Subject: Maths

	Year 9 - Novice	Year 9 - Capable	Year 9 - Expert
Term 1	**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.	**Students should be able to:** • Use percentages in real-life situations • Calculate reverse percentages • Solve compound interest problems • Use a calculator effectively for standard form calculations • Solve standard form problems with and without a calculator. • Use the fraction, powers, roots, negative buttons on a calculator to calculate results accurately • Apply and interpret limits of accuracy • Simplify algebraic expressions, for example by cancelling common factors in fractions or using index laws • Factorise quadratic expressions of the form x^2+bx+c • Factorise quadratic expressions using the difference of two squares • Solve simultaneous linear equations by elimination or substitution • Find approximate solutions using the point of intersection of two straight lines. • Set up linear equations to solve problems • set up a pair of simultaneous linear equations to solve problems • Rearrange formulae to change the subject
Term 2	**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	**Students should be able to:** • Solve problems involving direct and inverse proportion, including graphical and algebraic representations • Understand and use compound measures and compound units including speed, rates of pay, density and pressure. • Calculate the volume of spheres, pyramids, cones and composite solids. • Calculate the surface area of cylinders, spheres, cones and composite solids. • Understand and use trigonometric relationships in right-angled triangles • Understand, recall and use Pythagoras' theorem in 3D problems • Recognise that equations of the form *y = mx + c* corresponds to straight-line graphs and work out gradient m and y-intercept at (0, C). • Use the form y = mx + c to identify parallel lines and perpendicular lines; • Find the equation of the line through two given points, or through one point with a given gradient • Write equations that represent real life problems. • Work out the side of one shape that is similar to another shape given the ratio or scale factor of lengths.
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 • 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	**Students should be able to:** • Use the sum of angles in a triangle to deduce the angle sum in any polygon, and to derive properties of regular polygons • Solve problems given a Venn diagram • Complete a tree diagram to show outcomes and probabilities • Use a tree diagram as a method for calculating probabilities for independent or dependent events. • Use and interpret scatter graphs and draw estimated lines of best fit to make predictions; • Decide whether data is qualitative, discrete or continuous and use this decision to make sound judgements in choosing suitable diagrams for the data • Calculate the modal class and median for a grouped frequency distribution • Choose an appropriate measure to be the 'average', according to the nature of the data • Identify and construct congruent triangles • Know and use the criteria for congruence of triangles (SSS, SAS, ASA, RHS)