MATHEMATICS
LESSON PLAN

9TH STANDARD

2025

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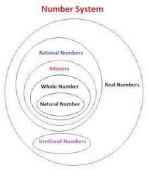
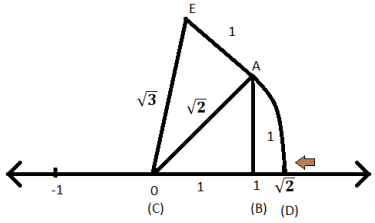
Unit: 01 Methodology: Demonstration cum lecture method Unit name: Number systems
Date: From to

Objectives:

1. Finding many rational numbers between two given rational numbers
2. Locate irrational numbers on number line
3. Decimal expansion of real numbers
4. Operations on real numbers
5. To rationalizing the denominator
6. Laws of exponents for real number

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions of number system like natural numbers, whole numbers, odd numbers & even numbers, ect.	Chart of numbers, board.	Discussion & group discussion.	Will try to answers	
Explore	Start the session by asking some question related to numbers. 	Chart Calendar projector	Questionnaire	Answering for supplementary questions.	
Explain	Introduce the chapter, explain all type of numbers. Then explain about different types of decimals like terminating and non-terminating and also explain rational and irrational numbers. **Number line:** explain how to write the irrational numbers on number line.  **Laws of exponents:** explain the concept of exponents and radicals by taking some examples.	Board Smart board Laptop projector	Discussion & group activities		
Elaborate	Now students will able to write rational and irrational numbers on number line, they also able to solve the problems on laws of exponents.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Now teacher will assign some word problems based on our daily life situations and help the students in	Textbook	Evaluation	Try to do all problems	

	the implementation of the above formulas in this problems.			in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 02 Methodology: Demonstration cum lecture method Unit name: Polynomials.
Date: From to

Objectives:

1. To understand the degree of the polynomials
2. To check the zeros of the polynomials
3. Factorizing the polynomials
4. Remainder theorem
5. Algebraic identities

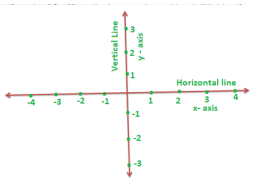
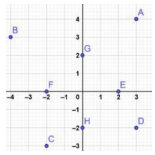
Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, asking questions monomials, binomials and trinomials, etc.	Chart of algebraic terms, board.	Discussion & group discussion.	Will try to answers	
Explore	Addition, subtraction, multiplication and division of algebraic terms, Evaluation of an algebraic expression for the given values of variable. Now introduce the chapter polynomials.	Chart Different colors of chalks projector	Questionnaire	Answering for supplementary questions.	
Explain	**Introduction to Polynomials:** Recognize variables and their degree in a given algebraic expression in order to differentiate whether given expression is a polynomial in one variable or not. **Polynomials in one variable:** Substitute the value of 'a' in a given expression p(x) in order to find the value of polynomial at 'a' i.e. p(a). Zeroes of a Polynomial: Use given values for the variable 'x' in a polynomial p(x) in order to identify if the given value is a zero of the polynomials. **Remainder Theorem**: Using Remainder Theorem, calculate division of p(x) by a linear polynomial 'x – a' in order to find that the remainder is p(a) and verify using long division method. **Algebraic Identities:** Point out to an algebraic identity that can be used in order to factorize a given expression.	Chart Different colors of chalks projector	Discussion & group activities		

Elaborate	Identifies/Classifies polynomials among algebraic expressions in order to apply appropriate algebraic identities to factorize them.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Now the teacher will discuss the above concepts by taking varied examples. Solve the problems given in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Unit: 09 **Methodology: synthetic and analytic method Unit name: Coordinate geometry.**
Date: From to

Objectives:

1. Cartesian plane axis & quadrants.
2. Coordinates of a point, name and terms associated with the coordinate plane.
3. Plotting points in the plane.

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions algebraic and geometric terms ect.	Chart, Projector chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher ask the class about the meaning of word "geometry". After getting the different answers from the class, introduce the chapter.	Chart project or ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Introduction:** to locate the point in the plane we use a system of two lines which are perpendicular to each other. This system was first developed by French mathematician Rene Descartes. **Cartesian coordinate system:**  Deep explanation about Cartesian system. **Representation of coordinates in Cartesian plane:** 	Graph Smart board Projector Geometry kit Ect.	Discussion & group activities		

Elaborate	Make a student group and give them to locate the points on Cartesian plane. By using different examples they make perfect.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 04 **Methodology: Demonstration & project method Unit name: linear equations in two variables.**
Date: From to

Objectives:

1. To know about equations, linear equations in two variables
2. To understand a linear equations in two variables has many solutions.
3. To understand the graph of every linear equation in two variables is a straight line
4. To find the many solutions in linear equations in two variables
5. To know about a linear equations is parallel to x axis and y axis

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related to linear equations in one variable, Cartesian coordinate system and representing points ect.	Chart, Projector chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about linear equations in one variable. After getting the different answers from the class, introduce the chapter.	Chart project or ppt	Questionnaire	Answering for supplementary questions.	

Explain	**Linear equations in one variable:** ax+b=0, 3x+4=0 & -3y+5=0 **Linear equations in two variable:** 3x+2y=4 & 4z-3y+5=0 **Solutions of linear pair of linear equations:** Let us take an example 3x+4y=12, If y=0, then x=4 If y=3, then x=8 If y=-3, then x=0 If y=-6, then x=-4	Markers Smart board Projector Graph Geometry kit Ect.	Discussion & group activities		
Elaborate	Make a student group and give them to solve the problems by taking different examples of linear equations. help them to plot the graph.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 05 Methodology: inductive and deductive Unit name: Introduction to Euclid's Geometry.
Date: From to

Objectives:

1. To know about undefined terms.
2. To know about Euclid's postulates and axioms
3. Understand the axioms and postulates
4. Know about two equivalent versions of Euclid's fifth postulate.

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Basic knowledge of terminology used in geometry such as circle, point, lines, regions etc	Chart of numbers, board.	Discussion & group discussion.	Will try to answers	

Explore	Teacher will start the class by defining a rectangle. So, to define one thing, you need to define many other things, and you may get a long chain of definitions without an end, for example, you might get the term 'point' in one of the definitions which is very difficult to simplify/define further.	Chart Calendar projector	Questionnaire	Answering for supplementary questions.	
Explain	**Introduction**: Give examples of theorems, postulates and axioms in order to differentiate between them with examples **Euclid's Definitions, Axioms and Postulates:** Reproduce Euclid's axioms in your own words in order to give examples for each List Euclid's 5 postulates in order to visualize and illustrate them through a diagram Analyze given statements/postulates in order to determine if they are extensions of **Euclid's postulates** Apply Euclid's postulates in order to prove basic geometrical concepts about lines, points, planes, shapes, etc	Board Smart board ppt	Discussion & group activities		
Elaborate	Applies axiomatic approach and derives proofs of mathematical statements particularly geometric shapes in order to solve the problems on them.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Now the teacher will discuss the above axioms by taking varied examples and introducing Postulates in the same way. Solve the problems given in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Unit: 06 Methodology: Demonstration cum lecture method Unit name: Lines and angles.
Date: From to

Objectives:

1. To know about linear pair axiom.
2. To know about how vertically opposite angles are equal.
3. To understand what happened if two transversal lines parallel

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME

Engage	Start the session by checking the previous knowledge, asking questions related to Parallel lines, intersecting lines,transversal, corresponding angles, alternate interior angles, etc.	Chart of numbers, board.	Discussion & group discussion.	Will try to answers	
Explore	The teacher will ask the following questions: What is a transversal? What are exterior angles? What are interior angles? By getting answers, introduce the chapter.	Chart Calendar projector	Questionnaire	Answering for supplementary questions.	
Explain	**Basic Terms and Definitions**: Define segment, ray, collinear points, non-collinear points, acute angle, right angle, obtuse angle, straight angle, reflex angle, complementary angles. **Pairs of Angles**: Label angles created by 2 intersecting lines in order to identify vertically opposite pairs, adjacent angles, linear pairs, complementary/supplementary pairs of angles. **Parallel Lines and a Transversal:** Label angles created by a transversal intersecting two parallel lines in order to identify corresponding angles, alternate angles, interior angles and define relationship between these angles. **Angle Sum Property of a Triangle:** Define relationship between angles formed when a triangle is placed between two parallel lines in order to prove that exterior angle of a triangle is the sum of the two opposite interior angles.	Board Smart board Ppt Geometry kit	Discussion & group activities		
Elaborate	Applies axiomatic approach and derives proofs of mathematical statements particularly geometric shapes in order to solve the problems on them.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Now the teacher will discuss the above concepts by taking varied examples.Solve the problems given in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

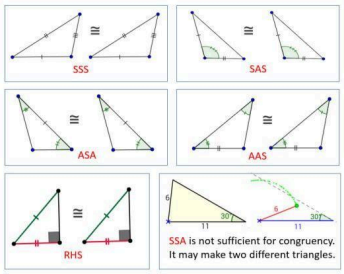
Unit: 07 **Methodology: Demonstration & lecture method Unit name: Triangles.**

Date: From to

Objectives:

1. To understand the congruent figures.
2. To know about congruent triangles.
3. To understand the rule of the congruent.
4. To know about sides related to the triangles.

5. Understand the sum of any two sides of a triangle is greater than the third side.

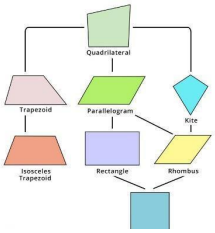
Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Students know that Construction of triangles, ASA, SSS, SAS, RHS Congruence. On the basis of this knowledge teacher will ask some questions.	Chart, board.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about different types of triangles and about simple properties. After getting different answers from the class now teacher introduce the chapter.	Chart Paper ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Congruence:** Now teacher will explain the congruence of things, figures & finally triangles.  **Theorems:** teacher will provide the proof of ASA, SSS, SAS, RHS theorems.	Geometry kit Chart paper Markers Smart board projector Ect.	Discussion & group activities		
Elaborate	Students will understand the different types of triangles, congruence conditions, triangular in equalities and theorems.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Now the teacher will discuss the above concepts by taking varied examples. Solve the problems given in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 08 **Methodology: Demonstration & lecture method Unit name: Quadrilaterals.**
Date: From to
Objectives:

1. To understand the sum of the angles of the quadrilateral is 360^0

2. To know about a diagonal of a parallelogram divides it in to two congruent triangles
3. To know about how quadrilaterals is a parallelogram
4. To understand diagonals of a rectangle bisect each other and are equal.
5. To understand a line through the mid-point of a side of a triangles parallel to another side bisects the third side.
6. To know about how the quadrilateral formed by joining the mid-points of the sides of a quadrilateral, in order, is a parallelogram.

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related to properties of triangles, quadrilaterals and types of quadrilaterals, ect.	Chart, Different colors of chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about different types of polygons and then different types of quadrilaterals. After getting different answers from the class, introduce the chapter.	Chart Paper ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Quadrilaterals:** explain about quadrilaterals and its properties. Also explain types of quadrilaterals.  Teacher should explain all the theorems mentioned in the objective and guide the students to prepare only those theorems for examination. In order to increase the concept of clarity in the minds of the student teacher should divide the content in parts and prepare worksheet for all types of students.	Geometry kit Chart paper Markers Smart board projector Ect.	Discussion & group activities		
Elaborate	Students will be able to understand the concept of quadrilaterals, types and properties.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 09 **Methodology: Demonstration & lecture method**
Unit name: Circles.

Date: From to

Objectives:

1. To understand the definition of circles, related to terms of circles.
2. To know about equal chords of the circle subtend equal angles at the centre
3. To understand perpendicular from the centre of a circle to a chord bisects the chord.
4. To know there is one and only one circle passing through three non-collinear points.
5. To understand the angles in the same segment of a circle are equal.

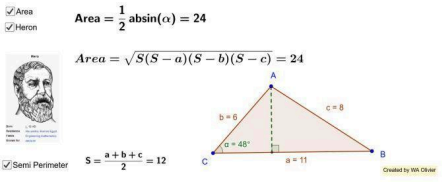
Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related to parts of circles ect.	Chart, ppt color chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about parts of circles. After getting the different answers from the class, introduce the chapter.	Chart projector ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Circles and its Related Terms: A Review** Define radius, chord, diameter, segment (major and minor), arc (major and minor), interior or exterior of a circle in order to illustrate and label them on a given circle. **Angle Subtended by a Chord at a Point:** Apply theorems regarding angle subtended by a chord in a circle in order to find the measure of an angle in the given figure. **Circle through Three Points:** Construct circle passing through 1, 2 & 3 non-collinear points in order to comment on how many circles can be constructed passing through them. **Angle subtended by arc of the circle:** Interpret and apply theorems on the angles subtended by arcs of a circle in order to solve for unknown values in given examples. **Cyclic Quadrilaterals**: Apply the relation between angles of a cyclic quadrilateral in order to solve for the value of a given angle.	Markers Smart board Projector Geometry kit Paper cut out of circles Ect.	Discussion & group activities		
Elaborate	Make a student group and give them to solve the problems by taking different examples circles, help them to prove themselves.	Exercise problems In textbook	Activity	Discussion with students	
Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 10 **Methodology: Demonstration & inductive Unit name: Heron's formula.**
Date: From to

Objectives:

1. To understand the areas of different types of geometrical figures
2. To know about how to find the area of triangle
3. To understand the finding of area of triangle when 3 sides given.
4. To calculate the area of a quadrilateral whose sides and diagonal are given by using Heron's formula

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related to different types of triangles, perimeter, & area ect.	Chart, Projector chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about meaning of lines and angles, and different types of angles. After getting the different answers from the class, introduce the chapter.	Chart project or ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Introduction**: Calculate area of a given triangle to state the limitation of the Standard formula (Area of Triangle = 1/2 x b x h).  **Area of a Triangle by Heron's formula:** Apply Heron's formula in order to calculate the area of a Triangle. **Application of Heron's Formula in finding** **Areas of Quadrilateral:** Breakdown a given polygon into triangles in order to find the area of a given polygon as a sum of areas of those triangles.	Markers Smart board projector Ect.	Discussion & group activities		
Elaborate	Students will be able to understand the concept of Heron's formula, will do problems individually. Additional problems will solve with the help of teacher.	Exercise problems In textbook	Activity	Discussion with students	

Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

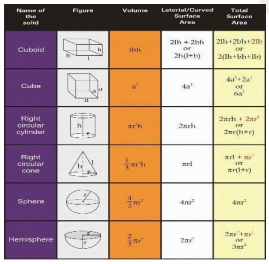
Unit: 11 Methodology: Demonstration, problem solving & lecture method Unit name: Surface area and volumes.
Date: From to

Objectives:

1. To calculate surface area of a cuboid
2. To calculate the surface area of a cube
3. To calculate the surface area of a cylinder
4. To calculate the total surface area of cylinder
5. To calculate the curved surface area of cone
6. To calculate the total surface area of a right circular cone
7. To calculate the surface area of sphere
8. To calculate the volume of cube
9. To calculate the volume of cylinder
10. To calculate the volume of cone

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related constructions of cubes ect.	Chart, ppt color chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about solid shaped regarding to the geometry. After getting the different answers from the class, introduce the chapter.	Chart projector scissor, paper cut ppt	Questionnaire	Answering for supplementary questions.	

Explain	**Surface Area of a Cuboid and a Cube**: Calculate the surface area (lateral and total) of the cube or cuboid in order to determine the cost of painting/covering the given surface. **Surface Area of a Right Circular Cylinder:** Calculate the surface area (curved and total) of a cylinder to determine the cost of painting/covering the given surface. **Surface Area of a Right Circular Cone**: Calculate the surface area (curved and total) of a cone to determine the cost of painting/covering the given surface. **Surface Area of a Sphere:** Calculate the surface area of a sphere/hemisphere to determine the cost of painting/covering the given surface of a sphere/hemisphere. **Volume of a Cube:** Calculate the volume of a given cube in order to infer the quantity of any substance it can hold. **Volume of a Cuboid:** Calculate the volume of a given cuboid in order to infer the quantity of any substance it can hold.	Chart projecto r scissor, paper cut ppt modals	Discussion & group activities		

	Volume of a Cylinder: Calculate the volume of a given cylinder in order to infer the quantity of any substance it can hold **Volume of a Cone**: Calculate the volume of a given cone in order to infer the quantity of any substance it can hold **Volume of a sphere**: Calculate the volume of a given sphere in order to infer the quantity of any substance it can hold. **Volume of a hemisphere:** Calculate the volume of a given hemisphere in order to infer the quantity of any substance it can hold.  				
Elaborate	Make a student group and give them to solve the problems by taking different examples in surface area and volumes, help them to prove themselves.	Exercise problem s In textbook	Activity	Discussion with students	

Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**

Unit: 12 **Methodology: Demonstration & lecture method Unit name: Statistics.**
Date: From to

Objectives:

1. To understand facts or figures, collected with a definite purpose, are called data.
2. To understand bar graph, pie chart.
3. Statistics is the area of study dealing with the presentation, analysis and interpretation of data.
4. How data can be presented graphically in the form of bar graphs, histograms and frequency polygons.
5. The three measures of central tendency for ungrouped data.

Steps	Activities To Favourable For Learning	TLM	Evaluation Tools & Techniques	Teachers Introspection	TIME
Engage	Start the session by checking the previous knowledge, by asking the questions related to tally marks, frequency ect.	Chart, ppt color chalks.	Discussion & group discussion.	Will try to answers	
Explore	Teacher will ask the class about frequency distribution table, class interval ect. After getting the different answers from the class, introduce the chapter.	Chart projector paper cut ppt	Questionnaire	Answering for supplementary questions.	
Explain	**Frequency Table:** Record and label a given data set in order to create a frequency table. **Bar Graph:** Identify an appropriate scale and labels in order to represent given data through a bar graph. **Histogram:** Read the given data in order to create a histogram for continuous and discontinuous data sets. **Frequency Polygon:** Read the given data in order to create a frequency polygon for given data sets.	Pen Paper Pencils Scale ect	Discussion & group activities		
Elaborate	Represents given data in different forms like, tabular form (grouped or ungrouped), bar graph, histogram (with equal and varying width and length), and frequency polygon in order to analyze	Exercise problems In textbook	Activity	Discussion with students	

	given data.				
Evaluate	Teacher will assign some problems to do work. For practice students should do problems in textbook.	Textbook	Evaluation	Try to do all problems in textbook.	

Subject teacher **Head master or mistress/Principal**