

Mathematics | Curriculum Map

Curriculum Intent | Mathematics

The Maths department at Co-op Academy Florence MacWilliams aims to provide students with a secure understanding of mathematical knowledge, categorised according to the following areas: number, algebra, geometry, ratio and proportion, probability, and statistics, meeting the needs of the National Curriculum at KS3 and KS4. The curriculum has been designed to promote mathematical fluency, in order for students to be able to accurately recall and apply their knowledge to both routine and nonroutine problems, and be confident to develop arguments and justifications using mathematical language.

The focus of the curriculum is to develop both conceptual understanding and procedural knowledge of the fundamental elements of mathematics in order for students to access further problem-solving elements and reason mathematically, whilst fostering a love of maths. We have developed and created a curriculum that is carefully sequenced to continuously interleave content in order to strengthen links between different areas of mathematics.

In mathematics, our aim is to secure retention of knowledge and a depth of learning that results in students who are confident in taking their studies to the next level, whether that be further qualifications, higher education, or into the workplace.

We are committed to providing an inclusive curriculum, celebrating and championing diversity and individuality in mathematics.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
7	7.1 Decimal Number System 7.2 Factors, multiples and primes 7.3 Order of operations 7.4 Negative numbers Students will study the foundation skills in the Number strand of maths, forming a strong basis for mathematical understanding.	7.5 Expressions 7.6 Equations 7.7 Sequences 7.8 Coordinates Students will build on the foundational number skills through applications in the foundations of Algebraic knowledge studied in this term.	7.9 Angles 7.10 Properties of 2D Shapes Students will be introduced to the angle facts and start to apply these to mixed problems. Special cases of 2D shapes will also be studied and angle facts will be interleaved into the 2D Shapes unit.	7.11 Area and perimeter 7.12 Conceptualising and comparing fractions Students will build on their KS2 knowledge of 2D shapes and go to to develop this knowledge of fractions, going on to study improper fractions and decimal conversions.	7.13 Manipulating and calculating with fractions 7.14 Introduction to proportion 7.15 Representing data 7.16 Averages and range Real life applications of proportion are studied before moving onto two topics from the Statistics and Probability strand.	7.17 Fractions, decimals and percentages 7.18 Ratio and proportion Students continue to develop their fraction work to form a strong foundation for KS3 and into KS4. Students will be introduced to ratio, building on 7.14 proportion.
8	8.1 Accuracy and estimation 8.2 Indices 8.3 Standard form 8.4 Working with percentages Students build on the number system topics they learnt in Year 7 through more foundational concepts within the number strand.	8.5 Expressions 8.6 Sequences 8.7 Linear graphs 8.8 Equations and inequalities Students develop understanding of algebra from Year 7 including through its applications in sequences, graphs and inequalities.	8.9 Angles in polygons 8.10 Real life graphs and compound measures Students build on the Year 7 Geometry stand with angles and 2D shapes combined. Students then study new knowledge from the measures part of Geometry.	8.11 Direct and inverse proportion 8.12 Transformations 8.13 Circles Students continue work on graphical relationships in 8.11. Students then move on to further develop their knowledge and skills in shape geometry in 8.12 and 8.13.	8.14 Volume and surface area of prisms 8.15 Representing data 8.16 Probability and Venn diagrams Students move onto 3D shape geometry building on Spring Term 2, followed by building on Statistics topics studied in Year 7.	8.17 Averages and range 8.18 Pythagoras' Theorem 8.19 Constructions and loci Students develop averages and range knowledge from 7.16 before building on shape geometry further in 8.18 and 8.19.
9	9.1 Algebra Review 9.2 Forming and solving equations 9.3 Rearranging 9.4 Recurring decimals Students revisit and consolidate algebra from Year 7 and 8 before building on this in 9.2, 9.3, 9.8 and 9.15.	9.5 Bounds and error intervals 9.6 Sets and Venns 9.7 Probability 9.8 Simultaneous equations Students build on rounding and estimation in 9.5, then building on Statistics and Probability in 9.6 and 9.7.	9.9 Trigonometry 9.10 Angles on parallel lines 9.11 Bearings Students build on right angle triangle geometry studied in 9.18, moving onto building on angles studied in 7.9 and 8.9.	9.12 Ratio 9.13 Congruence and similarity 9.14 Transformations Students develop ratio skills from 7.18 including combining ratio. Then develop on 8.12 with transformations on a coordinate grid.	9.15 Quadratics 9.16 Surds 9.17 Indices Students build on algebra skills in 9.15 quadratics followed by an introduction to surds and indices, building on powers and roots studied in 7.2.	9.18 Growth and decay 9.19 Vectors 9.20 Grouped frequency tables Students build on indices from 7.2, 9.17 and percentages 7.17 and 8.4. Students build on the statistics and probability strand in 9.20.

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Careers Links	Accountant, shop manager, engineer, chef, data analyst, computer programmer, cryptographer, data scientist, software developer, physicist, financial analyst, game developer, meteorologist, economist.	Software developer, engineer, data analyst, physicist, computer programmer, financial analyst, scientist, economist.	Architect, civil engineer, structural engineer, surveyor, interior designer, product designer, aerospace engineer, construction manager, town planner, animator, game designer, fashion designer, jewellery designer.	Architect, structural engineer, quantity surveyor, construction manager, landscape gardener, carpenter, builder, tailor, actuary, pharmacist, chef.	Doctor, nurse, nutritionist, chef, sports analyst, sports coach, market researcher, business analyst, epidemiologist, scientist, researcher, project manager.	

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Careers Links	Accountant, financial analyst, actuary, engineer, scientist, physicist, pharmacist, astronomer, data analyst, statistician.	Software developer, computer scientist, data analyst, data scientist, engineer, economist.	Set designer, furniture designer, architectural technician, meteorologist, stock trader, journalist, transport planner, energy analyst, environmental scientist, air traffic controller, pilot.	Mechanical engineer, electrical engineer, geologist, optician, biomedical engineer, urban planner.	Quantity surveyor, packaging designer, civil engineer, sports statistician, insurance underwriter, risk analyst, epidemiologist.	Sports statistician, performance analyst, civil engineer, construction manager, architect, urban planner, archaeologist.

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Careers Links	Software developer, engineer, data analyst, physicist, computer programmer, financial analyst, scientist, economist.	Risk analyst, insurance broker, actuary, polling analyst, election analyst, cryptographer.	Pilot, navigator, air traffic controller, ship captain, marine surveyor, military engineer, satellite technician.	Photographer, film animator, 3D modeller, interior designer, industrial designer.	Physicist, aerospace engineer, electrical engineer, data scientist, actuary, statistician, economist, astronomer.	Investment analyst, economist, financial planner, actuary, epidemiologist, robotics engineer, vector graphic designer.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
10F	10F.1 HCF and LCM 10F.2 Expressions and indices 10F.3 Standard form 10F.4 Expanding and factorising 10F.5 Scatter graphs 10F.6 Ratio Students will focus on securing understanding before development of problem solving skills through 10F1-4. Students will develop new skills in interpreting scatter graphs and further ratio.	10F.7 Perimeter and area 10F.8 Equations and rearranging 10F.9 Right angle triangles Students will secure their understanding of complex perimeter and area including compound shapes and contextual problems. Then moving onto securing knowledge of circles and building on this to solve problems involving arcs and sections. Students will build on equations and rearranging to include working with brackets and indices. Understanding of Pythagoras and trigonometry will be secured before building on this with exact trigonometric ratios.	10F.10 Fraction calculations 10F.11 Percentages 10F.12 Proportion 10F.13 Angles Students will secure and build on fraction calculations to include mixed number calculations. Percentage knowledge will be developed to include reverse percentages and apply to complex problems. Students will learn how to recognise and solve direct and inverse proportion problems including in a range of contexts. Angle facts and 2D shape properties will be secured and built for students to be able to solve a range of problems involving angles.	10F.14 Straight line graphs 10F.15 Probability Students will build on knowledge of drawing and interpreting straight line graphs before developing understanding of parallel lines. Students will then consolidate understanding of probability before developing it to calculate probabilities from frequency trees and two way tables.	10F.16 Sequences 10F.17 Rounding and bounds 10F.18 Plans and elevations 10F.19 Simultaneous equations 10F.20 Inequalities 10F.21 Non-linear graphs Students secure knowledge of sequences as well as building understanding of special sequences. Rounding and bounds is developed through applications to problem solving. Students develop ability to solve more complex simultaneous equations. Students build on knowledge of equations and inequalities to solve inequalities as well as developing further algebraic understanding and interpretation of quadratic graphs.	10F.22 Displaying data 10F.23 Statistics 10F.24 Construction and loci Students secure understanding of displaying data before moving on to comparing representations of data and constructing time series graphs. Students build on their skills of analysing grouped frequency tables and stem and leaf diagrams. Students secure understanding of simple constructions before building on these skills to construct triangles and solve more complex loci problems.
11F	11F.1 Percentages and interest 11F.2 Compound measures Students build on percentage knowledge to develop solving problems with applications of percentages such as profit, loss and interest,. Students develop knowledge and understanding of speed, density and pressure calculations including multi-step problem solving.	11F.3 Proportion 11F.4 Transformations Students build on their understanding of proportion to apply to different contextual applications. Students secure knowledge of transformations before going onto multiple transformations and problem solving.	11F.5 Bearings 11F.6 Vectors Students secure knowledge and understanding of scale drawings before developing knowledge of bearings including working in reverse and problem solving. Students link their knowledge of translation to vectors and develop this into working with column vectors.	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>

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10H	10H.1 Standard form 10H.2 Representing data 10H.3 Surds 1 10H.4 Perimeter and area 10H. 5 Linear and quadratic graphs Students secure understanding of prior knowledge before moving onto applications to complex problem solving in 10H.1, 10H.4 and 10H.5. In 10H.2, students develop knowledge of scatter graphs before developing knowledge into cumulative frequency graphs and box plots. Students build on their introduction to surds to develop knowledge and skills for calculation and problem solving.	10H.6 Pythagoras and trigonometry 10H.7 Proportion Students secure their understanding of Pythagoras and right angled trigonometry before a focus on non-right angled trigonometry. Students then go on to algebraic direct and inverse proportion including problem solving. Students then go on to study area and volume scale factor, further developing prior knowledge of similar shapes.	10H.8 Percentages 10H.9 Angles and circle theorems Students secure knowledge of percentages including reverse percentage problems before moving on to calculating and problem solving with compound interest rates. Students then review and secure their knowledge of angles on parallel lines before building on this through new knowledge of circle theorems.	10H.10 Simultaneous equations - linear 10H.11 Compound measures 10H.12 Functions 10H.13 Quadratic equations Students secure and build on knowledge of simultaneous equations. They then move onto compound measures, building on prior knowledge with multi-step speed problem solving and combining densities. Students then build on algebra skills in functions including solving complex equations. Algebra skills are developed further with methods of solving quadratic equations.	10H.14 Transformations 10H.15 Probability 10H.16 Simultaneous equations - non-linear 10H.17 Quadratic sequences Students secure their understanding of transformations before moving onto advance problem solving. Knowledge of probability is developed further with conditional probability in two way tables, Venns and tree diagrams. Students then build on solving simultaneous equations with non-linear. Algebra is further developed with quadratic sequences.	10H.18 Statistics 10H.19 Histograms 10H.20 Volume and surface area 10H.21 Non-linear graphs Students build on knowledge and understanding of grouped frequency tables which develops into drawing and interpreting histograms. Students then build on prior knowledge of 3D shapes with volume and surface area of spheres, cones and frustums. Students then build on 10H.5 graphs with cubic, reciprocal and exponential graphs.
11H	11H.1 Algebraic fractions 11H.2 Surds 11H.3 Trigonometric graphs and transformations of graphs 11H.4 Vectors Students develop knowledge of algebraic fractions including calculations and solving equations. Surds is developed from 10H.3 to include rationalising. Trigonometry from 10H.6 is further developed along with new knowledge of transforming graphs. Students then develop knowledge of vectors to cover complex problem solving including proof.	11H.5 Iteration 11H.6 Gradients and tangents 11H.7 Proof Students build on algebra skills of rearranging and substitution in iteration, as well as non-routine applications. Algebra is developed further through graphs, developing into tangent of a circle. Students then move onto algebraic proof, manipulating written methods.	11H.8 Inequalities 11H.9 Constructions, loci and bearings Students move onto graphical inequalities including linear and quadratics before securing understanding of constructions, loci and bearings.	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>	<i>Classes follow a bespoke Revision Programme based on identified areas of need to prepare them for the final GCSE assessment.</i>



Co-op Academy
Florence MacWilliams

At Co-op Academy Florence MacWilliams, colleagues and pupils work at 'PACE' ensuring pride, ambition, care, and excellence for self, school and city