MATHEMATICS

Year 10

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 curriculum is to ensure that all pupils: i)become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. ii) reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language iii) can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	*Algebra* *Equations* *Laws of Indices* *Rearranging Formula* *Proof*	• Simultaneous Equations • Solving Quadratic Equations • Laws of Indices • Problem Solving with Algebra • Rearranging a formula • Proof Questions **Key Words:** coefficient. elimination, simultaneous, factorise, power, exponent, index, perimeter, area, twice, half, more than, product, subject, rearrange, express in terms of, formula, show that Family/Relationship	• Solve simultaneous equations in two unknowns-linear/linear. • Solve quadratic equations by factorising. • Use the laws of indices to multiply and divide numbers written in index notation. • Use brackets and the hierarchy of operations with powers inside the	Treasure Hunt 'Detect and correct the error' Differentiated Worksheets True/False Card Activity KWL Exit Ticket Find someone who knows…. MathsWatch/ Transum Online activities Traffic Light Cards Summative Test

			brackets, or raising brackets to powers; • Use calculators for all calculations: positive and negative numbers, brackets, square, cube, powers and roots, and all four operations. • **Rearrange a formula** • Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments.	
Autumn 2	**Algebra**	• Arithmetic, Geometric, Quadratic, Special Sequences **Key words:** common difference, common ratio, rule, pattern, sequence, geometric, nth term, triangular, cube, square, odd, even, Fibonacci, quadratic.	• Generate terms of a sequence • Determine the nth term rule of an arithmetic sequence.	Student Project on Sequences in real life. Mini Whiteboard Activity Practice Workbook activities Traffic Light Cards

			• Recognise triangular, cube, square number sequences as well as Fibonacci type sequences. • Continue a quadratic sequence and use the nth term to generate terms	Talk it through 3-2-1 Prove it Exit Card Exam Questions Pair Carousel
	Number	• Multiplying and Dividing by Powers of 10(Review) • Operations with Decimals (Review) • Standard Form • Fractions of an amount (Review) • Operations with Fractions and Mixed Numbers (Review) • Percentage of an amount (Review) • Percentage Increase/Decrease (Review) including Simple Interest, VAT, Discounts • Percentage Change • Percentage Increase and Decrease using the multiplier method. • Reverse Percentage • Systematic Listing Strategies **Key Words:** standard form, index, powers, fractions, operations, fractions, decimals, percentage, increase,	• Calculate with and interpret standard form $A \times 10^n$, where $1 \le A < 10$ and n is an integer. • Apply the four operations, including to integers, decimals and fractions and mixed numbers. • Express one quantity as a percentage of another. • Work with percentages greater than 100%.	KWL Four Corners Scavenger Hunt Differentiated Worksheets True or False Cards

		decrease, profit, loss, discount, VAT, original amount Career Integration- Scientist, Engineers, Bankers	• Solve problems involving percentage change, including percentage increase/decrease, and original value problems and simple interest including in financial mathematics. • Apply systematic listing strategies	
Spring 1	**Graphs**	• Linear and Quadratic Graphs • Gradient of a straight line • Equation of a line • Equation of a line parallel to a given line. **Key Words:** linear, quadratic, parabola, substitute, quadratic, gradient, intercept, roots, turning point, minimum value, maximum value, parallel, coordinates. Career Integration- Budget Analyst, Auditor, Epidemiologist, Market Researcher, etc.	• Plot and draw graphs of straight line graphs • Plot and draw graphs of simple quadratic functions. • Identify the roots, line of symmetry, turning points and intercepts. • Determine the gradient of a straight line from the graph or the equation or given two points. • Determine the equation of a line	Differentiated worksheets. Ticket out the door True or False Cards Traffic light cards 3-2-1 Two stars and a wish Peer Feedback Summative Test Exam Question carousel

				from a graph or given a point and the gradient or two points.	
				• Determine if two lines are parallel from the equations given.	
Spring 2	**Angles** **Bearings** **Trigonometry**	• Properties of angles at a point, angles at a point on a straight line, vertically opposite angles; understand and use alternate and corresponding angles on parallel lines. • Sum of angles in a triangle. • Angles in a Polygon, including exterior angles. • Pythagoras Theorem • Trigonometry Ratios **Key Words:** angles, straight line, vertically opposite, alternate, corresponding, parallel, triangle, polygons, interior, sum, exterior, properties, transversal, bearing, angle, side, Pythagoras, hypotenuse, ratios, sine, cosine, tangent, angle of elevation, angle of depression Career Integration- Architects, Surveyors, Astronauts, Physicists, Engineers and Crime Scene Investigators Basic first aid- angle at which CPR is done and the placement of defibrillators.		• Find missing angles using properties of straight lines, at a point, in a triangle. • Understand and use the angle properties of parallel lines. • Calculate and use the sums of the interior angles of polygons. • Use the sum of the interior angles of an n-sided polygon. • . Use the sum of the exterior angles of any polygon is 360°. • Use bearings in a real-life context to describe the bearing between	Student presentation on Basic angle properties Angle Properties Summative Test Angles in Parallel Tick or Trash Mini Whiteboard Activity Student Learning Portfolio Practice Workbook activities Traffic Light Cards Talk it through-Students explain the reasons for their angle calculations using the key words. Ticket out the door Bearing Activity- Students stand at various points in the classroom. For each pair, Person A will estimate his/her bearing from Person B, then Person B will use that number to calculate his/her bearing from Person A.

			two towns on a map. • Calculate the length of the hypotenuse and of a shorter side in a right-angled triangle, including decimal lengths and a range of units. • Use the trigonometric ratios to solve 2D problems including angles of elevation and depression. • Know the exact values of sin ϑ and cos ϑ for ϑ = 0°, 30°, 45°, 60° and 90°; know the exact value of tan ϑ for ϑ = 0°, 30°, 45° and 60°. •	Differentiated worksheets. Trigonometry Treasure Hunt
Summer 1	**Transformation** **Similarity and Congruence**	• Transformation of shapes-Translation, Reflection, Rotation and Enlargement. • Similarity of triangles and other plane shapes	• Transform given shapes using translation, reflection, rotation and enlargement.	Practice Booklet Describe it Quiz Summative Assessment

		• Congruence **Key Words:** translation, shift, reflection, flip, rotation, turn, enlargement, single, describe, scale factor, centre of rotation, angle of rotation, mirror line, vector, similar, length, perimeter, congruent, sides, angles. Online and Media Families	• Describe a transformation fully. • Describe the changes achieved by combinations of rotations, reflections and translations. • Solve problems to find missing lengths and angles in similar shapes. • Use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS).	Differentiated worksheets Exam Past Paper Questions
Summer 2	**Construction and Loci**	• Perpendicular bisector of a line segment. • Construct a perpendicular to a given line from/at a given point, bisecting a given angle. • Construct given figures and solve loci problems. **Key Words:** Construct, circle, arc, sector, face, edge, vertex, two-dimensional, three-dimensional, solid, elevations, congruent, angles, regular, irregular, bearing, degree, bisect, perpendicular, loci, map, scale, plan, region.	• Use straight edge and a pair of compasses to do standard constructions. • Find and describe regions satisfying a combination of loci; • Use constructions to solve loci problems (2D only).	Mini Whiteboard Activity Statistics Project Transum Online Activity Differentiated worksheets Summative Assessments MathsWatch Activities

	Data Handling	• Measures of Central Tendency of Raw, Ungrouped and Grouped Data **Key Words:** Mean, mode, median, range, midpoint, frequency, tally. (Respectful Relationships Cyberbullying and Performance) Career Integration- Economists, Scientists, Researchers and Data Journalists	• Interpreting and comparing distributions using the Mean, Median, Mode, Range of Raw, Ungrouped and Grouped Data	