Department: Mathematics

Our Curriculum Aims:

We aim for our students to:

- Become fluent in the fundamentals of Mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof.
- Solve problems by applying their knowledge to a variety of routine and non-routine problems.
- Enjoy the study of Mathematics and experience its wide-ranging cross-curricula links and application in the real-world.
- Develop their confidence, independence and resilience through being challenged.
- Have a strong knowledge and skills base to progress to the next key stage, support their studies of other subjects and to enter a wide range of technical and scientific professions.

Key Stage Three Curriculum Overview

Content

- Number
- Algebra
- Ratio, proportion and rates of change
- Geometry and measures
- Probability and statistics

Year 7

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Number skills recap, introduction to algebra	Written methods for addition, subtraction, multiplication and division, decimals, rounding and estimating, negative numbers, BODMAS, simplifying algebraic expressions.	
HT 2	Basic algebraic skills, simple 2D geometry, averages	Indices, expanding brackets, solving equations, properties of quadrilaterals and triangles, area of 2D shapes and angle properties.	Termly assessment
HT 3	Number calculations, types of number, fractions	Square, cube and triangle numbers, factors, multiples and primes. Calculating with fractions; cancelling, equivalence, addition, subtraction, multiplication, division, fractions of amounts and types of averages.	
HT 4	Further algebra, percentages, angles in polygons	Solving more complicated equations, factorising, calculating percentages of amounts, percentage increase and decrease and angles in polygons.	Termly assessment
HT 5	Ratio, further algebra 2, probability	Ratio and proportion, substitution, changing the subject, calculating probabilities, sample space diagrams and expectation.	Termly assessment

HT 6	Coordinates, bearings, scale drawings, 3D shapes	4 quadrant coordinates, midpoint, bearings, maps scales, scale drawing, nets of 3D shapes, 2D projections, volume and surface area of cuboids.	

Year 8

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Sequences, functions, further ratio, further percentages	Generate sequences, nth term, using function notation, plotting graphs, divide a quantity into a given ratio, direct and inverse proportion, calculating percentage of an amount, increases and decreases using a calculator	
HT 2	Transforming shapes, similar shapes, units of measure, changing the subject, equation of straight lines	Rotational and line symmetry in 2D shapes, reflection, rotation, translation, enlargement of 2D shapes, converting between units of measure, similar triangles, ratio in area and volume, further changing the subject, using the equation of straight-line graphs, parallel and perpendicular lines.	Termly assessment
HT 3	Statistical diagrams, complex equations, further probability	Pie charts, scatter graphs and correlation, solving equations containing fractions, trial and improvement, simultaneous equations, experimental probability, relative frequency and tree diagrams.	
HT 4	Further Statistics, Pythagoras' theorem, constructions, further indices, standard form	Frequency polygons, averages from frequency tables, Pythagoras' theorem, constructions, loci, laws of indices, negative and fractional indices, calculating with standard form.	Termly assessment
HT 5	Inequalities, the circle	Solving inequalities, plotting inequalities, area and circumference of a circle, arc length, sector area.	Termly assessment
HT 6	Limits of accuracy, decimals	Upper and lower bounds, converting fractions and decimals, recurring decimals	

Year 9

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Algebra revision, circle theorems, simultaneous equations, sequences	Revision of basic algebraic manipulation skills (factorising, expanding brackets, changing the subject), changing the subject by factorising, circle theorems, solving simultaneous equations algebraically and graphically, nth term of linear and quadratic sequences.	Termly assessment

HT 2	Quadratic equations, complex percentages, Pythagoras revision, trigonometry	Expanding double brackets, factorising simple quadratic expressions, percentage increase and decrease, compound interest, reverse percentages, Pythagoras' theorem revision, right angled trigonometry.	
HT 3	Further quadratic equations, similarity and congruency, 3D shape, quadratic graphs	Solving quadratic equations by factorising, quadratic formula and completing the square. Similar triangles, congruent triangles, surface area and volume of prisms, cylinders, cones, and pyramids. Drawing quadratic graphs and solving quadratic equations graphically.	Termly assessment
HT 4	Algebraic fractions, functions	Solving equations containing fractions, adding, subtracting, multiplying and dividing algebraic fractions, using function notation, compound and inverse functions.	
HT 5	GCSE content: revision of basic number, algebra and shape knowledge	Written numerical calculations, BODMAS, factors and multiples, angle properties, scale drawing and bearings, algebraic manipulation (expanding brackets, factorising), calculations with fractions and decimals.	Termly assessment
HT 6	GCSE content: revision of basic number and statistics knowledge	Laws of indices, fractional and negative indices, surds, collecting data, frequency tables, representing data (e.g. pie charts, bar charts), frequency polygons, scatter graphs.	

Assessment

Staff continually assess the progress of pupils through a variety of techniques including low stakes retrieval tests to enable both pupils and staff to identify current strengths and areas for improvement. Following each termly assessment pupils are required to reflect on their performance and identify the key topics which require further practice. They are then set individual tasks to complete independently to close these knowledge gaps.

What can parents do to support their sons in KS3?

Collins KS3 Revision - KS3 Maths Higher Level All-in-One Complete Revision and Practice : Ideal for Years 7, 8 and 9. HarperCollins Publishers · Paperback ·ISBN 978-0-00-756279-4

Several websites have practice questions and solutions. We recommend:
https://corbettmaths.com/ (also has how to videos)
drfrostmaths.com
www.mymaths.co.uk (pupils will be given an individual log in)

Setting

The whole year group is divided into four or five pairs of parallel sets. Setting will take account of ability and the speed at which each pupil can work. There are large numbers of boys in the higher sets (about 30), reducing to about 12 in the lower sets.

Key Stage Four Curriculum Overview

GCSE Course Followed: Mathematics

- **Specification: AQA (Syllabus 8300)**

Content

- Number
- Algebra
- Ratio, proportion and rates of change
- Geometry and measures
- Probability and statistics

Examinations

All our students will be entered at the higher level. There are three examinations and these are all taken at the end of Year 11 with the exception of Set 1 pupils who will take them in Year 10.

Paper 1 (Non-Calculator) 1 hour 30 minutes, 33⅓% of the overall marks

Paper 2 (Calculator) 1 hour 30 minutes, 33⅓% of the overall marks

Paper 3 (Calculator) 1 hour 30 minutes, 33⅓% of the overall marks

In each of these papers, content from any part of the specification may be assessed.

Year 1 GCSE

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Coordinates and linear graphs, sequences, percentages, rounding	Calculating and using the equation of straight-line graphs, parallel and perpendicular lines. Linear, quadratic and geometric sequences, percentage revision, limits of accuracy.	
HT 2	Representing data, 2D and 3D shapes, real life graphs	Cumulative frequency diagrams, box plots and histograms. Properties of 2D shapes, area and perimeter, nets, plans and elevations. Interpreting real life graphs including speed-time and distance-time graphs.	
HT 3	Non-linear graphs, circles, ratio and proportion, linear equations,	Calculating and interpreting the gradient of a curved graph, calculating and interpreting the area under a curved graph Volume and surface area of prisms and cylinders, arc length and sector area. Ratio and proportion, solving linear equations.	Termly assessment
HT 4	Introduction to quadratic expressions, basic probability, standard form, transformations and constructions	Changing the subject, expanding and factorising quadratic expressions, substitution. Calculating probabilities, relative frequency, sample space diagrams, combinations of events and standard form. Reflection, rotation, translation, enlargement of 2D shapes, constructions and loci.	Trial Exam
HT 5	Financial Maths, measures, averages and polygons	Using percentages to solve financial problems, converting between units of measure, units of area and volume. Calculating and using averages, properties of polygons,	

HT 6	Congruence, similarity, Pythagoras, trigonometry and complex probability	Similar and congruent triangles and ratio in area and volume. Right angled trigonometry, Pythagoras' theorem, tree diagrams, venn diagrams, conditional probability	

Year 2 GCSE

	Name of topic	Key Content of the Topic	Assessment points
HT 1	3D shapes, non-linear graphs, quadratic equations, simultaneous equations and further quadratics	Surface area and volume of spheres, pyramids, cones and composite solids, sketching graphs of functions (quadratic, cubic, reciprocal, linear), solving quadratic equations by factorising and graphically, solving simultaneous equations algebraically and graphically. Expanding two or more brackets, factorising simple quadratic expressions, rearranging more complicated formulae and algebraic proof.	
HT 2	Algebraic fractions, functions, further trigonometry, growth and decay and circle theorems	Simplifying algebraic fractions, adding, subtracting, multiplying and dividing algebraic expressions. Function notation, composite and inverse functions. Apply Pythagoras' theorem and trigonometry to 3D shapes, graphs of exponential functions, growth and decay problems and circle theorems.	Trial Exam
HT 3	Further equations and graphs, proportion, inequalities and vectors	solving quadratic equations by factorising, quadratic formula, completing the square. Completing the square to deduce turning points, solving quadratic simultaneous equations algebraically and graphically, direct and inverse proportion. Solving linear and quadratic inequalities, graphical inequalities and using vector notation	
HT 4	Trig graphs, sine and cosine rules, transforming graphs	Trigonometric graphs, sine and cosine rule, area sine rule, transforming graphs (translation, reflection).	
HT 5	Numerical methods, equation of a circle	Trial and improvement, iteration, using the equation of a circle.	
HT 6	NA		GCSE exams

Assessment

Staff continually assess the progress of pupils through a variety of techniques including low stakes retrieval tests to enable both pupils and staff to identify current strengths and areas for improvement. Following each termly assessment pupils are required to reflect on their performance and identify the key topics which require further practice. They are then set individual tasks to complete independently to close these knowledge gaps.

Recommended Revision Guides for GCSE

Collins GCSE Grade 9-1 Revision - AQA GCSE 9-1 Maths Higher All-in-One Complete Revision and Practice
HarperCollins Publishers · Paperback ·ISBN 978-0-00-811250-9

Several websites have practice questions and solutions. We recommend:
https://corbettmaths.com/ (also has how to videos)
http://www.mathsgenie.co.uk/gcse.html
drfrostmaths.com

Specimen and past papers are available on STU Maths (KS4 resources folder)

Additional Mathematics Qualifications

During Year 11, Set 1 and 2 pupils will study one of two Additional Mathematics qualifications. These courses are excellent preparation for studying A Level especially for those pupils who want to study Further Mathematics at A Level. The content of these qualifications complements and extends the GCSE Mathematics course and covers topics such as calculus. Pupils who do not study either of the Additional Mathematics qualifications will still be able to take Maths at A Level.

Additional Maths (Free standing Maths Qualification) (Year 11 top set)

Specification: OCR Level 3 Free Standing Maths Qualification (Syllabus 6993)

Pupils will be provided with a textbook.

Examinations

There is one 2 hour (calculator) examination.

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Differentiation, permutations and combinations	Differentiation, gradient of a curve, stationary points, probability diagrams, factorials and the product rule, permutations and combinations	
HT 2	Binomial distribution, exponentials and logarithms, integration	The binomial distribution, exponential and logarithmic functions, reduction to linear form, equations involving exponentials, indefinite and definite integrals, area between curve and x axis, area between two curves.	Trial Exam
HT 3	Application to kinematics, numerical methods, Algebraic manipulation	Motion in a straight line, acceleration due to gravity, variable acceleration, locating a root, iterative sequences, gradients of tangents, area under a curve, application of numerical methods, simplifying algebraic fractions, surds.	
HT 4	Polynomials, applications of equations, sequences, lines and circles	Addition, subtraction, multiplication and division of polynomials, factor theorem, quadratic equations, application of equations and inequalities, sequences and recurrence relationships, linear and circle coordinate geometry.	
HT 5	Graphs, inequalities, trigonometry	Linear, polynomial, exponential and trigonometric graphs, graphical linear inequalities, linear programming, sine rule, cosine rule, area sine rule, trigonometric inequalities, solving trigonometric equations, 3D trigonometry, application of trigonometry to modelling,	GCSE exams
HT 6	NA		GCSE exams

Further Maths GCSE (Year 11 set 2)

Specification: AQA Level 2 Further Maths GCSE (Syllabus 8365)

Pupils will be provided with a textbook.

Examinations

There are two 1 hour 45 minute (calculator) examinations. In each of these papers, content from any part of the specification may be assessed.

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Binomial expansion, algebra and number beyond the GCSE syllabus	Binomial expansion, combinations, surds, indices, quadratic functions, linear functions, functions (composite, inverse), exponential functions, inequalities, simultaneous equations, factor theorem, sequences, proof.	
HT 2	Geometry beyond the GCSE syllabus, calculus	Circle theorems, equation of a circle, geometric proof, trigonometry in 2D and 3D shapes, trigonometric identities, differentiation to find gradient of a curve, tangents and normals, increasing and decreasing functions, stationary points, application of differentiation.	
HT 3	Matrices	Matrix algebra, transformations with matrices.	GCSE exams

Support available for GCSE and Key Stage 3 Students

6th Form mentors are available during lunchtimes in M3. Individual members of staff will run revision classes in Year 11.

Individual Year 11 pupils will receive one-to-one mentoring from Year 13 Maths prefects following the Year 11 mock examinations.

Key Stage Five Curriculum Overview

A Level Course Followed: Mathematics

- **Specification: Edexcel (Syllabus 9MAO)**

Year 12

	Name of topic	Key Content of the Topic	Assessment points
HT 1	AS Pure	Basic algebraic manipulation, indices and surds. Quadratic functions. Equations and inequalities. Graphs and transformations. Straight line graphs. Circles. Algebraic methods. Binomial theorem. Trigonometric ratios.	Baseline test. AS Pure (chapter 1 to 5) test
HT 2	AS/A2 Pure	Trigonometric identities and equations. Radians. Vectors (AS and A2). Differentiation. Integration.	AS Pure test
HT 3	AS Statistics, AS Mechanics	Integration. Exponentials and logarithms. Modelling in mechanics. Constant acceleration. Forces and motion. The large data set. Data Collection. Measures of location and spread. Representations of data.	
HT 4	AS/A2 Statistics, AS/A2 Mechanics	Forces and friction. Application of forces. Correlation. Probability. Conditional probability. Statistical distributions.	
HT 5	AS/A2 Statistics, AS/A2 Mechanics, A2 Pure	Application of forces. Hypothesis testing. Algebraic methods.	Trial Exam
HT 6	A2 Pure	Functions and graphs. Sequences and series. Binomial expansion. Radians.	

Year 13

	Name of topic	Key Content of the Topic	Assessment points
HT 1	A2 Pure	Trigonometric functions. Trigonometry and modelling. Parametric equations.	A2 Pure (chapter 1 to 5) test
HT 2	A2 Pure	Differentiation. Numerical methods. Integration.	
HT 3	A2 Pure, A2 Statistics, AS/A2 Mechanics	Integration. Regression, correlation and hypothesis testing. Moments.	Trial Exam
HT 4	A2 Statistics, AS/A2 Mechanics	The normal distribution. Projectiles. Application of forces. Variable acceleration.	
HT 5	A2 Statistics, AS/A2 Mechanics	The normal distribution. Further kinematics.	A Level Exams
HT 6		N/A	A Level Exams

A Level Course Followed: Further Mathematics

- **Specification: Edexcel (Syllabus 9FMO)**

Applied modules studied: Further Statistics 1, Decision 1.

Year 12

		Teacher 1	Teacher 2	Teacher 3	Assessment points
HT 1	AS Pure	Basic algebraic manipulation, indices and surds. Quadratic functions. Equations and inequalities. Graphs and transformations. Straight line graphs. Circles. Algebraic methods. Binomial theorem. Trigonometric ratios. Trigonometric identities and equations. Radians. Vectors (AS and A2). Differentiation. Integration.			Baseline test. AS Pure (chapter 1 to 5) test. AS Pure test.
HT 2	AS Pure, AS/A2 Statistics, AS/A2 Mechanics	Integration. Exponentials and logarithms. Modelling in mechanics. Constant acceleration. Forces and motion. Forces and friction. Application of forces. The large data set. Data Collection. Measures of location and spread. Representations of data. Correlation. Probability. Conditional probability. Statistical distributions. Hypothesis testing.			AS Applied test.
HT 3	A2 Pure, AS Further Statistics 1, AS Core Pure 1, AS Decision 1	A2 Pure: Sequences and series. Core Pure 1: Complex numbers. Argand diagrams. Series. Roots of polynomials. Proof by induction.	Further Statistics 1: Discrete random variables. Poisson distribution.	Decision 1: Algorithms. Graphs and networks. Algorithms on graphs.	
HT 4	AS Further Statistics 1, AS Core Pure 1, AS Decision 1	Core Pure 1: Vectors. Volumes of revolution. Matrices. Linear transformations.	Further Statistics 1: Hypothesis testing. Chi-Squared tests.	Decision 1: Route inspection. Linear programming. Critical path analysis.	
HT 5	A2 Decision 1, A2 Pure	Algebraic methods. Functions and graphs. Sequences and series.		Decision 1: Graphs and networks. Algorithms on graphs. Route inspection. The travelling salesman problem.	Trial Exam (Maths and Further Maths)
HT 6	A2 Decision 1, A2 Pure	Binomial expansion. Radians. Trigonometric functions.		Decision 1: The simplex algorithm. Critical path analysis.	

		Teacher 1	Teacher 2	Teacher 3	Assessment points
HT 1	A2 Pure	Trigonometry and modelling. Parametric equations. Differentiation.			A2 Pure (chapter 1 to 5) test
HT 2	A2 Statistics, AS/A2 Mechanics	Numerical methods. Integration. Regression, correlation and hypothesis testing. The normal distribution. Moments.			Decision 1 test

HT 3	Core Pure 2, Further Statistics 1, AS/A2 Mechanics	Core Pure 2: Complex numbers. Series.	Further Statistics 1: Geometric and negative binomial distributions. Hypothesis testing.	Mechanics: Projectiles. Application of forces. Variable acceleration.	Trial Exam
HT 4	Core Pure 2, Further Statistics 1, AS/A2 Mechanics	Core Pure 2: Hyperbolic functions. Polar coordinates.	Further Statistics 1: Central limit theorem. Chi-Squared tests.	Mechanics: Further Kinematics.	
HT 5	Core Pure 2, Further Statistics 1	Core Pure 2: Methods in differential equations. Modelling with differential equations.	Further Statistics 1: Probability generating functions. Quality of tests	Core Pure 2: Volumes of revolution. Methods in calculus.	A Level Exams
HT 6	N/A				A Level Exams