Curriculum Overview: Mathematics

Principles and Purpose of the Mathematics Curriculum

The purpose of the mathematics curriculum at Trumpington Community College is to provide a secure understanding of mathematical concepts, from basic principles of mathematics to complex topics that combine several areas of study into a single question. The curriculum promotes knowledge retention and a depth of learning rather than an accelerated curriculum, resulting in pupils who are confident in taking their studies further into sixth form, university and beyond.

In all year groups, there is an intentional focus on numeracy to support pupils not only in their study of maths but will also enable them to access mathematical questions in other subjects. Above all, we want our students to feel confident in applying maths successfully and without anxiety. We believe all of our students can master the concepts and skills in our curriculum, and our job as teachers is to take our students through at the right pace and with the right level of support for them.

Why this, why now?

Our curriculum has been carefully sequenced to ensure that knowledge is revisited without having a spiral curriculum, and to ensure that classic misconceptions between topic areas are avoided. We ensure that crucial prior-knowledge is taught to mastery before introducing new concepts and make a frequent return to key skills throughout the curriculum to promote fluency and retention.

Term 1	Autumn 1	Why this, why now?	Autumn 2	Why this, why now?
Year 7	Numerical Skills Order of Operations Basic rules of algebra Factors and Multiples Expand and factorise	An initial focus on decimal place value, negative numbers, rounding and basic multiplication and division. Order of operations gives knowledge that can then be applied to the simplifying and reading of algebraic expressions. Factors and multiples build on earlier understanding if multiplication from primary school.	Addition and Subtraction Perimeter Multiplication and Division Area of rectangles, triangles and parallelograms	To consolidate knowledge of addition and subtraction, and applying this to calculating perimeter. Knowledge of multiplication and division is consolidated, followed by application to calculating area. Following work on algebra, this knowledge will also be applied to perimeter and area problems. Area and perimeter are taught separately to avoid confusion.

Year 8	Indices Prime Factorisation Rounding Fractions Negative Numbers	Prime factorisation builds on knowledge and understanding of indices. The key skills of fractions, rounding and negatives are ready for application to other areas later in the curriculum.	Solving Linear Equations Forming Linear Equations Coordinates and Basic Graphs	Students develop key skills and method of solving equations Understanding of coordinates supports further application in graph and algebra work later on.
Year 9	Decimal Manipulation Estimation and Limits of accuracy Related calculations HCF and LCM Fraction calculations	All topics are revision and development of crucial content introduced in Year 8.	Algebraic manipulation Index Laws Expanding and Factorising Expressions and Substitution	Students understanding of indices is extended into the index laws. Further application to algebraic expressions is continued. Expanding, factorising and substitution all build on the algebraic manipulation knowledge and skills.
Year 10	Rearrange formulae Linear Graphs Compound measures	Rearranging formulae is a key skill when extending algebra topic, which is fundamental for later GCSE topics and when studying Maths at a higher level. Linear graphs and gradients prepare students for further algebra, which leads into gradients of curves and gradient function at A Level.	Quadratic Graphs Linear simultaneous equations Further graphs Expanding and Factorising	Simultaneous equations are introduced as a key problem solving method used in multiple later topics. Quadratics introduced as next order of equation that can be solved after linear equations. Expanding and factorising is revised from Year 9 and now linked to key values on quadratic graphs.
Year 11 Foundation	Pythagoras Right angled trigonometry Bearings and scale drawings	Important geometric problem solving methods are introduced ready for application to key exam questions	Transformations Congruence	Further shape work is introduced, now being extended to multi-step reasoning and geometrical arguments.
Year 11 Higher	Algebraic Proof Quadratic equation Functions Iteration	Introduces formal proof, important for taking the subject beyond GCSE. Function work builds on algebra rules	Transformations Congruence Circle Theorems Further Trigonometry	Knowledge of circle geometry is built on in this unit, once polygon and parallel-angle knowledge is secure.

	Quadratic Inequalities *Further Mathematics (L2) and Additional Mathematics (L3) studied by some students	and methods such as substitution. Quadratic equations extended and solved using different methods which is a key problem solving concept.		Trigonometry is further extended to applications for any triangle and links to work with bearings.

Term 2	Spring 1	Why this, why now?	Spring 2	Why this, why now?
Year 7	Fraction manipulation Adding and Subtracting Fractions Comparing and ordering fractions Fractions of amounts	Key knowledge of fractions is developed and applied to other areas. Future problems including fractions can now be looked at. Worded problems will be covered as well as basic processes.	Substitution Angles Polygons	Prior knowledge of algebra and order of operations is combined in the substitution topic. Key area of angles is introduced which forms the basis for much of the geometry subject area. This is then applied to polygons.
Year 8	Units of Measurement Angles Circumference	This unit introduces pi as circle ratio. Knowledge of angles is reviewed from Year 7 and developed as a key skill for later geometry work in parallel lines and circles.	Proportional reasoning Fractions, decimals and percentages Ratio	Students develop their ability to recognise different representations of same values after work on fractions in Year 7. Also now linking fractions as part of a whole to ratio as part to part of whole.
Year 9	Percentages Proportion Probability	Percentages work is revisited and extended. This is a key numerical area of the subject. This is then applied to problems in different contexts. Probability covered in depth by students. Key statistical method for predicting and modelling is looked at.	Linear Equations Linear Inequalities Sequences Pythagoras	Students build their knowledge from Year 8 equations work, where they revisit and extends this key area. Problems involving other areas such as angles, perimeter and area will be revisited with the use of equations. Key area of Pythagoras is introduced.
Year 10	Probability Standard Form Proportion	Probability covered in depth. Key statistical method for predicting and modelling is	Simple interest Ratio Growth and decay	Students build on knowledge of ratio and percentages. Percentages builds onto

		looked at. Standard form notation is introduced for use in later questions. Proportion builds on previous numerical work and links with algebra and rearranging equations.	Recurring Decimals	calculator methods. Recurring decimals is introduced as an application of rearranging equations from earlier in the year.
Year 11 Foundation	Vectors Similar Shapes Constructions and Loci	Introduction of vectors and their pure maths application. Geometric constructions with mathematical tools introduced.	GCSE revision programme – developed to suit the requirements of individual students and classes	
Year 11 Higher	Statistics (Further) Vectors Similar Shapes Constructions and Loci *Further Mathematics (L2) and Additional Mathematics (L3) studied by some students	Further work is done to develop the knowledge of the statistical elements of the maths curriculum. Introduction of vectors and their pure maths application. This area is developed further at A Level.	Gradients and areas under curves Kinematics Graphical transformations	Knowledge of gradients and straight-line graph work is extended and applied to curves. Introduces beginning of gradient function seen at A Level.

Term 3	Summer 1	Why this, why now?	Summer 2	Why this, why now?
Year 7	Symmetry and reflection Coordinates	Symmetry and reflection introduces transformations work. Understanding of coordinates underpins much of the later work using graphs and function.	Mean Two-way tables & Venn diagrams	Mean averages introduced independent of other types of average to avoid confusion. Venn diagram understanding is developed by students, in preparation for prime factorisation and probability
Year 8	Area of circles and trapezia Presenting and interpreting data Averages	Knowledge of circumference work and use of pi is extended into area. Other area calculations are introduced	3D visualization Volume	Students develop their understanding of 3D shapes leading into volume topic.

		after circles. Averages are included in other data content to promote application.		
Year 9	Interior and Exterior Angles Parallel Lines Basic vectors Basic transformations	Extends work on angle facts in Year 8 and previous term on polygons. Application of equations and algebraic manipulation and expressions will be used here. Vectors introduced to build on and be applied to transformations work. This prepares students for extension to vectors work at GCSE.	Plans and Elevations Circles Surface Area	Plans and elevations extends understanding of 3D visualization from Year 8. This leads into work on surface area, which also builds on previous area work linking into 3D shapes. Circles knowledge is key to many geometry areas like sectors and arcs. This prepares students for further work on circle theorems and equations at GCSE.
Year 10	Statistics Surds Bounds	Statistics work looks at representing data in variety of ways and shows the most appropriate for different data sets. Surds are introduced as important concept in working with exact values and avoiding rounding errors.	Right angled trigonometry Similar shapes Quadratic sequences	Introduces the important topic of trigonometry. This builds a foundational knowledge to allow further extension in Y11. Extends sequences work to introduce more complex number sequences.
Year 11 Foundation	GCSE revision programme – developed to suit the requirements of individual students and classes		GCSE revision programme – developed to suit the requirements of individual students and classes	
Year 11 Higher	GCSE revision programme – developed to suit the requirements of individual students and classes		GCSE revision programme – developed to suit the requirements of individual students and classes	

Further Mathematics

We offer our strongest Year 11 students a Level 2 qualification to take alongside the GCSE. This qualification fills the gap for high achieving students by improving their higher order mathematical skills - particularly in algebraic reasoning - in greater depth, thus preparing them fully to maximise

their potential in further studies at Level 3. The content assumes prior knowledge of the Key Stage 4 Programme of Study and covers algebra and geometry in greater depth and breadth as these are crucial to further study in the subject. This qualification places an emphasis on higher order technical proficiency, rigorous argument and problem-solving skills. It also provides an introduction to calculus and matrices, and develops further skills in trigonometry, functions and graphs.

Additional Mathematics

Our very strongest Year 10 and Year 11 students can study OCR's FSMQ: Additional Maths. It is a Level 3 qualification that targets learners who will go on to study AS and A Level Mathematics and it provides an excellent preparation for future study. It covers many A-Level topics, such as Enumeration, Coordinate Geometry, Pythagoras and Trigonometry, Calculus, Numerical Methods, Exponentials and Logarithms.

MESME Maths Circles

Small groups of our KS3 students are invited to work on advanced problem-solving in a dedicated mentoring programme funded by the educational charity MESME. They attend weekly tutorials to develop deeper communication and thinking skills within mathematics.

UKMT & Competitions

Many students are entered into the Junior, Intermediate and Senior UKMT Maths Challenges. Students in Year 10 compete in the Cambridgeshire-wide Maths Feast, an inter-schools team competition. Preparation and coaching for these is undertaken for students as part of their learning programme in school.

Sparx

Every student completes a personalized homework task in maths, set on the online platform Sparx. The platform also provides extension and support, as well as the opportunity for extensive independent learning.

Year 11 Exams

Year 11 students take a full set of GCSE mock exams in November and March as preparation. Their final exams are in the summer term.

Spring Exam

Years 7 to 10 take a formal hour-long examination in the spring term that can assess any previously taught content.

Summer Exam

Years 7 to 10 take an extended set of formal examinations comprised of multiple papers. These assess content taught throughout the year and in previous years.