# Gateacre Maths Department Key Year 3 Curriculum Mapping Document

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| National Curriculum Reference | Coverage | Key Threshold Concept |
| Number | | |
| Understand and use place value for decimals, measures and integers of any size | Year 7 Units 2, 3, 5 & 11  Year 8 unit 12 |  |
| Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ | Year 7 Units 2 & 3  Year 8 Unit 3  Year 9 unit 10 | 703 Order Fractions, Decimals, Percentages, and Negatives  912 Solve an inequality and express on a number line |
| 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 | Year 7 unit 1  Year 8 unit 10 | 701 Find HCF and LCM of two or more numbers  812 Express a number as a product of its prime factors  813 Use a Venn diagram to find HCF and LCM of large numbers |
| Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative | Year 7 units 5 & 7  Year 8 unit 19 | 702 Convert between Mixed Numbers and Improper Fractions  708 Add, Subtract, Multiply and Divide Mixed Numbers |
| Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals | Year 7 unit 5  Year 8 unit 19 |  |
| Recognise and use relationships between operations including inverse operations | Year 7 units 4 & 5 |  |
| Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations | Year 7 unit 1  Year 8 unit 15 |  |
| Interpret and compare numbers in standard form A x 10n 1≤A<10, where n is a positive or negative integer or zero | Year 8 unit 15 | 817 Read and Write numbers in Standard Form |
| Work interchangeably with terminating decimals and their corresponding fractions | Year 7 units 2 & 3  Year 8 unit 3 |  |
| Define percentage as ‘number of parts per hundred’, interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% | Year 7 units 2, & 3  Year 8 units 3 & 4  Year 9 unit 1 | 709 Increase by a percentage using a multiplier  806 Reverse a percentage change |
| Interpret fractions and percentages as operators | Year 7 units 2 & 3  Year 8 units 3 & 4 |  |
| Use standard units of mass, length, time, money and other measures, including with decimal quantities | Year 7 unit 11  Year 8 unit 12 |  |
| Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures] | Year 7 unit 10  Year 8 unit 10 | 713 Round to 1 significant figure |
| Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation *a*<*x*≤*b* | Year 7 unit 10  Year 8 unit 10 |  |
| Use a calculator and other technologies to calculate results accurately and then interpret them appropriately | *Covered implicitly over the course of KS3, especially during weekly problem solving tasks.* |  |
| Appreciate the infinite nature of the sets of integers, real and rational numbers | Year 8 units 6 & 16 |  |
| Algebra | | |
| Use and interpret algebraic notation | Year 7 unit 4  Year 8 unit 2 |  |
| Substitute numerical values into formulae and expressions, including scientific formulae | Year 7 unit 4  Year 8 units 2, 7 & 19  Year 9 units 8 & 12 | 707 Substitute into an expression  715 Find the area of a trapezium  808 Calculate the area and circumference of a circle  809 Find the volume of a prism  915 Calculate the volume of a sphere/pyramid/cone |
| Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors | Year 7 unit 4  Year 8 unit 2 |  |
| Simplify and manipulate algebraic expressions to maintain equivalence | Year 7 unit 4  Year 8 unit 2  Year 9 unit 3 | 703 Collect like terms  704 Multiply out a single bracket  803 Simplify expressions by multiplying or dividing  804 Factorise a single bracket  904 Expand double brackets |
| Understand and use standard mathematical formulae; rearrange formulae to change the subject | Year 7 unit 4  Year 8 units 2, 7 & 9  Year 9 unit 5 | 815 Change the subject of a simple formula |
| Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs | Year 7 units 4, 14 & 15  Year 8 units 5 & 6  Year 9 units5, 6 & 9 |  |
| Use algebraic methods to solve linear equations in one variable | Year 7 units 6, 14 & 15  Year 8 unit 5  Year 9 unit 6 | 707 Solve 2 step equations  807 Solve equations with unknowns on both sides  908 Solve a pair of linear simultaneous equstions |
| Work with coordinates in all four quadrants | Year 7 unit 16  Year 8 units 9, 13 & 14  Year 9 units 5 & 9 |  |
| 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 | Year 8 unit 9  Year 9 unit 9 | 811 Plot a straight line graph  911 Plot a quadratic graph |
| Interpret mathematical relationships both algebraically and graphically | Year 8 unit 9  Year 9 units 9 & 10 |  |
| Reduce a given linear equation in two variables to the standard form *y* = m*x* + c; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically | Year 8 unit 9  Year 9 unit 5 | 907 Find the equation of a straight line given two points |
| Use linear and quadratic graphs to estimate values of *y* for given values of *x* and vice versa and to find approximate solutions of simultaneous linear equations | Year 9 units 6 & 9 |  |
| Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs | Year 8 unit 9  Year 9 units 6 & 9 |  |
| Generate terms of a sequence from either a term-to-term or a position-to-term rule | Year 7 unit 9  Year 8 unit 6  Year 9 unit 13 |  |
| Recognise arithmetic sequences and find the *n*th term | Year 7 unit 9  Year 8 unit 6 | 712 Find the nth term of a linear sequence |
| Recognise geometric sequences and appreciate other sequences that arise. | Year 9 unit 13 | 916 Identify and continue a Fibonacci sequence  917 Identify and generate/continue a quadratic sequence |
| Ratio, Proportion & Rates of Change | | |
| Change freely between related standard units [for example time, length, area, volume/capacity, mass] | Year 7 unit 11  Year 8 unit 12 |  |
| Use scale factors, scale diagrams and maps | Year 8 unit 14  Year 9s unit 11 & 16 | 816 Draw an enlargement with a centre  914 Use similarity to find missing sides on shapes |
| Express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 | Year 7 unit 2 |  |
| Use ratio notation, including reduction to simplest form | Year 7 unit 8  Year 8 unit 1 | 710 Write and simplify a ratio |
| 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 | Year 7 unit 8  Year 8 unit 1 | 711 Share a total into a ratio  801 Solve a sharing problem involving ratio |
| Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction | Year 7 unit 8  Year 8 unit 1  Year 9 unit 11 |  |
| Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions | Year 7 unit 8  Year 8 unit 1  Year 9 unit 11 |  |
| Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics | Year 7 unit 2  Year 8 unit 4 | 806 Reverse a percentage change |
| Solve problems involving direct and inverse proportion, including graphical and algebraic representations | Year 9 unit 11 | 913 Solve a work done problem |
| Use compound units such as speed, unit pricing and density to solve problems | Year 8 unit 1 | 802 Calculate with speed, distance and time |
| Geometry and Measures | | |
| 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) | Year 7 units 4, 5, 13 & 14  Year 8 unit 7 | 715 Calculate the area of a trapezium  809 Find the volume of a prism |
| Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes | Year 8 unit 7 | 808 Calculate the area and circumference of a circle |
| Draw and measure line segments and angles in geometric figures, including interpreting scale drawings | Year 7 units 11 &12  Year 8 unit 14 |  |
| 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 | Year 9 Unit 16 | 920 Construct angle and line bisectors |
| Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric | Year 7 unit 12 |  |
| Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles | Year 9 unit 14 | 918 Know the rules for proving congruency |
| Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies | Year 7 units 12, 14 & 15 |  |
| Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures | Year 7 unit 16 | 718 Rotate a shape on a coordinate grid |
| Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids | Year 7 unit 12  Year 8 unit 14  Year 9 unit 11 | 714 Construct triangles  816 Draw an enlargement with a centre |
| Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles | Year 7 unit 15 |  |
| Understand and use the relationship between parallel lines and alternate and corresponding angles | Year 8 unit 11 | 814 Identify and use alternate and corresponding angles |
| Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons | Year 8 unit 11 | 815 Find the size of an exterior and interior angle of a regular polygon |
| Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras’ Theorem, and use known results to obtain simple proofs | Year 7 unit 15  Year 8 unit 11  Year 9 unit 2 & 14 | 717 Find missing angles in special triangles |
| Use Pythagoras’ Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles | Year 9 unit 2 | 902 Use Pythagoras theory to find any missing side on a right triangle  903 Use SOH CAH TOA to find missing sides and angles on right triangles |
| Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D | Year 7 unit 13 | 716 Find the surface area of a cube or cuboid |
| Interpret mathematical relationships both algebraically and geometrically | Year 7 units 14 & 15 |  |
| Probability | | |
| Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale | Year 8 units 8 & 16  Year 9 unit 4 | 810 Find theoretical simple probability |
| Understand that the probabilities of all possible outcomes sum to 1 | Year 8 unit 8  Year 9 unit 4 |  |
| Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams | Year 8 unit 16  Year 9 unit 4 | 818 List outcomes and find probability |
| Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities | Year 8 unit 16  Year 9 unit 4 | 818 List outcomes and find probability  906 Draw and use a tree diagram to find the probability of multiple events |
| Statistics | | |
| Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) | Year 7 units 3, 17 & 18  Year 8 units 17 & 18 | 720 Calculate the mean median mode and range of a list of numbers  820 Calculate the mean from grouped data |
| Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data | Year 7 unit 17  Year 8 units 17 & 18 | 719 Understand a read a pictogram |
| Describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs. | Year 8 units 17 & 18  Year 9 unit 7 | 819 Plot and understand a scatter graph  919 Identify and understand positive and negative correlation. |