

Maths Curriculum Information

Year 6

In number work, properties of multiples and factors are explored, including an introduction to the Sieve of Eratosthenes and Pascal's triangle. Decimal work is extended and practised with all operations covered to a basic level; conversions between metric units are also taught. Percentages are introduced and fraction work is extended to adding and subtracting simple proper fractions. A thorough study of symmetry explores reflective and rotational symmetry of quadrilaterals. Pupils are taught about plotting points on coordinate axes. Angles are classified, drawn, measured and calculated in simple situations. Different types of triangles are accurately constructed. The area and perimeter of irregular shapes, rectangles, triangles and compound shapes are calculated. Simple three dimensional objects are drawn using isometric paper, the nets of simple shapes are explored and the volume of a cube is calculated. Simple algebra is introduced with pupils learning that a letter is used to represent a number. They explore and describe patterns and grids, substitute numbers into simple expressions and begin to solve simple equations. In statistics, the different types of averages and the range are discussed and basic probability is introduced.

Year 7

Pupils move onto more complex decimal calculations, including multiplication and division. Links between fractions, decimals and percentages are investigated. Calculations involving multiples and factors, including squares and square roots, are discussed; rules of divisibility are also covered. Negative numbers are dealt with using simple examples with all operations. Fraction work is revised and extended to multiplying and dividing a fraction by an integer. Pupils use the unitary method to answer questions on proportion and are introduced to ratio problems. Knowledge of percentages is extended, pupils learn to write one number as a percentage of another and increase or decrease a number by a given percentage. Algebraic shorthand is introduced; pupils collect like terms, simplify expressions by cancelling, multiply out brackets, substitute values into expressions and formulae, write expressions and formulae and solve simple equations with brackets using the balance method. Pupils look at simple sequences and use a term to term rule to construct a sequence. They learn to generate coordinate pairs from a rule and plot them on a graph using four quadrants. They investigate the gradient and intercept of a straight line. Angle calculations are extended to include angles around a point, on a straight line, in triangles and parallel lines. Pupils investigate the properties of and construct triangles and quadrilaterals, construct perpendicular lines and angle bisectors. They learn to calculate the perimeter and area of rectangles, triangles,



parallelograms, trapeziums and compound shapes. They find the surface area and volume of a cuboid. Reflections, rotations, translations, enlargements and simple combinations of transformations are investigated together with reflective and rotational symmetry. In statistics, pupils interpret and draw a variety of statistical diagrams including pie charts. They extend their statistical knowledge to calculating the mean, mode and range from a frequency table or a set of data.

Year 8

Pupils learn to apply the index laws and use the rules for order of operations with positive and negative numbers. They learn to find positive (and negative) square and cube roots mentally, with a calculator and by factorising. The properties of multiplying and dividing by positive and negative powers of 10 are investigated. Pupils extend their existing knowledge of fractions to include multiplying and dividing by fractions and dealing with mixed numbers. They learn to increase or decrease an amount by a given percentage, express an increase or decrease as a percentage and solve simple reverse percentage questions. Direct proportion problems are solved and practice is given to simplifying and comparing ratios other ratio and proportion questions. In algebra, pupils extend their knowledge of simplifying expressions using the index laws, multiplying out single brackets and collecting terms. They substitute into expressions and formulae when the unknown is not the subject and solve linear equations with the unknown on both sides. A wide range of different sequences are investigated and associated vocabulary is learnt, pupils learn how to find the n th term rule. Linear graphs are investigated, including the effects of changes to the gradient and intercept. Linear graphs are plotted and identified. Real life graphs and distance time graphs are used to solve problems. Pupils solve more complex angle problems involving previous knowledge, learn how to find interior angles of regular and irregular polygons and discover how to use bearings. They construct triangles using a straight edge and compasses and learn about loci. They investigate the area and circumference of a circle and compound shapes involving circles. They study the volume and surface area of a prism, draw three dimensional shapes on isometric paper and learn about plans and elevations. Pupils study combinations of transformations on coordinate axes and learn about scales in scale drawings. They describe symmetry properties of objects in 2 and 3 dimensions. They find out how to convert between metric units including length, mass, capacity area and time. In probability, mutually exclusive outcomes are explored and probabilities calculated by listing outcomes and relative frequency. Pupils carry out a statistical survey, using a variety of statistical diagrams including stem and leaf plots and frequency polygons.



Year 9

Pupils learn to work in standard form. They consolidate their fraction skills and learn to do more complex percentage questions. Upper and lower bounds and uncertainty are introduced. Skills solving linear equations are refined; pupils learn to solve inequalities (graphically for two dimensions) and solve nonlinear equations involving fractions and squares (including using trial and improvement). They learn to expand two brackets, square a bracket and look at the difference of two squares. The topic of changing the subject of a formula is studied in depth. Simultaneous equations are solved algebraically and graphically. Pupils study quadratic sequences, find the n th term rule for a simple quadratic sequence and investigate fractional sequences. They revise existing graph theory knowledge and plot quadratic graphs. Pythagoras's theorem, trigonometry and related calculations are covered together with congruency and similarity. The vocabulary associated with circles is introduced and the area and perimeter of sectors is found. Problems involving the volume and surface area of prisms and cylinders are solved. Knowledge of transformations is extended. Pupils learn how to find the mean, mode and range from a grouped frequency table. They construct and interpret cumulative frequency diagrams and solve problems with scatter graphs. A statistical investigation reinforces statistical methods and box plots are introduced. Knowledge of probability is consolidated and pupils are taught to solve problems with tree diagrams.

Year 10 (GCSE)

Pupils study rational and irrational numbers, learning how to perform calculations with surds and how to write recurring decimals as fractions. They extend their knowledge of upper and lower bounds, learning about the effect of functions on bounds. They study the topic of proportionality, including inverse proportionality and other functions. In algebra, pupils extend their knowledge by simplifying expressions with indices. They study quadratics, learning how to factorise simple expressions and solve problems involving quadratic equations and simultaneous equations. They learn how to solve quadratic and linear equations using graphs, pupils become familiar with quadratic, cubic and reciprocal graphs. They study inequalities and solve these both algebraically and graphically. Pupils practise writing solutions to prove geometric results with angles. They study similar shapes, areas and volumes. They apply trigonometry to bearings, angles of elevation and depression and solve three dimensional trigonometric problems. They practise solving problems involving volumes of compound prisms and area and arc lengths of sectors. They investigate sine, cosine, tangent graphs, and learn how to use the sine and cosine rules. Pupils study probability, learning about mutually exclusive and independent events and conditional probability. Pupils use a variety of statistical diagrams, practise the use of cumulative frequency diagrams and learn how to draw and interpret histograms with unequal width.



Year 11 (GCSE)

Pupils extend and revise their knowledge of manipulating surds, including rationalising the denominator. They learn about set theory. In algebra, pupils learn to factorise harder quadratic equations and use the quadratic formula. They practise simplifying algebraic fractions and solve equations involving algebraic fractions. They solve simultaneous equations algebraically where one equation is quadratic. They learn how to use function notation including the terms domain, range, composite and inverse functions. Calculus is introduced and pupils learn how to calculate gradients; they look at rates of change, kinematics and problems involving maxima and minima. Pupils study circle geometry including cyclic quadrilaterals, angle theorems, the alternate segment theorem and intersecting chord theorems. They are introduced to vector theory and answer questions involving geometrical applications.

Year 12 (AS)

In the first term, pupils study surds, coordinate geometry of straight lines and circles, quadratics, cubics and their graphs, polynomials, the factor and remainder theorems, simultaneous equations involving quadratics, differentiation, gradients of curves, applications of differentiation, maximum and minimum points, optimisation and integration. After the January examinations pupils start the C2 module. This involves indices, more complex differentiation and integration including the trapezium rule, basic trigonometry and trigonometric equations in degrees and radians, transformation of graphs, the binomial expansion, series (both arithmetic and geometric), exponentials and logs. If pupils choose to study statistics, they learn about comparing distributions using measures of location and spread, probability, the binomial distribution, the normal distribution including the central limit theorem and confidence intervals, scatter plots and residuals. In decision mathematics, they learn about networks, linear programming, sorting, graph theory and other algorithms. In mechanics they learn about vectors, displacement velocity and acceleration, motion under constant acceleration, kinematics in two and three dimensions, forces, Newton's laws of motion, projectiles and momentum.

Year 13 (A2)

In the first term, pupils study algebra and functions, transformations of graphs, the modulus function, more complex trigonometric functions and their derivatives, the exponential function, natural logarithms and their derivatives, the chain rule, the product and quotient rules, the numerical solution of equations, integration of more complex functions using a variety of methods, volumes of revolution and numerical methods. After the January examinations, the binomial series is studied, algebraic fractions are investigated and the rules for partial fractions explored. More complex differentiation and integration is covered, including implicit differentiation, parametric



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equations and compound and double angle formulae. Pupils learn about exponential growth and decay, vectors and first order differential equations. If pupils choose to study statistics, they learn about the Poisson distribution, confidence intervals, hypothesis testing, contingency tables and common continuous distributions. If pupils choose to study mechanics, they learn about moments, centre of mass, work and energy, Hooke's law, kinematics and variable acceleration, circular motion and differential equations with Newton's second law.

The exam boards and specification codes are: -

Year 10 and 11

Edexcel IGCSE Mathematics (4400)

Year 12

AQA AS Mathematics (5361)

Year 13

AQA A2 Mathematics (6361)

