

Key Stage 4: Mathematics Curriculum Map 2023-24

Prior Learning:

At the start of KS4 students are expected to have a secure knowledge in the following areas of mathematics:

Algebra:

- be able to plot coordinates and read scales
- be able to substitute into a formula
- be able to rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae
- be able to substitute into formulae
- be able to expand single brackets and collect 'like' terms
- recall the index laws
- be able to draw linear graphs
- be able to substitute into and solve equations
- be able to use formulae
- use of inequality symbols

Number:

- know the four operations of number
- have a basic understanding of fractions as being 'parts of a whole'
- understand when to leave an answer in surd form
- know how to use the four operations on a calculator
- be able to find a percentage of an amount and relate percentages to decimals
- be able to rearrange equations and use these to solve problems
- be able to square negative numbers
- be able to write powers of 10 in index form and recognise and recall powers of 10, i.e. $10^2 = 100$

Shape Space and Measure:

- recall basic angle facts
- be able to measure and draw lines and angles and using compasses, ruler and protractor, and construct standard constructions
- know the formula for calculating the area of a rectangle
- be able to interpret scales on a range of measuring instruments
- know speed = distance/time, density = mass/volume
- use column vectors when dealing with translations
- recall and apply Pythagoras' Theorem on a coordinate grid
- be able to recognise and enlarge shapes and calculate scale factors
- know how to calculate area and volume in various metric measures

Curriculum Intent:

Our curriculum is designed to recognise students' prior learning and allow them to develop interpersonal skills Our intent is to aim to ensure that all children:

- become fluent in fundamental mathematics
- are able to reason mathematically
- can solve problems by applying their maths skills

We provide appropriate level of challenge and encourage students to explain their choices

This will translate into better GCSE outcomes, more post 16 options and improve their social mobility

SMSC

Spiritual: The study of mathematics enables students to make sense of the world around them and we strive to enable each of our students to explore the connections between their numeracy skills and every-day life Developing deep thinking and an ability to question the way in which the world works promotes the spiritual growth of students. Students are encouraged to see the sequences, patterns, symmetry and scale both in the man-made and the natural world and to use maths as a tool to explore it more fully

Moral: The moral development of students is an important thread running through the mathematics syllabus Students are provided with opportunities to use their maths skills in real life contexts, applying and exploring the skills required in solving various problems For example, students are encouraged to analyse data and consider the implications of misleading or biased statistical calculations All students are made aware of the fact that the choices they make lead to various consequences They must then make a choice that relates to the result they are looking for The logical aspect of this relates strongly to the right/wrong responses in maths.

Social: Problem solving skills and teamwork are fundamental to mathematics through creative thinking, discussion, explaining and presenting ideas Students are always encouraged to explain concepts to each other and support each other in their learning In this manner, students realise their own strengths and feel a sense of achievement which often boosts confidence Over time they become more independent and resilient learners

Cultural: Mathematics is a universal language with a myriad of cultural inputs throughout the ages Various approaches to mathematics from around the world are used and this provides an opportunity to discuss their origins This includes different multiplication methods from Egypt, Russia and China, Pythagoras' Theorem from Greece, algebra from the Middle East and debates as to where Trigonometry was first used We try to develop an awareness of both the history of maths alongside the realisation that many topics we still learn today have travelled across the world and are used internationally

ORACY

All staff actively planning to use the following Oracy strategies:

- Exploratory Talking Points
- Structured Grid - Turn and Talk
- Odd One Out with sentence stems
- Concept Cartoons
- What's wrong/find the fib
- Presentational talk

LITERACY/NUMERACY/IT

All staff actively planning to use the following resources/strategies:

- Key vocabulary

- Sharing learning objectives
- Command words, sentence structure, Tier 1(Basic and common vocabulary used in everyday conversations),Tier 2(Words that often have multiple meanings and are referred to as academic vocabulary words) and Tier 3 (Words that are subject specific)
- Sparx
- Blookets
- Quizes

Cross curricular links: Science, Geography, History, PE, Technology

Year 10 Foundation

	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Powers and Place Value; Algebra and Graphs; Transform and Measure	Multiplicative Relationships; Triangles and Angles; Statistical Diagrams; 3D into 2D	Functions; Units and Measures; Manipulation; Area and Volume	Probability; Transformations; Indices; Graphs and Formulae	Squares and Circles; Transformations; Sequences	Place Value and Powers; Angles; Lines
Learning Focus	Multiplying decimals, Multiplying and dividing by powers of 10, Writing numbers in standard form, plotting linear graphs, Equation of a straight line, Using brackets, Volume and surface area of cuboids	Converting FDP, Percentage increase and decrease, Angles in triangles and quadrilaterals, Angles and parallel lines, Vertical line charts, Pie charts, Understanding nets, Representations of 3D shapes	Setting up and solving simple equations, working with more complex equations, Dividing decimals, Adding and subtracting fractions, Working with mixed numbers, Finding area and perimeter, Volume and surface area of cuboids, Prisms	Multiplying fractions, Single event probability, combines events, Rotation, BIDMAS, writing numbers in standard form, Plotting quadratic and cubic graphs	Circumference, Area of circles, Enlargement, Linear sequences, Special sequences	Rounding decimals, Significance, Types of quadrilaterals, Angles in a polygon, the equation of a straight line, Plotting cubic and quadratic graphs
Careers Focus	Teacher, Professor, Mathematicians, Astronomers, Chemists, Physicists, Computer and Information Research Scientist, Air Traffic Controller, Application Software Developer, Medical Scientist, Automotive Engineer, Risk Analyst, Architect, Chemical Engineer, Application Software Developer, Electronics Engineer, Carpentry, Brick laying, Garden design, Interior Decorating		Retail, Accountants, Actuary, Finance and Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Sports and Analyst, Medical research, Molecular and Cellular Biologist, Banking and Finance, Aviation, Astronomy, Teacher, Professor, Mathematicians, Statisticians, Financial Analyst		Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Geospatial technician, Land surveyor, Meteorologist, Archaeologist, Cartographer, Land Surveyor, Teacher, Professor, Mathematicians, Cryptologists, Statisticians, Financial Analyst, Architect	
Assessment	1	2	3	4	5	6

Year 10 Higher

	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Powers and Place Value; Algebra and Graphs; Transform and Measure	Multiplicative Relationships; Triangles and Angles; Statistical Diagrams; 3D into 2D	Functions; Units and Measures; Manipulation; Area and Volume	Probability; Transformations; Indices; Graphs and Formulae	Squares and Circles; Transformations; Sequences	Place Value and Powers; Angles; Lines
Learning Focus	Calculating with standard form, Rules of indices, Quadratic equations, Factorising quadratics, Solve quadratics by factorising, Finding centres of rotation	Compound interest, Geometric progressions, Congruent triangles and proof, Proof with similar triangles, Trigonometry for special angles, Using lines of best fit, Enlargement in 2D and 3D, Constructing plans and elevations	Finding equations of straight lines, Polynomial and reciprocal functions, Working with compound units, Identities, Arcs and sectors, Surface area and volume of 3D shapes	The multiplication rule, The addition rule, Vectors, Fractional indices, Using indices in algebra, Growth and decay, Exponential functions	Surds, Enlargement with negative scale factor, Other sequences, Nth term for quadratic sequences	Recurring decimals, Upper and lower bounds, Circle theorems, Perpendicular lines, Solving linear inequalities in two variables
Careers Focus	Teacher, Professor, Mathematicians, Astronomers, Chemists, Physicists, Computer and Information Research Scientist, Air Traffic Controller, Application Software Developer, Medical Scientist, Automotive Engineer, Risk Analyst, Architect, Chemical Engineer, Application Software Developer, Electronics Engineer, Carpentry, Brick laying, Garden design, Interior Decorating		Retail, Accountants, Actuary, Finance and Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Sports and Analyst, Medical research, Molecular and Cellular Biologist, Banking and Finance, Aviation, Astronomy, Teacher, Professor, Mathematicians, Statisticians, Financial Analyst		Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Geospatial technician, Land surveyor, Meteorologist, Archaeologist, Cartographer, Land Surveyor, Teacher, Professor, Mathematicians, Cryptologists, Statisticians, Financial Analyst, Architect	
Assessment	1	2	3	4	5	6

Year 11 Foundation

	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Quadratics and Functions, Trigonometry, Algebra	Proportion and Algebra, Changing Shape, Grouped data	Compound units, Vectors, Algebra and graphs, Proportion	Triangles, percentages, Probability	Exam preparation and Revision	

Learning Focus	Ordering Fractions Multiplying and Dividing Fractions, Factorising quadratics, Solving quadratics, Pythagoras Theorem, Enlargement in 2 and 3 dimensions Bearing, Trigonometry for special angles	Sharing in a given ratio, Constant of proportionality, Scale Drawing, Constructions with a ruler and protractor, Loci, Using frequency tables, Reverse percentages, Displaying Grouped data	Compound units, limits of accuracy, Translations, Vectors, Identities, real life graphs, Working with proportional and inversely proportional quantities	Congruent triangles, Proof using similar and congruent triangles, finding percentage change from one amount to another, Repeated percentage change, Estimating probability, The addition rule	Bespoke revision QLA, Pixl Therapy	
Careers Focus	Teacher, Professor, Mathematicians, Astronomers, Chemists, Physicists, Computer and Information Research Scientist, Air Traffic Controller, Application Software Developer, Medical Scientist, Automotive Engineer, Risk Analyst, Architect, Chemical Engineer, Application Software Developer, Electronics Engineer, Carpentry, Brick laying, Garden design, Interior Decorating		Retail, Accountants, Actuary, Finance and Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Sports and Analyst, Medical research, Molecular and Cellular Biologist, Banking and Finance, Aviation, Astronomy, Teacher, Professor, Mathematicians, Statisticians, Financial Analyst			
Assessment	1	2	3	4	5	6
Year 11 Higher						
	Autumn Term 1 7 weeks	Autumn Term 2 7 weeks	Spring Term 1 6 weeks	Spring Term 2 6 weeks	Summer Term 1 6 weeks	Summer Term 2 7 weeks
Module Title	Quadratics and Functions, Trigonometry, Algebra	Proportion and Algebra, Changing Shape, Grouped data	Compound units, Vectors, Algebra and graphs, Proportion	Triangles, percentages, Probability	Exam preparation and Revision	
Learning Focus	Factorising harder quadratics, completing the square, the quadratic formula, the cosine rule, the sine rule,	Rearranging more formulae, solving equations, Combining transformations, Loci, Translations	Using chords and tangents, area under non-linear graphs, Proof with vectors, Inverse and composite functions,	Trigonometry in 2 and 3D shapes, Area and volume in similar shapes, Solving quadratic inequalities,	Bespoke revision QLA, Pixl Therapy	

	<p>simultaneous equations with quadratics, circular functions, manipulating more expressions and equations, Trig functions</p>	<p>and reflections of functions, Histograms</p>	<p>proving general results, formulating equations to solve proportion problems, working with inversely proportionate quantities</p>	<p>Conditional probability</p>		
Careers Focus	<p>Teacher, Professor, Mathematicians, Astronomers, Chemists, Physicists, Computer and Information Research Scientist, Air Traffic Controller, Application Software Developer, Medical Scientist, Automotive Engineer, Risk Analyst, Architect, Chemical Engineer, Application Software Developer, Electronics Engineer, Carpentry, Brick laying, Garden design, Interior Decorating</p>		<p>Retail, Accountants, Actuary, Finance and Business Advisor, Data Analyst, Tax Accountant, Forensic Accountant, Fund Manager, Stockbroker, Retail Banker, Research Scientist, Sports and Analyst, Medical research, Molecular and Cellular Biologist, Banking and Finance, Aviation, Astronomy, Teacher, Professor, Mathematicians, Statisticians, Financial Analyst</p>			
Assessment	1	2	3	4	5	6