MATHEMATICS

Year 11

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	**Number** Fractions, Decimals and Percentages • Estimation and Accuracy • Standard Form • Sequences (Review) Quadratic Sequences (Higher Tier) • Surds	• Converting between percentages, decimals and Fractions • Recurring Decimals (Higher Tier) • Operations with Decimals using the calculator • Rounding off • Estimation • Error Intervals and Limits of Accuracy • Bounds (Higher Tier) • Standard Form • Percentage Change • Arithmetic sequence • Surds (Higher Tier) **Key Words:** decimal place, recurring decimals, significant figures, error interval, truncation, lower bounds, upper bounds, standard form, increase/decrease, discount, VAT, depreciates, reverse percentage, principal, rate of interest, term, Fibonacci sequence, linear/arithmetic, surds, rationalise.	• Converting between fractions, decimals and percentages • Converting recurring decimals to fractions • Manipulating the calculator to compute complex calculations with decimals including square roots • Rounding off to a given degree of accuracy • Estimating answers and checking calculations using approximation and estimation • Using inequality notation to specify simple error intervals due to truncation or rounding • Apply and interpret limits of Accuracy, including upper and lower bounds • Calculating with and interpreting standard form $A \times 10^n$ • Solving problems involving percentage change, including percentage increase/decrease and original value problems and simple interest and compound interest including in financial mathematics. • Generating terms of a sequence from either a term-to term or a position to term rule • Recognizing and using special sequences such as triangular numbers, cubic numbers, Fibonacci type sequences • Deducing expressions to calculate the nth term of linear and quadratic sequences • Simplifying surd expressions and rationalizing denominators	3-2-1 Peer Assessment Self Assessment-Success Criteria Sheet On-going worksheets-RAG Traffic cards/Mini Whiteboard 'Detect and correct the error' activity Summative test Scavenger Hunt MyMaths

| Autumn 2 | Ratio, Proportion and Rates of Change and Graph

• Direct and Inverse Proportion
• Distance, Speed, Acceleration
• Compound Units
• Similarity
• Transformations
• Vectors | • Direct and Inverse Proportion
• Distance, speed, acceleration Calculations
• Distance-time Graphs
• Speed Time Graphs (Higher Tier)
• Gradient of a Curve (Higher Tier)
• Area under a Graph (Higher Tier)
• Calculations with Density and Pressure
• Lengths, Areas and Volumes of similar shapes
• Translation, Reflection, Rotation and Enlargement

Key words: distance, speed, acceleration, gradient, tangent, force, density, pressure, scale factor, column vector, translation, reflection, mirror line, enlarge, centre of enlargement, rotation, angle of rotation, origin, direction, clockwise, anti-clockwise/counter clockwise, x axis, y axis, parallel vectors. | • Solving problems involving direct and inverse proportion, including graphical and algebraic representations
• Constructing and interpreting equations that describe direct and inverse proportion
• Interpreting gradient at a point on a curve as the instantaneous rate of change
• Calculating area under graphs including quadratic and other non-linear graphs
• Performing calculations with distance, speed and acceleration
• Plotting and interpreting distance-time graphs
• Using compound units such as speed, density and pressure
• Comparing lengths, areas and volumes using ratio notation and making links to similarity and scale factors
• Transforming a given shape using translation, reflection, rotation and enlargement
• Describing the changes and invariances achieved by combinations of rotations, reflections and translations
• Applying addition, subtraction and multiplication of vectors (by a scalar) and diagrammatic and column representations of vectors
• Using vectors to construct geometric arguments and proofs | Step by Step Round Table

Peer Assessment Board

Hand signals

Mini-whiteboards/Traffic Cards

One Question Quiz

Observation-Vectors Snakes and Ladders

Summative Test

On-going worksheets-RAG

MyMaths

Online Quizzes |

| Spring 1 | **Algebra**

• Factorisation
• Simultaneous Equations
• Quadratic Inequalites(Higher)
• Rearranging Formulae
• Functions-(Higher Tier)
• Iteration | • Factorising linear and quadratic expressions, including the difference of two squares
• Solving linear simultaneous equations
• Solving Quadratic Linear Simultaneous equations (Higher)
• Solving quadratic inequalities (Higher)
• Rearrange formulae to change the subject
• Inverse and Composite Functions
• Iterations

Key words: factorise, highest common factor, coefficients, quadratic, difference of two squares. simultaneous equations, subject, inverse function, composite function, iteration. | • Factorising linear and quadratic expressions of the form $x^2 + bx + c$ including the difference of two squares
• Factorising linear and quadratic expressions of the form $ax^2 + bx + c$ (Higher)
• Solving linear simultaneous equations graphically and algebraically
• Solving quadratic-linear simultaneous equations graphically and algebraically
• Solving quadratic inequalities in one variable
• Rearranging formulae to change the subject
• Solving problems with inverse and composite functions
• Finding approximate solutions to equations using iteration | Self Assessment T-chart: 'Separate what you do and don't understand'

'Detect and correct the error'

Step by Step Round Table

3-2-1

Reflection Paragraph

Workbook Activities

MyMath/ Transum Online activities

Summative Test |
| Spring 2 | **Construction, Angles and Trigonometry**

• Construction
• Angles in a Polygon
• Trigonometry | • Construction of Perpendicular bisectors, figures and bisecting an angle
• Angles in a Polygon
• Pythagoras' Theorem and Trigonometry Ratios
• Cosine and Sine Rule and Area of a Triangle (Higher Tier)

Key words: perpendicular bisector, line segment, bisect, construct, compass, vertically opposite angles, alternate angles, corresponding angles, parallel lines, polygons, sine, cosine, tangent. | • Using the ruler and compass to construct perpendicular bisector of a line segment, a perpendicular to a given line from a given point, bisecting an angle and using them to construct given figures.
• Applying the properties of angles at a point, angles at a point on a straight line, vertically opposite angles, alternate and corresponding angles on parallel lines, sum of angles in a triangle and other polygons
• Applying Pythagoras' theorem and trigonometric ratios to solve problems with right angled triangles.
• Applying the sine and cosine rule to find unknown lengths and angles
• Applying the Area $A = \frac{1}{2} ab Sin\ C$ to calculate the area, sides or angles of any triangle. | Self Assessment- Success Criteria

Student Portfolio

Ticket out the door

'Talking Math' Talk Show- Students on the panel answer questions related to the topic

Summative Test

Workbook activities

Project-Sine and Cosine Spaghetti/ String Model |

Summer 1	Exam Revision	Exam Revision	• Selecting and applying mathematical and exam techniques to solve problems • Making deductions and inferences and drawing conclusions	Four Corners Reflection Journal Past Paper Questions Peer Assessment-Step by Step Round Table