

Mathematics

Teaching for mastery describes the elements of classroom practice and curriculum organisation that combine to give students the best chances of mastering mathematics. Mastering mathematics means learners acquiring a deep, long-term, secure and adaptable understanding of the subject; this is supported by the belief that that all students are capable of achieving success in mathematics.

Whilst teaching maths for mastery can be implemented within any curriculum model, the Trust Mathematics Secondary Curriculum has been particularly designed and structured to encourage teaching for mastery to be practiced in our mathematics classrooms. This means, in practice, longer blocks of deeper learning on one topic, ordered with consideration of continuity and mathematical links.

We want students to be able to apply and use mathematics in different ways and have really valuable experiences in lessons that enable them to do this. We want mathematics lessons to build students' mastery, character, metacognition and wider skills.

How have we got to the current stage of development with our Trust Mathematics Secondary Curriculum?

- We have worked collaboratively to build the curriculum, using the National Curriculum, GCSE and A level content as a starting point.
- Drawing on the expertise and experience of our mathematics teachers has been a key part of this, with respect to determining what mathematical knowledge and attributes are important for students. For example, we have had 'working groups' looking at this at Trust insets, and Maths Curriculum Leader meetings where issues have been discussed further.
- We haven't restricted the curriculum to examination content, but have considered the broad unifying and central concepts of mathematics, how these relate to cultural capital (such as knowing mental methods for working out simple percentages of amounts, so that you can estimate costs in a shop) and how these might relate to studies of mathematics at a higher level (such as number theory in mathematics degrees).
- We will keep reflecting on our choices, and make tweaks where necessary (for example, more graphs work in year 9 from September 2019 onwards when studying simultaneous equations).
- Our intention to teach mathematics for mastery is at the heart of all decisions made regarding the curriculum.

Why is the Trust Mathematics Secondary Curriculum structured as it is?

- We have longer blocks of deeper learning on one topic so that each topic can be studied and understood in depth, with appropriate challenge for all students, without teachers feeling the pressure of moving on to another topic too quickly.
- More time is available for rich activities, interleaving, and connecting and applying learning on a topic, to develop fluency, reasoning and problem-solving.
- We do not have 'foundation tier' or 'higher tier' specific topics on our curriculum; all students have access to learning all topics. This supports our ethos that every child can achieve in mathematics and that we should not reduce the mathematics curriculum for certain children. Differentiation is by teaching approaches, support and outcome.
- For logistical simplicity, on the outline each half term has one key topic focus indicated, however this 'half term time period' is applied flexibly (for example, if an extra week is needed on a topic after a half term break then this is implemented, and we know that number of weeks per half term varies with each academic calendar).

- The curriculum structure is also designed to support CPD and joint-planning activities between teachers where possible (for example, all year 7 teachers are teaching 'Integers' at the same time, and year 9 are also studying the related topic of 'Indices and Surds' at the same time as this) and to reduce disruption when students may need to change teaching group.

Why are topics ordered and positioned where they are?

- Coherence, continuity and mathematical links have been the key consideration here. We have also considered the primary mathematics experience that students will most likely have had, and looked to build on this from the appropriate starting points.
- Concepts studied earlier on will have significance in later topics and will be revisited (not repeated); concepts studied later on are here because the groundwork has been laid in prior topics. Topics develop fully and can be explored from different angles.
- We know that if topics are linked to prior learning and go on to make links to future learning, the subject of mathematics as a whole will make more sense to students and this will strengthen learning.

Where is the distinction between key stages, and how does year 9 fit in?

- The Trust Mathematics Secondary Curriculum is not split into key stages 3 and 4. Rather, we acknowledge that mathematics learning does not happen in distinct key stages and instead is continuously built from primary experiences in mathematics over the five secondary years – we have a continuous curriculum.
- As we do not have distinct key stages 3 and 4 within our curriculum, we do not define year 9 as being in either key stage 3 or key stage 4. However, we do note that year 9 (as with the other years of mathematics learning) is an important year in terms of going into greater depth regarding key topics and making links between the broad amount of mathematical topics that will have been covered by this year. It is also the first year where linear graphs are studied in depth – which is a key mathematical area for moving forwards.

Fundamentals – What are they and how do they fit in with the curriculum?

- Residual knowledge - knowledge that we want children to commit to long term memory, because they are the most useful and important, e.g. things that come up again and again, building blocks, central ideas, cultural capital.
- This does not mean learning by rote – learning of the fundamentals should be built over time, developing procedural and conceptual understanding together, making links between the mathematical topics and interleaving key skills.
- Fundamentals are not the totality or end of the curriculum; just the highlighted important parts of it. If a child is competent in all of the fundamentals, then they should be able to achieve at least grade 5 at GCSE.
- The fundamentals are the focus for recapping and key skills in lessons over the short, medium and long term.
- Appendix 2 gives the Mathematics Secondary Fundamentals 2019-2020.

What are the intended formative assessment processes to support the curriculum intent?

- A variety of formative assessment strategies and tasks (including low-stakes tests or learning checks) are used within lessons and across a half term, with appropriate follow-on or 'Directed Improvement and Reflection Time' activities to ensure progress following formative assessment.

- These are shared and developed in mathematics across the Trust, as a ‘bank’ of resources on the Mathematics area of the Trust drive.

What are the intended formative assessment processes to support the curriculum intent?

- We have three Maths Trust Common Summative Assessments per year for years 7-11. All students in a particular year group across the Trust take the same assessments (with years 9-11 split into foundation and higher tier papers) so that projected grades and percentiles can be generated for each student. These give us one way to assess the effectiveness of the curriculum implementation for all students.
- Each Maths Trust Common Summative Assessment assesses the curriculum content that has been covered up to that stage of the outline, along with prior knowledge from primary maths. The format of the assessment is in GCSE-style questions; where content and skills are reduced appropriately for the year group (for example, for the assessment taking place at the end of year 7, content is reduced to reflect the mathematics curriculum content to this point). GCSE-style questions, but adapted appropriately, are used for each year group so that students are able to build their confidence and competence with this style of questioning over their secondary years.
- For students, having Maths Trust Common Summative Assessments enables students to receive a feedback sheet with detailed information in terms of strengths and areas for improvement, which they are able to act on to drive their learning forwards. All stakeholders (students, parents, teachers, leaders) have access to this information so that they are able to work together. Regular practice of assessment situations enables students to realise the importance of key skills and connections between mathematical topics, as well as applying their knowledge and solving problems.
- For teachers, having Maths Trust Common Summative Assessments enables teaching approaches and activities to be shared, including follow-on strategies to ensure progress following assessments. Projected grades and percentiles, as well as question-level analysis for a whole class, enable teachers to target interventions effectively.
- For mathematics leaders, having Maths Trust Common Summative Assessments enables us to accurately analyse the teaching of mathematics topic areas across the Trust, so that we can organise efficient and effective interventions for students and CPD for teachers relating to teaching strategies.
- As with all of our work, we do not think that the current assessments are final and we will continue to make changes based on research and collaborative working across the Trust – for example, changes we are currently considering relate to the style of questions in the assessments and ways to support assessments being a positive experience for all students.

How else do we support the implementation of the curriculum intent?

- All of our Mathematics CPD across the Trust surrounds teaching mathematics for mastery; involving the five big ideas of representation and structure, fluency, mathematical thinking, variation and coherence. These link to the curriculum intent in the ways highlighted above – through an emphasis on mathematical connections, fluency, reasoning, problem-solving, depth of procedural and conceptual understanding, high expectations and developing metacognition for all students.
- Our Mathematics Trust Action Plan (Logic Model), given in Appendix 4, outlines our plans for 2019-2020 for CPD and resources to further support teachers in implementing the curriculum intent.

Programme of study

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7		Integers and maths key skills	Place value	Algebraic expressions	Fractions	2d shapes	Probability and Venn diagrams
Year 8		Percentages (recap decimals and fractions)	Linear equations, sequences and graphs	Ratio & proportion	Angles	3D Shapes	Statistics
Year 9		Basic number, FDP (growth & decay)	Factors, multiples & primes, Rounding, estimation, bounds, indices. surds & standard form	Expressions, equations, formula & proof coordinates	Area, perimeter and volume (including circles)	2D and 3D shapes, properties of polygons, angles, scale drawings & bearings	Statistics Probability
Year 10	F	Ratio & proportion (links to fractions)	Sequences, linear graphs Expressions (algebraic indices) and graphs	Measures, real life graphs	Pythagoras and Trigonometry	Transformations (& Loci) Similarity & Congruence Vectors	Probability, Venn Diagrams

	H	Ratio & proportion, exchange rates (links to fractions) [recap of surds, quadratics and standard form]	Sequences (inc quadratic), linear graphs (inc coordinate geometry) Expressions (algebraic indices) and graphs	"Measures, real life graphs [Simultaneous eqns: linear / quadratic algebraic proportion]"	Pythagoras and trigonometry [inc. non-right angled], Algebraic Fractions	Transformations (& Loci) Similarity & Congruence Vectors	Probability, Venn diagrams
Year 11	F	Number and Algebra Revision	Shape and Data Revision	Bespoke Revision	Bespoke Revision	Bespoke Revision	
	H	Completing the Square, Equation of a Circle, Functions, Non-Right angled Trig, Circle Theorems, Sectors & Segments Graph Transformation	DATA (CF Curves, Histograms) Inequalities (inc quadratic), non-linear graphs (inc. geometric progression / exponential graphs), iteration	Simultaneous equations (inc quadratic), rates of change / areas under graphs Probability Trees / algebraic Probability	Bespoke Revision	Bespoke Revision	

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	Introducing the LDS (Data Processing)	Binomial Expansion	Differentiation	Trigonometry	Sequences and Series	Mock AS Exams
	Surds, Indices and Logarithms	Binomial Distribution	Integration	Vectors	Trigonometry (Radians and Reciprocal Functions)	Revision / Consolidation
	Quadratics and Simultaneous Equations (Inc. Equations of Circles)	Kinematics	Hypothesis Testing	Forces	Revision	

	Probability	Coordinate Geometry (Parallel and Perpendicular)				
	Data 1 (Scattergraphs and Correlation, Sampling, Errors/Outliers)					
Year 13	Partial Fractions	Differentiation	Integration (Inc. Trapezium Rule)	Differential Equations	Revision	A Level Exams
	Binomial Expansion	Further Differentiation	Forces and Motion (Inc. Friction)	Proof		
	Polynomial Division	Trigonometric Identities	Parametric Equations (Inc. Integration)	Hypothesis Testing		
	Functions and Iteration	Vectors	Projectiles	Moments		
	Probability	Kinematics				
	Normal Distribution					

A-Level specification: OCR B (MEI)

Key Stage Three fundamentals

Term and topic:	Fundamental knowledge	Entitlement vocabulary
Year 7 half term 1: arithmetic	<ul style="list-style-type: none"> • Adding, subtracting, multiplying and dividing any whole numbers (including negative numbers and using BIDMAS for order of operations). • Finding and using even numbers, odd numbers, square numbers, triangular numbers, sums, products, prime numbers, factors, multiples, common multiples and factors, highest common factor, lowest common multiple and positive powers of a number. • Reading and writing (in words or digits) any number correctly, including being able to give the value of any digit in any number. 	Order of operations; square numbers, triangular numbers, sums, products, prime numbers, factors, multiples, common multiples and factors, highest and lowest common multiple positive powers of a number; million; integer
Year 7 half term 2: decimals	<ul style="list-style-type: none"> • Ordering, adding, subtracting, multiplying and dividing any decimal numbers (including negative numbers and using BIDMAS for order of operations); including calculations involving money, time and conversion of decimal units. • Rounding numbers to a given power of 10, number of decimal places or number of significant figures. 	Decimal; negative number/ significant figures
Year 7 half term 3: algebra	<ul style="list-style-type: none"> • Simplifying algebraic expressions, including adding, subtracting, multiplying, dividing and use of index laws. • Substituting into an expression including positive, negative and non-integer numbers (and use BIDMAS if required). • Expanding brackets and simplifying the resulting expression, including double and triple brackets, and factorising expressions into one bracket. • Understanding how algebraic notation can be used to represent worded scenarios, aspects of shape, calculations and different types of numbers (such as even, odd and consecutive numbers). 	Factorise; expand brackets; algebraic expressions;
Year 7 half term 4: fractions	<ul style="list-style-type: none"> • Finding any fraction of any amount and writing one number as a fraction of another. • Ordering, adding, subtracting, multiplying and dividing any fractions, including use of equivalent fractions where necessary (including working with mixed numbers and top heavy fractions). 	Fraction
Year 7 half term 5: geometry	<ul style="list-style-type: none"> • Knowing the parts of a circle and different types of shapes, including using properties of shapes to classify them. • Finding the perimeter and area of squares, rectangles, triangles, parallelograms, trapeziums, circles; and compound shapes made up of these. 	Names of 2d shapes
Year 7 half term 6: probability	<ul style="list-style-type: none"> • Writing a probability in words or calculating as a fraction or decimal, and marking on a scale (including use of the fact that the total probability of all of the outcomes is 1). • Recording all of the possible combinations/outcomes in a given situation and using these to calculate probabilities. • Calculating, comparing and explaining relative frequencies and theoretical probabilities. • Knowing And/Or/Not set notation and express simple regions using these on a Venn diagram. 	Probability; frequency; Venn diagram

Term and topic:	Fundamental knowledge	Entitlement vocabulary
Year 8 Autumn term:	<p>8-1-1 Finding any percentage of any amount.</p> <p>8-1-2 Increasing and decrease by a percentage, including calculating repeated percentage changes (and applications to real life scenarios such as simple/compo...)</p> <p>8-1-3 Calculating reverse percentages.</p> <p>8-1-4 Converting between any fraction, decimal and percentage and using this appropriately; including in writing one number as a percentage of another.</p> <p>8-2-1 Forming and solving equations, with unknowns on one or both sides.</p> <p>8-2-2 Finding and using the nth term of a linear sequence, including application to sequences given by diagrams and creating sequences given a rule.</p>	Percentage; Reverse percentage, Plot; interpret; linear graph; linear sequence; nth term
Year 8 Spring term:	<p>8-3-1 Writing ratios from given information and using equivalent ratios (including simplifying and writing ratios in the form 1:n and n:1).</p> <p>8-3-2 Dividing any number into any given ratio.</p> <p>8-3-3 Applying understanding of proportion to solve real-life problems such as value for money problems, exchange rates, recipe problems, direct and inverse...</p> <p>8-4-1 Using angle facts to solve problems or make conclusions, including in missing angle problems and/or problems relating to parallel lines, types of shapes...</p> <p>8-4-2 Discovering, understanding and using properties of interior and exterior angles of polygons.</p>	Ratio, Bearings; polygon
Year 8 Summer term:	<p>8-5-1 Naming different 3D shapes and parts/properties of these.</p> <p>8-5-2 Finding the volume and surface area of cubes, cuboids, triangular prisms, cylinders and other prisms, including compound shapes made up of a combination...</p> <p>8-5-3 Drawing and interpreting plans and elevations of 3D shape.</p> <p>8-6-1 Drawing and interpreting accurate stem and leaf diagrams, bar charts, line graphs, pie charts, pictograms, box plots, cumulative frequency diagrams, scatter graphs...</p> <p>8-6-2 Calculating, interpreting and evaluating the mean, mode, median and range from a list, table or stem and leaf diagram.</p>	Names 3d shapes, Stem and leaf diagrams, bar charts, line graphs, pie charts, pictograms, box plots, cumulative frequency diagrams, scatter graphs, two way tables; frequency trees

Term and topic:	Fundamental knowledge	Entitlement vocabulary
Year 9 Autumn term:	<p>9-1-1 Recognising when, how and why to apply the laws of indices, including applications to negative integer powers and reciprocals.</p> <p>9-1-2 Expressing numbers as a product of their prime factors and using this.</p> <p>9-1-3 Converting numbers to and from standard form and calculating with numbers in standard form.</p> <p>9-2-1 Appropriately and accurately using the functions on a calculator.</p> <p>9-2-2 Using and evaluating estimations for calculations and properties of real-life objects.</p> <p>9-2-3 Calculating and writing the upper and lower bounds of numbers given to varying degrees of accuracy and in the form of error intervals.</p>	<p>Index, reciprocal, product, prime, factor, multiple, square, cube, square root, cube root, round, significant figure, decimal place, bound, error interval, standard form, estimation</p>
Year 9 Spring term:	<p>9-3-1 Rearranging the subject of simple formulae.</p> <p>9-3-2 Forming and solving two linear simultaneous equations (including by use of elimination, substitution or graphs).</p> <p>9-3-3 Plotting and interpreting linear graphs given the equation of the line, graph or a relationship representing a real-life scenario; including showing that two li...</p> <p>9-4-1 Applying Pythagoras' theorem in 2D problems to calculate the length of the hypotenuse and of a shorter side, in a range of units and including decimals or ...</p> <p>9-4-2 Applying trigonometric ratios in right-angled triangles to find missing sides and angles.</p>	<p>Formula, equation, term, variable, constant, expression, coefficient, simultaneous equation, substitution, linear, graph, relationship, point of intersection, hypotenuse, adjacent, opposite, tangent, ratio, inverse</p>
Year 9 Summer term:	<p>9-5-1 Performing reflections (given line or equation of line, including diagonal lines), rotations, translations (instructions given in words or as a vector) and enlarg...</p> <p>9-5-2 Justifying whether two shapes are congruent, similar or neither; and using similarity to find missing lengths of shapes.</p> <p>9-6-1 Finding the perimeters and areas of semi-circles, quarter circles and composite shapes made from circles and parts of circles.</p>	<p>Transformation reflection, rotation, translation, enlargement, similar, congruent, vector, centre, clockwise, anticlockwise, perimeter, area, radius, diameter, circumference, arc, sector, segment, chord, tangent, semi-circle</p>

Year 9 Half Term 1 Indices and Surds

Link to previous work on integers, calculations with decimals, expressions, fractions, equations and ratio.

Year 9 Half Term 2 Decimals and Fractions

Link to previous work on integers, calculations with decimals, expressions, fractions, 2D/3D shapes, percentages, equations and ratio. Involve questions with angles, probability and statistics.

Year 9 Half Term 3 Graphs and Simultaneous Equations

Include graphs and equations with negative numbers, decimals and fractions. Link back to skills on expressions, equations and sequences – make the link between these and graphs. Look at 2D shapes and angles made with graphs. Link between ratio and graphs.

Year 9 Half Term 4 Pythagoras and Trigonometry

Calculations with decimals and fractions. Use as more chance to practice calculations with indices and surds. Use links between ratio that has been studied in so far, and the trigonometric ratios. Involve questions with other 2D shapes and angle properties incorporated.

Year 9 Half Term 5 Transformations and Similarity

Link to work on ratio and proportions (including fractions, decimals, percentages), and link similarity with enlargements as it is being studied. Use 2D and 3D shape work and properties that has been done in year 7 and 8. Lines of reflection and symmetry link to equations of straight lines. Look at angle properties of shapes and similar shapes. Look at Pythagoras and Trigonometry within similar triangles.

Year 9 Half Term 6 Circles and Circle Theorems

The topic gives a good opportunity to tie together, review and incorporate lots of shape work from years 7, 8 and 9 such as 2D shapes area, perimeter and properties, angles, Pythagoras, similarity. Looking at circles specifically also allows for the extension of this into shapes made up from circles or parts of circles, which hasn't previously been done in years 7 and 8.

Term and topic:	Fundamental knowledge	Entitlement vocabulary
Year 10 Autumn term:	10-2-1 Calculating compound measures such as speed, rates of pay, density, pressure. 10-2-2 Drawing and interpreting graphs for real-life situations; including distance-time graphs, velocity-time graphs, conversion graphs, fuel bull graphs, fixed charge...	Speed, distance, time, average, density, mass, volume, pressure, force, velocity, acceleration, rate, gradient
Year 10 Spring term:	10-3-1 Plotting graphs of quadratic functions and other non-linear functions, and using these to estimate solutions to related equations. 10-3-2 Forming and solving quadratic equations by factorising quadratics of the form $x^2 + bx + c = 0$ and difference of two squares.	Function, linear, quadratic, solution, root, solve, form, plot, graph, factorise, estimate
Year 10 Summer term:	10-5-1 Completing simple vector arithmetic and writing expressions using vectors. 10-6-1 Using simple cases of the and/or rules and finding probabilities from a tree diagram.	Vector, scalar, transformation, probability, intersection, union, compliment, independent, mutually exclusive, Venn diagram, tree diagram

Year 10 Half Term 1 FDPR

A chance to bring together fraction, decimal, percentage, ratio and proportion problems and make links to all other topics that have been studied previously (e.g. types of numbers, calculations, expressions, 2D/3D shapes, angles, graphs, Pythagoras, trigonometry, transformations, similarity, circles).

Year 10 Half Term 2 Measures, Functions and Graphs

Link back to work on graphs and all other topics studied so far.

Year 10 Half Term 3 Quadratics

A chance to practice indices and surds further, as well as calculate and draw graphs with negative numbers, decimals, fractions, and link back to all other previous topics.

Year 10 Half Term 4 Advanced Trigonometry

A chance to practice Pythagoras and trigonometry further, as well as calculate with decimals and fractions, and link back to all other previous topics.

Year 10 Half Term 5 Vectors and Transformations

A chance to practice transformations further, linking in vectors to this, as well as calculate with decimals and fractions, and link back to all other previous topics.

Year 10 Half Term 6 Advanced Probability and Venn Diagrams

Incorporate quadratic probability questions. Use set notation with categories from all other topics.

Year 11 – See year 7-10 fundamentals – consolidation, revision, extension of these. Fluency, Reasoning, Problem-Solving.

Year 11 Half Term 1 Advanced Statistics

Link back to all other topics studied so far through contexts and questions.

Year 11 Half Term 2 Functions, Graphs and Inequalities

Link back to work on equations, graphs, quadratics and all other topics studied so far.

Term and topic:	Fundamental knowledge	Entitlement vocabulary	Term and topic:
Year 12 Autumn Term	00a. Statistics	Introduction to the Large Data Set Averages & standard deviation Median and quartiles from a table LDS 4 – computer room LDS 5 – investigation	
	01 Indices and Surds	Indices Indices 2 - focus on converting fractional / negative to index form Surds 1 Surds 2 - rationalising	
	02 Logarithms and Exponentials	Introduction to Exponentials (Geogebra) Intro to Logarithms Laws of Logarithms Solving Logarithmic Equations Introducing e Exponential Equations Exponential Equations (hidden quadratics) Linearising Functions – case 1 Linearising Functions – case 2 Linearising Functions – consolidation	
	03 Quadratics	Different Forms of Quadratic The discriminant Quadratics Problem Solving Quadratics Problem Solving	
	04 Inequalities	Inequalities Inequalities	
	00a. Statistics	Bivariate Data Bivariate Data Bivariate Data	
	05 Polynomials & Circles	Completing the square Equation of a Circle 1	

	04 Inequalities	Equation of a Circle 2 Polynomial Division by grid method Factor and Remainder Theorem	
	00a. Statistics	Simultaneous Equations	
	06 Probability	Sampling Interpreting Diagrams 1 (CF/Box Plots) Interpreting Diagrams 2 (Histograms 1) Interpreting Diagrams 2 (Histograms 2 + Skew) Missing Data/Errors/outliers	
	06 Probability (Binomial Expansion)	Probability 1 Probability 2 Probability 3 DRVs	
	07 Mechanics	Binomial Expansion Binomial Expansion Binomial Distribution Binomial Distribution	
	08 Lines	Language of Kinematics Graphs in kinematics SUVAT SUVAT Motion in the Vertical Plane Kinematics Problems	
	00b. Proof	Equations of Lines, Tangents, Normals Equations of Lines, Tangents, Normals Equations of Lines, Tangents, Normals Proofy stuff	
Year 12 Spring Term	09 Differentiation	Differentiation by drawing tangents Differentiation by Geogebra Differentiation from 1st principals Differentiation of ax^n Tangents and Normals Increasing & Decreasing Functions Turning Points Second Derivative / Classifying Turning Points Turning Points Problem Solving – Solomon C2 Qs? Turning Points Problem Solving (missing PE Students)	
	10 Integration	Integration as the opposite of Differentiation Formalising Integration Evaluating Definite Integrals Finding the Area under a curve Finding the Area under a curve – split regions Areas between functions Trapezium Rule for Integration Integration Topic Assessment	

	11 Variable Acceleration	Variable Acceleration by Differentiation Variable Acceleration by Integration Variable Acceleration Combined	
	12 Graph Transformations	Sketching Graphs (and gradient functions + integral functions) Sketching Graphs COMBO activity: Continue work from Monday 5... IT Lesson	
	06 Probability	Hypothesis Testing – the Coke Test (using Y9 as guinea pigs) Hypothesis Testing – the Doritos Experiment Hypothesis Testing	
	13 Trigonometry	Sine and Cosine Rule Solving simple trig equations – multiple solutions: $\cos(x)$, $\sin(x)$, $\tan(x)$ Slightly more involved equations $\cos(2x)$ $\sin(x)-0.2$, $\tan(x-45)$ Identities Solving more involved trig equations Transformations of trig graphs – set Vectors Pre-Learning	
	15. Vectors	Calculations, directions, lengths + good diagrams / visualisations Vector equation of a line (simple) Modelling with Vectors (Old M1 modelling)	
	14. Mechanics	$F = ma$ $F = ma$ in 2 dimensions Connected systems Pegs and pulleys Connected systems / Pegs and pulleys practise Mechanics Assessment	
	16. Modelling	Gradients of ekx Modelling with (exponentials) Multi-topic Questions Revision	
	C. Revision		
Year 12 Summer Term	Sequences	Sequences introduction – Inductive Sequences / Recurrence Relations Arithmetic sequences Arithmetic series Geometric Sequences Geometric Series Modelling series problems	
	Trigonometry	Introducing radians, arcs & sectors	

		Sequences and Series Assessment Introducing radians, arcs & sectors Small angle approximations Small angle approximations Reciprocal Trig 1 Reciprocal Trig 2 – more complex equations Reciprocal Trig 3 – Identities Reciprocal Trig 4 – Equations using identities Inverse Trig Functions Inverse Trig Functions – solving equations	
	Revision	Revision	
	Revision	Consolidation based on Mock Exams	

Term and topic:	Fundamental knowledge	Entitlement vocabulary
Year 13 Autumn Term	Partial Fractions	Simplifying Algebraic Fractions Adding & Subtracting Fractions Polynomial Division Partial Fractions 1 Partial Fractions 2 Partial Fractions 3
	Binomial Expansion	Binomial Expansion of
	Functions	Intro to Functions Inverse Functions Composite Functions Inverse Trig Functions Modulus Functions – solving equations Modulus Functions – solving inequalities
	Transformations of Graphs	Transformations of Graphs Review Lesson/Assessment (Revising Y12 Probability &...) Introducing Conditional Probability The Conditional Probability Formula Conditional Probability & Tree Diagrams Independent Events
	Normal Distribution	Normal Distribution
	Differentiation (Y13)	First principals – sin & cos 2nd derivatives – concave and convex curves and points of inflection Chain Rule Product Rule Quotient Rule Differentiating Exponentials Differentiating Trig Implicit Differentiation

	Trigonometry (Y13)	Compound Angles Compound Angles Solving trig equations with "2A" in them Compound Angles (half angle formulae) R JOB	
Year 13 Spring Term	Integration (Y13)	Integration revision Integration from first principles Integration by substitution I Integration by substitution II Integration of $1/x$ (using substitution) Integration of $1/x$ using $f'(x)/f(x)$ and intuition Integration by parts I Integration by parts II Mixed Integrations Exercise Trapezium Rule Revision (or learning) of Iteration Newton-Raphson Differential Equations I Differential Equations II Separation of Variables I Separation of Variables II	
	Parametric Equations	Converting Parametric to Cartesian 1 Integration test / Converting Parametric to Cartesian 2 (Trig) Sketching / Points of Intersection Parametric Differentiation Parametric Integration Modelling	
	Vectors (Y13)	3D Vectors	
	Projectiles	Projectiles Projectiles Projectiles Exam Questions Non-uniform acceleration in 2D Projectiles Assessment	
	Statistical Distributions (Y13)	Normal Approximation to the Binomial + Distribution of Sample Means Hypothesis Testing on the Normal Distribution Hypothesis Testing on Correlation Coefficients	
	Mechanics	Resolving Forces Moments Moments 2 Revision Exam Preparation	
	Revision		
Year 13 Summer Term	Revision	Revision Exam Preparation	