Edexcel Specification Alignment
GCSE 2015 / 2016 Exams

Higher

This alignment document lists all Mathletics curriculum activities associated with the 'GCSE Higher 2015 & 2016 Exam' course, and demonstrates how these fit with the Edexcel specification for the higher tier GCSE being taken in 2015 and 2016.

As new activities are developed, this document will be updated. You can download the latest version from the training and support portal:

www.3plearning.com/uk/mathleticsalignment/england

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Expectation	Topic	Activity
Number		
N a Add, subtract, multiply and divide any number	Number - Addition & Subtraction	Add Integers
		Subtract Integers
		More with Integers
		Problems: Add and Subtract 2
		Column Addition 1
		Adding Colossal Columns
		Subtracting Colossal Columns
		Bar Model Problems 1
		Bar Model Problems 2
	Number - Multiplication & Division	Multiplying by 10, 100, 1000
		Dividing by 10, 100, 1000
		Mental Methods Multiplication
		Problems: Multiply and Divide 1
		Long Multiplication
		Short Multiplication
		Mental Methods Division
		Long Division
		Short Division
N b Order rational numbers	Number - Fractions	Ordering Fractions
	Number - Decimals	Decimal Order
N c Use the concepts and vocabulary of factor (divisor), multiple, common factor, Highest Common Factor (HCF), Least Common Multiple (LCM), prime number and prime factor decomposition	Number - Properties	Multiples
		Lowest Common Multiple
		Factors
		Highest Common Factor
		Prime or Composite?
		Product of Prime Factors
N d Use the terms square, positive and negative square root, cube and cube root	Number - Indices	Square and Cube Roots
	Number - Indices	Square and Cube Roots
N e Use index notation for squares, cubes and powers of 10	Number - Indices	Square and Cube Roots
	Number - Indices	Square and Cube Roots
N f Use index laws for multiplication and division of integer, fractional and negative powers	Number - Indices	Multiplication with Indices
		Index Laws and Algebra
		Negative Indices
		Fractional Indices
N g Interpret, order and calculate with numbers written in standard index form	Number - Estimation and Accuracy	Scientific Notation
N h Understand equivalent fractions, simplifying a fraction by cancelling all common factors	Number - Fractions	Simplifying Fractions
		Equivalent Fractions

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N i Add and subtract fractions	Number - Fractions	Common Denominator
		No Common Denominator
		Add Like Mixed Numbers
		Subtract Like Mixed Numbers
		Add Unlike Mixed Numbers
		Subtract Unlike Mixed Numbers
N j Use decimal notation and recognise that each terminating decimal is a fraction	Number - Fractions	Fraction to Terminating Decimal
	Number - Decimals	Decimals from Words to Digits 1
		Decimal Place Value
N k Recognise that recurring decimals are exact fractions, and that some exact fractions are recurring decimals	Number - Decimals	Recurring Decimals
N l Understand that 'percentage' means 'number of parts per 100' and use this to compare proportions	Number - Percentages	Modelling Percentages
		Percentage Composition
N m Use percentage, repeated proportional change	Number - Percentages	Percentage Word Problems
		Solve Percent Equations
		Profit and Loss
		Simple Interest
		Percentage Increase and Decrease
		Compound Interest
		Compound Interest by Formula
		Comparing Loans
		Comparing Home Loans
		Depreciation
N n Understand and use direct and indirect proportion	Number - Ratio & Proportion	Rates
		Rates Calculations
		Rates Word Problems
		Direct Variation
		Indirect Variation
N o Interpret fractions, decimals and percentages as operators	Number - Percentages	Percentage of a Quantity
		Calculating Percentages
	Number - Fractions	Fraction of an Amount
N p Use ratio notation, including reduction to its simplest form and its various links to fraction notation	Number - Ratio & Proportion	Ratio
		Equivalent Ratios
		Ratio and Proportion
N q Understand and use number operations and the relationships between them, including inverse operations and hierarchy of operations	Number - Multiplication & Division	Order of Operations 1
		Order of Operations 2

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Expectation	Topic	Activity
N r Use surds and π in exact calculations		
N s Calculate upper and lower bounds	Number - Estimation and Accuracy	Error in Measurement
N t Divide a quantity in a given ratio	Number - Ratio & Proportion	Dividing a Quantity in a Ratio
		Ratio and Proportion
		Ratio Word Problems
N u Approximate to specified or appropriate degrees of accuracy including a given power of ten, number of decimal places and significant figures	Number - Estimation and Accuracy	Rounding Significant Figures
		Rounding Decimals
N v Use calculators effectively and efficiently, including trigonometrical functions		
Algebra		
A a Distinguish the different roles played by letter symbols in algebra, using the correct notation		
A b Distinguish in meaning between the words 'equation', 'formula', 'identity' and 'expression'	Algebra - Expanding & Factorising	Writing Algebraic Expressions
	Algebra - Formulae & Substitution	Real Formulae
	Algebra - Linear Equations	Writing Equations
A c Manipulate algebraic expressions by collecting like terms, by multiplying a single term over a bracket, and by taking out common factors, multiplying two linear expressions, factorise quadratic expressions including the difference of two squares and simplify rational expressions	Algebra - Expressions	Like Terms: Add and Subtract
		Simplifying Expressions
		Algebraic Multiplication
		Algebraic Fractions 1
		Algebraic Fractions 2
	Algebra - Quadratic Equations	Factorising Quadratics 1
		Factorising Quadratics 2
	Algebra - Expanding & Factorising	Expanding Binomial Products
		Special Binomial Products
		Factorising and Fractions 1
		Factorising and Fractions 2
		Expanding with Negatives
		Expand then Simplify
		Factorising
		Factorising Expressions
		Factorising with Negatives
		Factorising with Indices

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A d Set up and solve simple equations including simultaneous equations in two unknowns	Algebra - Linear Equations	Equations to Solve Problems
		Writing Equations
		Write an Equation: Word Problems
	Algebra - Simultaneous Equations	Simultaneous Equations 1
		Simultaneous Equations 2
A e Solve quadratic equations	Algebra - Quadratic Equations	Quadratic Equations 1
		Quadratic Equations 2
		Quadratic Formula
		Completing the Square
		Checking Quadratic Solutions
		The Discriminant
A f Derive a formula, substitute numbers into a formula and change the subject of a formula	Algebra - Formulae & Substitution	Changing the Subject
		Substitution in Formulae
		More Substitution in Formulae
		Real Formulae
A g Solve linear inequalities in one or two variables, and represent the solution set on a number line or coordinate grid	Algebra - Inequalities	Solving Inequalities 1
		Solving Inequalities 2
		Solving Inequalities 3
		Graphing Inequalities 1
		Graphing Inequalities 2
		Graphing Inequalities 3
		Linear Regions
A h Use systematic trial and improvement to find approximate solutions of equations where there is no simple analytical method of solving them	Algebra - Linear Equations	Checking Solutions
A i Generate terms of a sequence using term-to-term and position-to-term definitions of the sequence	Algebra - Sequences	Increasing Patterns
		Decreasing Patterns
		Describing Patterns
A j Use linear expressions to describe the nth term of an arithmetic sequence	Algebra - Sequences	Find the Function Rule
		Linear Expressions for the Nth Term
		Terms: Arithmetic Progressions
A k Use the conventions for coordinates in the plane and plot points in all four quadrants, including using geometric information	Algebra - Graphing Equations	Graphing from a Table of Values
		Reading Values from a Line

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A l Recognise and plot equations that correspond to straight-line graphs in the coordinate plane, including finding gradients	Algebra - Graphing Equations	Determining a Rule for a Line
		Which Straight Line?
		Equation of a Line 1
		Gradient
A m Understand that the form y = mx + c represents a straight line and that m is the gradient of the line and c is the value of the y- intercept	Algebra - Linear Graphs	Determining a Rule for a Line
		Which Straight Line?
		Equation of a Line 1
		General Form of a Line
		Gradient
		Intercepts
		Modelling Linear Relationships
A n Understand the gradients of parallel lines	Algebra - Linear Graphs	Are they Parallel?
		Are they Perpendicular?
		Perpendicular and Parallel Lines
A o Find the intersection points of the graphs of a linear and quadratic function, knowing that these are the approximate solutions of the corresponding simultaneous equations representing the linear and quadratic functions	Algebra - Simultaneous Equations	Simultaneous Equations 3
	Algebra - Non-linear Graphs	Intersection: Line & Parabola
A p Draw, sketch, recognise graphs of simple cubic functions, the reciprocal function y = 1/x with x ≠ 0, the function y = kx for integer values of x and simple positive values of k, the trigonometric functions y = sin x and y = cos x	Algebra - Non-linear Graphs	Graphing Cubics
		Graphing Hyperbolas
		Graphing Exponentials
		Sine and Cosine Curves
		Identifying Graphs
A q Construct the graphs of simple loci		
A r Construct linear, quadratic and other functions from real-life problems and plot their corresponding graphs	Algebra - Graphing Equations	Modelling Linear Relationships
A s Discuss, plot and interpret graphs (which may be non-linear) modelling real situations		
A t Generate points and plot graphs of simple quadratic functions, and use these to find approximate solutions	Algebra - Graphing Equations	Graphing Parabolas
A u Direct and indirect proportion	Number - Ratio & Proportion	Direct Variation
		Indirect Variation
A v Transformation of functions	Algebra - Non-linear Graphs	Symmetries of Graphs 1

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Expectation	Topic	Activity
Geometry		
GM a Recall and use properties of angles at a point, angles on a straight line (including right angles), perpendicular lines, and opposite angles at a vertex	Geometry - Shape & Angle Properties	Angles in a Revolution
		Parallel Lines
		Angles and Parallel Lines
GM b Understand and use the angle properties of parallel and intersecting lines, triangles and quadrilaterals	Geometry - Shape & Angle Properties	Angle Sum of a Triangle
		Exterior Angles of a Triangle
		Angle Sum of a Quadrilateral
GM c Calculate and use the sums of the interior and exterior angles of polygons	Geometry - Shape & Angle Properties	Interior and Exterior Angles
GM d Recall the properties and definitions of special types of quadrilateral, including square, rectangle, parallelogram, trapezium, kite and rhombus	Geometry - Shape & Angle Properties	Plane Figure Terms
		Plane Figure Theorems
GM e Recognise reflection and rotation symmetry of 2-D shapes	Geometry - Transformations	Rotational Symmetry
		Symmetry or Not?
GM f Understand congruence and similarity	Geometry - Transformations	Similar Figures
		Using Similar Triangles
		Scale Factor
		Congruent Triangles
		Congruent Figures (Grid)
		Congruent Figures: Find Values
GM g Use Pythagoras' theorem in 2-D and 3-D	Geometry - Shape & Angle Properties	Pythagoras' Theorem
		Pythagorean Triads
	Geometry - Volume & Surface Area	Volume: Triangular Prisms
GM h Use the trigonometric ratios and the sine and cosine rules to solve 2-D and 3-D problems	Geometry - Trigonometry	Hypotenuse, Adjacent, Opposite
		Sin A
		Cos A
		Tan A
		Find Unknown Sides
		Find Unknown Angles
		Elevation and Depression
		Bearings
		Sine Rule 1
		Cosine Rule 1
		Sine Rule 2
		Cosine Rule 2
		3D Trigonometry
GM i Distinguish between centre, radius, chord, diameter, circumference, tangent, arc, sector and segment		

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Expectation	Topic	Activity
GM j Understand and construct geometrical proofs using circle theorems	Geometry - Shape & Angle Properties	Circle Theorem
GM k Use 2-D representations of 3-D shapes	Geometry - Shape & Angle Properties	Circle Terms
GM l Describe and transform 2-D shapes using single or combined rotations, reflections, translations, or enlargements by a positive, fractional or negative scale factor and distinguish properties that are preserved under particular transformations	Geometry - Transformations	Rotations: Coordinate Plane
		Transformations: Coordinate Plane
		Scale Factor
GM v Use straight edge and a pair of compasses to carry out constructions		
GM w Construct loci		
GM x Calculate perimeters and areas of shapes made from triangles, rectangles and other shapes	Geometry - Perimeter & Area	Perimeter: Composite Shapes
		Area: Composite Shapes
GM y Calculate the area of a triangle using ½ab sin C	Geometry - Trigonometry	Area Rule 1
		Area Rule 2
		Area Problems
GM z Find circumferences and areas of circles	Geometry - Perimeter & Area	Circumference: Circles
		Area: Circles
GM aa Calculate volumes of right prisms and shapes made from cubes and cuboids	Geometry - Volume & Surface Area	Volume: Prisms
		Volume: Rectangular Prisms 1
		Volume: Triangular Prisms
		Volume: Cylinders
GM bb Solve mensuration problems involving more complex shapes and solids		
GM cc Use vectors to solve problems	Geometry - Transformations	Vector Magnitude (Column)
		Vector Operations 1 (Column)
		Scalar Product (Vector Form)
Measures		
GM m Use and interpret maps and scale drawings	Measure - Scales & Conversions	Scale
GM n Understand and use the effect of enlargement for perimeter, area and volume of shapes and solids	Measure - Scales & Conversions	Perimeter, Area, Dimension Change
GM o Interpret scales on a range of measuring instruments and recognise the inaccuracy of measurements	Number - Estimation and Accuracy	Error in Measurement

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Expectation	Topic	Activity
GM p Convert measurements from one unit to another	Measure - Scales & Conversions	Grams and Milligrams
		Grams and Kilograms
		Converting Units of Mass
		Centimetres and Metres
		Converting Units of Length
		Converting Units of Area
		Converting Volume
GM q Make sensible estimates of a range of measures		
GM r Understand and use bearings		
GM s Understand and use compound measures	Number - Ratio & Proportion	Average Speed
		Time Taken
		Distance Travelled
GM t Measure and draw lines and angles	Geometry - Shape & Angle Properties	Measuring Angles
GM u Draw triangles and other 2-D shapes using ruler and protractor		
Statistics		
SP a Understand and use statistical problem solving process/handling data cycle		
SP b Identify possible sources of bias		
SP c Design an experiment or survey		
SP d Design data-collection sheets distinguishing between different types of data		
SP e Extract data from printed tables and lists	Statistics - Interpretation	Mean
		Median
		Mode
		Mean from Frequency Table
		Median from Frequency
		Mode from Frequency Table
	Statistics - Presentation	Tally Charts
SP f Design and use two-way tables for discrete and grouped data	Probability	Probability Tables
		Two-way Table Probability
		Dice and Coins

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Expectation	Topic	Activity
SP g Produce charts and diagrams for various data types	Statistics - Presentation	Scatter Plots
		Stem and Leaf Introduction
		Tally Charts
		Pie Charts
		Pie Chart Calculations
		Histograms
		Frequency Histograms
SP h Calculate median, mean, range, quartiles and interquartile range, mode and modal class	Statistics - Interpretation	Mean
		Median
		Mode
		Data Extremes and Range
		Mean from Frequency Table
		Median from Frequency
		Mode from Frequency Table
		Median from Stem and Leaf Plot
		Mode from Stem and Leaf Plot
		Data Extremes and Range
		Grouping Data and Modal Class
		Calculating Interquartile Range
SP i Interpret a wide range of graphs and diagrams and draw conclusions		
SP j Look at data to find patterns and exceptions		
SP k Recognise correlation and draw and/or use lines of best fit by eye, understanding what these represent	Statistics - Interpretation	Correlation
	Statistics - Presentation	Scatter Plots
SP l Compare distributions and make inferences		
SP u Use calculators efficiently and effectively, including statistical functions		
SP m Understand and use the vocabulary of probability and probability scale	Probability	Probability Scale
SP n Understand and use estimates or measures of probability from theoretical models (including equally likely outcomes), or from relative frequency	Probability	Relative Frequency
		Simple Probability
		Find the Probability
		Probability Tables
SP o List all outcomes for single events, and for two successive events, in a systematic way and derive relative probabilities	Probability	How Many Combinations?
		Counting Techniques 1

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SP p Identify different mutually exclusive outcomes and know that the sum of the probabilities of all these outcomes is 1	Probability	Complementary Events
SP q Know when to add or multiply two probabilities: when A and B are mutually exclusive, then the probability of A or B occurring is P(A) + P(B), whereas when A and B are independent events, the probability of A and B occurring is P(A) × P(B)		
SP r Use tree diagrams to represent outcomes of compound events, recognising when events are independent	Probability	Tree Diagrams
SP s Compare experimental data and theoretical probabilities		
SP t Understand that if they repeat an experiment, they may – and usually will – get different outcomes, and that increasing sample size generally leads to better estimates of probability and population characteristics		


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