

**Grade 8 MATHEMATICS**

RATIONALE:

**Grade 8** students are required to take increasing responsibility for planning and executing their work and for organizing their personal time to include systematic private study as well as homework.

The grade 8 Mathematics curriculum extends their calculation skills; students begin to apply algebraic symbols and techniques confidently; the progress from a simple understanding of shape and measure to using definitions and reasoning to understand geometry; they study handling data through practical activities and are introduced to probability.

Grade 8 students are encouraged to develop positive attitudes towards mathematics, and to apply critical reasoning skills with increasing confidence and flexibility to solve mathematical problems.

REQUIRED TEXT:

Mathematics for the International Student 8 (MYP3) by Volmar, Haese, et al.

**OR**

New National Framework Mathematics 8 – M.J. Tipler & K.M. Vickers

REQUIRED MATERIAL FOR CLASS:

Notebooks, folder paper, graph paper, letter size folder to store worksheets, 30cm ruler, geometry set, pens, and pencils.

The Casio fx-82MS calculator is used throughout the Grade 8 Mathematics Programme.

ASSESSMENT:

In addition to tests, homework, and classwork, students will be assessed through projects, presentations and problem solving investigations.

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| **TERM 1**  |
| **TOPIC** | **OBJECTIVES** |
| Algebra and Inequalities | * **Review:**
* Simplify algebraic expressions using the order of operations- including brackets and exponents.
* Simplify, using the distributive property, a single term over a bracket, i.e. monomial times a polynomial, including fractional forms and variable with exponents.
* Calculating the numerical value of algebraic expressions by substitution - positive and negative integers into formulae, linear expressions and expressions involving powers; example: $3x^{2}+ 4$ or $2x^{3}$
* **Students should be able to:**
* identify laws on indices
* expand terms in order to simplify
* use the laws of indices to simplify an expression
* Construct linear expressions and simple formulae from worded questions
* Simplify algebraic fractions
* Factorise expressions involving powers and fractions.
* Solve linear equations and formulae including algebraic fractions.
* Construct and solve linear equations from worded questions (unknown on either or both sides, with or without brackets.)
* Change the subject for the indicated variable (transposition)
* Identify and use inequality signs.
* Construct inequalities from worded questions.
* Solve inequalities and represent answers on a number line and Cartesian Plane.
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| Fractions, Decimals, Percentages, Ratio and Proportion | * **Review:** Calculate simple interest.
* Solve real life problems involving percentages and simple interest.
* Ratio: definition, comparison, division
* **Students should be able to:**
* Calculate and solve problems involving percentages or quantities.
* Find the percentage increase and decrease.
* Calculate original amount
* Calculate compound and reverse percentages.
* review unitary and ratio method to solve problems
* identify quantities that are in direct proportion
* identify quantities that are inversely related
* find unknown quantities that are directly and inversely related
* use ratio and unitary method to calculate unknown
* solve worded problem on ratio and proportion using different

methods-unitary, ratio, algebraic method |
| Shape, Construction and Loci | * **Students should be able to:**
* Know that 2D shapes are congruent, corresponding sides and angles are equal.
* Know and use the angle properties of triangles, quadrilaterals, and polygons – including diagonal properties where necessary.
* Identify all the symmetries of 2D shapes – line and order of rotational symmetry.
* Use a ruler and a pair of compasses to construct:
* Perpendicular line from an external point to a line and from a point on the line – both end point and anywhere on the line.
* Bisector of an angle.
* A parallel line to a given line through a given point.
* 30o, 60o, 90o, 45o, 120o angles.
* A triangle, given a right angle, hypotenuse and one side (RHS).
* Quadrilaterals – square, rectangle, parallelogram.
* Use the following loci and the method of intersecting loci for sets of points in two dimensions:
* which are at a given distance from a given point
* which are at a given distance from a given straight line
* which are equidistant from two given points
* which are equidistant from two given intersecting straight lines.
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| **TERM 2**  |
| Geometry, Lines and Angles | * **Students should be able to:**
* Identify alternate, corresponding, and co-interior angles made with transversal and parallel lines.
* Solve geometrical problems using properties of angles, or parallel and intersecting lines, and of triangles and special quadrilaterals – explaining reasoning with diagrams.
* Find the sum of interior and exterior angles regular polygons.
* Find the size of each interior and exterior angles of regular polygons.
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| Coordinate Geometry  | * **Students should be able to:**
* Recognise and draw the equations of lines in the form $y=mx+c$
* Write equations of straight line graphs – point-slope form and slope intercept form.
* Recognize and draw the equation of lines parallel to the x-axis or y-axis.
* Find equation of lines given its graph
* Draw and interpret distance time graphs.
* Find the equation of parallel and perpendicular lines
* Given a point find a line parallel and perpendicular to etc…
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| Measurement | * **Revise:** metric conversions,Calculate perimeter and area of 2D shapes
* **Students should be able to:**
* Derive and use the formulae for the area of a parallelogram, trapeziums.
* Name the parts of a circle; know and use the formulae for the circumference and area of a circle.
* Calculate the area of a sector and the length of the arc.
* Calculate perimeter and area of **compound** 2D shapes
* Calculate the volume of cubes, cuboids, cylinders and prisms.
* Draw and use simple nets of solids to work out the surface area of cubes, cuboids, cylinders, and prisms.
* Calculate the volume of Pyramids and Sphere
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| Transformational Geometry | * **Students should be able to:**
* Transform 2D shapes by rotation, reflection and translation – about the origin / different points
* define a translation
* translate figures using co-ordinates
* identify co-ordinate of image
* identify translation vector given an object and its image
* define reflection
* identify lines of symmetry
* reflect shapes in given lines: x-axis, y-axis, $x=1$, $x=y$
* state relation between an object and its image in a plane when reflected in a line in that plane
* identify image of object reflected
* find image of points rotated about the origin in a clockwise or anti-clockwise direction
* find image of a point rotated about other centres
* Transform combinations of these transformations.
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| **TERM 3**  |
| Probability | * **Students should be able to:**
* Define a sample space
* Write the sample space for a given event
* Identify complementary events
* Use grids and tree diagrams to find probabilities
* Calculate the expectation of an event occurring
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| Sequences | * **Students should be able to:**
* Indentify special sequences (arithmetic, geometric, and Fibonacci)
* Derive (using formula) expressions for the general term for arithmetic and geometric sequences
* Recognise and describe linear and quadratic sequences.
* Write the nth term of linear and quadratic sequences.
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| The Right Angled Triangle | * **Students should be able to:**
* State the theorem of Pythagoras
* Recall Pythagorean triples
* Solve problems using Pythagoras
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