Key Stage 4 Mathematics

What your child will learn in Years 10 and 11

Topics covered

Higher tier. Pupils are entered for either the Foundation tier or the Higher tier at the end of Year 11. Topics shaded below are taught only to pupils following the Higher tier; every other topic is taught to all pupils. Several of the remaining topics also contain some Higher tier material within them.

	Topic	What it covers
1	**Algebraic manipulation**	Simplifying expressions, the laws of indices, and expanding and factorising brackets.
2	**Equations, inequalities and formulae**	Solving equations and inequalities, and rearranging a formula to make a different letter the subject.
3	**Quadratic expressions and equations**	Expanding and factorising quadratic expressions, and three different methods for solving quadratic equations.
4	**Percentages**	Percentage increase and decrease, repeated change, working back to an original value, and simple and compound interest.
5	**Ratio and scale**	Sharing in a ratio, combining ratios, and using scales on maps and scale drawings.
6	**Working with fractions**	Calculating confidently with fractions, then applying the same methods to fractions containing algebra.
7	**Non-calculator methods**	Efficient written and mental methods, and converting recurring decimals into fractions.
8	**Straight line graphs**	Gradient and intercept, finding the equation of a line, perpendicular lines, and graphs in real-life contexts.
9	**Probability**	Calculating probabilities, listing outcomes, and using two-way tables and tree diagrams.
10	**Rounding and estimation**	Estimating to check an answer, and judging how accurately a result can be stated.
11	**Perimeter, area and volume**	Circles, arcs and sectors, and the volume and surface area of prisms and cylinders.
12	**Interpreting and representing data**	Averages from tables, comparing two sets of data, sampling, and scatter graphs.
13	**Non-linear graphs**	Curved graphs including quadratics, cubics and reciprocals, and the equation of a circle.
14	**Angles**	Angle facts, angles in polygons and parallel lines, and setting out a clear geometric argument.
15	**Graphs and diagrams** HIGHER ONLY	Histograms, cumulative frequency diagrams and box plots, and using them to compare data.
16	**Vectors**	Describing movement and position using vectors, and using them to prove facts about shapes.
17	**Factors, powers and surds**	Prime factors, index laws including fractional indices, and giving exact answers using surds.
18	**Pythagoras' theorem and trigonometry**	Finding lengths and angles in triangles, including the sine rule and the cosine rule.

	Topic	What it covers
19	**Simultaneous equations**	Solving two equations together, both graphically and algebraically.
20	**Ratio and proportion**	Extending ratio into direct and inverse proportion, and the graphs that represent them.
21	**Area and volume**	Spheres, cones and compound solids, and the effect of scale factors on area and volume.
22	**Similarity and congruence**	Proving that two shapes are congruent, and using similarity to find missing lengths.
23	**Sequences and proof**	Finding a rule for any term of a sequence, and proving a statement is true for every number.
24	**Standard form**	Calculating confidently with very large and very small numbers.
25	**Circle theorems** HIGHER ONLY	The angle rules inside circles, and using them to build a reasoned argument.
26	**Set notation and Venn diagrams**	Describing groups of outcomes formally, and using them to calculate probabilities.
27	**Vectors and geometric proof** HIGHER ONLY	Extending vector work into proof about the properties of shapes.
28	**Functions and graphs** HIGHER ONLY	Composite and inverse functions, and how changing an equation moves or stretches its graph.
29	**Harder equations and formulae** HIGHER ONLY	Harder equations and rearrangements, including finding a solution by repeated improvement.
30	**Rates**	Compound measures, rates of change, and reading them from a graph.
31	**Angles, bearings and trigonometry** HIGHER ONLY	Bearings, three-dimensional problems, and trigonometry in triangles without a right angle.
32	**Constructions and loci**	Accurate construction with compasses, and finding the set of points that satisfy a condition.
33	**Transformations**	Combining reflections, rotations, translations and enlargements, including negative scale factors.
34	**Revision and examinations**	Structured revision across the whole course, practice on past papers, and the GCSE examinations.

N.B. *Where a class is taught by more than one teacher, staff plan the sequence together so that each topic builds on what has already been covered. This sometimes means a topic is taught in a slightly different order from the one shown here. If you have any questions, your child's teacher will be happy to explain.*