MATHEMATICS

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 Curriculum is to deepen students' knowledge, skills and understanding of mathematical methods and concepts. Also to enable them to select and apply mathematical techniques to solve problems, reason mathematically, make deductions and inferences and draw conclusions.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	**Fractions, Decimals and Percentages** **Approximation** **Ratio and Scale Drawing (Review)**	• Four Operations with Fractions and Mixed Numbers • Operations with Decimals using the calculator • Recurring Decimals to Fractions (Higher Tier) • Approximation • Converting between percentages , decimals and Fractions • Ordering Percentages, fractions and Decimals • Dividing an amount in a ratio • Scale Drawing **Key Words** : Lowest Common Multiple, highest common factor, mixed numbers, denominator, numerator, proper fractions, improper fractions, mixed numbers, recurring decimals, significant figures, decimal places, ratio, scale drawing.	• Applying the four operations to simple fractions and mixed numbers. • Manipulating the calculator to compute complex calculations with decimals including square roots • Recognizing recurring decimals • Converting recurring decimals to fractions • Rounding off to a given degree of accuracy • Converting between fractions, decimals and percentages • Comparing and Ordering fractions, decimals and Percentages • Sharing an amount in a given ratio • Calculating scaled and actual measurements using the scale on a map	Mini Whiteboards Think Pair Share One Question Quiz 'Detect and correct the error' activity Self Assessment- Success Criteria Sheet On-going worksheets (RAG)/Workbook activities Map Scavenger Hunt Summative test MyMaths/Transum Online Quiz

Autumn 2	Measurement			
	• Perimeter and Area of Simple and Compound Shapes • Arc Lengths, Areas of Sectors of Circles • Total Surface Area and Volume of 3d shapes	• Perimeter and Area of simple shapes including squares, rectangles, triangles, circles, parallelograms, trapezia • Parts of a Circle • Arc Lengths, Areas of Sectors of Circles • Surface Area and Volume of cubes, cuboids, cylinders and other prisms, spheres, pyramids and cones **Key words:** perimeter, area, arc, pi diameter, radius, chord, tangent, circumference, sector, segment, prism, cylinder, vertical and slant height, pyramid, sphere, surface area, volume.	• Calculating perimeter and area of simple and compound shapes • Identifying the different parts of a circle • Calculating length of arc, area of a sector and angle (in degrees) • Calculating the total surface area and volume of prisms, pyramids and spheres and composite solids	3-2-1 Mini-Project on Parts of a circle Solids Model Project and Oral Presentations Peer Assessment Traffic Cards Self Assessment- Success Criteria Scavenger Hunt Summative Test On-going worksheets (RAG)
Autumn 2	**Trigonometry** **Pythagoras' Theorem** **Trigonometry Ratios** **Sine and Cosine Rule and Area of a Triangle (Higher Tier)**	• Pythagoras Theorem • Trigonometric Ratios • Sine and Cosine Rule • Area of a triangle **Key words:** Right angled triangle, hypotenuse, sine, cosine, tangent	• Using the Pythagoras' theorem to solve problems with right angled triangles • Using the correct trigonometric ratio to solve problems with right angled triangles • Applying the sine and cosine rule to find unknown lengths and angles • Applying the Area $A = \frac{1}{2} abSin\,C$ to calculate the area, sides or angles of any triangle.	Investigative Activity and Reflection Research Project on Pythagoras Project- Creating a clinometer; Sine and Cosine Graph Spaghetti/String Model Trigonometry Maze Online quiz

Spring 1	Number and Algebra			
	- Integers - Algebraic Expressions - Expanding Products of Two Binomials - Function Machines - Functions-Composite and Inverse (Higher Tier) - Equations and Inequalities	- Operations with Integers - Substitution with formulae and expressions - Simplifying algebraic expressions - Expansion of Brackets - Function Machines - Functions-Composite and Inverse (Higher Tier) - Solving Equations and Inequalities - Solving quadratic inequalities(Higher Tier) **Key words:** Integers, substitute, input, output, inverse, composite,expressions, equations, inequalities, solution set.	- Ordering and comparing integers - Using the number line to do simple addition and subtraction operations with integers - Applying the four operations with integers - Substituting numerical values into formulae and expressions - Simplifying and manipulating algebraic expressions - Expanding single and double brackets - Calculating the input and output value of a function machine - Performing calculations with inverse and composite functions - Solving equations and inequalities in one variable - Representing solution set of an inequality on a number line - Solving quadratic Inequalities	Self Assessment- Success Criteria Scavenger Hunt Traffic Cards/ Mini Whiteboard Ticket out the door 'Detect and Correct the error' Quiz Workbook Activities MyMaths/ Transum Online activities Summative Test
Spring 2	Graph			
	- Coordinates, Midpoint, Gradient ,Equation of a Line - Linear Graphs - Parallel and perpendicular Lines - Quadratic Graphs - Cubic Graphs	- Plotting Coordinates - Gradient, Midpoint, Equation of a line - Parallel and perpendicular lines - Linear graphs - Quadratic Graphs **Key words:** X axis, y axis, origin , gradient, y intercept, midpoint, parallel, perpendicular, parabola, roots, intercepts ,vertex, minimum point, maximum point, axis of symmetry, turning points	- Working with coordinates in all four quadrants - Calculating the gradient of a line given two points or from a graph - Calculating the midpoint of a line segment - Identifying and Interpreting gradients and y intercepts of linear functions graphically and algebraically - Plot graphs of equations that correspond to straight line graphs - Plotting and interpreting quadratic and cubic graphs	Student Portfolio and Journaling 'Talking Math' Talk Show-Students on the panel will answer questions relating to the topic Scavenger Hunt Mini Whiteboard Peer Assessment Jeopardy Summative Test

Summer 1	Algebra 2			
	• Laws of Indices • Solving simultaneous equations • Factorising linear and quadratic expressions • Solving quadratic equations	• Laws of Indices • Simultaneous Equations (Linear) • Simultaneous Equations Quadratic-Linear (Higher Tier) • Factorising Linear and Quadratic Expressions • Solving quadratic expressions by factorization and quadratic formula and completing the square <u>Key words</u>: Indices/powers, simultaneous equations, factorisation, quadratic expressions, coefficients, quadratic formula	• Simplifying expressions using the laws of indices • Solving linear simultaneous equations graphically and algebraically • Solving quadratic-linear simultaneous equations graphically and algebraically • Factorising linear and quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares • Solve quadratic equations by factorising and using a graph as well as quadratic formula and completing the square	.Self Assessment T-chart: 'Separate what you do and don't understand' and Success Criteria Sheet Step by Step Round Table 'Detect the error' One question quiz On-going worksheets(RAG) Summative Test Math Race
Summer 2	Statistics and Probability			
	• Measures of Central Tendency of Ungrouped and Grouped Data • Charts and Diagrams • Probability	• Mean, Median, Mode, Range of Ungrouped and Grouped Data • Advantages and Disadvantages of the three averages (Mean, median, mode) • Pictograms, Stem and Leaf Diagram, Bar Graph, Scatter Diagram, Frequency Polygon • Frequency Trees and sample space tables • Expected Outcomes • Experimental and Theoretical probability • Mutually Exclusive Events **Key words:** Mean, median, range, modal class, class interval, correlation, outliers, line of best fit, probability scale, equally likely, biased, fair, relative frequency, expected frequency, trial, outcome, event, mutually exclusive, independent, dependent.	• Interpreting and comparing distributions using the Mean, Median, Mode, Range of Ungrouped and Grouped Data • Drawing and interpreting pictograms, stem and leaf diagrams, comparative bar charts, scatter diagrams, frequency polygons, box and whisker plots • Drawing estimated lines of best fit and make predictions from scatter diagrams • Constructing sample space tables and using them to calculate probabilities • Using frequency trees to show probabilities of two events and calculate the probability of independent and dependent events. • Calculate theoretical probabilities and expected frequencies • Recognising mutually exclusive events and know that the probabilities of mutually exclusive exhaustive events sum to 1	Roll the Dice Q&A table session Statistics Project 3-2-1 Twitter Board- Peer Assessment Expert Jigsaw and Four Corners Transum Online Activity On-going worksheets(RAG) Self Assessment-Success Criteria Workbook Activities

| Summer 3 | Prime Factorisation, HCF and LCM

Arithmetic Sequences

Quadratic Sequences (Higher)

Angles in a Polygon and Bearings

Complex Bearings (Higher Tier) | • Prime Factorisation, HCF and LCM
• Arithmetic Sequences
• Quadratic Sequences (Higher)
• Angles in a Polygon
• Bearings

Key words: Multiple, factor, prime number, highest common factor, lowest common multiple, linear/Arithmetic, common difference, term, position, Fibonacci, cube numbers, triangular numbers, Vertically opposite angles, corresponding angles, alternate angles, exterior angles, co-interior angles, polygons, sine and cosine rule | • Using factor trees to list the prime factors of a number
• Using prime factor decomposition to calculate the HCF and LCM of two or more numbers
• Writing HCF and LCM using product notation
• Find terms of a linear sequence using a term to term or position to term rule
• Writing a formula for the nth term of a linear sequence and quadratic sequence
• Recognising special sequences and using them to solve problems
• Applying the properties of angles at a point, on a line and at intersecting and parallel lines, angles in a triangle
• Deducing and using the angle sum in any polygon
• Calculating simple bearings and complex bearings | Math Race

Think Pair Share

Ticket out the door

Angles Summary Writing Activity

Workbook activities

Summative Test |