

**P M English Medium School, Dhinoj**  
**Annual Syllabus breakup - 2024-25**  
**Grade 9**

**Subject: Mathematics**

Month	Topics	Learning Outcome
April (22 Days)	1) Number Systems	<ul style="list-style-type: none"> <li>● The students will be able to classify real numbers: Rational and Irrational.</li> <li>● The students will be able to locate real numbers on the number line.</li> <li>● The students will be able to perform decimal expansion of real numbers.</li> <li>● The students will be able to express any given number in the form of <math>\frac{p}{q}</math>.</li> <li>● The students will be able to perform operations (Addition/ Subtraction/ Division/ Multiplication) on real numbers.</li> <li>● The students will be able to Rationalise the denominator.</li> <li>● The students will be able to use laws of exponents for real numbers.</li> <li>● The students will be able to solve the questions other than the textual questions.</li> </ul>
	2) Polynomials	<ul style="list-style-type: none"> <li>● The students will be able to Recall the terms such as variables/literals, constants, coefficient etc.</li> <li>● The students will be able to elicit degree of a polynomial, differentiate between algebraic expressions and polynomials.</li> <li>● The students will be able to differentiate polynomials based on degree: linear, quadratic, cubic and number of terms: monomial, binomial and trinomial.</li> <li>● The students will be able to define the zeros of a polynomial.</li> <li>● The students will be able to find the zeros of a polynomial.</li> <li>● The students will be able to factorise the polynomials using algebraic identities and factor theorem.</li> <li>● The students will be able to Use suitable identities to solve the given algebraic expressions.</li> </ul>

		<ul style="list-style-type: none"> <li>● The students will be able to solve the questions other than the textual questions.</li> </ul>
<p>June (16 Days) I Quarterly Exam Ch. – 1,2,3</p>	<p>3) Coordinate Geometry</p> <p>4) Linear Equation in Two Variables</p>	<ul style="list-style-type: none"> <li>● The students will be able to understand the concept of coordinate plane, including: x-axis, y-axis, quadrants and the origin.</li> <li>● The students will be able to define the terms: origin, abscissa, ordinate, etc.</li> <li>● The students will be able to plot the points accurately on a coordinate plane using ordered pair (x, y).</li> <li>● Identify the quadrant in which a given point lies by using the sign conventions.</li> <li>● The students will be able to solve the questions other than the textual questions.</li>   <li>● The students will be able to Recall the meaning of the word linear</li> <li>● The students will be able to Express a statement into a linear equation in two variables.</li> <li>● The students will be able to Find the solutions of a linear equation.</li> <li>● The students will be able to Read and represent linear equations in two variables.</li> <li>● The students will be able to solve the questions other than the textual questions.</li> </ul>
<p>July (23 Days)</p>	<p>5) Euclid's Geometry</p>	<ul style="list-style-type: none"> <li>● The students will be able to understand and articulate fundamental geometric terms such as point, line, plane, circle, etc.</li> <li>● The students will be able to distinguish axioms and postulates and understand their role in establishing the foundational principles of geometry.</li> <li>● The students will be able to identify terms and definitions used by Euclid and how it helped the future mathematicians.</li> <li>● The students will be able to solve the questions other than the textual questions.</li> </ul>

	<p>6) Lines and Angles</p> <p>7) Triangles Cont.....</p>	<ul style="list-style-type: none"> <li>● The students will be able to define basic terms of geometry.</li> <li>● The students will be able to recall types of angles: (acute, obtuse, right, straight, reflex, linear pair, vertically opposite angles, adjacent angles.)</li> <li>● The students will be able to solve problems by applying suitable axioms such as linear pair, vertically opposite angles, etc.</li> <li>● The students will be able to Apply angle sum property of a triangle and exterior angle property to solve the given sums.</li> <li>● The students will be able to Find out the relation between the angles when pairs of parallel lines and a transversal intersect each other.</li> <li>● The students will be able to use the theorems based on the concept of a transversal and parallel lines to solve the given sums.</li> <li>● The students will be able to solve the questions other than the textual questions.</li> <li>● Students will be able to recall the parts/elements of a triangle</li> <li>● Students will be able to define congruence of lines and angles of two triangles</li> <li>● Students will be able to elicit the correspondence of two given triangles.</li> <li>● Students will be able to understand different criteria of Congruency Students will be able to prove the congruence of two given triangles under the congruence criterion: SSS, SAS, ASA, and RHS.</li> </ul>
<p>August (19 Days)</p>	<p>7) Triangles</p> <p>Revision for Term – 1 Exam</p>	<ul style="list-style-type: none"> <li>❖ Students will be able to apply suitable congruence condition to solve the sum by finding the matching Parts</li> <li>❖ Students will be able to use isosceles triangle property and its converse to deduce the solution of the question.</li> <li>❖ Students will be able to comprehend the relation between unequal sides and unequal angles of a triangle</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> </ul>

<p>September (10 Days) Ch. – 1,2,3,4,5,6,7</p>	<p>Revision Term-1 Exam 8) Quadrilaterals Cont.....</p>	<ul style="list-style-type: none"> <li>❖ The students will be able to recall the different types of quadrilaterals based on their properties, such as parallelograms, rectangles, squares, rhombuses, trapezoids, and kites. They should also understand the characteristics that distinguish each type.</li> <li>❖ The students will be able to comprehend the defining properties of quadrilaterals, including angles, side lengths, and diagonals.-</li> </ul>
<p>October (17 Days)</p>	<p>8) Quadrilaterals</p>	<ul style="list-style-type: none"> <li>❖ The students will be able to explore relationships between different types of quadrilaterals, such as how rectangles and squares are special cases of parallelograms, or how the diagonals of certain quadrilaterals intersect.</li> <li>❖ The students will be able to apply properties of quadrilaterals in geometric proofs and problem-solving situations.</li> <li>❖ The students will be able to understand that the sum of the angles of a quadrilateral is 360 degrees</li> <li>❖ The students will be able to apply various properties of parallelograms to solve the sums.</li> <li>❖ The students will be able to understand the statement and significance of the midpoint theorem. They should be able to explain why the line segment joining the midpoints of two sides of a triangle is parallel to the third side and half of its length.</li> <li>❖ The students will be able to identify and locate the midpoints of the sides of a triangle. They should understand that the midpoint is the point on a line segment that divides it into two equal parts.</li> <li>❖ The students will be able to draw conclusions based on the midpoint theorem. This includes identifying parallel lines within triangles and understanding the implications of the theorem for geometric shapes and constructions\</li> <li>❖ The students will be able to Apply the midpoint theorem and its converse to deduce the problems.</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> </ul>

	12) Statistics	<ul style="list-style-type: none"> <li>❖ The students will be able to understanding Basic Statistical Concepts, Define statistics and its relevance in real-life applications.</li> <li>❖ The students will be able to define terms like data, frequency, and frequency distribution.</li> <li>❖ The students will be able to organize data using different methods such as tally marks, frequency tables, and histograms.</li> <li>❖ The Students will be able to Calculate and interpret measures of dispersion such as range. The students will be able to elicit the terms such as primary data, interval, classmarks etc</li> <li>❖ The students will be able to Represent the data graphically: Bar graph, Histogram and frequency polygon.</li> <li>❖ The students will be able to plot frequency polygon with using histogram and without using histogram.</li> <li>❖ The students should be able to construct histograms in both inclusive and exclusive forms using the given data and class intervals</li> <li>❖ The students will be able to understand that frequency polygon involve plotting points on a graph where the x-axis represents the class intervals or categories, and the y-axis represents the frequency of each interval.</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> </ul>
November (17 Days)	9) Circles  11) Surface Area and volumes Cont....	<ul style="list-style-type: none"> <li>❖ The students will be able to define and understand basic circle terminology such as radius, diameter, circumference, chord, arc, sector, and segment.</li> <li>❖ The students will be able to differentiate segment and sector of a circle</li> <li>❖ The students will be able to Prove Equal chords of a circle subtend equal angles at the centre and its converse.</li> <li>❖ The students will be able to show that the perpendicular from the centre of a circle to a chord bisects the chord.</li> <li>❖ The students will be able to prove the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.</li> <li>❖ The students will be able to apply the property of a cyclic quadrilateral to solve the sums related to it.</li> <li>❖ The students will be able to use angle in a semicircle is right angle</li> <li>❖ The students will be able to develop understanding about central angles, inscribed</li> </ul>

		<p>angles, intercepted arcs, and the relationship between angles and arcs.</p> <ul style="list-style-type: none"> <li>❖ The students will be able to solve the questions other than the textual questions.</li> <li>❖ The students will be able to define area and volume and their difference</li> <li>❖ The students will be able to understand the basic concept of right circular cone and how it is generated</li> <li>❖ The students will be able to understand that the solid generated by the rotation of a right-angled triangle about one of the sides containing the right angle is called the right circular cone.</li> <li>❖ The students will be able to develop understanding about the vertex of the cone, base of the cone, radius of the cone, slant height of the cone and height of the cone</li> </ul>
December (10 Days)	11)Surface Area and volumes Cont...	<ul style="list-style-type: none"> <li>❖ The students will be able to apply the formula for calculating the slant height of the cone and from the same they can find height and radius of the cone.</li> <li>❖ The students will be able to slant height of the cone <math>(l) = \sqrt{h^2 + r^2}</math></li> <li>❖ The students will be able to understand difference between the curved surface area and total surface area of cone</li> <li>❖ C.S.A of cone <math>=\pi r l</math>; T.S.A of the Cone <math>=\pi r(l + r)</math></li> <li>❖ The students will be able to understand relation between volume of cone and volume of cylinder i.e. volume of cone <math>=\frac{1}{3}\pi r^2 h</math></li> <li>❖ The students will be able to understand that the solid generated by revolving a circular lamina about any of its diameter is called a sphere.</li> <li>❖ The students will be able to understand difference between the sphere and the hemisphere.</li> <li>❖ The students will be able to understand difference between the curved surface area and total surface area of hemisphere</li> <li>❖ C.S.A of sphere <math>=4\pi r^2</math> square units; C.S.A of hemisphere <math>=2\pi r^2</math> square units</li> <li>❖ T.S.A of hemisphere <math>=3\pi r^2</math> square units</li> <li>❖ Volume of the sphere <math>=\frac{4}{3}\pi r^3</math> cubic units</li> <li>❖ Volume of the hemisphere <math>=\frac{2}{3}\pi r^3</math> cubic units</li> <li>❖ The students will be able to understand the basic concepts of surface area and volume for different geometric shapes such cones and spheres.</li> </ul>

		<ul style="list-style-type: none"> <li>❖ The students will be able to calculate the surface area of various geometric solids using appropriate formulas.</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> </ul>
<p>January (22 Days) I Quarterly Exam Ch. – 8, 9, 12</p>	<p>10) Heron’s Formula</p> <p>Revision for Annual Exam</p>	<ul style="list-style-type: none"> <li>❖ The students will be able to recall the area of triangle = <math>\frac{1}{2} \times base \times height</math></li> <li>❖ The students will be able to understand need of Herons formula</li> <li>❖ The students will be able to understand the concept and derivation of Heron's formula.</li> <li>❖ The students will be able to apply Heron's formula to find the area of a triangle when the lengths of its three sides are given.</li> <li>❖ The students will be able to Compute the area of given triangles by using formula (equilateral/isosceles/scalene).</li> <li>❖ The students will be able to Understand the terms like semi-perimeter (s).</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> <li>❖ The students will be able to solve the questions other than the textual questions.</li> <li>❖ The students will be able to Understand formula to calculate “s” if three sides of a triangle are given (a, b and c)</li> </ul> $s = \frac{a + b + c}{2}$ <ul style="list-style-type: none"> <li>❖ The <i>students will be able to</i> Learn the following formula: area of an equilateral triangle = <math>\left(\frac{\sqrt{3}}{4} \times a^2\right)</math> square units.</li> <li>❖ The students will be able to find the Area of an isosceles triangle = <math>\frac{b}{4} \times \sqrt{4a^2 - b^2}</math></li> <li>❖ <i>The students will be able to find the</i> Area of a scalene triangle if three sides are given as <i>a, b and c</i></li> </ul> $Area = s\sqrt{(s - a) \times (s - b) \times (s - c)}$ <p>The students will be able to solve the questions other than the textual questions.</p>
<p>February</p>	<p>Revision for Annual Exam</p>	