KS3 CURRICULUM DOCUMENT: MATHS

Content at KS3 is split into 5 key themes:
Number
Algebra
Ratio and Proportion
Geometry and Shape
Probability & Statistics

Students study each key theme every year based on a spiral curriculum that is aimed at revisiting past topics, and consolidating them before building further

Students will tackle a problem each half term building links between topics

		Year 7		Year 8		Year 9	
		FOUNDATION	HIGHER	FOUNDATION	HIGHER	FOUNDATION	HIGHER
Assessment 1		Place Value Properties of Number Negative Numbers Integer Arithmetic	Place Value Properties of Number Negative Numbers Indices and Roots	Fraction Arithmetic Recap	Fractions & Decimals Irrational Numbers	Review of Decimal Arithmetic	Inequalities and Bounds
				Percentages	Percentages		Indices and Standard Form
Assessment 2		Algebraic Expressions	Algebraic Expressions	Angles Recap Constructions Symmetry and Properties of 2d Shapes Informal Transformations	Internal and External angles of Polygons	Indices and S.I. Form	Sequences and Proof
		Fraction Arithmetic	Fraction Arithmetic		Constructions and Transformations	Solving linear equations (unknowns on both sides)	Solving Inequalities and Complex linear equations
Assessment 3		Coordinates and Graphs Sequences	Sequences Linear Graphs	Brackets Solving linear equations by balancing	Trial and Improvement Factorising/Expanding Quadratics	3d shapes Volume and Surface Area	Angle Proofs, Bearings Congruence and Similarity
		Decimal Arithmetic	Decimal Arithmetic	Two way tables and Frequency Trees	Two way tables and Frequency Trees	Fraction Arithmetic Probability Relative Frequency	Probability Rules Tree Diagrams
Assessment 4		Time Metric Units Area and Perimeter of	Properties of 2d Shapes Area and Perimeter	Area of Trapezium, Parallelogram and Compound Shapes	3d Shapes, Volume and Surface Area	Percentages and Decimal Multipliers	Compound and Simple Interest Decimal Multipliers
		Probability Intro Experimental Probability	Theoretical and Experimental Probability	Direct Proportion Conversion of Units	Direct and Indirect Proportion Conversion of Units	Loci, Constructions and Pythagoras Parallel lines	Circles Pythagoras Right angled Trigonometry
Assessment 5		Inverse Operations and Solving one & two step linear equations	Solving Equations Rearranging formulae	Integer Arithmetic BIDMAS/Substitution)	$y = mx + c$ Gradients and Parallel lines	Averages from a table Frequency Polygons (Continuous Data)	Cumulative Frequency and Box Plots (Continuous Data)
		Angles in a triangle, On a line and Round a Point	Angles in a Triangle and Quadrilaterals Parallel lines	Sequences and plotting linear graphs (all 4 quadrants)	Distance Speed and Time Compound Measures	Rounding Area and Perimeter of a Circle	Loci, Constructions More complex volume and surface area
Assessment 6		Averages, Pie Charts Bar Chars (Discrete Data)	Averages, Pie Charts, Bar Chars (Discrete Data)	Data collection and analysis Comparing Discrete Data	Data collection and analysis Comparing Discrete Data	Line Graphs (Gradient, Speed)	Linear & Non Linear graphs
		Ratio	Ratio		Mental Mastery & Surds	Transformations	Simultaneous and Quadratic equations

NUMBER

ALGEBRA

RATIO AND PROPORTION

GEOMETRY AND SHAPE

PROBABILITY & STATISTICS

Key Maths Skills are taught intrinsically within all themes and are developed across the year groups

FLUENCY AND RECALL
REASONING AND PROOF
APPLICATION AND PROBLEM SOLVING
MATHEMATICAL COMMUNICATION

By the End of Year 9 all students will have covered the GCSE content to *at least* to Grade 4

KS3 CURRICULUM INTENT: MATHS

Subject:	Maths				
Intent		What new knowledge/content do we introduce?			**How does this curriculum incorporate the National Curriculum and go beyond? How does going beyond the NC ensure challenge?**
By the end of year 9 a Chesterton maths student will…		Year 7	Year 8	Year 9	
Be confident in the 5 key areas of Mathematics: • Number (Arithmetic with integers and decimals, Rounding, Fractions, Decimals, Percentages, Indices) • Shape/Measure (Angle facts, informal transformations and properties of shape, Area, Perimeter, Volume of shapes) • Algebra (Simplifying expressions, Collecting terms, Plotting graphs, Expanding, Factorising ,	Autumn	• Exploring rounding numbers through the use of different methods such as significant figures and estimating. • Exploring the relationship between square numbers, cube numbers and roots. • Writing numbers in standard form and how these numbers are interpreted and displayed on a calculator. • Sequences and patterns in a real life.	• Review of fraction arithmetic from Year 7, extend to problem solving with fractions and simple algebraic fractions • Describing quantities using percentages and solving percentage problems. • Calculating interior and exterior angles of polygons. • Transformations – rotations, reflections and translations. • Review of algebraic expressions and solving equations from Year 7. Extend to expanding and factorising double brackets and using trial and	• Rounding inequalities and bounds • Indices and Standard Form. • Review of algebra skills from Year 9 and extend to solving complex linear equations and power equations • Algebraic proof linked to sequences and number properties, Geometric proof linked to sequences and properties of shape. • Formal transformations with a focus on similarity and Enlargements. • Bearings.	The Scheme of Learning is based on the National curriculums for KS3 & 4. We cover the content of the KS3 National Curriculum within the first three years and in most strands go beyond the KS3 content, dipping into KS4 content. (For example Cumulative frequency curves, dependent/independent variables in probability, solving quadratic equations, concepts of proof) The Scheme of Learning is deigned to be challenging and to enable the most able students to take an additional qualification in Additional Maths in Year 10s and 11 alongside their normal maths GCSE. To achieve this we embed UK Maths challenge questions and GCSE standard questions into our lessons wherever possible - using these as a

Solving equations, Substituting) • Ratio/Proportion (Be able to write and use ratios, solve problems involving sharing and proportional reasoning, calculate percentages of amounts and increase/decrease by given percentages) • Statistics and Probability (Comparing data sets using measures of location and spread, reading and plotting appropriate graphs, understanding likelihood, calculating probabilities by counting and using diagrammatic aids for combined events) In addition students will be able to take the above			improvement for more complex equations •		bench mark to track pupils progress All students who wish to take part in the UKMT maths challenges have an opportunity to do so. Where possible we try and link maths into areas of cross-curricular interest to inspire and develop students' cultural capital. There are lessons within the SoL celebrating the international nature of the subject, its links with computing, science, art and design. It is vital that our practitioners deliver our curriculum in a way that promotes a thirst for knowledge as this encourages students to study maths past their GCSE qualification. Research suggests that students who have experienced a challenging and enriching KS3 are more likely to assert themselves purposefully at key stage 4 as well as to consider Mathematics as an option at Key Stage 5.
	Spring	• Decimal Arithmetic and the relationship between fractions decimals and percentages. • Drawing and interpreting graphs of linear functions. • Properties of shapes, area and perimeter • Probability of single events and multiple events using ideas for counting and diagramatic representations	• 3d shapes and their 2d representations. • Finding the volume and surface area of prisms. • Representing data with two way tables and frequency trees, link to probability from Year 7 • Review of ratio from Year 7, extending to solving problems involving direct and inverse proportion	• Probability of combined events including tree diagrams and abstract rules for independence and mutually exclusive. Relative frequency. • Review of percentages from Year 8, extend to calculator methods involving problem solving using decimal multipliers • Circles, including Sector Area and Arc Length. • Properties of right angled triangles including Pythagoras and right-angled trigonometry	
	Summer	• Inverse operations, writing and solving linear equations. • Angle facts for triangles, quadrilaterals and parallel lines • Calculating averages and presenting data using bar charts and pie charts (focus on discrete data types). • Describing quantities with ratios their relationship to	• Plotting straight line graphs and the relationship between a graph and its equation • Review collecting and analysing data from Year 7, extend to comparing data sets and looking at measures of spread. • Compound units, especially distance speed and time.	• Analysing and representing continuous data including calculating the mean and median for grouped data, inter-quartiles, cumulative frequency and box plots. • Recap volume of a prism from Year 8 and extend to non-prisms and surface area/volumes of similar solids • Graph working including parallel and	

content/skills and apply them to mathematical problems.		• fractions and sharing quantities in ratios	• Mental mastery of arithmetic without a calculator including simple surd manipulation	perpendicular lines and non-linear functions. • Simultaneous equations graphically and algebraically for linear functions • Solving quadratic functions
	Rationale for this sequence.	The Year 7 curriculum is designed to mesh with the challenging content taught to student's at KS2. It is a balance of introducing new ideas (for example significant figures, more complex algebraic expressions and properties of parallel lines) whilst giving opportunities for students to develop fluency and recall of topics that they may or may not be secure from prior learning. When reviewing more established KS2 content, the scheme of learning is designed to provide opportunities to deepen understanding and build links between topics. This is achieved by asking students to apply their maths and solve problems related to GCSE standard. There is a particular focus on students being asked to justify their answers and to describe the methods they have used to develop their reasoning skills both verbally and through written arguments.	The Year 8 curriculum builds on the Year 7 curriculum by taking each of the strands taught previously and reviewing their content before extending into new subject knowledge. An example of this is the work on straight line graphs which reviews the work on plotting lines in Year 7 to develop a fuller understanding of how the equation of a line relates to the graph's gradient and y-intercept point. In Year 8 students are encouraged to use their reasoning skills both verbally and with written arguments to are assessed half termly on recently studied strands with the assessments focusing on key declarative and procedural knowledge. All students will work on their retrieval and understanding of core skills such as expanding brackets, solving linear equations, calculating averages and	The year 9 curriculum builds in the Year 8 curriculum by taking each of the strands taught previously and reviewing the content before extending into new subject knowledge. In Year 9 students are assessed each half term on each of the most recently studied topics, but the style of question is more evenly distributed between declarative, procedural and conditional knowledge. In the summer term of Year 9 students take an end of Key Stage assessment which is based on a full GCSE exam paper, with some of the higher level content reviewed. Although the content in Year 9 is still divided between our 5 strands a key theme through the year is a gradual shift towards work where students will be required to draw on knowledge required in several different strands do answer problems. As in years 7 and 8 there is a focus on justifying and reasoning, but this is even more heavily formalised with explicit units of work focusing on algebraic and geometric proof.	

| | | Students are tested halft termly with a focus on key declarative and procedural knowledge from the most recent topic strands.

Overall the Year 7 curriculum is designed to enable students to quickly explore other areas of mathematics not covered at KS2, whilst still providing support or those students who are weaker at basic numeracy. | understanding different types of number | Assessments in Year 9 focus on a more balanced mix of declaritive, procedural and conditional knowledge than previous years, with a higher proportion of more complex questions that require multi-stage reasoning from across the syllabus. At the end of Year 9 are given an holistic Key Stage 3 assessment based on a GCSE past paper. | |

How is challenge embedded into the KS3 curriculum?

- Students are encouraged each lesson by their teacher to aim to extend their learning by engaging in discussions about their topic as well as attempt International maths challenge problems to broaden knowledge and application.
- Students in Mathematics are given aspirational targets on a lesson by lesson basis with clear signposting referencing GCSE grading, giving them an indication of their performance compared to that of a year 11 student.
- Setting enables each student to be challenged at their most appropriate level

How does the KS3 curriculum above build on previous learning in KS2?

- The main purpose of our Key Stage 3 curriculum is to challenge all students and for them to aspire to maximise their potential in the subject.
- From discussion with local primary schools, the Key Stage 2 curriculum places a large focus on the skill element of mathematics and learners are expected to remember and retrieve key facts methods to answer questions. Our Key Stage 3 curriculum takes their core skills and places the emphasis on application and problem solving. This allows for a deeper understanding of the topic and allows students to feel confident in applying knowledge in a number of ways.
- Setting enables students who have mastered skills at KS2 to move swiftly onto new content