Holy Trinity School

A Church of England Secondary School

Maths Curriculum Guide

WHOLE SCHOOL CURRICULUM INTENT STATEMENT

Curriculum Intent:

- As a Church of England School we are committed to the belief that every child is a child of God – uniquely blessed with individual gifts and talents. The intention of our curriculum is to provide opportunities for all students to flourish, drawing out their individual potential and developing them as fully integrated human beings. Our curriculum reflects our Christian ethos and is designed to be challenging, fulfilling, enjoyable and successful for all, regardless of academic or social barriers.

- The curriculum is designed with the intention of being rich and balanced, giving a breadth of opportunity at Key Stage 3 supporting the development of the skills needed to succeed at Key Stage 4 and Key Stage 5. Key Stage 4 has a core which includes RS GCSE for all, alongside both academic and vocational courses. Key Stage 5 provides appropriate pathways for the majority of students to progress to, and allows students to prepare for further study and the world of work. Alongside this, students are provided with a broad enrichment and work-related offer that stimulates their aspirations as global citizens - resilient in the face of difficulty, skilful when faced with new challenges, confident to step out into the unknown and assured of their individual self-worth and of the unique gifts that they each have to bring to the world.

We review our curriculum on a yearly basis and consider the following principles. We believe our curriculum should:

- Embody the school vision which is to be a centre of excellence for learning, inspired by Christian values, where every person in our school community fulfils their potential.

- Provide a broad and balanced range of subjects, including those that are creative and practical, at all Key Stages.

- Include opportunities in a range of both academic and vocational courses at Key Stages 4&5.

- Ensure Religious Studies sits alongside Maths, English and Science as a Core subject which every student will take up to GCSE level.

- Ensure that every student has the opportunity to develop their character through a variety of experiences within REACH, PE, and the Creative Arts.

- Be coherent and sequential so that new knowledge and skill builds on what has been taught, both within an individual subject and across the wider curriculum.

- Be informed by educational research e.g. Growth Mindset (Carol Dweck) and Feedback Loop (John Hattie).

- Acknowledge our contextual needs by giving a high priority to increasing students' mastery of functional literacy, vocabulary and numeracy to maximise students' opportunities for future learning and employment.

- Provide opportunities for learning outside of the classroom. At KS3 this is being embedded through the concept of a 'Passport'; a collection of co-curricular experiences that every student will have experienced.

- Make explicit links to future career pathways alongside a programme of advice and guidance based on the Gatsby benchmarks to prepare students for life and work.

- Ensure effective transitions at all key stages; from Year 6 to Year 7, Year 9 to Year 10 and Year 11 to Year 12.

- Meet statutory National Curriculum expectations.

Whole School Curriculum Principles:

- Our curriculum is structured in a logical and chronological manner.

- Leaders carefully plan to ensure that appropriate knowledge and skills build upon what has been taught previously and are carefully developed before application into more challenging and complex situations, appropriate to the different curricular end points. These skills are recognised as the 'big ideas' within each subject area.

- Knowledge is considered as a 'big idea' within all subject areas. We are developing our understanding of cognitive psychology to enable students to maximise their learning potential. This is best seen through the regular opportunities provided within subject areas to revisit knowledge acquired to enable improved retention and recall.

- Our curriculum runs within a two-week timetable made up of 50 periods a fortnight, with 5 x 1 hour lessons plus assembly and Tutor time every day.

- Each day begins at 8.45am with registrations, assemblies and a period of reflection and students are dismissed from this regular timetable at 3.10pm.

- There are a range of additional activities such as study studio and numerous co-curricular opportunities which take place after this time on a daily basis.

Whole School Learning Principles:

- Progress at Holy Trinity is informed by 'Accelerated Learning' which emphasises efficiency by engaging learners in order to speed up the process of learning. It enables students to commit knowledge to their long-term memory and develop and refine their skills and performance over time.

- This in turn supports the OFSTED definition of learning; "Learning is defined as an alteration in long-term memory. If nothing has altered in long-term memory nothing has been learned".

Maths Intent Statement:

Our vision:

- To promote the enjoyment and understanding of mathematics by making links to other areas of the curriculum and real-life context.
- For every student to become fluent, confident, and resilient in their mathematical thinking, fully prepared for the next stage of their education and beyond.

Our curriculum is thoughtfully designed with our students at its heart. It follows a carefully sequenced progression that builds on prior knowledge; promotes conceptual understanding; and allows time for reflection, assessment, and improvement. We teach for depth, not just coverage, ensuring that students not only know how to complete mathematical processes but also understand why it works.

Intent:

Our mathematics curriculum is carefully structured to provide a clear and coherent progression from Key Stage 3 through to Key Stage 5, with each stage building towards well-defined end points. At Key Stage 3, students in Years 7 and 8 focus on mastering core mathematical skills that form the foundation for future success. These skills, developed collaboratively by the department and are designed to promote fluency, confidence, and deep conceptual understanding. In year 9 we begin to explore the relevant skills for GCSE whilst ensuring a strong foundation of key knowledge and skills in Maths.

Throughout the curriculum, we place a strong emphasis on problem-solving, mathematical reasoning, and retrieval practice to support long-term retention and application of knowledge. Our curriculum is inclusive and adaptive, with targeted interventions and differentiated pathways to meet the needs of all learners, including those who may have gaps in their understanding. For students who excel, we provide opportunities to deepen their understanding rather than accelerate through content, fostering a richer and more meaningful engagement with mathematics.

At Key Stage 4, students follow either the Foundation or Higher GCSE pathway, both of which build on prior learning and provide structured opportunities for retrieval and consolidation. The curriculum is designed to develop fluency with their knowledge and skills while encouraging students to apply their understanding in a variety of contexts. Assessment is used formatively to identify areas for review and extension, ensuring that teaching remains responsive and impactful.

In Key Stage 5, the curriculum extends into more abstract and applied areas of mathematics, preparing students for further study and careers in STEM (Science, Technology, Engineering and Mathematics) fields. Resources such as

Underground Mathematics, STEP, and MAT questions are embedded to challenge students and cultivate a love of the subject. The curriculum also contributes to students' cultural capital by connecting mathematical learning to real-world applications and encouraging intellectual curiosity.

We achieve curriculum coherence and consistency through regular departmental collaboration, shared planning, and ongoing evaluation of student outcomes. Our expectations are clearly communicated through curriculum maps, knowledge organisers, and assessment feedback, ensuring that students understand what they are working towards at each stage of their learning journey.

Our curriculum also supports whole-school priorities, including literacy and numeracy across the curriculum. We embed mathematical vocabulary, promote precise communication, and make cross-curricular links to subjects such as science and geography. Students are supported in understanding the relevance of mathematics to future pathways, with contextualised learning and guidance on careers and further education opportunities.

Looking ahead, we are committed to continuous improvement through curriculum refinement, targeted professional development, and the expansion of enrichment opportunities. In alignment with our school's Christian ethos, we strive to reflect values such as perseverance, integrity, and wonder in our teaching. We aim to provide every student with a sense of purpose and connection through their mathematical journey, supporting their academic success and personal growth.

Curriculum Aim:

- The overarching aim of the mathematics curriculum is to deliver a broad, balanced, and ambitious programme of study that enables all students to master key mathematical concepts and apply them confidently to increasingly complex problems.

- We are committed to fostering a positive attitude toward mathematics, where students enjoy their learning, feel challenged, and are supported to reach their full potential.
- We also aim to ensure that students understand the relevance and value of mathematics in everyday life, equipping them with the skills they need to make informed decisions and succeed in a wide range of future pathways.

Curriculum Principles:

Our curriculum is aligned with the National Curriculum for Mathematics and is structured to ensure comprehensive coverage of all key domains: Number, Algebra, Ratio and Proportion, Geometry and Measures, Probability, and Statistics. We place a strong emphasis on the interconnectedness of these areas, helping students to make meaningful links across topics and apply their knowledge in varied contexts.

Key Stage 3:

Years 7 and 8 are designated as the 'Preparation Stage', where students build a strong foundation in core mathematical skills through a mastery-based approach. The curriculum is designed to allow extended time on key topics, enabling students to explore concepts in depth and develop fluency, accuracy, and confidence.

By the end of Year 7, students are expected to be fluent in essential number skills and able to apply arithmetic methods across different contexts. They will also have been introduced to algebraic thinking in a variety of forms. By the end of Year 8, students should demonstrate confidence and fluency in algebraic manipulation and be well-prepared to transition into more advanced content.

In Year 9, students begin to explore the skills and knowledge required for success at GCSE. This year serves as a bridge between the mastery-focused KS3 curriculum and the more granular, exam-focused content of KS4. The curriculum continues to emphasise depth, variation, and conceptual understanding.

Key Stage 4:

The Key Stage 4 curriculum, delivered in Years 10 and 11, follows the GCSE Mathematics specification. All students are entered for either the Foundation or Higher tier, based on their prior attainment and individual progress. The Foundation tier allows students to achieve grades 1–5, while the Higher tier covers grades 4–9.

The curriculum is divided into carefully sequenced units covering Number, Algebra, Geometry and Measures, Ratio and Proportion, and Data Handling. Each unit is taught in depth, with a focus on real-life applications, problem-solving, and exam-style practice. Retrieval of prior knowledge is embedded at the start of each topic to support progression and long-term retention.

There are approximately 20 units in the Foundation pathway and Higher pathway. Each unit concludes with a formal assessment, followed by dedicated time for reflection and improvement. In addition, students complete termly assessments that revisit both recent and previously taught content, helping to build exam readiness and reinforce key knowledge.

GCSE content is introduced at the end of Year 9 and completed by the February half term. This allows the remainder of Year 11 to be dedicated to structured revision, including exam technique, targeted practice, and knowledge recall activities to maximise student outcomes.

Key Stage 5:

At Key Stage 5, our mathematics curriculum is designed to develop students' logical thinking, analytical reasoning, and problem-solving skills. We aim to foster a deep understanding of mathematical concepts and processes, encouraging confidence and enjoyment in the subject. Through

this course, students extend their range of mathematical techniques and gain insight into how different areas of mathematics are interconnected.

Our commitment is to provide a high-quality mathematics education that promotes academic excellence, supports personal development, and prepares students for future success. The curriculum is aligned with national standards ensuring rigorous teaching, effective assessment, and strong outcomes for all learners.

Studying A Level maths:

A Level Mathematics is a highly respected qualification that supports academic success across a wide range of subjects. It enhances students' abilities in disciplines such as physics, chemistry, biology, economics, and geography, where quantitative reasoning is essential. Outside of these subjects, A Level Mathematics provides students with the ability to analyse complex data sets and an approach to problem-solving that is both logical and detail-oriented, which are valued skills within the fields of the social sciences, humanities and creative arts. Research from University College London (UCL) has shown that students who study A Level Mathematics are more likely to progress to Russell Group universities, which demonstrates the subject's role in supporting access to top-tier higher education. Beyond academic benefits, the course cultivates key employability skills including logical reasoning, effective communication, and resilience. These skills are highly valued in the modern workplace and are applicable across a broad spectrum of careers.

Studying A Level Further maths:

For students with a strong interest in mathematics or those considering a STEM-related degree, Further Mathematics is a valuable and enriching option. This course goes beyond the standard A Level content, offering greater depth and challenge. Students often find it intellectually stimulating and rewarding, with many naming it as their favourite subject. In addition to deepening mathematical understanding, studying Further Mathematics can also improve performance in A Level Mathematics, as the additional depth reinforces key concepts and techniques.

Mathematical Studies:

Mathematical Studies, also known as Core Maths, is an ideal choice for students who wish to continue developing their mathematical skills without taking the full A Level. This course consolidates knowledge from GCSE and focuses on practical applications of mathematics in real-life contexts. It encourages students to think critically and apply mathematical reasoning in new situations. Core Maths also supports learning in other subjects that require quantitative skills, such as psychology, business studies, and

biology, and prepares students for the mathematical demands of further education, apprenticeships, and employment.

Curriculum Overview for Year 7:

Year 7 – Maths		
Key topics		**Assessment**
Autumn 1: Number Sense	Working with number lines; ordering numbers; rounding numbers; adding, subtracting, multiplying and dividing decimals and integers; calculating with negative numbers; working in order of operations	**Preparation:** Century Classcharts **Other assessments:** Topic Test Introductory Assessment (Start of Year)
Autumn 2: Expressions and Equations Measures	Simplifying expressions; substituting into expressions; solving equations Working with time, converting units, estimating units	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment
Spring 1: Fractions	Identifying Highest Common Factor (HCF) and Lowest	**Preparation:** Century

2D Shapes	Common Multiple (LCM); identifying equivalent fractions; simplifying fractions; converting between improper fractions and mixed numbers; adding, subtracting, multiplying and dividing fractions Identifying properties of shapes; recognising symmetry; calculating perimeter and area of 2D shapes	Classcharts **Other assessments:** Topic Test
Spring 2: Equations and Brackets Angles and constructions	Solving equations, expanding and factorising into single brackets Classifying angles; estimating, measuring and drawing angles; using angles facts including angles on a line, angles at a point and angles in a triangle; using a compass	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment
Summer 1: Probability Handling Data and Statistical Diagrams	Representing probabilities through fractions, decimals and percentages; working out probabilities; drawing sample space diagrams; drawing and interpreting venn diagrams Working out mean, mode, median and	**Preparation:** Century Classcharts **Other assessments:** Topic Test

	range; drawing and interpreting tally charts, pictograms, bar charts and stem and leaf diagrams	
Summer 2: Handling Data and Statistical Diagrams (cont.) Fractions, Decimals and Percentages (FDP)	Working out mean, mode, median and range; drawing and interpreting tally charts, pictograms, bar charts and stem and leaf diagrams Finding fractions of amounts; converting between FDP; ordering FDP; expressing decimals as percentages	**Preparation:** Century Classcharts **Other assessments:** Topic Test End of Year Assessment
Suggestions for independent study and home support: Century - https://www.century.tech/ BBC Bitesize - https://www.bbc.co.uk/bitesize/subjects/z6vg9j6 Oak Academy - https://www.thenational.academy/		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly • Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-	Numeracy: Our key focus: • Develop mathematical fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	Other: Independent learning

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Curriculum Overview for Year 8:

Year 8 – Maths		
Key topics		**Assessment**
Autumn 1: Percentages and Fractions	Adding, subtracting, multiplying and dividing mixed numbers; finding percentage of amounts; calculating percentage change	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Money and Ratio	Simplifying ratio; writing ratios in the form 1:n; sharing into ratios; drawing and	

	interpreting scale diagrams; using the unitary method; solving special deal and best buy problems	
Autumn 2: Indices and Venn diagrams Equations	Using the rules of indices; simplifying expressions involving indices; simplifying algebraic fractions; completing prime factor decomposition; identifying Highest Common Factor (HCF), Lowest Common Multiple (LCM) using a venn diagram Collecting like terms; solving linear equations; forming and solving equations; substituting into expressions	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment
Spring 1: Area Sequences	Calculating the area of rectangles, triangles, parallelograms and compound shapes; converting units of area; calculating the area and circumference of circles Identifying the term-to-term rule; using nth term; finding nth term, identifying visual patterns in sequences	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Spring 2: Rounding and Standard Form	Rounding to decimal places and significant figures; estimating calculations; converting into and out of standard form with	**Preparation:** Century Classcharts **Other assessments:**

Coordinates and Linear Graphs	large and small numbers Identifying coordinates; finding midpoints; recognising vertical and horizontal lines; plotting linear lines; calculating gradient and the equation of a line	Topic Test Periodic Assessment
Summer 1: Transformations 3D Shapes	Completing and describing translation, reflections, rotations and enlargements Identifying properties of 3D shapes; drawing nets; calculating surface area and volume of cubes and cuboids	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Summer 2: Angles Inequalities and Brackets	Using angle rules like the sum of angles on a straight line, angles in a triangle, angles in quadrilaterals, angles in parallel lines Reading and drawing inequalities on a number line; solving inequalities; expanding single brackets and double brackets	**Preparation:** Century Classcharts **Other assessments:** Topic Test End of Year Assessment
Suggestions for independent study and home support: Century - https://www.century.tech/ BBC Bitesize - https://www.bbc.co.uk/bitesize/subjects/z6vg9j6 Oak Academy - https://www.thenational.academy/		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly	Numeracy: Our key focus: • Develop mathematica	Other: Independent learning

• Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide	l fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	

Curriculum Overview for Year 9:

Year 9 – Maths		
Key topics		**Assessment**
Autumn 1:		**Preparation:**

Number – integers and place value, decimals, indices, powers and roots, FMP	Adding, subtracting, multiplying and dividing, negative numbers, order of operations, Powers of 10, rounding, estimating, using calculations, powers and roots, index laws, estimating roots, using a calculator, factors, multiple, primes numbers, prime decomposition, highest common factor, lowest common multiple	Century Classcharts **Other assessments:** Topic Test
Autumn 2: **Algebra – notation and manipulation, equations, formulae and inequalities, sequences**	Collecting like terms, index laws, writing expressions, substitution, expanding, factorising, solving equations, rearranging formulae, inequalities on a number line, solving inequalities, continuing a sequence, visual pattern, Fibonacci and geometric sequences, nth term	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment (Pre-public examinations - PPEs)
Spring 1: **Statistics – averages and range, representing data**	Working out averages, comparing averages, drawing and interpreting pictograms, bar charts, stem and leaf diagrams, two way tables and pie charts	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Spring 2: **FDPR - fractions, decimals, percentages and ratio**	Equivalent and simplifying ratio, mixed to improper fractions, adding, subtracting, multiplying and dividing fractions, fractions of amounts,	**Preparation:** Century Classcharts **Other assessments:** Topic Test

	converting between fractions, decimals and percentages (FDP), reciprocals, percentages of amounts, increase and decrease, percentages, profit and loss, simple interest, reverse percentages, Simplifying ratio, writing in the form 1:n, scaling problems, recipe problems, currency conversion, sharing into a ratio, combing ratio	Periodic Assessment
Summer 1: **Geometry – area and perimeter, angles**	Converting units, perimeter, area of 2D shapes, surface area, volume of prisms, properties of angles, angle facts such as angles around a point, angles on a straight line, angles in a triangle, angles in a quadrilateral, angles on parallel lines, angles in polygons	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Summer 2: **Geometry - Plans and elevations, transformations, constructions, bearings**	Drawing and interpreting scale drawings, plans and elevations; identifying symmetry; drawing and describing transformations (reflections, rotations, translations and enlargements); constructing bisectors, triangles, quadrilaterals, loci and regions; measuring, drawing and problem solving with bearings	**Preparation:** Century Classcharts **Other assessments:** Topic Test End of Year Assessment

Suggestions for independent study and home support: Century - https://www.century.tech/ BBC Bitesize - https://www.bbc.co.uk/bitesize/subjects/z6vg9j6 Maths Genie - https://www.mathsgenie.co.uk/		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly • Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide	Numeracy: Our key focus: • Develop mathematical fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	Other: Independent learning

Curriculum Overview for Year 10:

Year 10 – Mathematics GCSE			
Exam Board & course title/code		Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics		Summer – Year 11	100%
Key topics	**Course content**		**Assessment**
Autumn 1: **FDPR - Multiplicative reasoning, compound measures, accuracy and bounds**	Identifying the decimal multiplier; calculating compound, simple interest and repeated percentage change; converting units; calculating using compound measures (speed/distance/time, force/pressure/area and mass/density/volume); identifying and calculating with bounds and error intervals		**Preparation:** Century Classcharts **Other assessments:** Topic Test
Autumn 2: **Algebra - Real life graphs, straight line graphs**	Drawing and interpreting conversion graphs and Distance-Time graphs; generating tables of values; finding the gradient, y-intercept and equation of a line; finding the midpoint of a line segment		**Preparation:** Century Classcharts **Other assessments:** Topic Test

		Periodic Assess ment
Spring 1: Statistics - Averages from a table, comparing averages, frequency polygons, scatter graphs	Calculating averages from frequency and grouped frequency tables; categorising data sampling methods; comparing sets of data; drawing and interpreting frequency polygons and scatter graphs	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Spring 2: **Geometry - Pythagoras and trigonometry** Number - Standard form, indices, surds	Using the Pythagorean Theorem to calculate missing sides of right-angled triangles and problem solve; identifying and calculating with trignometric functions to find missing sides, angles and problem solve Converting between standard form and ordinary numbers; calculating with standard form; calculating with index laws; simplifying and rationalising surds	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assess ment
Summer 1: Probability - Diagrams, estimating	Listing outcomes; drawing and interpreting sample space diagrams; estimating probabilities; calculating probabilities using probability trees, frequency trees and Venn diagrams	**Preparation:** Century Classcharts **Other assessments:**

		Topic Tests
Summer 2: Geometry - Circles, cones, spheres and cylinders, circle theorems	Identifying parts of a circle; calculating the area and circumference of circles; calculating arc lengths, areas fo sectors; calculating volume and surface areas of cylinders, spheres, cones pyramids *and frustums; Solving problems with circle theorems; finding equations of circles*	**Preparation:** Century Classcharts **Other assessments:** Topic Test End of Year Assessment (PPEs)

Suggestions for independent study and home support:
Century - https://www.century.tech/
BBC Bitesize - https://www.bbc.co.uk/bitesize/subjects/z6vg9j6
Maths Genie - https://www.mathsgenie.co.uk/

KEY SKILLS

Literacy:	Numeracy:	Other:
Our key focus: Spelling key terms correctly Use of mathematical language Sites which we use to promote correct mathematical language include:	Our key focus: Develop mathematical fluency through numeracy www.nationalnumeracy.org.uk/why-numeracy-important www.skillsyouneed.com/numeracy-skills.html	Independent learning

www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide		

Curriculum Overview for Year 11:

Year 11 – Mathematics GCSE Foundation			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1F, 1MA1/2F and 1MA1/1F	Summer – Year 11	100%

Key topics	Course content	Assessment
Autumn 1: Algebra – Equations FDPR - Proportion	Solving one- and two- step equations; solving equations with fractions, brackets and unknowns on both sides; forming and solving equations; expanding double brackets; factorising quadratics Using direct and inverse proportion; identifying value for money	**Preparation:** Century Class Charts **Other assessments:** Topic Test
Autumn 2: Geometry - Similarity and congruence Algebra - Quadratics, cubic,	Identifying congruence and similarity in 2D; solving problems using similarity and scale factors	**Preparation:** Century Classcharts **Other assessments:**

reciprocal and other graphs	Solving quadratic equations; plotting and interpreting quadratic graphs; plotting cubic and reciprocal graphs; classifying graphs	Topic Test Periodic Assessment (Pre-public Examinations, PPEs)
Spring 1: Geometry - Vectors and vector proof Geometry - Trigonometry Statistics - Statistics recap	Finding column vectors; representing vectors with lines; combining vectors; finding vectors between coordinates Using trigonometric functions; calculating missing sides and angles; assessing elevation and depration in worded trigonemetry problems; solving problems using trigonometry Identifying averages from a frequency table and grouped frequency tables; sampling data; comparing sets of data; drawing and interpreting frequency polygons and scatter graphs	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Spring 2: **Algebra - Advanced algebra** Revision	Solving equations and inequalities; rearranging formulae; solving simultaneous equations	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment (Pre-public Examinations, PPEs)
Summer 1:		**Preparation:** Past papers

		Other assessments
Suggestions for independent study and home support: GCSE Bitesize, Maths Genie and Century		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly • Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide	Numeracy: Our key focus: • Develop mathematical fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	Other: Independent learning

Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1H, 1MA1/2H and 1MA1/1H	Summer – Year 11	100%

Key topics Key topics	Course content Course content	Assessment Assessment
Autumn 1: Algebra - Quadratics, simultaneous equations FDPR – Proportion Geometry - Similarity and congruence	Factorising, solving, sketching, plotting and interpreting quadratics; completing the square; using the quadratic formula; forming and solving linear and quadratic simultaneous equations Calculating using direct and inverse proportion; identifying value for money; calculating using equations of proportion Identifying and finding proof of congruence; using scale factors and similarity calculate missing lengths, areas and volumes; problem solving using similarity and scale factors	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Autumn 2: Algebra - Quadratics, cubic, reciprocal and other graphs Geometry - Vectors and vector proof	Expanding expressions with triple brackets; sketching, plotting and interpreting cubic functions; plotting reciprocal and exponential functions; identifying graphs; solving equations (cubic, quadratic, reciprocal, etc.) using a graph; graphing inequalities Finding column vectors; representing vectors with lines; combining vectors; finding vectors between coordinates; using scalars and collinear vectors; calculating the magnitude of vectors; applying vectors	**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment (Pre-public Examinations, PPEs)

Geometry - Advanced trigonometry	Using the Pythagorean Theorem and trigonometric functions without a calculator; solving 3D problems using Pythagoras and Trigonometry; using the sine (for lengths, angles and area) and cosine rule; graphing trigonometric functions	
Spring 1: Statistics - Advanced statistics Algebra - Advanced algebra Algebra - Functions, graph transformations, kinematic graphs	Plotting and interpreting cumulative frequency graphs; drawing and interpreting box plots and histograms; completing capture-recapture problems Calculating with surds; simplifying and calcuting with algebraic fractions; rearranging formulae; using the iterative process; working with algebraic proof Graphing transformations using functions; calculating with composite functions; transforming trigonmetric graphs; identifying gradient and area of linear and non-linear kinematic graphs	**Preparation:** Century Classcharts **Other assessments:** Topic Test
Spring 2:		**Preparation:** Century Classcharts **Other assessments:** Topic Test Periodic Assessment (Pre-public Examinations, PPEs)
Summer 1:		**Preparation:** Past papers **Other assessments**

Suggestions for independent study and home support: GCSE Bitesize, Maths Genie and Century		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly • Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide	Numeracy: Our key focus: • Develop mathematical fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	Other: Independent learning

Curriculum Overview for Year 12:

Year 12 – Mathematics GCE			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
8MAO (AS)	Pure Mechanics & Statistics		62.5% 37.5%

Key topics	Course content	Assessment	
Autumn 1: Quadratics	Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square.		15
Coordinate Geometry - Lines & Circles	Understand and use the equation of a straight line, including the forms y – y1 = m(x – x1) and ax + by + c = 0. Gradient conditions for two straight lines to be parallel or perpendicular. Be able to use straight line models in a variety of contexts. Understand and use the coordinate geometry of the circle including using the equation of a circle in the form (x – a)^ 2 + (y – b)^2 = r2. Completing the square to find the centre and radius of a circle; use of the following properties: • the angle in a semicircle is a right angle • the perpendicular from the centre to a chord bisects the chord • the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point		
Equations & Inequalities	Solution of quadratic equations, including solving quadratic equations in a function of the unknown. Solve simultaneous		

	Graph transformations Kinematics	equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically. including inequalities with brackets and fractions. Express solutions through correct use of 'and' and 'or', or through set notation. Represent linear and quadratic inequalities such as y > x + 1 and y > ax2 + bx + c graphically. Understand and use graphs of functions; sketch curves defined by simple equations including polynomials y = x/a and y = a/x^2 (including their vertical and horizontal asymptotes) Interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations. Understand and use proportional relationships and their graphs. Understand the effect of simple transformations on the graph of y = f(x), including sketching associated graphs: y = af(x), y = f(x) + a, y = f(x + a), y = f(ax) Understand and use fundamental quantities and units in the S.I. system: length, time, mass. Understand and use derived quantities and units: velocity, acceleration, force, weight. Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration.	

Polynomials Data collection/Sampling Data presentation and interpretation	Understand, use and interpret graphs in kinematics for motion in a straight line: displacement against time and interpretation of gradient; velocity against time and interpretation of gradient and area under the graph. Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem. Understand and use the terms 'population' and 'sample'. Use samples to make informal inferences about the population. Understand and use sampling techniques, including simple random sampling and opportunity sampling. Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population. Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency.	

		Connect to probability distributions. interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams that include distinct sections of the population (calculations involving regression lines are excluded). Understand informal interpretation of correlation.	
		Understand that correlation does not imply causation.	
	Autumn 2: Differentiation Measure of location and spread	Understand and use the derivative of f(x) as the gradient of the tangent to the graph of y = f(x) at a general point (x, y); the gradient of the tangent as a limit; interpretation as a rate of change sketching the gradient function for a given curve Second derivatives differentiation from first principles for small positive integer powers of x Understand and use the second derivative as the rate of change of gradient. Differentiate x^ n, for rational values of n, and related constant multiples, sums and differences. Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points. Identify where functions are increasing or decreasing.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests
		Interpret measures of central tendency and variation,	

	extending to standard deviation. Be able to calculate standard deviation, including from summary statistics. Recognise and interpret possible outliers in data sets and statistical diagrams. Select or critique data	
Binomial Expansion	presentation techniques in the context of a statistical problem. Be able to clean data, including dealing with missing data, errors and outliers.	
Forces and motions	Understand and use the binomial expansion of (a+ bx)^n for positive integer n; the notations n! and nCr link to binomial probabilities.	
Vectors 2D	Understand, use and derive the formulae for constant acceleration for motion in a straight line. Use calculus in kinematics for motion in a straight line. Understand the concept of a force; understand and use Newton's first law. Understand and use Newton's second law for motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors).	
large data set	Use vectors in two dimensions. Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form. Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations. Understand and use position vectors; calculate the distance between two points represented by position vectors. Use vectors to solve problems in pure	

	mathematics and in context, (including forces).	
Spring 1: Exponential & Logarithms Probability	**Know and use the function a^x and its graph, where a is positive.** **Know and use the function e^x and its graph. Know that the gradient of e^kx is equal to ke^kx and hence understand why the exponential model is suitable in many applications. Know and use the definition of logax as the inverse of a^x , where a is positive and x > 0** **Know and use the function lnx and its graph** **Know and use lnx as the inverse function of e^x. Understand and use the laws of logarithms:** **logax + logay = loga(xy)** **logax − logay = loga (x/y)** **klogax = logax^k (including, for example, k = −1 and k = − 1/2). Solve equations of the form a^x = b. Use logarithmic graphs to estimate parameters in relationships of the form y = ax^n and y = kb^x ,given data for x and y. Understand and use exponential growth and decay; use in modelling (examples may include the use of e in continuous compound interest, radioactive decay, drug concentration decay, exponential growth as a model for population growth); consideration of limitations and refinements of exponential models**	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests

Trigonometry Integration	**Understand and use mutually exclusive and independent events when calculating probabilities.** **Link to discrete and continuous distributions.** **Understand and use the definitions of sine, cosine and tangent for all arguments;** **the sine and cosine rules; the area of a triangle in the form 1/2 ab sin C. Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity. Understand and use tanθ=sinθ/ cosθ** **Understand and use sin^2 θ + cos^2 θ = 1. Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle.** **Know and use the Fundamental Theorem of Calculus. Integrate x n (excluding n = −1) and related sums, differences and constant multiples. Evaluate definite integrals; use a definite integral to find the area under a curve.**	
Spring 2: Connected particles	Understand and use weight and motion in a straight line under gravity; gravitational acceleration, g, and its value in S.I. units to varying degrees of accuracy. Understand and use Newton's third law;	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests

	equilibrium of forces on a particle and motion in a straight line; application to problems involving smooth pulleys and connected particles.	Other assessments: End of Unit closed Book Tests Closed book periodic tests
Probability Distributions & Binomial Distribution	Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution.	
Trig -reciprocal graphs	Understand and use the definitions of secant, cosecant and cotangent; their relationships to sine, cosine and tangent;	
Proof -Trig identities	Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including:Proof by deduction	
Hypothesis Testing (Binomial)	Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value. Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context.	

Integration & Variable Acceleration	Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis. understand that displacement, velocity and acceleration may be given as functions of time. use differentiation to solve kinematics problems. Use calculus to solve problems involving maxima and minima. use integration to solve kinematics problems. Use calculus to derive constant acceleration formulae.	
Summer 1: Differentiation Functions	Understand and use the derivative of f(x) as the gradient of the tangent to the graph of y = f(x) at a general point (x, y); the gradient of the tangent as a limit; interpretation as a rate of change sketching the gradient function for a given curve. second derivatives differentiation from first principles for small positive integer powers of x and for sin x and cos x. Understand and use the second derivative as the rate of change of gradient. Understand and use graphs of functions; sketch curves defined by simple equations including polynomials The modulus of a linear function. y = a/x and y = 2/ax^2 (including their vertical and horizontal asymptotes)	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests

Trig compound angles Trigonometry 2 (A Level - Radians)	Interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations. Understand and use proportional relationships and their graphs. Understand and use composite functions; inverse functions and their graphs. Use of functions in modelling, including consideration of limitations and refinements of the models. Understand and use tanθ= sinθ/cosθ Understand and use sin2θ + cos2θ = 1 sec2θ = 1 + tan2 θ and cosec2θ = 1+ cot2θ. Understand and use double angle formulae; use of formulae for sin (A ± B), cos (A ± B), and tan (A ± B), understand geometrical proofs of these formulae. Understand and use expressions for a cosθ + bsinθ in the equivalent forms of r cos (θ ±α) or rsin (θ± α) Understand and use the standard small angle approximations of sine, cosine and tangent sinθ ≈θ cosθ≈ 1-θ^2/2 , tanθ ≈ θ Where θ is in radians.	
Summer 2: Trig Functions	Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent; understanding of their	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests

Differentiation Modulus functions Large data set	graphs; their ranges and domains. Differentiate x^n , for rational values of n, and related constant multiples, sums and differences. Differentiate e^kx and a^kx, sin kx, cos kx, tan kx and related sums, differences and constant multiples. Understand and use the derivative of ln x. Apply differentiation to find gradients, tangents and normals maxima and minima and stationary points. points of inflection. Identify where functions are increasing or decreasing. Differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions. Differentiate simple functions and relations defined implicitly or parametrically, for first derivative only. Sketch the modulus of linear functions	Other assessments: End of Unit closed Book Tests Closed book periodic tests including PPE

Suggestions for independent study and home support:

Integral Maths
Exam Solutions
Course Textbook issued through the Library
Variety of PowerPoints on Student Shared Area

KEY SKILLS

Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research development Time management

Year 12 – Further Mathematics GCE			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Pearson Edexcel – GCE As Level Further Maths (8FM0)	Core Pure Maths 1 (Both)		25% (50% AS)
	Core Pure Maths 2 (A Level only)		25%
	Further Statistics 1		25% (AS & A Level)
	Further Pure 1		25% (AS & A Level)
Key topics	Course content		Assessment
Autumn 1: MAtrices and inverses	Add, subtract and multiply conformable matrices.		Preparation: Assessed Homework Tasks,

Complex numbers Series Roots of polynomials Proof by induction	Multiply a matrix by a scalar. Understand and use zero and identity matrices. Understand and use singular and non-singular matrices. Properties of inverse matrices. Calculate and use the inverse of non-singular 2 × 2 matrices and 3 × 3 matrices. Add, subtract, multiply and divide complex numbers in the form x + iy with x and y real. Understand and use the terms 'real part' and 'imaginary part'. Understand and use the complex conjugate. Know that non-real roots of polynomial equations with real coefficients occur in conjugate pairs. Use and interpret Argand diagrams. Understand and use formulae for the sums of integers, squares and cubes and use these to sum other series. Understand and use the relationship between roots and coefficients of polynomial equations up to quartic equations. Form a polynomial equation whose roots are a linear transformation of the roots of a given polynomial equation (of at least cubic degree). Construct proofs using mathematical induction. Contexts include sums of series, divisibility and powers of matrices.	Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests

Autumn 2: Matrices and transformations Complex numbers and geometry Coordinate systems/Conic sections 1 Discrete Random variables Poisson distribution	Use matrices to represent linear transformations in 2-D. Successive transformations. Single transformations in 3-D. Find invariant points and lines for a linear transformation. Calculate determinants of: 2 × 2 and 3 × 3 matrices and interpret as scale factors, including the effect on orientation. Solve three linear simultaneous equations in three variables by use of the inverse matrix. Interpret geometrically the solution and failure of solution of three simultaneous linear equations. Convert between the Cartesian form and the modulus-argument form of a complex number. Knowledge of radians is assumed. Multiply and divide complex numbers in modulus argument form. Construct and interpret simple loci in the argand diagram such as Iz- r I>r and arg (z − a) = θ Knowledge of radians is assumed. Cartesian equations for the parabola and rectangular hyperbola. Parametric equations for the parabola and rectangular hyperbola. The focus-directrix property of the parabola. Tangents and normals to these curves. Simple loci problems.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests

	Calculation of the mean and variance of discrete probability distributions. Extension of expected value function to include E(g(X)). The Poisson distribution. The additive property of Poisson distributions. The use of the Poisson distribution as an approximation to the binomial distribution. The mean and variance of the binomial distribution and the Poisson distribution. Extend ideas of hypothesis tests to test for the mean of a Poisson distribution	
Spring 1: Inequalities Vectors and 3d space Chi-squared test	The manipulation and solution of algebraic inequalities and inequations. Understand and use the vector and Cartesian forms of an equation of a straight line in 3-D. Understand and use the vector and Cartesian forms of the equation of a plane. Goodness of fit tests and Contingency Tables.The null and alternative hypotheses. The use of sum of (oi-Ei)^2/Ei as an approximate χ2 statistic. Calculate the Degrees of freedom.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests
Spring 2: Vectors	Calculate the scalar product and use it to express the equation of a plane, and to calculate the angle between two lines, the angle	Preparation: Assessed Homework Tasks, Exam questions,

	between two planes and the angle between a line and a plane. Check whether vectors are perpendicular by using the scalar product. Find the intersection of a line and a plane. Calculate the perpendicular distance between two lines, from a point to a line and from a point to a plane.	Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests
Numerical methods	Numerical solution of first order and second order differential equations.	
Further Calculus/volumes of revolutions	Derive formulae for and calculate volumes of revolution	
The t-Formulae	The t-formulae, Applications of t-formulae to trigonometric identities. Applications of t-formulae to solve trigonometric equations	
Summer 1: Complex numbers and geometry	Understand de Moivre's theorem and use it to find multiple angle formulae and sums of series. Know and use the definition e^iθ = cos θ +i sin θ and the form z = re^iθ. Find the n distinct nth roots of reiθ for r ≠0 and know that they form the vertices of a regular n-gon in the Argand diagram. Use complex roots of unity to solve geometric problems.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests
Geometric and negative	Geometric and negative binomial distributions.	

binomial distributions Hypothesis testing Geo dist	Mean and variance of a geometric distribution with parameter p. Mean and variance of negative binomial distribution Extend hypothesis testing to test for the parameter p of a geometric distribution	
Summer 2: Further vectors Inequalities	The vector product a x b of two vectors. Applications of the vector product. The scalar triple product a.bx c The manipulation and solution of algebraic inequalities and inequations, including those involving the modulus sign.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests including PPE
Suggestions for independent study and home support: Integral Maths Exam Solutions Course Textbook issued through the Library Variety of PowerPoints on Student Shared Area		
KEY SKILLS		
Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research development Time management

Year 12 – Mathematical Studies			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
AQA L3 Certificate in Mathematical Studies	Paper 1 Paper 2B	Summer – Year 13	100 %
Key topics	**Course content**		**Assessment**
Autumn 1: Analysis of Data Personal finance	Types of sampling, measures of spread, box plots, cumulative frequency curve, histograms, comparing data Budgeting, income tax, national insurance, annual percentage rate, mortgages, savings, VAT, exchange rates, inflation		**Preparation:** SMHW tasks Looking at newspapers **Other assessments:** Topic test after every topic
Autumn 2: Modelling and estimation Critical path analysis	Standard form, estimation techniques, assumptions, facts and formulae Networks and algorithms, activity networks, early and late times, critical activities, gantt charts		**Preparation:** SMHW tasks Looking at newspapers

		Other assessments: Topic test after every topic
Spring 1: Critical analysis Expectations Cost-benefit analysis	Selectivity of data, sampling and trailing, misleading with data Venn diagrams, probability, tree diagrams, conditional probability, expected value Cost-benefit principle, control measures and uncertainty, insurance myths	**Preparation:** SMHW tasks Looking at newspapers **Other assessments:** Topic test after every topic
Spring 2:	Paper 1 Preliminary Material Paper 2 Preliminary Material	**Preparation:** SMHW tasks Looking at newspapers **Other assessments:** Topic test afte

		r ever y topi c
Summer 1:	Revision	**Prepar ation:** SMHW tasks Looking at newspa pers **Other assess ments:** Topi c test afte r ever y topi c
Summer 2:		**Prepar ation:** SMHW tasks Looking at newspa pers **Other assess ments:** Topi c test afte r ever y topi c End of

		year exam
Suggestions for independent study and home support: Maths Genie and Sparx Looking at news paper articles		
KEY SKILLS		
Literacy: Our key focus: • Spelling key terms correctly • Use of mathematical language • Sites which we use to promote correct mathematical language include: www.mathsisfun.com/definitions/ and https://lexonik.co.uk/resources/resource-hub/gcse-maths-vocabulary-guide	Numeracy: Our key focus: • Develop mathematical fluency through numeracy • www.nationalnumeracy.org.uk/why-numeracy-important • www.skillsyouneed.com/numeracy-skills.html	Other: Independent Learning

Curriculum Overview for Year 13:

Year 13 – Mathematics GCE			
Exam Board & course title/code EDEXEL	Unit	Date of Exam	% of Total Exam
9MAO (A Level)	Pure		$33\frac{1}{3}\%$
	Pure		$33\frac{1}{3}\%$
	Statistics & Mechanics		$33\frac{1}{3}\%$
Key topics	Course content		Assessment
Autumn 1: Binomial expansion Algebra Forces and motion	Understand and use the binomial expansion of (a + bx)^n for positive integer n; the notations n! and nCr link to binomial probabilities. Extend to any rational n, including its use for approximation; be aware that the expansion is valid for Ibx/aI < 1 (proof not required) Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem. Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only). Understand, use and derive the formulae for constant acceleration for motion in a straight line. Extend to 2 dimensions using vectors.. Use		Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests

Numerical methods	calculus in kinematics for motion in a straight line. Understand and use addition of forces; resultant forces; dynamics for motion in a plane. Locate roots of f(x) = 0 by considering changes of sign of f(x) in an interval of x on which f(x) is sufficiently well behaved. Understand how change of sign methods can fail. Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams. Solve equations using the Newton-Raphson method and other recurrence relations of the form xn+1= g(xn). Understand how such methods can fail. Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between. Use numerical methods to solve problems in context.	
A model for friction	Understand and use the F ≤ μR model for friction; coefficient of friction; motion of a body on a rough surface; limiting friction and statics.	
Trigonometry	Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle.	
Integration		

	Construct proofs involving trigonometric functions and identities. Use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces. Know and use the Fundamental Theorem of Calculus. Integrate x^n (excluding n = −1) and related sums, differences and constant multiples. Integrate e^kx, 1/x, sinkx , cos kx and related sums, differences and constant multiples. Evaluate definite integrals; use a definite integral to find the area under a curve and the area between two curves. Understand and use integration as the limit of a sum. Carry out simple cases of integration by substitution and integration by parts; understand these methods as the inverse processes of the chain and product rules respectively (Integration by substitution includes finding a suitable substitution and is limited to cases where one substitution will lead to a function which can be integrated; integration by parts includes more than one application of the method but excludes reduction formulae.). Integrate using partial fractions that are linear in the denominator. Evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions	

	(Separation of variables may require factorisation involving a common factor.), Interpret the solution of a differential equation in the context of solving a problem, including identifying limitations of the solution; includes links to kinematics.	
Autumn 2: Projectiles and kinematics Differential equations Parametric equations Statistical distributions	Model motion under gravity in a vertical plane using vectors; projectiles. Construct simple differential equations in pure mathematics and in context, (contexts may include kinematics, population growth and modelling the relationship between price and demand). Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms. Use parametric equations in modelling in a variety of contexts. Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution. Understand and use the Normal distribution as a model; find probabilities using	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests

	the Normal distribution. Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate.	
Spring 1: Moments hypothesis testing Proof	Understand and use moments in simple static contexts. Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value; extend to correlation coefficients as measures of how close data points lie to a straight line. and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded). Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context. Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including: Proof by deduction	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests including PPE

Sequence and series Vectors	Proof by exhaustionDisproof by counter example. Proof by contradiction (including proof of the irrationality of 2 and the infinity of primes, and application to unfamiliar proofs) Work with sequences including those given by a formula for the nth term and those generated by a simple relation of the form xn + 1 = f(xn); increasing sequences; decreasing sequences; periodic sequences. Understand and use sigma notation for sums of series. Understand and work with arithmetic sequences and series, including the formulae for nth term and the sum to n terms. Understand and work with geometric sequences and series, including the formulae for the nth term and the sum of a finite geometric series; the sum to infinity of a convergent geometric series, including the use of $\|r\| < 1$; modulus notation. Use sequences and series in modelling. Use vectors in two dimensions and in three dimensions. Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form. Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical	

	interpretations. Understand and use position vectors; calculate the distance between two points represented by position vectors. Use vectors to solve problems in pure mathematics and in context (including forces).	
Spring 2: Probability Revision	Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables. Understand and use the conditional probability formula P(A|B) = P(A∩ B)/ P(B). Modelling with probability, including critiquing assumptions made and the likely effect of more realistic assumptions.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Open Book Tests
Summer 1: Revision		Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests
Summer 2:	Formal examination (A level) Exam Leave	

Suggestions for independent study and home support:

Integral Maths
Exam Solutions
Course Textbook issued through the Library
Variety of PowerPoints on Student Shared Area

KEY SKILLS		
Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research development Time management

Year 13 – Further Mathematics GCE			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Pearson Edexcel – GCE A Level Further Maths (9FM0)	Core Pure Maths 1 (Both)		25% (50% AS)

	Core Pure Maths 2 (A Level only)		25%
	Further Statistics Paper 3A		25% (AS & A Level)
	Further Pure 1 Paper 3A		25% (AS & A Level)
Key topics	Course content		Assessment
Autumn 1: Sequences and series Polar coordinates Hyperbolic functions Maclaurin series	Understand and use the method of differences for summation of series including use of partial fractions Understand and use polar coordinates and be able to convert between polar and Cartesian coordinates. Sketch curves with r given as a function of θ, including use of trigonometric functions. Find the area enclosed by a polar curve. Understand the definitions of hyperbolic functions sinh x, cosh x and tanh x, including their domains and ranges, and be able to sketch their graphs. Differentiate and integrate hyperbolic functions. Understand and be able to use the definitions of the inverse hyperbolic functions and their domains and ranges. Derive and use the logarithmic forms of the inverse hyperbolic functions Find the Maclaurin series of a function including the general term. Recognise and use the Maclaurin series for e^x , ln(1+ x) , sin x , cos x and (1+ x)^n , and be aware of the range of values of x for which they are valid (proof not required).		Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Closed Book Tests

Autumn 2: Further calculas	Evaluate improper integrals where either the integrand is undefined at a value in the range of integration or the range of integration extends to infinity. Understand and evaluate the mean value of a function. Integrate using partial fractions. Differentiate inverse trigonometric functions. Integrate functions of the form (a^2-x^2)^-0.5 and (a^2-x^2)^-1 and be able to choose trigonometric substitutions to integrate associated functions.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Closed Book Tests Closed book periodic tests
Conic sections2	Cartesian and parametric equations for the parabola and rectangular hyperbola, ellipse and hyperbola. The focus-directrix properties of the parabola, ellipse and hyperbola, including the eccentricity.	
Numerical methods	Simpson's rule.	
Vectors	Applications of vectors to three dimensional geometry involving points, lines and planes.	
Methods in DE's	Find and use an integrating factor to solve differential equations of form dy/dx + P(x)y = Q(x) and recognise when it is appropriate to do so. Find both general and particular solutions to differential equations. Use differential equations in modelling in kinematics and in other contexts. Solve differential	

Taylor series	equations of form y” + ay’ + by = 0 where a and b are constants by using the auxiliary equation. Solve differential equations of form y ”+ a y ’+b y = f(x) where a and b are constants by solving the homogeneous case and adding a particular integral to the complementary function (in cases where f(x) is a polynomial, exponential or trigonometric function). Understand and use the relationship between the cases when the discriminant of the auxiliary equation is positive, zero and negative and the form of solution of the differential equation. Derivation and use of Taylor series. Use of series expansions to find limits. Use of Taylor series method for series solution of differential equations. Differential equations reducible by means of a given substitution.	
Spring 1: Methods in calculas Modelling with DE	Leibnitz’s theorem. L’Hospital’s Rule. The Weierstrass substitution for integration. Solve the equation for simple harmonic motion and relate the solution to the motion. Model damped oscillations using second order differential equations and interpret their solutions. Analyse and interpret models of situations with one independent variable and two dependent variables as a pair of coupled first order simultaneous equations and	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Closed Book Tests

Modelling with trig 5.4+Simpson's rule Reducible Differential equations	be able to solve them, for example predator-prey models. Use the t-formula for modelling with trigonometry. Use simpson's rule to find an approximate for a given definite integral First order differential equations , second order differential equations, Modelling with Differential equations	
Spring 2: Central limit theorem Probability generating functions Quality tests	Applications of the Central Limit Theorem to other distributions. Definitions, derivations and applications. Use of the probability generating function for the negative binomial, geometric, binomial and Poisson distributions. Use to find the mean and variance. Probability generating function of the sum of independent random variables. Type I and Type II errors. Size and Power of Test. The power function.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Closed Book Tests Closed book periodic tests
Summer 1:	Revision	Preparation: Assessed Homework Tasks, Exam questions,

		Online Section Tests Other assessments: End of Unit Closed Book Tests
Summer 2:	Exam Leave	
Suggestions for independent study and home support: Integral Maths Exam Solutions Course Textbook issued through the Library Variety of PowerPoints on Student Shared Area		
KEY SKILLS		
Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research development Time management

Subject Assessment Reporting and Recording:

Marking Policy

Overview

The Mathematics Department adopts a comprehensive marking policy that balances both **formative** and **summative** assessment opportunities. Feedback is structured around key points in the curriculum and is delivered using the PIA (Positive, Improvement, Action) model. Students are also encouraged to engage in **self and peer assessment**, using the PIA

process to develop reflective thinking and critical evaluation skills. The integration of iPads in lessons enables **live and verbal feedback**, enhancing the immediacy and impact of teacher guidance.

Assessment Strategy

Assessment is embedded within the schemes of work and includes both **formative (diagnostic)** and **summative** components. Formative assessments help identify areas for improvement and guide students in their learning journey. Summative assessments are used to record overall attainment at key points, such as end-of-topic tests and formal assessments periodically throughout the year. These assessments inform future lesson planning and ensure that teaching is responsive to student needs.

Teachers maintain detailed records of student progress to monitor development over time, provide accurate historical data for parents and colleagues, and support effective reporting and target setting. Planning is informed by data from Bromcom, including baseline assessments, attendance, and contextual information such as SEND, EAL, Pupil Premium, and High Achievers.

Teacher Responsibilities

Teachers are expected to plan a range of differentiated tasks that allow for meaningful feedback and progress monitoring. They will create opportunities for students to act on feedback and encourage independent learning through strategies such as using their work from previous lessons, discussing with fellow students and checking the board for any additional information. Teachers will closely monitor student work in lessons to identify and address misconceptions or errors. Teachers also ensure that homework is completed and recorded systematically.

Summative assessments will be administered as outlined in the schemes of work for each Key Stage. This includes tests after each topic and termly periodic assessments. Teachers will analyse results to track progress against target grades and identify students who require additional support or challenge. Progress will be reported in line with the school's reporting cycle.

Student Responsibilities

Students are expected to actively engage with all assessment and feedback opportunities. They should regularly mark their own work using a green pen, correct errors using provided answers, and use strategies, such as checking their work from previous lessons, to foster independence. Written feedback from teachers must be read and acted upon, typically through a short task indicated on their PIA sheet. Students are also

responsible for updating their assessment tracker on their iPad to monitor their own progress.

Assessment Structure by Key Stage

Key Stage 3 (Years 7–8)

- Each topic concludes with a **closed book end-of-topic test**, marked using a standardised mark scheme and grade boundaries. This follows a review lesson where students have completed a Personalised Learning Checklist (PLC) to direct their review. Results from the topic test are recorded on Pupil Progress and converted into GCSE-style grades. Teachers complete PIA sheets to guide students in Directed Improvement and Reflection Time (DIRT) work.
- **Periodic assessments** are conducted each term to evaluate cumulative understanding. These are also closed book and students receive a Question Level Analysis (QLA) to highlight strengths and areas for improvement. Periodic assessments cover content learned throughout the year and may be calculator or non-calculator papers, depending on the topics.

Key Stage 4 (Years 9–11)

- Assessment follows a similar structure to KS3, where each topic concludes with a **closed book end-of-topic test**, marked using a standardised mark scheme and grade boundaries. Results are recorded on Pupil Progress and converted into GCSE-style grades. Teachers complete PIA sheets to guide students in Directed Improvement and Reflection Time (DIRT) work.
- **Periodic assessments** are conducted each term to evaluate cumulative understanding. These are also closed book and students receive a Question Level Analysis (QLA) to highlight strengths and areas for improvement. Periodic assessments cover content learned throughout the year and may be calculator or non-calculator papers, depending on the topics.
- In Years 9 and 10, one of these periodic assessments will be Pre-Public Examinations (PPEs). These are mock exams, sat in the hall under exam conditions. In Year 11, students sit two sets of PPEs, typically in December and March. These exams use past papers from the exam board and mirror the format of the final GCSE exams.

Key Stage 5 (Years 12–13)

- For A Level Mathematics and Further Mathematics, each topic includes an **assessed homework task (open book)** and a **formal written assessment (closed book)**. Periodic assessments

throughout the year help monitor progress. Year 12 students sit AS-level papers at the end of the year, while Year 13 students complete mock exams that replicate the final A Level structure: three papers covering Pure Mathematics, Statistics, and Mechanics.

- The **Core Maths** course includes regular topic tests and an end-of-year exam in Year 12. The **GCSE re-sit course** also features regular assessments and mock exams. Students are expected to maintain a well-organised ring binder or exercise book containing all marked work. While teachers do not mark folders directly, students are responsible for keeping them up to date and complete.

HOMEWORK

Mathematics Department Homework Policy

All homework tasks across Key Stages 3, 4, and 5 will be set using ClassCharts, ensuring consistency and accessibility for students and parents.

Key Stages 3 and 4

- Students in Years 7 to 11 will receive one homework task per week. The primary platform for these tasks is Century Tech, where students complete "nuggets" tailored to their current learning, areas requiring revision, or preparation for upcoming topics. The platform provides immediate feedback, but teachers are expected to review student performance to monitor progress and plan any necessary interventions.
- Occasionally, alternative homework formats may be used, including worksheets, teacher-directed tasks, vocabulary exercises, revision, or review activities. Regardless of format, all homework must be monitored and acknowledged. For example, students completing revision tasks should be able to demonstrate the time and effort spent on the activity.
- Homework may be reviewed in class through verbal feedback, discussion of common misconceptions, or targeted teacher intervention with individuals, small groups, or the whole class. Students may also self-assess their work and reflect on their performance during DIRT (Directed Improvement and Reflection Time) lessons, identifying areas for improvement.
- Homework tasks are appropriately differentiated between classes to meet the needs of all learners. Teachers may adapt the standard

homework pattern in consultation with the Head of Department to ensure it remains effective and inclusive.

Key Stage 5

- For all sixth form mathematics courses, students are expected to complete approximately two hours of directed homework per week, in addition to independent study.
- Homework tasks will include a variety of formats such as online assessments via the Integral platform, textbook exercises, exam-style questions, and revision activities. At the end of each topic, students are required to complete an online Integral assessment. These are automatically marked and the teachers will address any areas that students need to work on.
- Some homework tasks will be marked during lessons, while others will be self-assessed using mark schemes or model answers. Assessed homework tasks will be formally marked by teachers using the PIA (Positive, Improvement, Action) feedback model. Students are expected to keep all marked work in an organised folder or ring binder, which serves as a record of their progress, although teachers will not mark the folders themselves.

Marking and feedback in practice

In the Mathematics Department, marking and feedback are essential tools for supporting student progress and fostering a reflective learning environment. Across all Key Stages, written feedback follows the PIA (Positive, Improvement, Action) model is applied consistently to all formal assessments. In addition, regular feedback is provided on classwork and homework to ensure students receive timely and meaningful guidance.
Feedback may be delivered through written comments or structured PIA sheets. Regardless of the format, the following elements will be evident:
Positive

- Teachers begin by highlighting a positive aspect of the student's work. This may include celebrating accuracy, clear presentation, or thoughtful methods. Comments such as "well set out" or "really clear methods" acknowledge effort and attention to detail. For some students, it is important to recognise perseverance with challenging content or noticeable progress in understanding key concepts.

Improvement

- Teachers then provide specific, constructive advice on how the student can improve. This feedback should focus on the mathematical content and be tailored to the individual's needs. In some cases, the most effective feedback may be embedded directly within the student's work—for example, by correcting an error or modelling a method. In such instances, a brief comment referencing the correction is sufficient, rather than repeating the advice on the PIA sheet.
- Even when a student demonstrates full understanding of a topic, teachers should identify the next step in their mathematical development. This ensures that all students, regardless of ability, are continually challenged and supported in making further progress.

Action

- Students are expected to respond to feedback by completing a specific task that demonstrates their understanding and improvement. These actions may include:
  - Correcting errors using teacher guidance.
  - Completing similar practice questions provided in class or on a worksheet.
  - Engaging in targeted DIRT (Directed Improvement and Reflection Time) activities.
  - Reviewing a concept or method using online resources such as Maths Genie or Sparx.
- While PIA sheets are not required for every piece of work, there must be clear evidence that classwork and homework are being monitored and that misconceptions are being addressed. This can be shown through:
  - Students regularly checking and correcting their work using green pen.
  - Teachers providing verbal feedback during lessons and intervening with individuals, small groups, or the whole class as needed.

Teachers should mark work using purple pen, while students use green pen to respond to feedback or self-assess their work. During DIRT lessons, students should write the title in green pen but complete the main task in blue or black pen.