Subject	Maths

Threshold Concepts		
	Applying mathematical techniques	Problem solving
	Communicating mathematical reasoning	Manipulation of data

Curriculum Map

CITY OF LONDON ACADEMIES TRUST

Year 7

	Term Aut 1 Unit 1	Term Aut 2 Unit 2	Term Spr 1 Unit 3	Term Spr 2 Unit 4	Term Sum 1 Unit 5	Term Sum 2 Unit 6
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Number System and Calculating**	**Comparing and Visualising**	**Algebra and Proportion**	**Geometry and FDP**	**Algebra and Geometry**	**Data**
Knowledge / Skills	Understand and use place value Apply the four operations, including formal written methods, to integers and decimals Order of operations, including brackets Recognise and use relationships between operations, including inverse operations Recognise primes Multiples and factors Solve problems using common factors and highest common factors Solve problems using multiples and lowest common multiples Powers and roots Sequences of triangular, square and cube numbers, simple arithmetic progressions	Round numbers to decimal places and significant figures Estimation Order positive and negative integers, decimals and fractions Understand and use inequility notation (including the equals sign) Understand and use labelling notation for lengths and angles Use ruler and protractor to construct triangles, including when all three sides are known Know and solve problems using the properties and triangles and quadrilaterals Identify line and rotational symmetry in polygons Know the connection between faces, edges and vertices in 3D shapes Recognise and use nets of 3D shapes	Understand the words variable, term and coefficient Use basic algebraic notation (including basic forming equations) Simplify algebraic expressions Substitution One quantity as a fraction of another Write a percentage as a fraction One quantity as a percentage of another Use ratio notation, including reducation to simplest form Divide a given quantity into two parts in a given part:part or part:whole ratio	Generate terms of a sequence from a term-to-term rule Measure line segments and angles Converting between mentric units of length, mass, volume, time and money Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles Four operations with fractions (including improper and mixed numbers) FDP Percentage change using a multiplier Compare two quantities using percentages Percentage change = actual change / original amount	Solve linear equations in one unknown (up to multi-step) Calculate perimeters of 2D shapes Calculate the area of squares, rectanglea, triangles and trapezia Calculate the volume of cuboids Find the surface area of cuboids (including cubes) Work with coordinates in all four quadrants Understand and use lines parallel to the axes, y = x and y = -x Transformations (rotations, reflections, translations)	Ierpret and construct frequency tables Interpret and construct bar charts and know their appropriate use Interpret comparative bar charts Interpret and construct pie charts and know their appropriate use Interpret vertical line charts Mean, median and mode of a data set Mean, median and mode from a frequency table Range
Lit / Num	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Argumentation and logical thinking, Calculation skills	Visual perception of information, Calculation skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Calculation skills, Understanding trends, Language Skills, Data analysis
Enrichment	Preparation for UKMT (Maths Challenge)	Coding and code breaking - The Enigma Project	Cross-curricular project with Science	Cut the knot	Problem solving DDD	Life skills session (finance etc)
Careers	Data analyst, actuary, teacher, administration, finance	Accountant, data analyst, research scientist, system developer, programmer	Actuary, investment analyst, meteorologist, quantity surveyor	Systems developer, meteorologist, surveyor, architect	Accountant, data analyst, research scientist, system developer, programmer	Actuarial analyst, Data analyst, statistician, financial manager, software developer/tester

Year 8

	Term Aut 1 Unit 7	Term Aut 2 Unit 8	Term Spr 1 Unit 9	Term Spr 2 Unit 10	Term Sum 1 Unit 11	Term Sum 2 Unit 12
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Number and Visualising**	**Risk and Introduction to Algebra**	**Proportional reasoning and Patterns**	**Investigating Angles, Calculating and Solving Equations**	**Visualising shapes and Algebraic Visualising**	**Risk and Data**
Knowledge / Skills	Find HCF, LCM, and prime factorisation Rounding to decimal places and significant figures Interpreting standard form Using formal written methods to calculate with integers, decimals, and fractions Applying order of operations Measure line segments and angles in geometric figures Interpret maps and scale drawings Construct and use bearings Identify, describe, and construct similar shapes Construct and interpret enlargements Interpret and construct plans and elevation of 3D shapes	Relate experimental probability to theoretical probability Use probability language and 0-1 probability scale Use tables and frequency trees to record outcomes of experiments Construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities Apply the property that the probabilities of a set of mutually exclusive events sum to one Use and interpret algebraic notation Understand the concepts and vocabulary for factors By factorising, simplify expressions involving sums, products and powers Substituition into formulae Rearrange formulae to change the subject	Converting FDP Converting terminating decimals Express division of quantity into two or more parts Understand and use proportion as equality of ratios Use and convert compound units/ rates Generate terms of sequence Calculate expressions of nth term of linear sequences	Understand and use alternate, corresponding, and cointerior angles on a parallel line Derive and use the sum of angles in a triangle Deduce and use the angle sum in any polygon Interpret fractions and percentages as operators Work with percentages greater than 100% Solve problems involving percentage change Calculate exactly with fractions Solving linear equations with the unknown on both sides. Find approximate solutions to linear equations using a graph	Compare lengths, are and volumes using ratio Calculate perimeters of 2D shapes including circles Identify and apply circle definitions and properties, including: arc, sector, centre, radius, chord, diameter, circumference Know the formula for circumference and area of a circle Calculate area for circles and composite shapes Know and apply formulae to calculate volume of prisms (including cylinders) Plot graphs of equations that correspond to straight-line graphs in the coordinate plane Identify and interpret gradients and intercepts of linear functions graphically Recognise, sketch and interpret graphs of linear functions and simple quadratic functions	Apply systematic listing strategies, enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams. Record describe and analyse the frequency of outcomes of probability experiments using frequency trees Construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities. Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data. Use and interpret scatter graphs of bivariate data and recognise correlation. Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) Apply statistics to describe a population
Lit / Num	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Argumentation and logical thinking, Calculation skills	Visual perception of information, Calculation skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Calculation skills, Understanding trends, Language Skills, Data analysis
Enrichment	Preparation for UKMT (Maths Challenge)	Coding and code breaking - The Enigma Project	Cross-curricular project with Science	Cut the knot	Problem solving DDD	Life skills session (finance etc)
Careers	Data analyst, actuary, teacher, administration	Accountant, data analyst, research scientist, system developer, programmer	Actuary, investment analyst, meteorologist, quantity surveyor	Systems developer, meteorologist, surveyor, architect	Accountant, data analyst, research scientist, system developer, programmer	Actuarial analyst, Data analyst, statistician, financial manager, software developer/tester

Year 9

	Term Aut 1 Unit 13	Term Aut 2 Unit 14	Term Spr 1 Unit 15	Term Spr 2 Unit 16	Term Sum 1 Unit 17	Term Sum 2 Unit 18
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Accuracy and Constructions**	**Binomials and Proportion**	**Non-linear sequences and Inequalities**	**Geometric Generalisation**	**Coordinate Geometry**	**Risk and Respresenting Data**
Knowledge / Skills	**Calculate with roots, integer and fractional indices** Calculate with Standard Form Use inequalitiy notation for Error Intervals Apply and interpret limits of accuracy Use a compass for geometic constructions Use constructions to solve loci problems Construct Plans and Elevations of 3D shapes	Vocabulary and concept of Identity Expanding products of two or more binomials Factorise quadratic expressions (e.g x^2 + bx + c) Argue mathematically to show algebraic expressions are equivalent Translate (form) simple situations or procedures into algebraic expressions or formulae Solve problems involving Direct and Indirect Proportion Apply concepts of Similarity to find missing lengths Use and onvert between compund units of measure (eg Density and Pressure)	Recognise and use quadratic sequences Deduce Expressions to calculate the nth term of quadratic sequences Understand and use concepts of inequalities Solve linear inequalities with one unknown in all forms. (eg 3<2x-1<17) Respresent all solutions of a inequalitiy on a number line	Calculate arc lengths, angles and area of sectors Calculating the Surface Area of Prisms (including cyclinders) Understand and apply Pythagoras' Theorem Understand and use congruency criteria in triangles for proof Apply principles relating to triangles and quadrilaterals to conduct geometric proof	Understand the derivation and concepts underlying straight line graphs Use the general form to identify gradients and y-intercept Derive the equation given two points Recognise and Plot graphical functions (Quadratic, Cubic and Reciprocal) Interpret Real Life Graphs (Linear and Non- Linear) Solve two linear simultaneous equations in two variables algebraically and graphically Derive and Form Simultaneous Equations to be solved	Calculate probability of Combined Events using tree diagrams and other representations Use combination theory in relation to probability Constructing and interpreting Scatter Diams, including accurate applicaiton of line of best fit Use of scatter diagrams to interpolate and understanding of limitations with regards to extrapolation. (Correlation does not mean causation)
Lit / Num	Diagnosing key language with respect to bounds (Significant figures, nearst decimals)	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Argumentation and logical thinking, Calculation skills	Visual perception of information, Calculation skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Calculation skills, Understanding trends, Language Skills, Data analysis
Enrichment	Preparation for UKMT (Maths Challenge)	Coding and code breaking - The Enigma Project	Cross-curricular project with Science	Cut the knot- website	Problem solving DDD	Life skills session (finance etc)
Careers	Architecture, Data Analysis, Insurance	Accountant, data analyst, research scientist, system developer, programmer	Actuary, investment analyst, meteorologist, quantity surveyor	Systems developer, meteorologist, surveyor, architect	Accountant, data analyst, research scientist, system developer, programmer	Actuarial analyst, Data analyst, statistician, financial manager, software developer/tester

	Term Aut 1 Unit 19	Term Aut 2 Unit 20	Term Spr 1 Unit 21	Term Spr 2 Unit 22	Term Sum 1 Unit 23	Term Sum 2 Unit 24
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Number and Solving Equations**	**Mathematical movement, Algebra and Proportional reasoning**	**Patterns, Algebra and Visualising**	**Geometric Reasoning and Visualising**	**Number, Solving Equations and Risk**	**Statistics, Graphing and Vectors**

Year 10	Knowledge / Skills	**Investigating Properties of shape** Similar Shapes and scale factors Exact values of sin, tan, cos (0, 30, 45, 60, 90) Know and apply the trig ratios to right angled triangles to find missing angles or lengths **Calculating** Calculating exactly with surds Apply and interpret limits of accuracy including upper and lower bounds **Solving equations and inequalities 1** Using iterative methods Solving linear simultaneous equations and where one is quadratic	**Mathematical movement 1** Enlargement with negative and fractional scale factors LInk similarity to scale factors Describe combined transformations. **Algebraic proficiency** Algebraic manipulation including, quadratics, cubics, fractions Factorising quadratics, including difference of two squares **Proportional reasoning** Direct and inverse proportion (including graphs)	**Patterns** Calculate the nth term of quadratic sequences Recognise and use simple geometric progressions (hwere n is and integer and r>0) **Solving inequalities** Solve linear inequalities in two variables. Represent solutions using graphs and set notation **Calculating Space** Surface area and volume of spheres, pyramids, cones and composite solids Apply congruence and similarity to length, area and volume	**Circle Theorems - Geometric Reasoning** Apply and prove the standard circle theorems concering angles, radii, tnagents and chords, and use them to prove related results **Algebraic proficiency - visualising** Plot and interpret graphs including interpolation such as speed distance time graphs. Calculate and interpret gradients (including at a point) and areas under graphs and interpret results in context. Identify and interpret roots, intercepts, turning points of quadratic functions graphically	**Exploring Fractions Decimals Percentages** Conversion between recurring decimals and fractions Set up solve and interpret answers in growth and decay problems including compound interest (repeated rates of change) **Solving Equations 2** Solve quadratic equations by factorising Find approximate solutions quadratically **Understanding risk** Apply systematic listing strategies including product rule to ensure all outcomes are listed Calculate and interpret consitional probabilities through representation using expected freuqcies with two wya tables, tree diagrams and Venn diagrams	**Analysing Statistics** Infer properties of populations or distributions from a sample Know the limitations of sampling Interpret, analyse and compare the distriutions of data sets thrugh appropriate graphical representation and measures of central tendance (mmmr, quartiles and interquartile range. Analyse and represent discrete, countinuous and grouped data, including box plots **Equation of lines and circles** Use y=mx+c to identify perpendicular lines Recognise and use the equation of a circle with centre at the origin Find the equation of a tangent to a circle at a given point **Vectors** Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors.
	Lit / Num	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Argumentation and logical thinking, Calculation skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Calculation skills, Understanding trends, Language Skills, Data analysis
	Enrichment	Preparation for UKMT (Maths Challenge)	Coding and code breaking - The Enigma Project	Cross-curricular project with Science, Fibonacci sequence	Problem solving DDD	Preparation for UKMT (Maths Challenge)	Life skills session (finance etc)
	Careers	Data analyst, actuary, teacher, administration, architecture and engineering, computer programming	Accountant, data analyst, research scientist, system developer, programmer, physicist, movie production, project management	Actuary, investment analyst, meteorologist, quantity surveyor, fashion design, product design	Accountant, data analyst, research scientist, system developer, programmer, architecture	Data analyst, actuary, teacher, administration	Actuarial analyst, Data analyst, statistician, financial manager, software developer/tester, designer, engineer

Year 11		Term Aut 1 Unit 25 Curriculum/Syllabus Coverage	Term Aut 2 Unit 26 Curriculum/Syllabus Coverage	Term Spr 1 Unit 27 Curriculum/Syllabus Coverage	Term Spr 2 Unit 28 Curriculum/Syllabus Coverage	Term Sum 1 Unit 29 Curriculum/Syllabus Coverage	Term Sum 2 Unit 30 Curriculum/Syllabus Coverage
	Unit Title	**Properties of shapes, Calculating and Functions**	**Proportional reasoning, Patterns and Solving Equations**	**Visualising and Anlysing data**	**Revision**	**Revision**	
	Knowledge / Skills	Use pythagoras and trigonometric ratios in three dimensions and problem solving (bearings). Know and apply the sine and cosine rule. Know and apply the sine rule for are to solve problems. Rationalise denominators with expansion of double brackets, manipulate more complex surds. **Solving problems involving quadratics and recognising roots, y-intercepts, minimum and maximum points from a quadratic curve.** Derive iterative formula to find approximate solutions. Interpret composite and invere functions.	Construct equations that describe direct and inverse proportion. Recognise and use simple geometric progressions and other sequences Solve quadratic inequalities and simultaneous equations involving quadratics of increasing complexity. Solve simultaneous equations invloving linear and quadratics, both graphically and algebraically.	Recognise, sketch and interpret graphs of exponential functions y = k^x for positive values of k, and the trignometric function (with arguments in degrees) y = sin x, y = cos x and y = tan x for angles of any size sketch translations and reflections of a gicen function construct and interpret diagrams for grouped discrete and continuous data i. e. histograms with equal and unequal class intervals and know their appropriate use apply the concepts of average and instantaneous rate of change (gradient of chords and tangents) in numerical, algebraic and graphical contexts) use vectors to construct geometric arguments and proofs	Revision of: Number Reasoning Geometry Proportion Statistics	Revision of: Number Reasoning Geometry Proportion Statistics	External Examination
	Lit / Num	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Ability to organise information, Visual perception of information, Calculation skills, Language Skills	Argumentation and logical thinking, Calculation skills	As outlined previously	As outlined previously	
	Enrichment	Preparation for UKMT (Maths Challenge)	Coding and code breaking - The Enigma Project	Cross-curricular project with Science	As outlined previously	As outlined previously	
	Careers	Data analyst, actuary, teacher, administration	Accountant, data analyst, research scientist, system developer, programmer	Actuary, investment analyst, meteorologist, quantity surveyor	As outlined previously	As outlined previously	

Year 12		Term Aut 1 Unit 61 Curriculum/Syllabus Coverage	Term Aut 2 Unit 62 Curriculum/Syllabus Coverage	Term Spr 1 Unit 63 Curriculum/Syllabus Coverage	Term Spr 2 Unit 64 Curriculum/Syllabus Coverage	Term Sum 1 Unit 65 Curriculum/Syllabus Coverage	Term Sum 2 Unit 66 Curriculum/Syllabus Coverage
	Unit Title	**Proof**	**Proof**	**Mechanics**	**Statistics**	**Mechanics**	**Problem Solving**
	Knowledge / Skills	Algebra (basic methods and GCSE review); graph sketching and transformations, inequalities, straight line graphs, circles	Algebraic methods, proof, binomial, exponentials and logs, vectors, integration intro, trig equations and identities, differentiation	Mechanics: suvat, velocity-time graphs, forces (F=ma), variable acceleration. Stats: measures of location and spread, correlation, data representation	Stats: probability, distribution, hypothesis testing. Revise: calculus, trig, vectors, binomial	Revise Mechanics; Stats: histogram revision, location and spread.	Maths Challenge work; Problem solving mini-course. Teach start of pure year 13 content
	Lit / Num	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Visual perception of information, Calculation skills, Language skills, Ability to organise information	Ability to organise information, Calculation skills, Understanding trends, Language Skills, Data analysis	Visual perception of information, Calculation skills, Language skills, Ability to organise information	Ability to organise information, Visual perception of information, Calculation skills, Language Skills
	Enrichment	Preparation for UKMT (Maths Challenge)	Further development through extra study	Cross-curricular links to Physics	Problem-solving activities	Cross-curricular links to Physics	Problem-solving activities
	Careers	Data analyst, scientific researcher, teacher, system developer	Data analyst, scientific researcher, teacher, system developer	Physicist, systems development and testing, sports scientist, engineer	Actuarial analyst, Data analyst, statistician, financial manager, software developer/tester	Physicist, systems development and testing, sports scientist, engineer	Accountant, data analyst, research scientist, system developer, programmer

Year 13		Term Aut 1 Unit 71 Curriculum/Syllabus Coverage	Term Aut 2 Unit 72 Curriculum/Syllabus Coverage	Term Spr 1 Unit 73 Curriculum/Syllabus Coverage	Term Spr 2 Unit 74 Curriculum/Syllabus Coverage	Term Sum 1 Unit 75 Curriculum/Syllabus Coverage	Term Sum 2 Unit 76 Curriculum/Syllabus Coverage
	Unit Title	**Mechanics**	**Proof**	**Geometry**	**Review**	**Revision**	
	Knowledge / Skills	Mechanics: Moments, projectiles, forces, variable acceleration. Stats: Regression and correlation, probability and normal distribution	Algebraic methods, differentiation, functions, binomial, sequences and series	Three Trig chapters, parametrics, numerical methods	Integration, vectors; review of Pure, Review of Applied, exam practice	Exam practice and revision	External Examination
	Lit / Num	Visual perception of information, Calculation skills, Language skills, Ability to organise information	Knowledge of numbers, Visual perception of information, Calculation skills, Language Skills	Systems developer, meteorologist, surveyor, architect	As outlined previously	As outlined previously	
	Enrichment	Preparation for UKMT (Maths Challenge)	Further development through extra study	Further development through extra study - exam skills	As outlined previously	As outlined previously	
	Careers	Physicist, systems development and testing, sports scientist, engineer	Data analyst, scientific researcher, teacher, system developer	Systems developer, meteorologist, surveyor, architect	As outlined previously	As outlined previously	