

**Department of Education
High School Mathematics**

**Pacing Guide
September 2021**

This scheme is designed for classes that will sit the BGCSE examination in three years.

Grade 10

| Topics | Objectives | Duration |
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| Basic Number Theory | <p>Revise types of numbers such as natural numbers, whole numbers, odd, even, prime, composite, square, and cube numbers.</p> <p>Estimating the results of arithmetic operations including powers and roots.</p> <p>Use of a scientific calculator to compute operations including powers and roots.</p> <p>Use the commutative and associative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with natural numbers.</p> | 3wks |
| Properties of Real Numbers | <p>Define, identify and use real numbers (Natural, whole, integers, rational, irrational and real).</p> <p>Recognize relationships between sets of numbers.</p> | 1wk |
| Factors and Multiples | <p>More problem solving using H.C.F./ G.C.F., L.C.M, square roots and cube roots.</p> | 1 wk |
| Squares & Square Roots, and Cubes & Cube Roots | <p>Use a scientific calculator to evaluate square roots and cube roots.</p> | 1 wk |
| Sequences of Natural Numbers | <p>Use simple algebraic expressions to generalize the pattern in sequences involving consecutive even/odd numbers; consecutive numbers; multiples; squares and cubes, triangular number and Fibonacci sequence.</p> <p>Use the general pattern to continue the sequence and to find missing term(s).</p> | 2 wks |
| Integers | <p>Use a scientific calculator to operate on integers.</p> | 3 wks |

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| | More problem solving using integers in practical situations | |
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Grade 11

| Topics | Objectives | Duration |
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| Simultaneous Equations | Solve simultaneous linear equations algebraically. Problem solving involving simultaneous linear equations. | 3 wks |
| Graphs of Linear Functions | Find the gradient/slope of a straight line (a) By drawing a triangle to determine rise over run (b) Using the coefficient of x when the equation is written in the form $y = mx + c$ (c) Using the coordinates of two points on the line $m = \frac{y_2 - y_1}{x_2 - x_1}$ Gradients of parallel and perpendicular lines Determine the equation of a line given (a) The gradient and y – intercept (b) Two points on the line (c) The graph of the line. Use the slope and the y -intercept to graph a line. Use graphical method to solve systems of linear equations. | 3 wks |
| Graphs of Quadratic Functions | Construct/complete tables of values for quadratic functions of the form $y = ax^2 + bx + c$ Draw, identify and interpret the graphs of such functions. | 3 wks |

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| | <p>Determine the features of a parabola from its graph and its equation.</p> <p>Estimate the gradient of a curve at a given point by drawing a tangent at the point.</p> <p>Use the graphs to solve, or estimate the solutions of, associated equations.</p> | |
| Sets | <p>Use Venn diagrams to show relationships between three sets within a universal set</p> <p>Use set notation to describe and shade regions in Venn diagrams with up to three subsets of the universal set.</p> <p>Read, interpret, draw, and use Venn diagrams to solve problems involving up to three subsets of a universal set.</p> <p>Read, interpret, draw and use Venn diagrams to solve problems involving up to two subsets of the universal set.</p> <p>Apply formulas or use Venn diagrams to determine cardinal numbers of complements, unions, and intersections of sets.</p> <p>Draw Venn diagrams and apply algebraic techniques to solve problems involving up to three subsets of a universal set</p> | 2wks. |
| Geometrical Terms & Properties | <p>Review basic geometrical terms: (point, line, plane, angle, angle types, parallel, perpendicular, etc.).</p> <p>Define bearings</p> <p>Define compass direction, bearings from north/south and three figure bearings</p> <p>Three figure bearings involving a change of direction</p> <p>Define back (reverse) bearing</p> | 1 wk |

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Grade 12

| Topics | Objectives | Duration |
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| Mensuration | <p>Solve problems involving perimeters and areas of triangles, quadrilateral, circles and compound shapes.</p> <p>Solve word problems involving surface areas of cubes, cuboids, cylinders, prisms and other solids with uniform cross-sections.</p> <p>Converting between metric units of area</p> <p>Calculate arc length and area of a sector.</p> <p>Calculate the area of segments.</p> <p>Surface area of spheres pyramids and cones.</p> <p>Converting between metric units of area</p> <p>Solve word problems involving volumes and capacity of cubes, cuboids, cylinders, prisms and other solids with uniform cross-sections.</p> <p>Converting between metric units of volume</p> | 3 wks |
| Similarity & Congruency | <p>Identify and state properties of</p> <p>(a) Similar triangles</p> <p>(b) Congruent triangles (SSS, SAS, ASA, AAS, RHS)</p> <p>Use the properties of similar and congruent triangles to find the measure of missing sides and angles.</p> <p>Determine the ratio of corresponding sides/area/volume of similar objects.</p> <p>Find:</p> <p>(a) the length of sides.</p> | 2 wks |

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| | <p>(b) the area</p> <p>volume of similar shapes and objects.</p> | |
| Ratio & Proportion | <p>Increase and decrease a quantity in a given ratio.</p> <p>Distinguish between direct and inverse variation and represent graphically.</p> <p>Use a graph to illustrate the relationship between two quantities that vary directly or inversely.</p> <p>Read in interpret graphs represent the relationship between two quantities that vary directly or inversely</p> <p>Direct and inverse variation: Use notation</p> <p>$y \propto x$ or $y = kx$ $y \propto \frac{1}{x}$ or $y = \frac{k}{x}$</p> <p>Determine the constant of proportionality and unknown quantities.</p> <p>Word problems</p> | 2 wks |
| Probability | <p>Draw and interpret 2 stage probability tree diagrams for the following experiments: tossing two coins, rolling a pair of dice, selecting/drawing letters/numbers/objects from two sets of letters/numbers/objects, tossing a coin twice, rolling a die twice, spinning a spinner twice, tossing a coin and rolling a die, etc.</p> <p>Apply the sum and product laws.</p> <p>$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ (or) $P(A \cap B) = P(A) \cdot P(B)$</p> <p>$P(A B) = \frac{P(A \cap B)}{P(B)}$ $P(B A) = \frac{P(A \cap B)}{P(A)}$</p> <p>Determining if given events are: (a) mutually exclusive, (b) independent, (c) dependent.</p> <p>Determine conditional probabilities when drawing without replacement.</p> | 2 wks |

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| | <p>Draw and interpret tree diagrams with more than 2 branches and more than 2 branches per stage and at most three stages.</p> <p>Solving word problems involving selecting/drawing objects with or without replacement.</p> | |
| <p>Statistics</p> | <p>Define and explain the terms: data, frequency table, class, lower/upper class limits, lower/upper class boundary, class interval, midpoint, class width.</p> <p>Construct grouped and ungrouped frequency tables from secondary data.</p> <p>Draw histograms and frequency polygons from grouped and ungrouped frequency tables</p> <p>Interpret histograms and frequency polygons of grouped and ungrouped data</p> <p>Estimate the measures of central tendency (mean, median, and mode) and the range from grouped and ungrouped frequency tables</p> <p>Calculate the measures of central tendency (mean, median, mode) and the range from a frequency distribution of ungrouped and grouped data.</p> <p>Make deductions about data, given one or more measures of central tendency and the range.</p> <p>Construct and interpret histograms from equal and unequal intervals.</p> <p>Construct and use cumulative frequency tables to estimate the mean, median and mode of grouped data.</p> <p>Draw cumulative frequency curves (ogives).</p> <p>Estimate median, upper and lower quartiles as well as interquartile range from cumulative frequency curves.</p> | <p>3 wks</p> |

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| | Estimate percentiles (multiples of 10, the 25 th and 75 th) from cumulative frequency curves. | |
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