

Mathematics is the Queen of All Sciences

TEACHING PLANS

(Year and Unit Plans)

Subject: MATHEMATICS

9th CLASS

Teaching Plan for

- What to teach
- Why to teach
- How to teach

Name of the Teacher

Designation

School.....

Mandal.....

District.....

PREFACE

In the ever-evolving landscape of school education, particularly in the teaching of Mathematics, the role of a well-structured teaching plan cannot be overstated. Teaching, learning, and assessment are intricately interlinked processes that require thoughtful planning, timely execution, and continuous reflection. In this context, this booklet, titled “Teaching Plans for Classes 6th to 10th – Year Plan & Unit Plan in Mathematics”, is a valuable and timely contribution to the professional toolkit of every mathematics teacher.

Effective classroom transaction hinges on meticulous and purposeful planning. Planning acts as the compass that guides teachers through the academic year, ensuring that curricular goals and learning outcomes are achieved within the stipulated timeframe. This booklet offers a comprehensive and structured approach to teaching mathematics, integrating pedagogical expertise with innovative practices in education.

The booklet includes two core planning formats that are essential for successful mathematics instruction:

1. Year Plan – This section provides a macro-level view of the academic year for each class from 6th to 10th. It includes clearly articulated class-wise learning outcomes, monthly allocation of syllabus and units, a detailed period distribution for each unit, essential teaching-learning resources (TLMs, ICT tools, and AI-integrated tools), and a calendar of monthly mathematics activities. Additionally, space for teacher reflections has been included to encourage introspection and self-improvement.
2. Unit Plan – Focusing on the meso level of planning, the unit plans present unit-wise learning outcomes, structured concept maps, clearly demarcated subtopics with associated textbook exercises, and an array of resources such as digital tools, manipulatives, and learning management systems. Each unit includes teacher notes, facilitating a deeper understanding of pedagogical approaches, and provision for teacher reflections and Headmaster's observations for professional dialogue and review.

These plans are more than just templates—they are crafted by a team of eminent and experienced mathematics educators who are well-versed in content, pedagogy, and the practical realities of classroom teaching. As senior resource persons and subject experts, their experience in training teachers, developing curriculum materials, and leading innovative practices in mathematics education adds immense value to this work.

Furthermore, this booklet also includes a Model Teacher Diary, which aims to support reflective teaching. The diary format encourages teachers to document their day-to-day teaching experiences, track student progress, and refine their strategies based on ongoing assessment and classroom feedback.

In the spirit of the National Education Policy (NEP) 2020, which emphasizes competency-based learning, integration of ICT, and continuous professional development of teachers, this booklet aligns with national priorities and classroom

realities. It encourages the use of digital tools, AI, and experiential learning in the teaching of mathematics to improve student engagement and learning outcomes.

It is hoped that this resource will serve as a practical guide and a source of inspiration for all mathematics teachers working in schools. Whether a new teacher seeking guidance or an experienced teacher aiming to refine practice, these plans provide clarity, structure, and motivation. More importantly, they help transform classroom teaching into a meaningful, engaging, and outcome-oriented experience for students.

Let this booklet be a light post guiding every teacher toward creating a vibrant, interactive, and learning-centered mathematics classroom. Through meticulous planning and reflective practice, let us all work toward improving the mathematical abilities of every child.

With sincere appreciation for the teacher community's dedication and commitment to excellence.

Note: *These teaching plans are meant to serve as models only. Teachers may modify or design their own plans based on their convenience and specific classroom needs.*

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YEAR PLAN

CLASS: 9th

SUBJECT: Mathematics

Number of Allotted Periods: 211 Periods

Learning Outcomes that Students should achieve by the end of the Academic Year:

The learner

- applies logical reasoning in classifying Real Numbers, proving their properties, and using them in different situations.
- identifies / Classifies d polynomials among algebraic expressions and factorizes them by applying appropriate algebraic identities.
- relates the algebraic and graphical representations of a linear equation in one or two variables and applies the concept to daily life problems.
- identifies similarities and differences among different geometrical shapes.
- derives proofs of mathematical statements particularly related to geometrical concepts, like parallel lines, triangles, quadrilaterals, circles etc. by applying axiomatic approach and solves problems using them.
- finds areas of all types of triangles by using appropriate formulae and apply them in real life situations.
- constructs different geometrical shapes like bisectors of line segments, angles and triangles under given conditions and provides reasons for the processes of such constructions.
- develop strategies to locate a point in a cartesian plane.
- identifies and classifies the daily life situations in which mean, median and mode can be used.
- analysis data by representing it in different forms like tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), frequency Polygon, frequency curve and ogive curves.
- calculates empirical probability through experiments and describes its use in words.
- derives formulae for surface areas and volumes of different solid objects like cubes, cuboids, right circular cylinders/cones, spheres and hemispheres and applies them to objects found in the surroundings.
- solve problems that are not in the familiar context of that child using above learning. These problems should include the situations to which the child is not exposed earlier.

Number of Unit	Name of the Unit	Month	Number of periods required	TLM required	Activities to be conducted	Sign of Subject Teacher	Sign of the Headmaster	Remarks
1	Real Numbers	June, July	23	Real Numbers chart	π value, square root spiral			
2	Polynomials and Factorization	July	22	Algebraic identities chart, Polynomials chart	Preparation of Project and Review			
3	The Elements of Geometry	August	6	Geometry Box				
4	Lines and Angles	August, September	15	Types of lines chart, Types of angles chart, Transversal chart	Quiz			
5	Co-ordinate Geometry	December	6	Graph Paper				
6	Linear Equations in two variables	September	12	Graph Paper	Preparation of Project and Review			
7	Triangles	November	14	Congruency rules of triangles chart, Geometry Box	Preparation of Project and Review			
8	Quadrilaterals	November, December	12	Types of quadrilaterals chart and models				
9	Statistics	August	18	Mean, Median and Mode formulae chart and graph paper				

10	Surface Areas and Volumes	September, October, November	21	Models of 3-D shapes			
11	Areas	December	11	2-D shapes models, Geometry Box, Graph Paper			
12	Circles	December, January	15	Chart of Parts of Circle, Geometry Box	Celebration of National Mathematics Day		
13	Geometrical Constructions	January	17	Geometry Box	Quiz		
14	Probability	February	8	Dice, Coins	Preparation of Project and Review		
15	Proofs in Mathematics	February	11	Patterns Chart			
16	Revision	March			Preparation for SA-2 Exams		

Academic Standards:

1. Problem Solving
2. Reasoning – Proof
3. Communication
4. Connection
5. Visualization and Representation

TEACHING DIARY

Date:

Teacher Name : Subject:

S.No	Period	Class	Name of the Unit/ Chapter	Name of the Sub-topic/Concept	Learning Outcomes to be achieved	Remarks
1						
2						
3						
4						
5						
6						
7						
8						

Signature of the Teacher

Signature of the Headmaster

SOME USEFUL ICT RESOURCES FOR TEACHING LEARNING AND ASSESSMENT PROCESS IN MATHEMATICS

<https://www.nctm.org/pows/>

<https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/cubes/>

<https://ncert.nic.in/science-laboratory-manual.php?ln=en>

<https://ncert.nic.in/exemplar-problems.php?ln=en>

<https://arvindguptatoys.com/math-magic.php/toys-from-trash.php>

<https://mathforlove.com/>

<https://activities.graspablemath.com/>

<https://mathequalslove.net/>

<https://apps.mathlearningcenter.org/geoboard/>

<https://www.geogebra.org/u/community+team>

<https://www.robocompass.com/>

1. REAL NUMBERS

Class: IX

Name of the Unit: 1. Real Numbers

Learning Outcomes: The learner

- Explain rational and irrational numbers in their own words.
- Classifies rational and irrational numbers.
- Explains the difference between rational numbers and irrational numbers.
- Represents both rational numbers and irrational numbers on number line.
- Find the rational numbers and irrational numbers between any two numbers.
- Express the rational numbers in decimal form and the numbers in decimal form in p/q form.
- Find the square root of irrational numbers.
- Constructs square root spiral.
- Represent real numbers on the number line through successive magnification.
- Read and write laws of exponents.
- Simplify the problems using laws of exponents.
- Write the surds in exponential form and radical form.
- Rationalize the denominator of irrational numbers.
- Use the concept of real numbers to solve real life problems and apply in different subjects.

Prerequisites: Students must know the following:

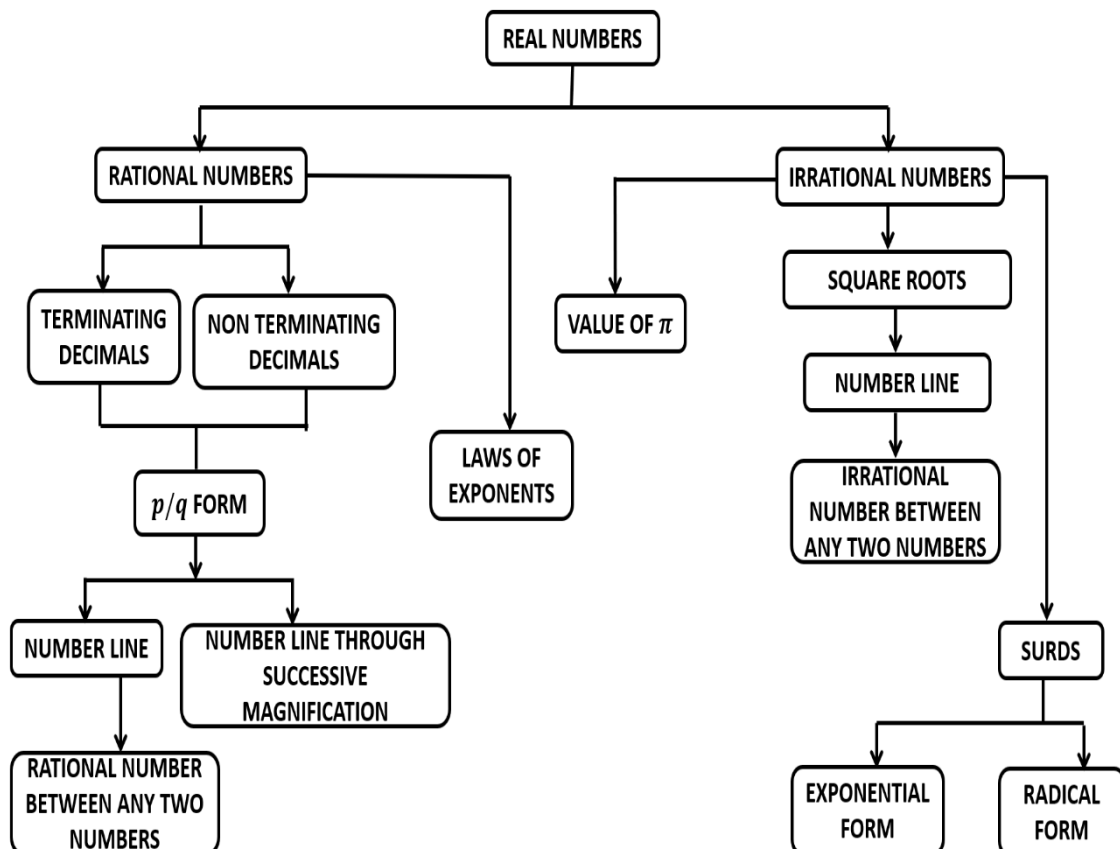
Natural numbers, whole numbers, integers, Rational numbers, addition, subtraction, multiplication, numerator, denominator, decimal form, number line, squares, square roots, laws of exponents, terminating and non-terminating recurring decimals.

Number of allotted periods: 23 Periods .

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
1. Real Numbers	1.Introduction of Real numbers	1	--
	2. Representing rational numbers on number line and the numbers between two rational numbers by mean method	2	
	3. Express the rational numbers into decimal form.	2	
	4. Express the numbers in decimal form into rational form.	2	

	5. The square root of irrational numbers and know about π value.	2	
	6. Representing irrational numbers on number line.	2	
	7. An irrational number between two rational number.	2	
	8. Representing real numbers on the number line through successive magnification.	2	
	9. Operations on real numbers.	2	
	10 Rationalizing the denominator.	2	
	11. Laws of exponents for real numbers.	2	
	12. Surds	2	
	TOTAL	23	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers,

ICT TOOLS: LMS APP (IFP), GeoGebra, DIKSHA, Khan academy.

TEACHER REFERENCE:

TEACHER'S REFLECTIONS:

2. POLYNOMIALS AND FACTORISATION

Class: IX

Name of the Unit: 2. Polynomials and Factorisation.

Learning Outcomes: The learner

- Understands the concepts of variables, constant terms, monomial, binomial, trinomial, polynomial and degree of polynomial.
- Read and write general forms of polynomials like linear, quadratic and cubic polynomials.
- Classifies the different polynomials.
- Identifies which are polynomials and which are not.
- Find the zeros of linear and quadratic polynomials.
- Finds the value of polynomial for a given variable value.
- Divides one polynomial by another polynomial and verify the division fact.
- Understands the concept of remainder theorem and factor theorem.
- Solve the problems by using remainder theorem and factor theorem.
- Factorise the quadratic polynomials.
- Read and write algebraic identities.
- Solve the problems by using algebraic identities.
- Solve the real life problems by relating them with polynomial concepts.

Prerequisites: Students must know the following:

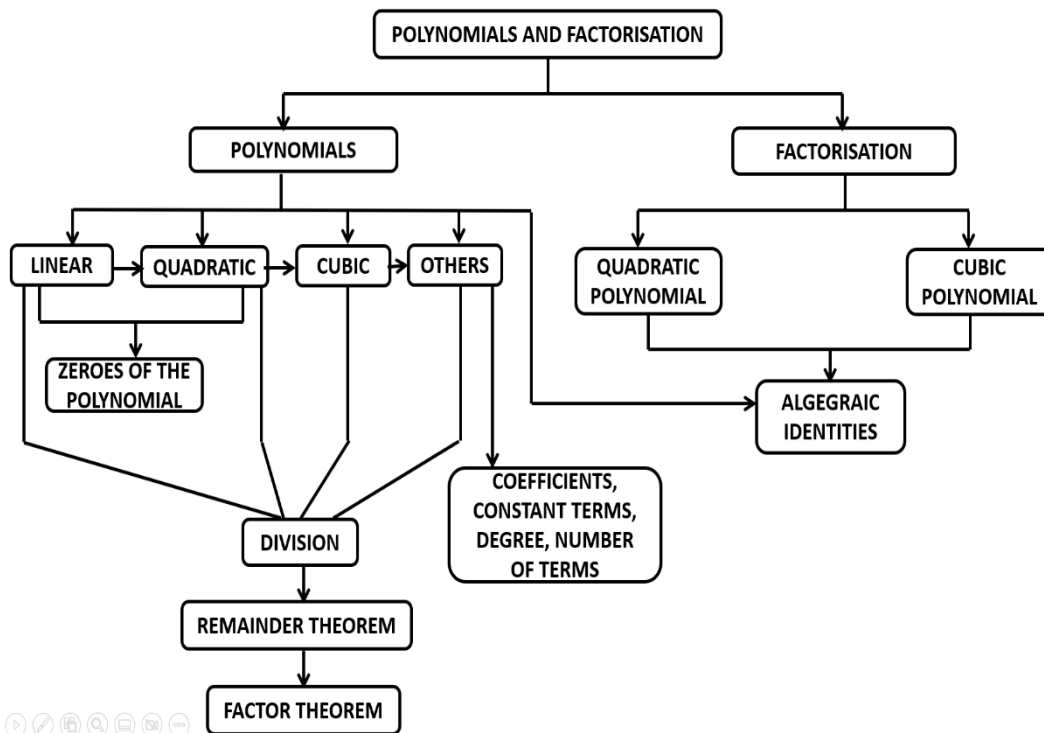
Variables, constant terms, monomial, binomial, trinomial, polynomial, number of terms, linear, Quadratic, and cubic polynomials, addition, subtraction, multiplication and division of variables, factors, algebraic identities like $(a + b)^2$, $(a - b)^2$, $a^2 - b^2$ etc. and division fact.

Number of allotted periods: 17 Periods

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
Polynomials and Factorisation.	1.Prerequisites and Introduction of Polynomials.	1	
	2. Zeros of a polynomial	2	
	3. Zero of the linear polynomial in one variable.	2	

	4. Dividing polynomials	3	
	5. Remainder theorem	2	
	6. Factor theorem	2	
	7. Factorization of quadratic polynomials.	2	
	8. Algebraic identities	5	
	TOTAL	17	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers,

ICT TOOLS: IFP, GeoGebra, DIKSHA App, Khan academy.

TEACHER'S REFERENCE:

TEACEHR'S REFLECTIONS:

3. THE ELEMENTS OF GEOMETRY

Class: IX

Name of the Unit: 3. The elements of geometry.

Learning Outcomes: The learner

- Express defined and undefined terms in their own words.
- Know the history of geometry.
- Explain the difference between axioms and common notion.
- Solve the problems using Euclid's axioms.
- Gives examples for conjecture.
- Construct an equilateral triangle.
- Understand the concepts Euclid's axioms and postulates.
- Proves the Euclid's axioms and postulates.
- Constructs suitable geometric diagrams for the proof of Euclid's axioms.
- Connect the concepts between Euclidean and Non-Euclidean geometry.

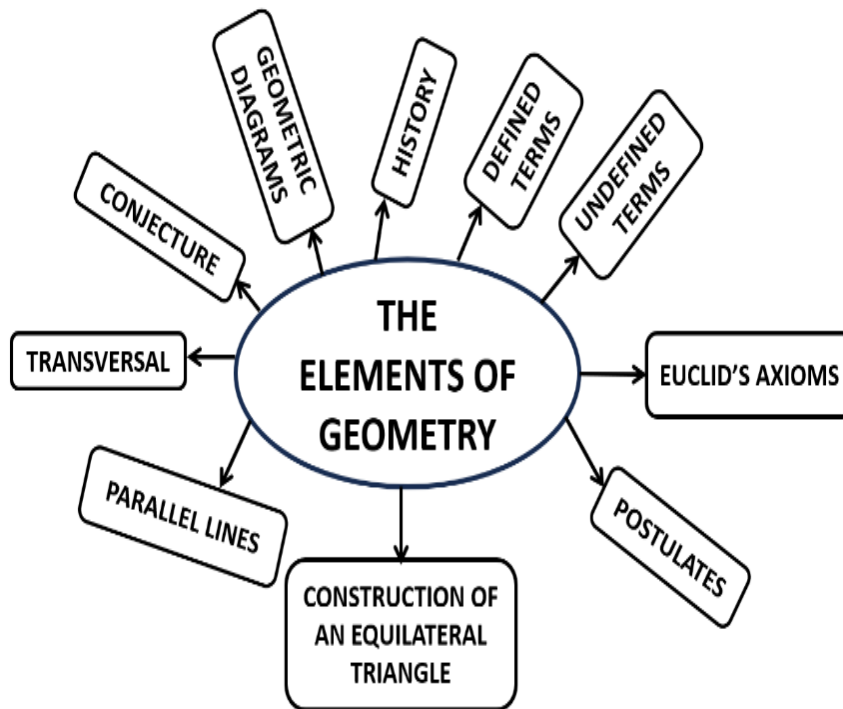
Prerequisites: Students must know the following:

Point, plane, ray, line segment, line, parallel lines, intersecting lines, half, double, equal, dimensions, surface, types of triangles based on angles, exterior angles, interior angles, angle sum property, hey transversal line, circle, centre, radius, reminder.

Number of allotted periods: 6 Periods

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
3. The elements of geometry.	1 Introduction of history of the elements of geometry.	1	
	2. Euclid's axioms and postulates	3	
	3. Equivalent version of 5th postulate or equivalent of 5th postulate and non-Euclidean geometry.	2	
	TOTAL	6	

CONCEPT MAP:



Required TLM: Charts, colour papers, Full protractor, triangle, circle shapes.

ICT TOOLS: GeoGebra, LMS App (IFP), DIKSHA App, Khan academy.

TEACHER REFERENCE:

TEACHER'S REFLECTIONS:

4. LINES AND ANGLES

Class: IX

Name of the Unit: 4. Lines and Angles.

Learning Outcomes: The learner

- Understands the concepts of acute, right, Obtuse, straight and reflex angles.
- Explains the difference between intersecting lines, parallel lines and concurrent lines.
- Understands the concept of complementary, supplementary and conjugate angles, linear pair of angles.
- Read and write the complementary, supplementary, conjugate and linear pair of angles.
- Explains the concept of linear pair of angles axiom.
- Identifies, read and write all angles of a transversal like corresponding angles alternate angles, interior angles exterior angles, vertically opposite angles etc.
- Solves the problems of angles of a transversal.
- Draw lines parallel to the same line.
- Solves the problems based on angle sum property of a triangle.
- Solves the problems based on relation between exterior and interior angles of a triangle.
- Solve the real life problems using the concept of lines and angles.

Prerequisites: Students must know the following:

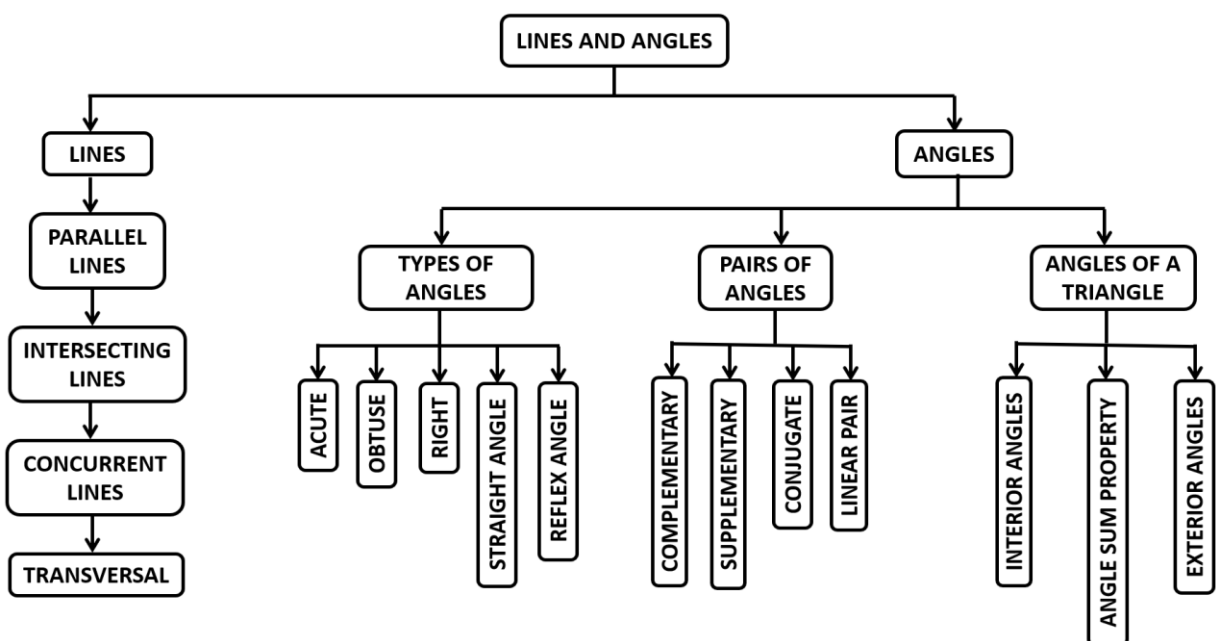
Angles, complementary and supplementary angles, linear pair, parallel lines, intersecting lines, transversal line, vertically opposite angles, interior angles, exterior angles, types of triangles based on sides and based on angles, straight angle and reflex angle.

Number of allotted periods: 15 Periods .

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
4. Lines and Angles.	1.Introduction of lines and angles, basic terms in geometry.	1	
	2. Intersecting lines, non-intersecting lines and concurrent lines	2	
	3. Pair of angles	2	

	4. Linear pair of angles axiom and angles in intersecting lines	2	
	5. Lines and a transversal	2	
	6. Lines parallel to the same line	2	
	7. Angle sum property of a triangle and exterior angles	3	
	TOTAL	14	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers.

ICT TOOLS: GeoGebra , LMS APP I(FP), DIKSHA APP, KHAN ACADEMY.

TEACHER REFERENCES:

TEACHER'S REFLECTIONS :

5. CO-ORDINATE GEOMETRY

Class: IX

Name of the Unit: 5. Co-ordinate Geometry.

Learning Outcomes: The learner

- Draw the coordinate axes on the graph paper.
- Explains the quadrants on the graph.
- Locate the points and the cartesian plane.
- Find the points on the graph.
- Write the quadrants of the given points.
- Write the x, y – coordinates of the point.
- Write the coordinates of the origin.
- Write the general forms of the points lies on the x – axis and y – axis.
- Locates and join the points on the graph paper and find the areas of the figure so formed.
- Solves the geometric problems related to coordinate geometry.
- Constructs triangles, parallelograms and tangles with given points on the graph.
- Connects the concept of coordinate geometry to everyday life situations.

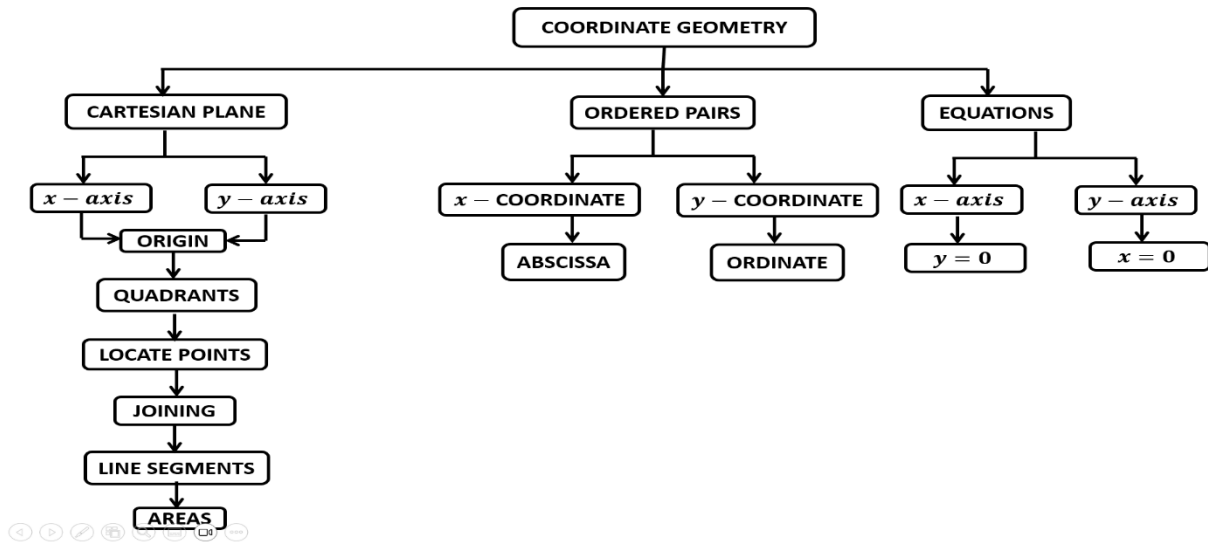
Prerequisites: Students must know the following:

Point, plane, line segment, line, x – axis, y –axis, triangle, rectangle, parallelogram and its formulae of areas, sum of digits, horizontal line, vertical line, origin.

Number of allotted periods: 6 Periods .

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
5. Co-ordinate Geometry.	1.Introduction of coordinate geometry and cartesian system	1	
	2. Locating points and coordinates of origin	2	
	3. Plotting a point on the cartesian plane when its coordinates are given	3	
	TOTAL	6	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers, 2D Shapes.

ICT TOOLS: GeoGebra, LMS App (IFP), DIKSHA App , Khan Academy.

TEACHER'S REFERENCE:

TEACHER'S REFLECTIONS:

6. LINEAR EQUATIONS IN TWO VARIABLES

Class: IX

Name of the Unit: 6. Linear equations in two variables.

Learning Outcomes: The learner

- Read and write the general form of linear equations in 2 variables.
- Express the linear equations in the form of $ax + by + c = 0$.
- Explain the general form of linear equation in 2 variables.
- Solve the problems of linear equations in 2 variables.
- Finds the different solutions of linear equations in 2 variables.
- Converts Verbal problems into linear equations and draw their graphs.
- Draw the graphs of linear equations in 2 variables and solves them.
- Check whether the given numbers are solutions of the given equation or not.
- Express the statements as linear equations in 2 variables.
- Write the values of a , b and c for given equations.
- Understands the concept that the graph of the equation $y = mx + c$ is passes through the origin.
- Identifies that the graph of every linear equation in 2 variables is a straight line.
- Express the general forms of equations of $x - axis$ and $y - axis$.
- Visualise the equations parallel to the $x - axis$ and $y - axis$.
- Relate the algebraic and graphical representation of a linear equation in 2 variables and apply the concept to daily life situations.

Prerequisites: Students must know the following:

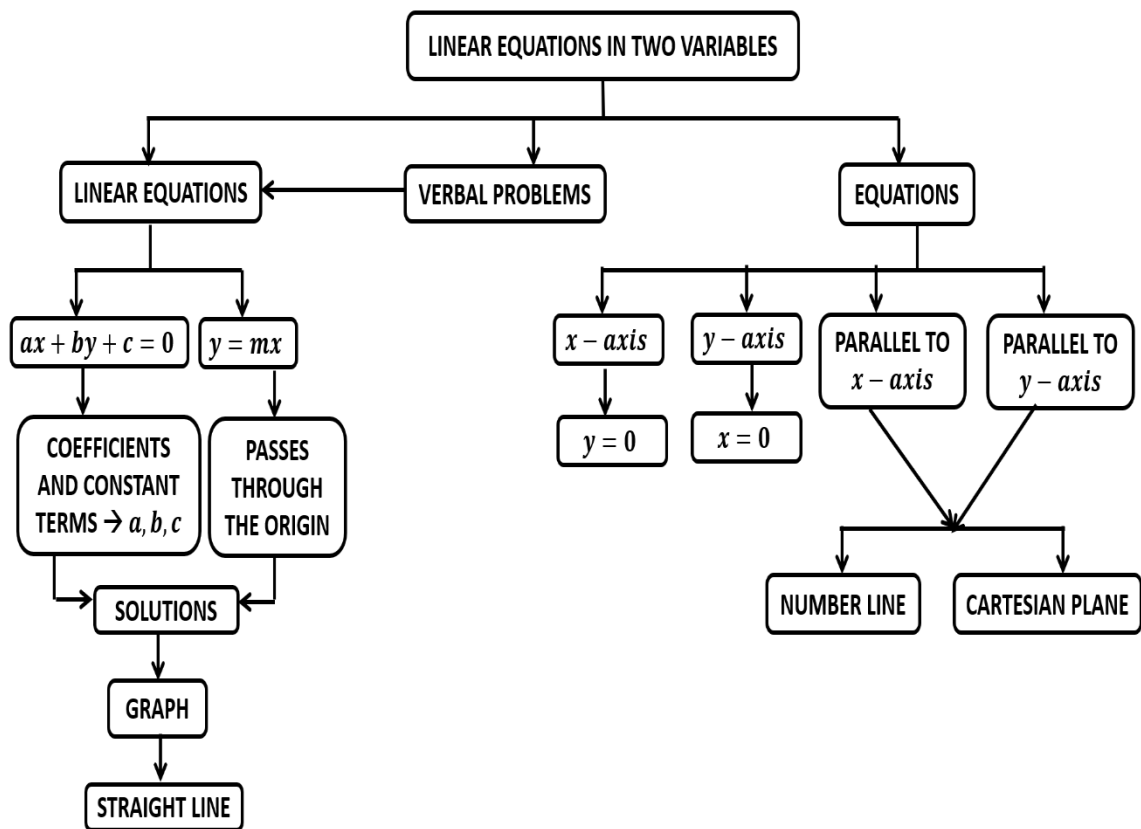
Variables, constant terms, Linear equation in one variable, coefficients, degree of the linear equation, parallel lines, $x - axis$, $y - axis$, horizontal line, vertical line, origin.

Number of allotted periods: 12 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Practice Periods
6. Linear equations in two variables.	1.Prerequisites and Introduction of linear equations in 2 variables	1	
	2. Solution of a linear equation in 2 variables	4	

	3. Graph of a linear equation in 2 variables	4	
	4. Equation of lines parallel to $x - axis$ and $y - axis$.	3	
	TOTAL	12	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers,

ICT TOOLS: GeoGebra, LMS (IFP APP), DIKSHA App

TEACHER'S REFERENCE:

TEACHER'S REFLECTIONS:

7. TRIANGLES

Class: IX

Name of the Unit: 7. Triangles

Learning Outcomes: The learner

- Explains whether the given triangles are congruent or not.
- Explains the congruency figures in their own words.
- Express the congruency figures in mathematical language using symbols.
- Explain the concept that to make unique triangle we require 3 independent measurements.
- Proves the rules of congruency of triangles.
- Solves the problems based on the rules of congruency of triangles.
- Generalise the rules of congruency of triangles through activities.
- Proves that the sum of any 2 sides of a triangle is greater than the 3rd side.
- Understands the concept that angles opposite to equal sides of an isosceles triangle are equal.
- Knows the concept that in every triangle, the angles opposite to the equal sides are equal.
- Proves the concept that, if 2 sides of a triangle are unequal, then the angle opposite to longer side is larger.
- Understands the concept that in any triangle, the side opposite to the larger angle is longer.
- Solves the problems based on the rules of inequality of sides of triangles.

Prerequisites: Students must know the following:

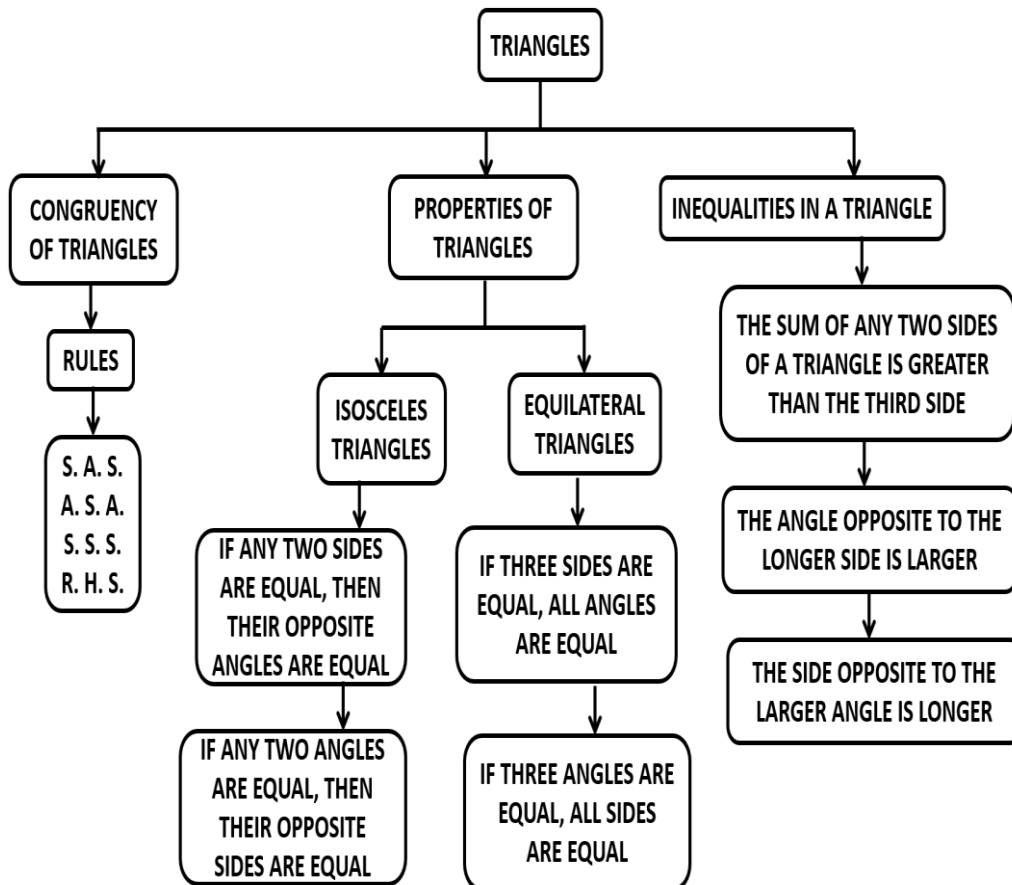
Required measurements of a triangle, types of triangles based on sides, based on angles, congruent figures, congruency symbol.

Number of allotted periods: 14 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
Triangles	1.Prerequisites and Introduction of triangles	1	
	2. Criteria for congruence of triangles	3	
	3. Some properties of a triangle	3	

	4. Some more criteria for congruence of triangles	3	
	5. Inequalities in a triangle	2	
	TOTAL	12	

CONCEPT MAP:



Required TLM: Charts, colour papers, TRAIANGLES papers,

ICT TOOLS: GeoGebra, LMS AAP

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

8. QUADRILATERALS

Class: IX

Name of the Unit: 8. Quadrilaterals

Learning Outcomes: The learner

- Understands the types of quadrilaterals and their properties.
- Check whether the given statements are true or not based on properties of quadrilaterals.
- Generalise the properties of parallelogram through activities.
- Identifies the differences between different types of quadrilaterals.
- Solves the problems using properties of quadrilaterals.
- Solves the problems based on properties of parallelogram.
- Solves the problems using sub theorems of parallelogram.
- Proves the theorems and sub theorems of parallelogram.
- Gives the examples for types of quadrilaterals.
- Explains the theorems in their own words.
- Proves the midpoint theorem and converse theorem of triangle.
- Solves the problems related to the midpoint theorem of triangle.
- Identifies that the sum of 4 angles of any quadrilateral is 360° or 4 right angles.
- Connect properties of triangles with properties of quadrilaterals.
- Connect properties of quadrilaterals with other geometrical concepts.

Prerequisites: Students must know the following:

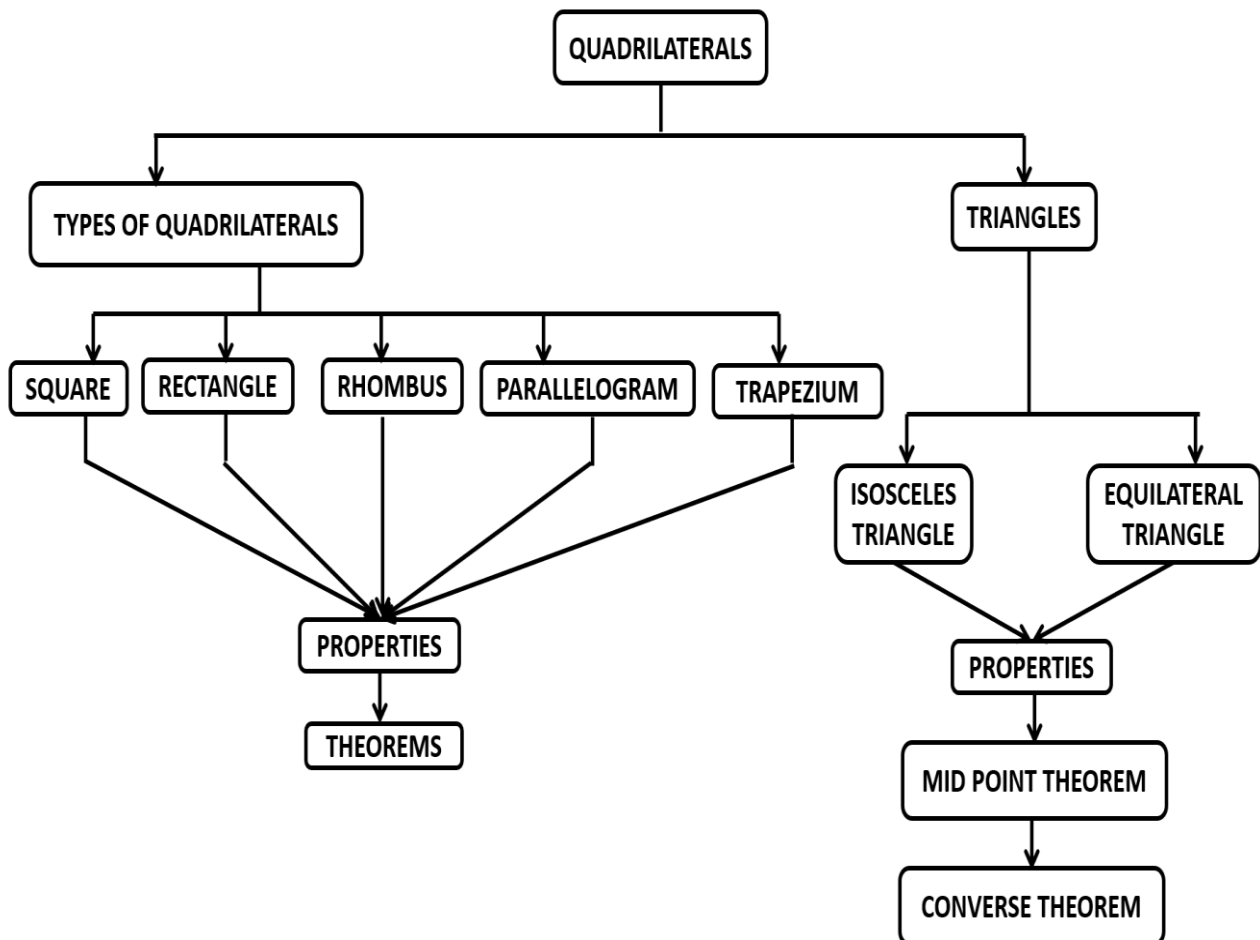
Triangles and their properties, quadrilateral, types of quadrilaterals and their properties, sum of angles in a quadrilateral, adjacent angles, opposite angles, opposite sides, midpoint, diagonals, perpendicular bisector, congruent triangles, adjacent sides, parallel lines, supplementary angles, transversal.

Number of allotted periods: 12 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
8. Quadrilaterals	1. Prerequisites and Introduction of quadrilaterals	1	
	2. Different types of quadrilaterals and their properties	3	
	3. Parallelogram and its properties	3	

	4. Midpoint theorem of a triangle	3	
	TOTAL	10	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers, shapes of various types of quadrilaterals

ICT TOOLS: GeoGebra, LMS App (IFP), DIKSHA App

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

9. STATISTICS

Class: IX

Name of the Unit: 9. Statistics

Learning Outcomes: The learner

- Prepares the ungrouped and grouped frequency tables and solves them.
- Explains the relationship between class intervals, boundaries and limits.
- Explains the definitions of Mean, Median and Mode.
- Reads and writes the formulae of Mean, Median and Mode.
- Interprets the results of frequency distribution tables.
- Solves the problems related to Mean, Median and Mode.
- Represents the data by frequency distribution tables.
- Writes frequency distribution table from the bar graph.
- Writes frequency distribution table from the histogram.

Prerequisites: Students must know the following:

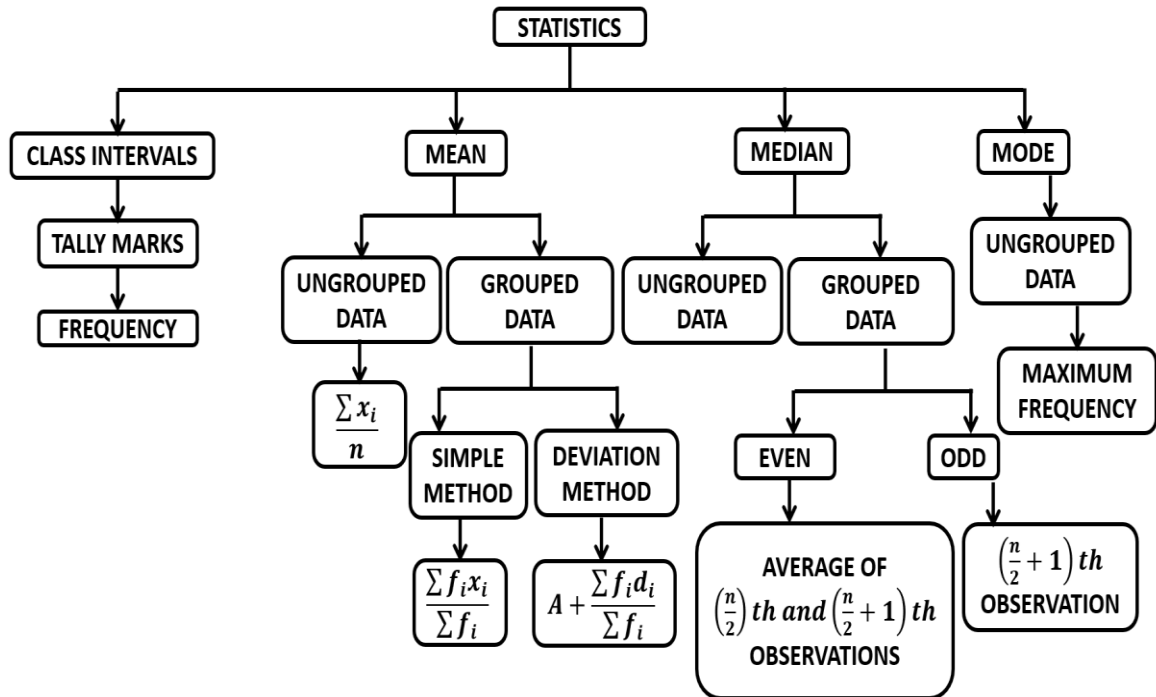
Class intervals, tally marks, frequency distribution, limits, boundaries, range, ungrouped data grouped data, cumulative frequency, mean, median, mode, bar graph and histogram.

Number of allotted periods: 18 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
Statistics	1. Prerequisites and Introduction of statistics, collection of data	1	
	2. Presentation of data	2	
	3. Measures of central tendency - arithmetic mean of raw data and ungrouped frequency distribution	3	
	4. Mean of ungrouped frequency distribution by simple method	2	
	5. Deviation method	2	
	6. Median of raw data	2	
	7. Median of a frequency distribution	2	
	8. Mode of raw data and group data	2	

	9. Deviation in values of central tendency	2	
	TOTAL	18	

CONCEPT MAP



Required TLM: Charts, colour papers, graph papers.

ICT TOOLS: GeoGebra

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

10. SURFACES AREAS AND VOLUMES

Class: IX

Name of the Unit: 10. Surface areas and volumes.

Learning Outcomes: The learner

- Finds the surface areas and volumes of different 3D figures - cube, cuboid, cylinder etc.
- Explains the difference between LSA, CSA and TSA of solids.
- Gives formulae of surface areas and volumes of different 3D figures and explain its terms.
- Uses the concept of surface areas and volumes of different 3D figures to solve daily life problems.
- Draw different 3D figures and their net shapes.
- Establishes relationship between surface areas and volumes of different 3D figures.

Prerequisites: Students must know the following:

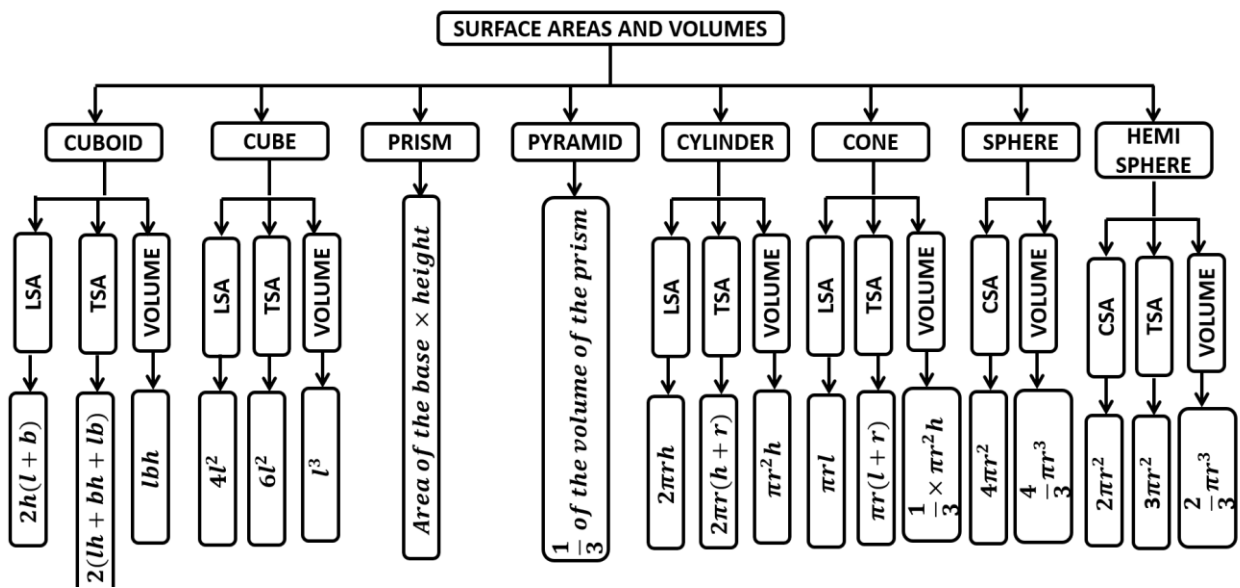
Identifying the shapes of 3 objects, visualising the 3D shapes, Nets of 3D shapes, areas of plane figures – triangle, square, rectangle, circle, substitutions and calculations.

Number of allotted periods: 21 Periods

Unit/Lesson Name	Sub-topics	Teaching Periods	Practice Periods
10. Surface areas and volumes.	1. Prerequisites and Introduction of surface areas and volumes	1	
	2. Total surface area and lateral surface area of cuboid	2	
	3. TSA and LSA of cube	2	
	4. Volume of cuboid and cube	2	
	5. Volume of Prism and Pyramid	2	
	6. Surface area of cylinder	2	
	7. Surface area of cone	2	
	8. Volume of cylinder	2	

	9. Volume of cone	2	
	10. Surface area of sphere and hemi sphere	2	
	11. Volume of sphere and hemi sphere	2	
	TOTAL	21	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers.

ICT TOOLS: GeoGebra

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

11. AREAS

Class: IX

Name of the Unit: 11. Areas

Learning Outcomes: The learner

- Finds the areas of different figures and formulae.
- Understands the concept that the areas of two congruent figures are equal, but converse need not to be true.
- Solves the problems using the properties of parallelograms and triangles which are between the same base and same parallel lines.
- Proves the theorems and sub theorems related to triangles between the same base and the same parallel lines.
- Proves that the median of triangle divides the triangle into two triangles of equal areas.
- States and explains the formulae for the areas of various geometrical figures.
- Explains the theorems and sub theorems in their own words.
- Connects the concept of areas with other geometrical figures.
- Understand the concept of triangles on the same base and having equal areas lie between the same parallel lines.
- Solves daily life problems related to the concept of areas.
- Visualize triangles and parallelograms between the same base and the same parallel lines on the graph paper.
- Understands the concept that if a parallelogram and a triangle are on the same base and between the same parallel lines, then the area of the triangle is half the area of the parallelograms.

Prerequisites: Students must know the following:

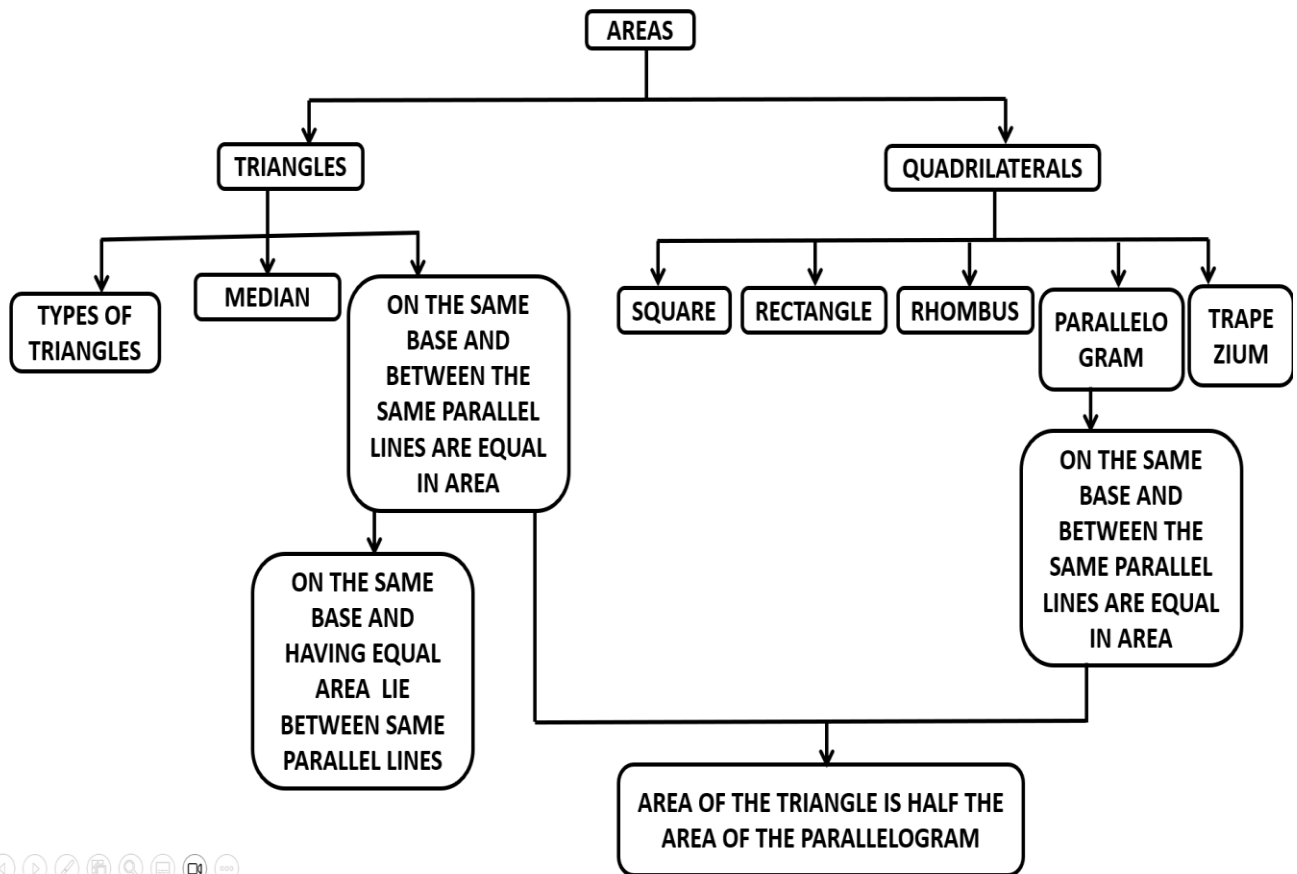
Types of triangles, properties of triangles, formula of area of triangle, types of quadrilaterals, properties quadrilaterals and their formulae of areas, Median, parallel lines, congruent figures and symbol, line segments, perpendicular lines.

Number of allotted periods: 11 Periods .

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
Areas	1.Prerequisites and Introduction of areas and area of plane regions	1	
	2. Area of rectangle	2	

.	3. Figures on the same base and between the same parallel lines	3	
	4. Triangles on the same base and between same parallel lines	4	
	TOTAL	10	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers

ICT TOOLS: GeoGebra, <https://apps.mathlearningcenter.org/geoboard/> site

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

12. CIRCLES

Class: IX

Name of the Unit: 12. Circles.

Learning Outcomes: The learner

- Defines circle and give examples.
- Proves that there is exactly one circle passes through three non-collinear points.
- Explains congruent circles and concentric circles in their own words.
- Solves the problems based on the theorems of angles in the same segment.
- Defines minor segment and major segment.
- Draws congruent circles and concentric circles.
- Constructs circumcircles of triangles.
- Proves the theorem that the opposite angles of a cyclic quadrilateral are supplementary.
- Solves the problems using properties of cyclic quadrilateral.
- Connects the concept of circle to daily life situations.
- Understands that the equal chords of a circle subtends equal angles at the Centre.

Prerequisites: Students must know the following:

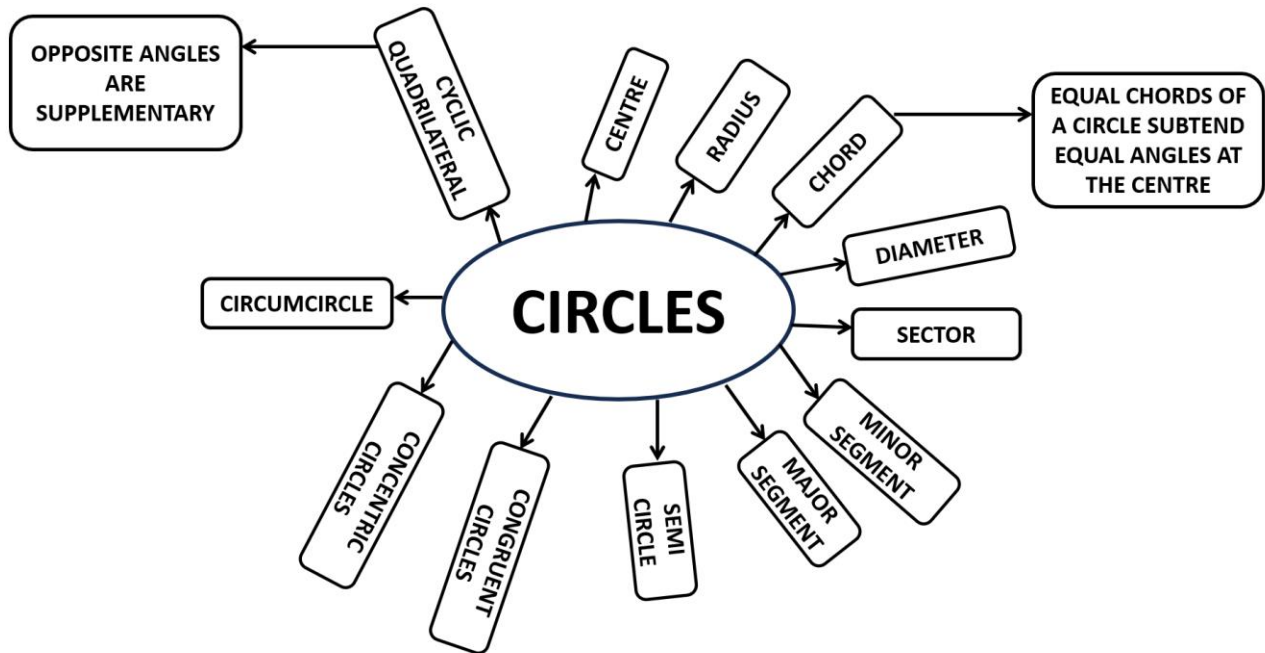
Circle, arc, radius, centre, point, sector, chord, diameter, triangle, quadrilateral.

Number of allotted periods: 15 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
12. Circles.	1.Prerequisites and Introduction of circles.	1	
	2. Angle subtended by a chord at a point on the circle.	2	
	3. Perpendicular from the centre to a chord.	2	
	4. The three points that describe a circle.	2	
	5. Chords and their distance from the centre of the circle.	2	
	6. Angle subtended by an arc of a circle at the centre.	2	

	7. Angle subtended by an arc at a point on the remaining part of circle.	2	
	8. Cyclic quadrilateral.	2	
	TOTAL	15	

CONCEPT MAP:



Required TLM: Chart, colour papers, graph papers

ICT TOOLS: GeoGebra

TEACHER’S REFERENCES:

TEACHER'S REFLECTIONS:

13. GEOMETRICAL CONSTRUCTIONS

Class: IX

Name of the Unit: 13. Geometrical Constructions.

Learning Outcomes: The learner

- Constructs the perpendicular bisector of a given line segment.
- Constructs the bisector of a given angle.
- Constructs angles like 60° , 30° , 120° , 90° , 45° etc. without using protractor.
- Constructs an equilateral triangle and an isosceles triangle.
- Solves the problems based on the concept of geometrical constructions.
- Constructs a triangle when base, a base angle and the sum of other two sides are given.
- Constructs a triangle when base, a base angle and the difference of the other two sides are given.
- Constructs a triangle when perimeter and two base angles are given.
- Constructs a right-angled triangle when base and the sum of hypotenuse and other side are given.
- Constructs a circle segment for a given chord and angle.

Prerequisites: Students must know the following:

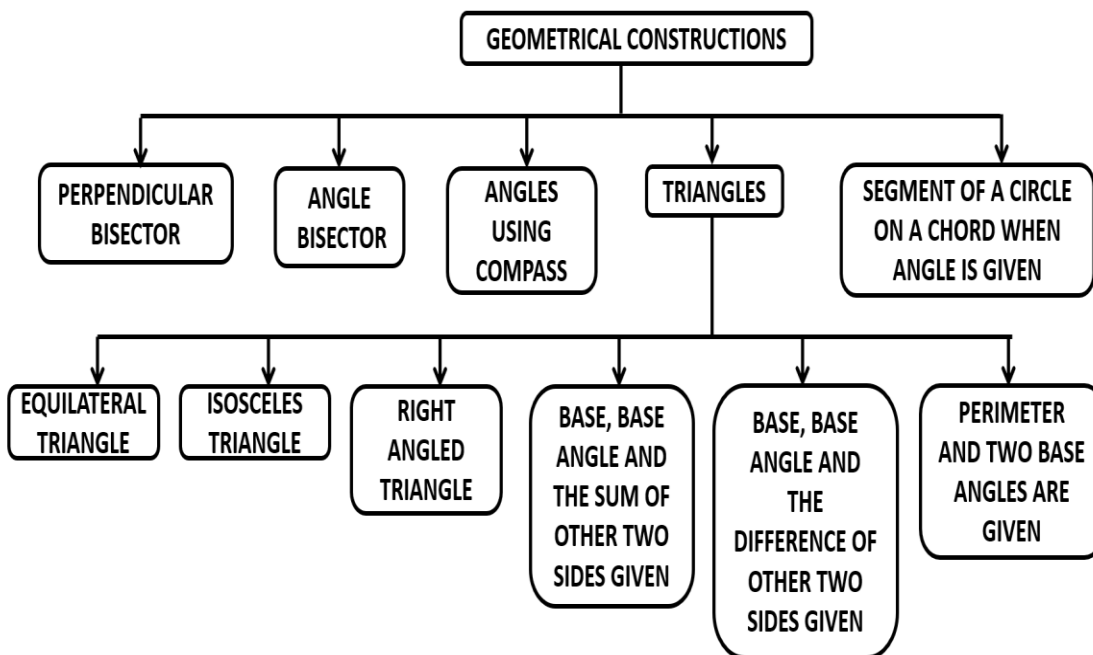
Types of triangles, chord, circle, segment of a circle, perpendicular bisector, angle bisector, construction of a triangle, construction of angles using compass, perimeter of triangle, sum, difference, line segment.

Number of allotted periods: 17 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Remarks
Geometrical Constructions.	1.Prerequisites and Introduction of basic construction, to construct the perpendicular bisector of a given line segment	1	
	2. To construct the bisector of a given angle.	2	
	3. To construct angles of 60° , 30° , 120° , 90° , 45° etc.	3	
	4. Construction of triangles	2	

	(i) To construct a triangle given its base, a base angle and the sum of the other two sides		
	5. (ii) To construct a triangle given its base, a base angle and the difference of other two sides.	2	
	6. (iii) To construct a triangle given its perimeter and its two base angles.	2	
	7. (iv) To construct a right triangle when base and sum of its hypotenuse and other side is given.	2	
	8. To construct a circle segment given a chord and angle.	2	
	TOTAL	18	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers

ICT TOOLS: GeoGebra

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS:

14. PROBABILITY

Class: IX

Name of the Unit: 14. Probability

Learning Outcomes: The learner

- Explains the words related to probability like random experiment, outcomes, event etc.
- Classifies the chances to equally likely, less likely, more likely.
- Gives examples of equally likely, less likely, more likely.
- Generalize that the sum of the probabilities of all the outcomes of a random experiment is always equal to 1.
- Generalize that the probability of an event always lies between 0 and 1.
- Learns that the probability of a certain event is 1.
- Learns that the probability of impossible event is 0.
- Solves the problems related to probability.
- Interpret the results of a random experiment.
- Visualize the observations and results of random experiment in the form of tables.
- Connects the concept of probability is to real life situations such as weather, insurance and exit poll etc.

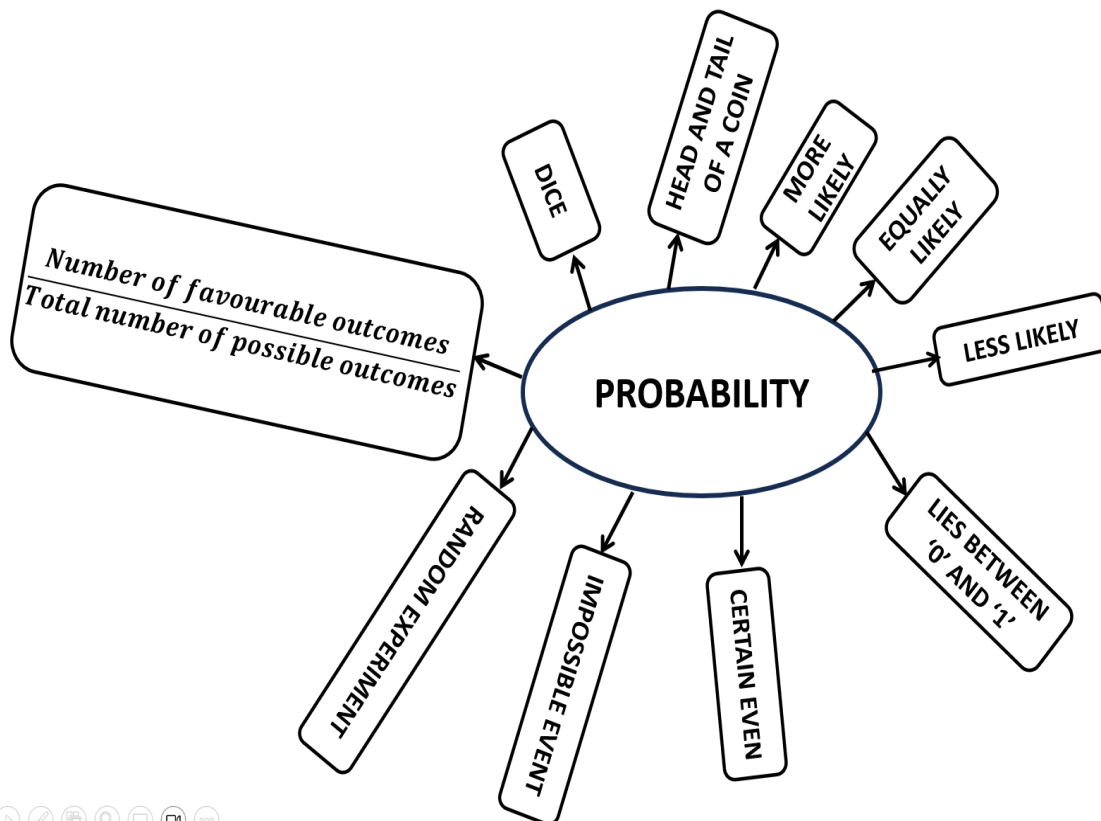
Prerequisites: Students must know the following:

More likely, no chance, equal chance, impossible, sum, dice, head and tails of a coin, less likely, odd numbers, even numbers, prime numbers, natural numbers, whole numbers.

Number of allotted periods: 8 Periods .

Unit/Lesson Name	Sub-topics	Teaching Periods	Practice Periods
14. Probability	1.Prerequisites and Introduction of Probability.	1	
	2. Equally likely outcomes, Trials and events.	2	
	3. Linking the chance to probability.	3	
	4. Uses of probability in real life.	2	
	TOTAL	8	

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers,

ICT TOOLS: GeoGebra

TEACHER'S REFERENCES:

TEACHER'S REFLECTONS:

15. PROOFS IN MATHEMATICS

Class: IX

Name of the Unit: 15. Proofs in Mathematics.

Learning Outcomes: The learner

- Explains the reasons for whether given statements are true or not.
- Solves the problems through deductive method.
- Understands the concept of mathematical proof.
- Tests with examples to proof of inductive and deductive methods.
- Observes patterns and make hypotheses and check them.
- Prepare the mathematical hypotheses.
- Express hypotheses in mathematical language using appropriate symbols.
- Explains the theorems, axioms and conjectures in their own words.
- Visualize mathematical hypotheses with patterns.
- Connects the concepts of real numbers, algebra and geometry in formulating mathematical hypotheses.

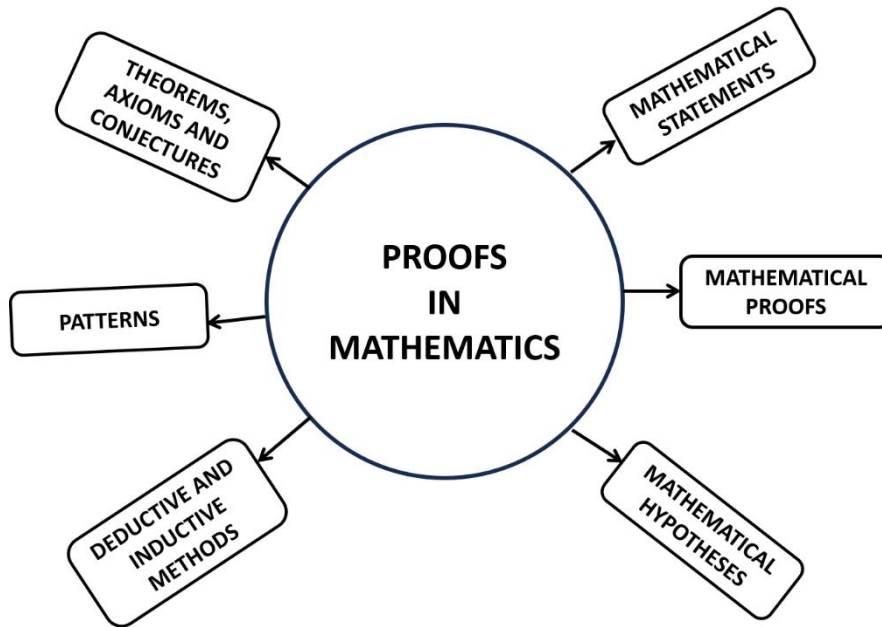
Prerequisites: Students must know the following:

Natural numbers, odd numbers, even numbers, multiples, square, rectangle, perimeter, sum of three angles of a triangle, greater than, less than, patterns, hypothesis, statements, theorems, axioms and conjectures.

Number of allotted periods: 9 Periods.

Unit/Lesson Name	Sub-topics	Teaching Periods	Practice Periods
15. Proofs in Mathematics.	1.Prerequisites and Introduction of Proofs and Mathematical statements.	1	
	2. Verifying the statements.	2	
	3. Reasoning in Mathematics → Deductive reasoning	2	
	4. Theorems, conjectures and axioms	2	
	5. What is Mathematical Proof?	2	
	TOTAL		9

CONCEPT MAP:



Required TLM: Charts, colour papers, graph papers

ICT TOOS: GeoGebra

TEACHER'S REFERENCES:

TEACHER'S REFLECTIONS: