

**Curriculum Area: Maths Year: 9
2015/2016**

Topics	Year Curriculum	How you can support learning at home, eg. Books, websites, family learning through visits.
<p>Term 1</p> <ol style="list-style-type: none"> 1. Number Properties 1 2. Geometry & Measures 3. Number Properties 2 4. Algebra 1 5. Fractions, Decimals & Percentages 6. Approximation 7. Algebra 2 8. Collecting & Interpreting Data 	<p>Number Properties KS4 N (1) Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ KS3 No (a) Understand and use place value for decimals, measures and integers of any size KS4 No (2) Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals).</p> <p>Geometry & Measures KS3 G&M (k) Understand and use the relationship between parallel lines and alternate and corresponding angles. KS3 G&M (o) Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D. KS4 G&M (14) Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.).</p> <p>Numbers Properties 2 KS3 No (c) and KS4 No (4) Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property. KS3 No (g) Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations</p> <p>Algebra 1 KS4 Alg (2) Substitute numerical values into formulae and expressions, including scientific formulae. KS4 G&M (16) Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).</p>	<p>BBC Bitesize website Mathswatch personal tutor CD http://www.mathswatchvle.co.uk</p> <p>Edexcel Foundation/Higher Revision guides & workbooks available from Edexcel www.mymaths.co.uk <u>Login: sheffspr</u> <u>Password: square</u></p>



Fractions, Decimals & Percentages

KS3/4 Define percentage as 'number of parts per hundred'; interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%; solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics.

KS3 No (k): Interpret fractions and percentages as operators.

Express one quantity as a fraction of another, where the fraction is less than 1 and greater than

Approximation

KS3 No (m, n, o).

KS4 No (14): Estimate answers; check calculations using approximation and estimation, including answers obtained using technology.

KS4 No (15): Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures).

Algebra 2

KS3 Alg (c) Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.

KS3 Alg (d) Simplify and manipulate algebraic expressions to maintain equivalence by:- Collecting like terms, - Multiplying a single term over a bracket, - taking out common factors, - expanding products of two or more binomials.

KS4 Alg (3) Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, terms and factors.

KS4 Alg (4) Simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) by:- collecting like terms, multiplying a single term over a bracket, taking out common factors, expanding products of two or more binomials, factorising quadratic expressions of the form ax^2+bx+c , simplifying expressions involving sums, product and powers including the laws of indices.

KS4 Alg (17) Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph.

Collecting & Interpreting Data

KS3 Stats (a) Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete,



	<p>continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).</p> <p>KS4 Stats (2) Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use.</p>	
<p>Term 2</p> <p>9. Sequences & Graphs 10. Proportion 1 11. Ratio & Scale 12. Shape Properties 13. Algebra 3 14. Transformations</p>	<p>Sequences & Graphs KS3 Alg (n) Generate terms of a sequence from either a term to term or a position to term rule KS3 Alg (o) Recognise arithmetic sequences and find the nth term KS3 Alg (p) Recognise geometric sequences and appreciate the other sequences that arise KS4 Alg (24) Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences and simple geometric progressions KS4 Alg (25) Deduce expressions to calculate the nth term of linear and quadratic sequences</p> <p>Proportion 1 KS4 R&P (4) Use ratio notation, including reduction to simplest form KS4 R&P (5) Divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) KS 4 No (10) Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8)</p> <p>Ratio and Scale KS3 R&P (b) Use scale factors, scale diagrams and maps. KS4 G&M (15) Measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings.</p> <p>Shape Properties KS4 G&M (1) Use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description.</p>	<p>Edexcel Past Papers Mobile Phone App Springs VLE Nrich Maths: http://nrich.maths.org/teacher-secondary</p>



	<p>Algebra 3 KS4 Alg (5) Understand and use standard mathematical formulae; rearrange formulae to change the subject. KS4 Alg (6) Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments and proofs. KS4 Alg (7) Where appropriate, interpret simple expressions as functions with inputs and outputs.</p> <p>Transformations KS3 G&M (h) Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures KS4 G&M (7) Identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargements</p>	
<p>Term 3</p> <p>15. Probability 16. Triangles & Constructions 17. Interpreting Data 18. Circles 19. Proportion 2 20. Solving Equations & Inequalities 21. Plotting & Sketching Graph</p>	<p>Probability KS3 Prob (b): Understand that the probabilities of all possible outcomes sum to 1. KS4 Prob (4): Apply the property that the probabilities of an exhaustive set of outcomes sum to one; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. KS4 Prob (5): Understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size.</p> <p>Triangles & Constructions KS3 G&M (d) Derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line KS4 G&M (13) Construct and interpret plans and elevations of 3D shapes KS4 G&M (2) Use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line</p> <p>Interpreting Data KS4 Stats (5) Apply statistics to describe a population.</p> <p>Circles</p>	



KS4 G&M (9) Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment.

KS4 G&M (17) Know the formulae: circumference of a circle = $2\pi r = \pi d$, area of a circle = πr^2 ; calculate: perimeters of 2D shapes, including circles; areas of circles and composite shapes.

Proportion 2

KS4 R&P (16) Set up, solve and interpret the answers in growth and decay problems, including compound interest.

KS4 R&P (10) Solve problems involving direct and inverse proportion, including graphical and algebraic representations

Solving Equations & Inequalities

KS4 Alg (17) Solve linear equations in one unknown algebraically (including those with the unknown on both sides of the equation); find approximate solutions using a graph.

KS4 Alg (22) Solve linear inequalities in one variable and represent the solution set on a number line and using set notation.

KS4 Alg (18) Solve quadratic equations. Find approximate solutions using a graph.

KS4 Alg (21) Translate simple situations or procedures into algebraic expressions or formulae; derive an equation. Solve the equation and interpret the solution

Plotting & Sketching Graphs

KS4 Alg (9) Plot graphs of equations that correspond to straight-line graphs in the coordinate plane; use the form $y = mx + c$ to identify parallel and perpendicular lines; find the equation of the line through two given points, or through one point with a given gradient.

KS4 Alg (11) Identify and interpret roots, intercepts, turning points of quadratic functions graphically.

KS3 Alg (i) Recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane.

KS3 Alg (k) Reduce a given linear equation in two variables to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.

