2. Pair of Linear Equations in Two Variables** Pair of linear equations in two variables. Geometric representation of different possibilities of solutions / inconsistency. Algebraic conditions for number of solutions. Solution of pair of linear equations in two variables algebraically – by substitution, by elimination and by cross multiplication. Simple situational problems must be included. Simple problems on equations reducible to linear equations may be included. **3. Quadratic Equations** Standard form of a quadratic equation $ax^2+bx+c=0$, (a ≠ 0). Solutions of quadratic

	algebraic expressions (coefficients should be integers). **Simple equations** • Simple linear equations in one variable (in contextual problems) with two operations (integers as coefficients)	complex coefficient in the equations)	two variables has infinitely many solutions, and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.	equations (only real roots) by factorization and by completing the square, i.e., by using quadratic formula. Relationship between discriminant and nature of roots. Problems related to day-to-day activities to be incorporated. **4. Arithmetic Progressions (AP)** 1. Sequence and series 2. Motivation for studying AP. Derivation of standard results of finding the n^{th} term and sum of first n terms. 3. Arithmetic mean 4. GP- n^{th} term of GP- geometric mean – relation between AM and GM sum of n terms of GP – infinite GP - S ∞ S. $\sum n$, $\sum n^2$, $\sum n^3$.

Ratio and Proportion (15 hrs) • Concept of Ratio Inverse ratio, compound ratio • Proportion as equality of two ratios • Unitary method (with only direct variation implied) • Word problems • Understanding ratio and proportion in Arithmetic	**Ratio and Proportion (20 hrs)** • Ratio and proportion (revision) • Unitary method continued, consolidation, general expression. • Compound ratio : simple word problems • 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).	**Ratio and Proportion (25 hrs)** • Problems involving applications on percentages, profit & loss, overhead expenses, Discount, tax.(Multiple transactions) • Difference between simple and compound interest (compounded yearly up to 3 years or half-yearly up to 3 steps only), Arriving at the formula for compound interest through patterns and using it for simple problems. • Direct variation – Simple and direct word problems • Inverse variation –Simple and direct word problems Mixed problems on direct , inverse variation • Time & work problems– Simple and direct word problems • Time & distance : Simple and direct word problems	**Trigonometry** **1. Introduction to Trigonometry** Trigonometry ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios, whichever are defined at 0^0 and 90^0. Values (with proofs) of the trigonometric ratios of 30^0, 45^0 and 60^0. Relationships between the ratios.	**Trigonometry** **1. Introduction to Trigonometry** Trigonometry Identities: Proof and applications of the identity $\sin^2A + \cos^2A = 1$. Only simple identities to be given. Trigonometric ratios of complementary angles. **2. Heights and Distance** Simple and believable problems on heights and distances. Problems should not involve more than two right triangles of elevation / depression should be only 30^0, 45^0, 60^0.

Geometry (65 hrs) **Basic geometrical ideas (2-D):** Introduction to geometry. Its linkage with and reflection in everyday experience. • Line, line segment, ray. • Open and closed figures. • Interior and exterior of closed figures. • Curvilinear and linear boundaries • Angle — Vertex, arm, interior and exterior, • Triangle — vertices, sides, angles, interior and exterior, altitude and median • Quadrilateral — Sides, vertices, angles, diagonals, adjacent sides and opposite sides (only convex quadrilateral are to be discussed), interior and exterior of a quadrilateral. • Circle — Centre, radius, diameter, interior and exterior,	**Geometry (60 hrs)** **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) Triangles:** • Definition of triangle. • Types of triangles acc. To sides and angles • Properties of triangles • Sum of the sides, difference of two sides. • Angle sum property (with notion of proof and verification through paper folding, proofs , using property of parallel lines , difference between proof and verification • Exterior angle property of triangle • **Congruence**: • congruence through	**Geometry (40 hrs)** **(i) Understanding shapes:** • Properties of quadrilaterals Revision – • Properties of parallelogram (By verification) (i) Opposite sides of a parallelogram are equal, (ii) Opposite angles of a parallelogram are equal, (iii) Diagonals of a parallelogram bisect each other. [Why (iv), (v) and (vi) follow from (ii)] (iv) Diagonals of a rectangle are equal and bisect each other. (v) Diagonals of a rhombus bisect each other at right angles. (vi) Diagonals of a square are equal and bisect each other at right angles. **Construction:** Construction of Quadrilaterals: • Four sides, one angle • Four sides, one diagonal	**Coordinate geometry** The Cartesian plane, coordinates of a point names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type ax + by + c = 0 by writing it as y = c and linking with the chapter on linear equations in two variables. **Geometry** **I. Introduction to Euclid's Geometry** History – Euclid and geometry in India. Euclid's method of formalizing observed phenomenon onto rigorous mathematics with definitions, common / obvious notions, axioms / postulates, and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem. 1. Given two district points, there exists one and only one line through them. 2. (Prove) Two district lines cannot have more than one	**Coordinate geometry** **Lines (In two-dimensions)** Review the concepts of coordinate geometry done earlier including graphs of linear equations. Awareness of geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). Area of a triangle. **Geometry** **I. Triangles** Definitions, examples, counterexamples of similar triangles. 1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in district points, the other two sides are divided in the same ratio. 2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side. 3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are

arc, chord ,sector, segment, semicircle, circumference, **(ii) Understanding Elementary Shapes (2-D and 3-D):** • Measure of Line segment • Measure of angles • Pair of lines Intersecting and perpendicular lines Parallel lines • Types of angles- acute, obtuse, right, straight, reflex, complete and zero angle iii) **Constructions** (using Straight edge Scale, protractor, compasses) • Drawing of a line segment • Construction of circle • Perpendicular bisector • Construction of angles (using protractor) • Angle 60°, 120° (Using Compasses) • Angle bisector- making angles of 30°, 45°, 90° etc. (using compasses) • Angle equal to a given angle	superposition **ex**. Blades, stamps etc.. • Extend congruence to simple geometrical shapes ex. Triange , circles, • criteria of congruence (by verification only) • property of congruencies of triangles SAS, SSS, ASA, RHS Properties with figures • • **Construction of triangles** (all models) **iii- Quadrilaterals** Quadrilateral-definition. • Quadrilateral, sides, angles, diagonals. • Interior, exterior of quadrilateral • Convex, concave quadrilateral differences with diagrams • Sum angles property (By verification) , problems • Types of quadrilaterals • Properties of parallelogram, trapezium, rhombus, rectangle, square and kite. **(iii) Symmetry** • Recalling reflection symmetry	• Two adjacent sides, three angles • Three sides, two diagonals. • Three sides, two angles in between • Construction of parallelogram • Construction of trapezium • Construction of rhombus • Construction of rectangle • Construction of square **Triangles and concurrent lines** Concurrent lines, points of concurrencies , circumcentre, incentre, ortho-centre, centroid. **(ii) Representing 3-D in 2-D** • Identify and Match pictures with objects [more complicated e.g. nested, joint 2-D and 3-D shapes (not more than 2)]. • Drawing 2-D representation of 3-D objects (Continued and extended) • Counting vertices, edges & faces & verifying Euler's relation for 3-D figures with flat faces	point in common. **II. Lines and Angles** 1. (Motive) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180^0 and the converse. 2. (Prove) If two intersect, the vertically opposite angles are equal. 3. (Motive) Results on corresponding angles, interior angles when a transversal intersects two parallel lines. 4. (Motive) Lines, which are parallel to given line, are parallel. 5. (Prove) The sum of the angles of a triangle is 180^0. 6. (Motive) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the interior opposite angles. **III. Lines and Angles** 1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).	proportional and the triangles are similar. 4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar. 5. (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar. 6. (Motivate) If a perpendicular is drawn from the vertex of the right angle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other. 7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides. 8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. 9. (Prove) In a triangle, if the

(using compass) • Drawing a line perpendicular to a given line from a point a) on the line b) outside the line. iv)Simple polygons (introduction) (Upto pentagon regulars as well as non regular). •v) Classification of triangles (on the basis of sides, and of angles) •vi) Identification of 3-D shapes: Cubes, Cuboids, cylinder, sphere, cone, prism (triangular), pyramid (triangular and square) Identification and locating in the surroundings • Elements of 3-D figures. (Faces, Edges and vertices) • Nets for cube, cuboids, cylinders, cones and tetrahedrons. **(vii)** Symmetry: **(**reflection**)** • Observation and identification of 2-D symmetrical objects for	• 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 **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)	(cubes, cuboids, tetrahedrons, prisms and pyramids) **(iii)**	2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence). 3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruence). 4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle. 5. (Prove) The angles opposite to equal sides of a triangle are equal. 6. (Motivate) The sides opposite to equal angles of a triangle are equal. 7. (Motivate) Triangle inequalities and relation between 'angle and facing sides'; inequalities in a triangle. **IV. Quadrilaterals** 1. (Prove) The diagonal divides a parallelogram into	square on one side is equal to sum of the squares on the other two sides, the angles opposite to the first side is a right triangle. **II. Circles** Tangents to a circle motivated by chords drawn from points coming closer and closer to the point. 1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact. 2. (Prove) The lengths of tangents drawn from an external point to a circle are equal. **III. Constructions** 1. Division of a line segment in a given ratio (internally). 2. Tangent to a circle from a point outside it. 3. Construction of a triangle similar to a given triangle. 4. Construction of a similar quadrilateral.

reflection symmetry • Operation of reflection (taking mirror images) of simple 2-D objects • Recognising reflection symmetry (identifying axes)			two congruent triangles. 2. (Motivate) In a parallelogram opposite sides are equal and conversely. 3. (Motivate) In a parallelogram opposite angles are equal and conversely. 4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal. 5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely. 6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse. 7. Sum of interior angles, exterior angles of a polygon. Interior and exterior angles of a regular polygon. **V. Area** Review concept of area, recall area of a rectangle. 1. (Prove) Parallelograms on the same base and between the same parallels have the same area.	

			2. (Motivate) Triangles on the same base and between the same parallels are equal in area and its converse. **VI. Circles** Through examples, arrive at definitions of circle related concepts of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle. 1. (Prove) Equal chords of a circle subtend equal angles at the centre and (motivate) its converse. 2. (Motivate) The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of circle to bisect a chord is perpendicular to the chord. (Motivate) There is one and only one circle passing through three given non-collinear points. 3. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the centre (s) and conversely. 4. (Prove) The angle subtended by am arc at the centre is double the angle subtended by it at any point on the	

			remaining part of the circle. 5. (Motivate) Angles in the same segment of a circle are equal. 6. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle. 7. (Motivate) The sum of the wither pair of the opposite angles of a cyclic quadrilateral is 180^0 and its converse. **VII. Constructions** 1. Construction of bisectors of a line segment and angle, 60^0, 90^0, 45^0 angles etc, equilateral triangles. 2. Construction of cicum 3. Construction of a triangle given its base, sum / difference of the other two sides one base angles.	
Mensuration (15 hrs) **CONCEPT OF PERIMETER AND INTRODUCTION TO AREA**	**Mensuration (15 hrs)** • Revision of perimeter, Idea of , Circumference of Circle Area	**Mensuration (15 hrs)** **(iii)** Area of a trapezium and quadrilateral. (ii) Surface area of a cube, cuboid,	**Mensuration (15 hrs)** **I.Areas** Area of a triangle using Heron's formula (without proof) and its application in	**Mensuration** **I. Areas Related to Circles** Motivate the area of a circle; area of sectors and segments of a circle. Problems based on

Introduction and general understanding of perimeter using many shapes. Shapes of different kinds with the same perimeter. Concept of area, Area of a rectangle and a square Counter examples to different misconcepts related to perimeter and area. Perimeter of a rectangle – and its special case – a square. Deducing the formula of the perimeter for a rectangle and then a square through pattern and generalisation.	Concept of measurement using a basic unit area of a square, rectangle, rhombus triangle, parallelogram and circle, area of rectangular paths and circular path.	(iii) Concept of volume, measurement of volume using a basic unit, volume of a cube, cuboid and cylinder (iv) Volume and capacity (measurement of capacity) .	finding the area of a quadrilateral. **II. Surface Areas and Volumes** 1. Revision of surface area and volume of cube, cuboid. 2. Surface areas and volumes of shapes (including hemispheres) and right circular cylinders / cones.	areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of 60^0,90^0 and 120^0 only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.) **II. Surface Areas and Volumes** 1. Problems on finding surface areas and volumes of any two of the following: cubes, cuboids, shapes, hemispheres and right circular cylinders / cones. Frustum of a cone. 2. Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken.)
Data handling (10 hrs) (i) What is data - (ii) Collection and organisation of data - examples of organising it in tally marks and a table. (iii) Pictograph- Need for	**Data handling (15 hrs)** (i) Collection and organisation of data – (ii) Mean, median and mode of ungrouped data –	**Data handling (15 hrs)** **(iv)** Scope and necessity of grouped data **(v)** preperation of frequency distribution table **(vi)** cumulastive frequency distribution table **(vii)** frequency	**Data handling (15 hrs)** **Probability** Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Tabulating and counting occurrences of 1	**Data handling (15 hrs)** **(Statistics)** Revision of Mean, median and mode of ungrouped data Understanding, the concept of Arithmetic Mean, Median and Mode for classified data.

scaling in pictographs interpretation & construction. (iv) Making bar graphs for given data interpreting bar graphs+.	understanding what they represent. Reading bar-graphs **(iv)** Constructing double bar graphs **(v)** iii) simple pie charts with reasonable data numbers	graphs(histogram, frequency polygon,frequency curve, cumulative frequency curves)	through 6 in a number of throws. Comparing the observation with that for a coin.Observing strings of throws, notion of randomness (iii) Consolidating and generalising the notion of chance in events like tossing coins, dice etc. Relating it to chance in life events. Visual representation of frequency outcomes of repeated throws of the same kind of coins or dice. Throwing a large number of identical dice/coins together and aggregating the result of the throws to get large number of individual events. Observing the aggregating numbers over a large number of repeated events. Comparing with the data for a coin. Observing strings of throws, notion of randomness **Introduction to graphs (15 hrs)** **PRELIMINARIES:** (i) Axes (Same units), Cartesian Plane	The meaning and purpose of AM, Median and Mode. Simple problems on finding Mean, Median and Mode for grouped / non-grouped data. Relationship between Mean, Median and Mode. Probability: Concept and definition of Probability. Simple problems (day to day life situation) on single events not using set notation.

			(ii) Plotting points for different kind of situations (perimeter vs length for squares, area as a function of side of a square, plotting of multiples of different numbers, simple interest vs number of years etc.) (iii) Reading off from the graphs • Reading of linear graphs • Reading of distance vs time graph. **Coordinate geometry:** Co-ordinates of point. Plotting of points in co-ordinate axes (Cartesian place). Linking linear equation in two variables of the type ax + by + c = 0 in the Cartesian co-ordinate system. Graphical solution of system of linear equation in two variables.	