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.

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.
This is an excellent on-line platform that supports students to develop fluency in the mathematical skills needed for GCSE. The maths homework is set on Sparx every week. In addition to this, we encourage all students to make full use of the Independent Learning function within sparx to target their weaknesses and maximise success in the regular assessment program that we run at TCC. For this reason, the relevant Sparx clips have been included below. Students generally take a short assessment following each module.

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.

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Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 7				
Why this, why now?	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 and are linked to algebraic understanding. Knowledge of addition and subtraction is consolidated and applied to calculating perimeter.	
	Numerical Skills	M763, M704, M522, M527, M135, M111, M431, M878	Primes, Factors and Multiples	M227, M823, M698, M322, M829
	Order of operations	M521	Expanding and Factorising 1	M288, M237, M792, M100
	Introduction to Algebra	M106, M830, M813, M795, M531, M417, M327, M208, M979	Addition and Subtraction	M928, M429, M347, M152, M899
			Perimeter	M920, M635, M690

Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 8				
Why this, why now?	Prime factorisation builds on knowledge and understanding of indices. The key skills of fractions, rounding are ready for application to other areas later in the curriculum.		Students develop key skills and method of solving equations Understanding of angles rules link to applied problem solving with equations.	
	Powers and Roots	M135, M608	Solving equations 1	M707, M509, M387, M554, M813, M795, M531, M957
	Prime Factorisation	M322, M823, M108, M365, M227, M698	Angles in Parallel Lines	M818, M163, M606, M351, M679, M393
	Rounding	M111, M431, M994, M131, M878		
	Fractions	M939, M410, M671, M601, M835, M931, M157, M197, M110, M265		

Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 9				
Why this, why now?	All topics are revision and development of crucial content introduced in Year 8.		Students understanding of indices is extended into the index laws. Standard form links directly to an understanding of indices in base 10. Further application to algebraic expressions is continued. Expanding, factorising and substitution all build on the algebraic manipulation knowledge and skills.	
	Decimal Manipulation	U417, U478, M462, U735, U127, U293, U453, U868, U976	Algebraic Manipulation	M795, U613, M830
	Estimation and Limits of accuracy	U480, U298, U731, U965, U225, U657, U587, U108, U301	Index Laws	U105, U622, U103, U437, U685, U457, U824
	Related Calculations	U735	Standard Form	U330, U534, U264, U290, U161
	HCF & LCM of large numbers	U211, U751, U529, U236, U739, U250	Expanding & Factorising 2	U179, U365, U768, U178, U963
	Fraction Calculations	U736, U692, U793, U475, U224, U544, U538, U881, U916, U163		

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Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 10 Foundation				
Why this, why now?	Understanding of equations is developed further and linked to rearranging formulae. Graphs exploring relationships between 2 variables is thoroughly covered and graphical and algebraic solutions to linear simultaneous equations follows neatly afterwards as a key problem-solving method.		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.	
	Solving equations and rearranging formulae	U755, U325, U870, U505, U556, U221, U373	Compound Measures	U914, U462, U896, U902, U388, U248, U468, U151, U256, U403, U914, U462, U966, U910, U527
	Linear Graphs	U789, U741, U933, U889, U638, U669, U315, U377, U477, U848, U862	Quadratics - graphical	U989, U667, U601, U178, U963
	Linear Simultaneous Equations	U760, U757, U836, U137	Quadratics - algebraic	U228
	Volume 2	U786, U174, U915, U484, U116, U617, U426, U350, U543	Further graphs	U980, U593, U238

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Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 10 Higher				
Why this, why now?	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.		Quadratics introduced as next order of equation that can be solved after linear equations.

Graphical and several algebraic methods of solving quadratics are fully taught which leads to a greater understanding of the link between algebraic equations and quadratic graphs, and significantly develops skills of algebraic manipulation. | |
	Rearranging formulae	U556, U221, U373	Compound Measures	U914, U462, U896, U902, U388, U248, U468, U151, U256, U403, U910, U527
	Linear Graphs	U789, U741, U933, U889, U638, U238, U669, U315, U377, U477, U848, U862, U898	Quadratics - graphical	U989, U667, U601, U178, U963
	Linear Simultaneous Equations	U760, U757, U836, U137	Quadratics - algebraic	U228
	Volume 2	U786, U174, U915, U484, U116, U617, U426, U350, U543	Further graphs	U980, U593, U238

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Term 1	Autumn 1	Sparx Clips	Autumn 2	Sparx clips
Year 11 Foundation				
Why this, why now?	Important geometric problem-solving methods are introduced ready for application to key exam questions. Abstract algebraic skills are revisited for consolidation.		Further shape work is introduced, now being extended to multi-step reasoning and geometrical arguments.	
	Algebra Review		Congruence	U790, U866
	Right angled Trigonometry	U605, U283, U545, U627	Constructions & Loci	U678, U447, U787, U245, U979, U820
	Similar shapes	U551, U578		
Term 1	**Autumn 1**	**Sparx Clips**	**Autumn 2**	**Sparx clips**
Year 11 Higher				
Why this, why now?	The usefulness of algebra is explored by looking at applications in writing recurring decimals as fractions, deducing the nth term of quadratic sequences. Several previous algebraic skills are combined to solve simultaneous equations with quadratics		Further trig develops trig into non right-angled triangles. The concept of inequalities is developed further into quadratic inequalities which links to previous work on solving and sketching quadratics and the usefulness on graphical representation. Functions demands an understanding of algebra and builds on skills such as substitution.	
	Recurring decimals	U550, U689	Further Trigonometry	U952, U591, U592, U450, U164, U170
	Quadratic sequences	U206	Inequalities 2	U989, U667, U769, U133
	Simultaneous equations 2		Functions	U637, U895, U448, U996

Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 7				
Why this, why now?	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 were taught last term to avoid confusion.		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	
	Mean	M940	Fraction Manipulation	M158, M410, M671, M939, M601
	Multiplication and Division	M113, M911, M187, M803, M462, M354, M873, M262	Adding and Subtracting Fractions	M835, M931
	Area of triangles and quadrilaterals	M900, M390, M291, M610, M269, M996	Comparing and Ordering Fractions	M335, M958
			Fractions of amounts	M695

Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 8				
Why this, why now?	This unit introduces pi as circle ratio. The concept of direct proportion is introduced. An understanding of proportion leads into an understanding of the links between fractions, decimals and percentages after work on fractions in year 7.		Proportion is now developed to link fractions as part of a whole to ratio as part to part of whole. Area of circles is covered in a different half term to circumference to avoid confusion. Fractions of a circle are also covered, linking understanding of circles to proportion.	
	Circumference	M595, M169	Ratio 1	M885, M543, M267, U921, M801, M525
	Direct Proportion	M478, M681	Area of circles	M705, M231, M430, M303, M269, M996
	Fractions, decimals and percentages	M267, M958, M264, M553		
	Percentage calculations	M235		

Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 9				
Why this, why now?	Algebraic skills of forming expressions, linking abstract algebra to "real life" examples. Substitution skills prepare students for further work in Maths and also Science. Probability is expressed as a proportion eg fraction, so links are made between proportion and probability. Probability is covered in depth by students. This is a key statistical method for predicting and modelling. Higher questions often combine expressions with probability and the groundwork for success is laid here.		Students build their knowledge from Year 8 equations work, where they revisit and extend 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, as well as an algebraic description of sequences.	
	Forming expressions & substitution	M175, M428, U201, U585, U144	Solving equations 2	U755, U325, U585, U144, U870, U599, U505
	Direct and Inverse Proportion	U721, U610, U357, U640, U407, U364, U138, U238, U369	Inequalities 1	U759, U509, U738, U145
	Probability 1	U408, U510, U683, U166, U104, U476, U748, U296, U280, U580	Sequences	U213, U530, M381, M241, U498, U978, U680, U958
			Pythagoras	U851, U385, U541

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Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 10 foundation				
Why this, why now?	Probability covered in depth by students. This is a key statistical method for predicting and modelling. Statistics is fully covered in year 10 Foundation now and students develop their understanding in how to compare sets of data and interpret statistical diagrammatic representations.		Students build on knowledge of ratio and percentages. Emphasis is placed on the power of expressing percentage increases as decimals, enabling students to complete calculations efficiently. A high percentage of the maths papers are on ratio, so considerable time is spent exploring ratio in a variety of scenarios.	
	Probability 2	U803, U408, U510, U280, U166, U683, U580, U476, U748, U104, U558, U729, U296, U369	Ratio 2	U687, U577, U753, U176
	Statistics 2	U981, U363, U557, U508, U172, U653, U506, U200, U909, U291, U260, U456, U526, U569, U854, U877, U717, U322, U162, U590, U193, U199, U277, U128	Growth & Decay	U332, U988

Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 10 higher				
Why this, why now?	Probability covered in depth by students. This is a key statistical method for predicting and modelling. The study of statistics extends beyond averages now and students develop their understanding in how to compare sets of data and interpret some statistical diagrammatic representations. This is concluded with histograms in year 11.		Students build on knowledge of ratio and percentages. Emphasis is placed on the power of expressing percentage increases as decimals, enabling students to complete calculations efficiently. A high percentage of the maths papers are on ratio, so considerable time is spent exploring ratio in a variety of scenarios. Ratio is used in calculations of similar shapes, so this topic follows on well.	
	Probability 2	U803, U408, U510, U280, U166, U683, U580, U476, U748, U104, U558, U729, U296, U369	Growth & Decay	U332, U988
	Statistics 2	U981, U363, U557, U508, U172, U653, U506, U200, U909, U291, U260, U456, U526, U569, U854, U877, U717, U322, U162, U590, U193, U199, U277, U128	Ratio 2	U687, U577, U176, U753, U921, U676, U865
	Cumulative Frequency and Box Plots	U642, U182, U837, U879, U507	Ratio 3	U595
			Similar shapes	U551, U578, U630, U110, U350, U334

Term 2	Spring 1	Sparx Clips	Spring 2	Sparx clips
Year 11 foundation				
Why this, why now?	Students are given ample past paper practice to consolidate their skills. The revision programme ensures that all skills are revisited in turn.		Students are given ample past paper practice to consolidate their skills. The revision programme ensures that all skills are revisited in turn.	
	Revision Programme	See personalized program of suggested clips following mocks.	Revision Programme	See personalized program of suggested clips following mocks.
Term 2	**Spring 1**	**Sparx Clips**	**Spring 2**	**Sparx clips**
Year 11 Higher				
Why this, why now?	Students work on their revision programme alongside their further maths studies. Higher skills such as linking an understanding with roots of polynomials with iteration, developing fluency with pure maths and algebraic proof and developing geometrical proof and reasoning with circle theorems are all covered. The last module of statistics, histograms, completes the statistical knowledge required.		Knowledge of gradients and straight-line graph work is extended and applied to curves. Introduces beginning of gradient function seen at A Level. More geometric proof is developed with the module on congruence.	
	Iteration	U434, U168	Vectors 2	
	Algebraic proof	U582	Gradients (Further), and area under a graph	U567, U882, U800
	Circle theorems	U459, U251, U489, U130, U808, U807	Graphical transformations	U598, U487, U455
	Histograms	U185, U814, U983, U267	Congruence	U790, U866
			Constructions & Loci	U678, U447, U787, U245, U187, U979, U820

Term 3	Summer 1	Sparx Clips	Summer 2	Sparx clips
Year 7				
Why this, why now?	Polygons are defined and properties explored. Key area of angles is introduced which forms the basis for much of the geometry subject area. This is then applied to polygons.		As well as revising for the end of term exam, and consolidating all of the work for the year, some time is spent ensuring that students can work fluently with problems involving time, such as the 24 hour clock and timetables; an essential life skill.	
	Polygons	M276, M523	Time	M892, M627, M963, M747, M515
	Angles	M502, M541, M780, M331, M818, M351, M679, M319		
	Coordinates	M618		

Term 3	Summer 1	Sparx Clips	Summer 2	Sparx clips
Year 8				
Why this, why now?	Averages are included in other data content to promote application, as well as using charts to present and interpret data. This builds on previous work on the mean in year 7.		Students develop their understanding of 3D shapes leading into volume topic. Volume is taught separately to area to avoid confusion, although the concept of cross-sectional area and linking to previous area work is integral.	
	Statistics 1 (presenting and interpreting data)	M945, M460, M738, M140, M183, M574, M165, M648, M210	3-D visualisation	M767, M518
	Averages and Spread	M940, M934, M328, M841, M440	Volume	M765, M722, M697, M465
Term 3	Summer 1	Sparx Clips	Summer 2	Sparx clips
Year 9				
Why this, why now?	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 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.	
	Interior and Exterior Angles	U447, U390, U730, U628, U732, U329, M985, U427	Plans and Elevations	U743
	Vectors 1	U196, U903, U564, U632, U660	Arcs and Sectors	U767, U604, U950, U221, U373
	Transformations 1	U196, U799, U696, U519	Surface Area	U929, U259, U464, U761, U781, U523, U893, U334, U561

Term 3	Summer 1	Sparx Clips	Summer 2	Sparx clips
Year 10 Foundation				
Why this, why now?	Pythagoras is developed more into a variety of problem-solving contexts and is combined with other knowledge into problems that involve several steps. Pythagoras is sometimes combined with an understanding of bearings, so the 2 modules are taught consecutively.		Consolidation of all topics and the application of knowledge in a variety of contexts develops students' ability in both mathematical skills, and also problem solving.	
	Pythagoras Review	U851, U385	Year 9 and 10 Review	
	Bearings & Scale Drawings	U257, U525, U107		
Term 3	**Summer 1**	**Sparx Clips**	**Summer 2**	**Sparx clips**
Year 10 Higher				
Why this, why now?	Fluency with many of the previous skills of algebraic and fraction manipulation are developed with the study of algebraic proportion. Surds are introduced as an important concept in working with exact values.		Bounds explores the upper and lower limits imposed by rounding errors, which contrasts with the exact values of surds in the previous term. Previous transformations work is revisited and extended.	
	Algebraic proportion	U640, U364, U238, U407, U138, U721, U357	Bounds	U657, U587
	Surds	U633, U872, U338, U499, U707, U281	Bearings and scale drawings	U257, U525, U107
	Right angled Trigonometry	U605, U283, U545, U627	Transformations 2	U849, U696, U799, U196, U519

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.

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

Year 7 to 10 Exams

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

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