

Mathematics

Working hard together, achieving together, making every lesson count

The Mathematics Team will provide students with exciting, relevant and challenging Mathematics, delivered by dedicated staff.

Students will understand the underlying principles of the mathematics they learn, making links and developing reasoning skills and logical thinking. They will progress towards being independent mathematicians who take ownership of their learning and can identify correct and incorrect work for themselves.

Students will have their confidence encouraged and their complacency challenged in order to maximise potential. To achieve this, staff will design and develop simple and effective systems and interesting and effective teaching ideas and resources to enable classroom delivery and promote mathematics across the school.

Autumn		Spring		Summer	
Similarity Congruence Vectors	Completing the square to sketch curves Iteration Set Theory	Applied Handling Data Applied Number Applied Shape and Space Applied Algebra	Personalised exam Preparation: Knowledge and Understanding Enhancement	Personalised exam Preparation: Knowledge and Understanding Enhancement	Exams

Students will receive one piece of homework per week that will be marked and returned to the student at the next available opportunity. The piece of work will be designed to last between 1 hour and 1 and a half hours. Unless otherwise stated by the teacher, students should complete homework in their book and show all working out. Homework could take a variety of formats including:

- Worksheet
- Research Project
- MathsWatch
- Revision
- Exam Practice

During the final year of study we will ensure that your child is on the right pathway to maximise their potential and ensure that they achieve the best possible outcome.

Higher

Unit	Duration (WEEKS)	Learning Objectives/Outcomes
Similarity	2	<ul style="list-style-type: none"> • To understand and use the different effects of enlargement for perimeter, area and volume of shapes and solids. • To know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids.
Congruence and Similarity	1	<ul style="list-style-type: none"> • To understand and use conditions of congruence. • To complete a formal geometric proof of similarity of two given triangles.
Vectors and Vector Geometry	2	<ul style="list-style-type: none"> • To understand and use vector notation. • To calculate resultant vectors and other vector calculations. • To apply vector methods for simple geometrical proofs.
Functions	2	<ul style="list-style-type: none"> • To plot, interpret and recognise graphs of complex functions. • To select and apply a variety of transformations to a variety of functions. • To interpret and analyse transformations of functions and write the functions both graphically and algebraically.
Sketching Curves	1	<ul style="list-style-type: none"> • To identify minimum/maximum from an equation by completing the square. • To determine an equation from a sketch and vice versa.
Tangents	1	<ul style="list-style-type: none"> • To construct an appropriate tangent. • To determine the gradient of a tangent to the curve using a variety of methods.
Velocity Graphs	2	<ul style="list-style-type: none"> • To recognise the differences between a D/T and a V/T graph. • To interpret and construct a V/T graph. • To understand and convert between compound units.
Iteration	2	<ul style="list-style-type: none"> • To know when a sequence converges or diverges. • To generate a sequence from a given iteration formula.
Set Theory	2	<ul style="list-style-type: none"> • To understand and use sets and subsets defined in algebraic terms. • To use set notation and Venn diagrams to represent sets and elements. • To use sets in practical situations.

Exponential Growth and Decay	1	<ul style="list-style-type: none"> To recognise the characteristics of an exponential curve or formula. To know and understand the principles of compound interest. To be able to draw a graph of $y = abx$ or use co-ordinates on a graph to determine a formula.
Algebraic Fractions	2	<ul style="list-style-type: none"> To understand the four operations of algebraic fractions. To manipulate and simplify algebraic fractions. To solve algebraic fraction equations.
Higher Order Polynomials	1	<ul style="list-style-type: none"> To expand triple brackets.
Applied Handling Data	1	<ul style="list-style-type: none"> To understand contextualised data representation questions. To recap work and apply knowledge.
Applied Number	1	<ul style="list-style-type: none"> To understand contextualised number questions. To recap work and apply knowledge.
Applied Shape and Space	1	<ul style="list-style-type: none"> To understand contextualised shape and space questions. To recap work and apply knowledge.
Applied Algebra	1	<ul style="list-style-type: none"> To understand contextualised algebra questions. To recap work and apply knowledge.
Exam Preparation	3	<ul style="list-style-type: none"> Personalised exam preparation
Knowledge and Understanding Enhancement	2	<ul style="list-style-type: none"> Revision

Foundation

Unit	Duration (WEEKS)	Learning Objectives/Outcomes
Data Representation	1	<ul style="list-style-type: none"> To interpret data from a variety of databases, tables, charts, and graphs. To populate or construct a variety of databases, tables, charts and graphs.
Congruence and Similarity	2	<ul style="list-style-type: none"> To understand and use conditions of congruence. To understand and use the different effects of enlargement for perimeter, area and volume of shapes and solids. To know the relationships between linear, area and

		<p>volume</p> <ul style="list-style-type: none"> • scale factors of mathematically similar shapes and solids.
Trigonometry	2	<ul style="list-style-type: none"> • To understand, recall and use trigonometric relationships in right-angled triangles. • To use basic trigonometry to solve problems in 2D and 3D. • To use the sine and cosine rules to solve 2-D and 3-D problems.
Sequences	1	<ul style="list-style-type: none"> • To recognise and describe the term to term rule for a variety of sequences. • To find a specific term in a sequence. • To find and use the nth term of an arithmetic sequence.
Perimeter, Area, and Volume	2	<ul style="list-style-type: none"> • To calculate the perimeters, arc lengths and areas of circles and sectors. • To give answers in terms of π. • To find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders.
Vectors	2	<ul style="list-style-type: none"> • To understand and use vector notation. • To calculate resultant vectors and other vector calculations.
Transformations	1	<ul style="list-style-type: none"> • To describe or draw all four transformations.
Proportionality	3	<ul style="list-style-type: none"> • To calculate an unknown quantity from quantities that vary in direct or inverse proportion. • To set up and use equations to solve proportionality problems.
Algebra	2	<ul style="list-style-type: none"> • To expand brackets using surds.
Proof	1	<ul style="list-style-type: none"> • To prove the congruency of triangles.
Set Theory	2	<ul style="list-style-type: none"> • To understand and use sets and subsets defined in algebraic terms. • To use set notation and Venn diagrams to represent sets and elements. • To use sets in practical situations.
Applied Handling Data	1	<ul style="list-style-type: none"> • To understand contextualised data representation questions. • To recap work and apply knowledge.
Applied Number	1	<ul style="list-style-type: none"> • To understand contextualised number questions. • To recap work and apply knowledge.

Applied Shape and Space	1	<ul style="list-style-type: none"> • To understand contextualised shape and space questions. • To recap work and apply knowledge.
Applied Algebra	1	<ul style="list-style-type: none"> • To understand contextualised algebra questions. • To recap work and apply knowledge.
Exam Preparation	3	<ul style="list-style-type: none"> • Personalised exam preparation
Knowledge and Understanding Enhancement	3	<ul style="list-style-type: none"> • Revision

