Subject: Maths

	Year 8 - Novice	Year 8 - Capable	Year 8 - Expert
Term 1	**Students should be able to:** • Know division facts for multiplication tables up to 12x12 • Know how to divide by ½ • Find fractions of amounts • Add and subtract simple fractions with and without a calculator • Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8) • Order decimals and fractions • Use the symbols =, ≠, <, >, ≤, ≥ • Calculate percentage changes • Express one quantity as a percentage of another • Understand and use place value for decimals, measures and integers of any size • Use the four operations, including formal written methods, applied to integers and decimals • Use conventional notation for the priority of operations: BIDMAS • Round to the nearest 1 or 2 decimal places • Use approximation through rounding to estimate answers • Identify HCF and LCM of pairs of numbers less than 100 by listing • Simplify expressions involving the laws of indices. • Understand and use the concepts and vocabulary of expressions, and terms • Simplify algebraic expressions to maintain by: collecting like terms and multiplying a single term over a bracket • Use algebraic methods to solve linear equations in one variable	**Students should be able to:** • Use short division to divide two and three digit numbers by a one or two digit number • Use the four operations, including formal written methods, applied to proper and improper fractions • Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8) • Work with percentages greater than 100% • Solve problems involving percentage change, including: percentage increase, decrease and simple interest in financial mathematics • Compare two quantities using percentage • Order positive and negative integers, decimals and fractions • Find the reciprocal of a number • Round numbers to significant figures • Use approximation through rounding to estimate answers • Write prime factors using indices • Use Venn diagrams and product of primes to find HCF and LCM • Simplify expressions involving positive and negative laws of indices • Simplify algebraic expressions by collecting like terms, multiplying a single term over a bracket and taking out common factors • Solve linear equations with integer coefficients where the unknown appears on both sides of the equation • Solve linear inequalities in one variable; represent the solution set on a number line	**Students should be able to:** • Convert mixed numbers to improper fraction • Use the four operations, including formal written methods, applied to proper and improper fractions, and mixed numbers, both positive and negative • Use fractions, decimals or percentages to find quantities • Interpret a percentage increase or decrease as a multiplier • Express one quantity as a percentage of another • Calculate reverse percentages • Add, subtract, multiply and divide with negative integers • Interpret and compare numbers in standard form A x 10^n, where n is a positive integer or zero • Estimate calculation given in standard form • Decide whether a number is a square or cube from its prime factors • Work out a root of a number from a product of prime factors. • Calculate values using fractional indices • Simplify algebraic expressions by expanding products of two binomials • Rearrange formulae to change the subject • Use algebraic methods to solve linear equations in one variable with the unknown on one or both sides (including all forms that require rearrangement) • Substitute positive numbers into a complex formula.
Term 2	**Students should be able to:** • Use ratio notation, including reduction to simplest form • Divide a given quantity into a ratio • Know and use standard metric and imperial measures • Recall and use conversions for metric measures for length • Understand speed and know the relationship between speed, distance and time • Calculate perimeter and area of triangles, parallelograms and composite shapes made of rectangles and triangles • Calculate volume of cuboids (including cubes) • Recognise arithmetic, geometric sequences and appreciate other sequences that arise. • Generate terms of a sequence from a position-to-term rule (n^{th} term) • Work with coordinates in all four quadrants • Produce graphs of linear functions of one variable using equations in x and y • Transform 2D shapes using translations, reflections and rotations	**Students should be able to:** • Divide a given quantity into a ratio • Solve problems involving direct proportion • Work out conversions for units of area and volume/capacity • Understand speed and know the relationship between speed, distance and time • Calculate the perimeter and area of triangles, parallelograms, trapezia and composite shapes • Calculate and solve problems involving volume of cuboids (including cubes) • Recognise arithmetic, geometric sequences and appreciate other sequences that arise. • Recognise arithmetic sequences and find the nth term • Produce graphs of linear functions of one variable using equations in x and y • Interpret real life graphs • Transform 2D shapes using translations, reflections and rotations • Construct similar shapes by enlargement	**Students should be able to:** • Represent the ratio of two quantities in direct proportion as a linear relationship and represent the relationship graphically • Relate ratios to fractions and use linear equations to solve problems. • Solve problems involving direct and inverse proportion • Understand and use compound measures and compound units including speed, rates of pay, and density • Work out the area of a circle, given the radius or diameter • Work out the area of semicircles, quarter circles and simple fractions of a circle (e.g. 1/8). • Work out the volume of a cylinder • Recognise that the general equation of a linear graph is y=mx+c • Re-arrange a given linear equation in two variables to the standard form y = mx + c • Find approximate solutions using the point of intersection of two straight lines • Describe translations as 2D vectors • Describe enlargements stating the scale factor and the centre of enlargement
Term 3	**Students should be able to:** • Apply the properties of: angles at a point, angles on a straight line and vertically opposite angles • Know the sum of angles in a triangle and a quadrilateral • Calculate probabilities of events • Understand the difference between theoretical and experimental probability • Draw sample space diagrams and use these to calculate probabilities • understand that there are different types of data: • Construct and interpret appropriate tables, frequency tables, bar charts, pictograms and pie charts • Find the mode, median and mean for a discrete frequency distribution • Identify the properties of quadrilaterals, triangles and circles • Know the properties of faces, surfaces, edges and vertices of 3D shapes. • Use scale factors, scale diagrams and maps • Draw and measure line segments and angles in geometric figures • Identify lines that are perpendicular	**Students should be able to:** • Apply the properties of: angles at a point, angles on a straight line and vertically opposite angles • Know the sum of angles in a triangle and a quadrilateral • Understand and use the relationship between parallel lines and alternate and corresponding angles • Understand that the probabilities of all possible outcomes sum to 1 • Understand the difference between theoretical and experimental probability • Draw sample space diagrams and use these to calculate probabilities • Construct and interpret appropriate tables, charts, pictograms. pie charts and frequency tables and bar charts for discrete and continuous (grouped data) • Describe, interpret and compare data for discrete, continuous and grouped data • Identify the properties of quadrilaterals, triangles, circles and other plane figures • Know the properties of faces, surfaces, edges and vertices of 3D shapes. • Use scale factors, scale diagrams and maps • Derive and use the standard ruler and compass constructions:	**Students should be able to:** • Work out missing angles using properties of alternate angles, corresponding angles and interior angles • Understand the consequent properties of parallelograms • Apply angle facts and properties of quadrilaterals to solve problems • Understand set notation for a Venn diagrams • Shade areas on a Venn diagram involving at most two sets • Solve simple problems given a Venn diagram • Calculate an estimate of the mean for a grouped frequency distribution, knowing why it is an estimate • Draw a scatter diagram • Recognise and name positive, negative or no correlation as types of correlation • Use Pythagoras' Theorem to solve problems involving right-angled triangles • Construct a perpendicular bisector of a given line • Construct a perpendicular at a given point on a given line