

MATHEMATICS KEY STAGE 3 CURRICULUM MAP

By the end of Key Stage 3, students should:

Know	Students to become fluent in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
Do	Students can reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. Students can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. Students should build on Key Stage 2 and connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge in Science, Geography, Computing and other subjects.
Appreciate	Students to appreciate that Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Curriculum coverage:

	Topic	Sub topic	Coverage
Year 7	Algebraic thinking	Sequences	Exploring sequences in detail using both diagrams and lists of numbers.
		Algebraic notation and substitution	Developing a deep understanding of the basic algebraic forms and substitute into function machines.
		Expressions and equations	Collecting like terms and forming and solving one-step linear equations that build upon the study of inverse operations.
	Place value	Place value, ordering integers and rounding	Explore integers up to one billion and decimals to hundredths. Round to varying degrees of accuracy and explore Standard Form.
		Four operations	Build upon the prior knowledge of the order of operations.
	Statistical analysis	Averages and range	Develop the understanding of a variety of averages and calculate the range of data.
	Application of number	Rounding and estimation	Building on the previous rounding knowledge from KS2 and extend into rounding to significant figures and applying the skill to estimation.
	Statistics analysis	Graphing data	Become familiar with multiple graphical representations of data and build the awareness of correlation.
	Fractional thinking	Fractions , decimals and percentages	Explore the concept of equivalence between fractions, decimals and percentages.
	Directed number	Operations with directed number	Extend and deepen the understanding of directed numbers.
	Application of number	Fractions and percentages of amounts	Calculate fractions and percentages of quantities and understand the link between the two.
	Geometry and measure	Perimeter and area	Build on their KS2 geometry skills to solve problems with perimeter and area.
	Reasoning with number	Speed, distance and time	Develop skills to be able to solve problems involving speed, distance and time.
	Developing number sense	Factors, multiples and primes	Extend their mental strategies with a focus on using known facts to find other facts.
	Fractional thinking	Addition and subtraction of fractions	Build the experience of equivalence of fractions with any denominators and introduce the addition and subtraction of fractions.
	Geometric reasoning	Angles and polygons	Extend the KS2 knowledge of angles through exploring angle rules for polygons.

Curriculum coverage continued:

	Topic	Sub topic	Coverage
Year 8	Proportional reasoning	Ratio	Develop the understanding of ratio and the various models that can be used to represent ratios, and compare them with fractions.
		Proportion and scale	Enhance the awareness of direct proportion, similar shapes, scale diagrams and its application to map reading.
	Algebraic manipulation	Algebraic expressions	Build on the knowledge of equivalence and explore simplifying, substitution, expanding over a single bracket and factorising.
	Co-ordinates and Graphs	Working in the Cartesian plane	Expand upon the knowledge of co-ordinates from Key Stage 2 by examining the algebraic rules for straight lines graphs.
	Application of numbers	Multiplying and dividing fractions	Deepen the understanding of multiply and dividing fractions by looking at multiple representations.
	Developing geometry	Symmetry and reflection	Enhance the understanding of symmetry and reflection, and explore shapes and lines in different orientations.
		Area, volume and density	Explore 2D/3D shapes, their area and volume, and apply the knowledge to density.
	Algebraic manipulation	Equations and inequalities	Extend the algebraic knowledge to solving a variety of forms of equations and inequalities.
		Indices	Manipulate expressions involving powers and learn the addition and subtraction laws of indices.
	Developing Number	Standard index form	Build on the knowledge of indices and explore standard form notation and its uses.
	Statistical analysis	Interpret and represent data	Enhance the prior knowledge of averages and apply them to frequency tables.
	Developing geometry	Angles in parallel lines & polygons	Build on the knowledge of angle notation and relationships in Year 7 by exploring angles in parallel lines and polygons.
	Probability	Probability and tables	Apply the knowledge of probability to sample space diagrams, two-way tables and frequency tree diagrams.
	Developing geometry	Working with circles	Develop knowledge of circles through calculating and problem solving with circumference and area.
	Reasoning with data	Graphs and charts	Deciding on the most appropriate representation from pictograms, vertical line charts, pie charts and line graphs.
Year 9	Algebraic manipulation	Sequences	Extend the knowledge of sequences with the use of the nth term and more complex algebraic rules.
	Reasoning with number	Properties of number	Develop knowledge of the number system to include, factors, multiples, primes, rational and real numbers.
		Using percentages	Extend Year 8 skills by exploring, percentage change, including reverse and repeated percentage, and compound interest.
	Geometric reasoning	Area and volume	Apply the prior knowledge to surface area and volume of cubes, cuboids, cylinders, cones, prisms, pyramids and spheres.
	Reasoning with algebra	Forming and solving equations	Extend the knowledge of forming and solving linear equations and inequalities, and explore its link to re-arranging formulae.
	Reasoning with number	Fractions	Apply the skills of adding, subtracting, multiplying and dividing fractions and finding fractions of amounts.
	Proportional reasoning	Rates	Explore the links between rates of change e.g. speed, distance and time, and flow.
	Reasoning with number	Standard Form	Apply the knowledge of to adding, subtracting, multiplying and dividing numbers in standard form.
		Maths & money	Apply number skills to financial mathematics within the areas of interest, taxation and wages.
	Reasoning with algebra	Straight line graphs	Explore gradients and intercepts and be able to fully use and understand the equation of a line, $y = mx + c$.
	Proportional reasoning	Proportion and ratio	Extend knowledge through exploring inverse proportion and solving ratio problems with the whole or part given.
	Geometric reasoning	Constructions & congruency	Build upon construction skills by exploring the idea of a locus and standard constructions using ruler and a pair of compasses.
		Similarity	Extend from the previous topic covering congruency and apply skills to similar shapes.
	Algebraic manipulation	Expanding and Factorising	Build upon previous knowledge and extend skills into quadratics (double brackets) and triple brackets.
	Geometric reasoning	Pythagoras' theorem	Through the investigation of the relationship between the sides of a right angled triangle, build the understanding of the theorem.
	Algebraic manipulation	Non-linear graphs	Enhance their knowledge of graphs through the interpretation and creation of non-linear curves and the representation of inequalities
	Probability	Sets and probability	Build the understanding of set notation and apply the knowledge to calculating probabilities from Venn diagrams.
	Geometric reasoning	Transformations	Explore a variety of transformations such as enlargement, rotation and translations and reflections, including ones that are combined.
	Reasoning with algebra	Simultaneous equations *	Develop the skills of solving simultaneous equations with a increasing amount of complexity. (* = optional)
	Geometric reasoning	Trigonometry *	Build the awareness of using the Sine, Cosine and Tangent Ratios and apply them in a 3D context. (* = optional)
Wider Key Stage 3 Curriculum			

Competitions - Termly Mathematics Challenge and the International Mathematics Day competition.

Homework expectations: work is set online weekly using Sparx Maths allow students time to consolidate on skills they have already covered in detail in lessons and so boosting the impact on their long term memory.

MATHEMATICS KEY STAGE 4 CURRICULUM MAP			
By the end of Key Stage 4, students should:			
Know	Students to become fluent in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.		
Do	Students can reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. Students can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. Students should build on Key Stage 3 to further develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge in other subjects and in financial contexts.		
Appreciate	Students to appreciate that Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.		
Curriculum coverage: Edexcel			
	Topic	Sub topic	Coverage
Year 10- Foundation Paper	Algebraic manipulation	Algebraic techniques	Recap on prior knowledge of substitution, simplifying, indices, expanding and factorising.
		Forming and solving equations	Extend the knowledge of forming and solving linear equations and inequalities, and explore its link to re-arranging formulae.
		Quadratic expressions and equations	Build the awareness of manipulating quadratics expressions and solving their equations including the use of a difference of two squares.
	Reasoning with number	Using percentages	Extend prior knowledge by exploring percentage change, including reverse and repeated percentage, and simple/compound interest.
	Proportional reasoning	Ratio and scale	Enhance previous ratio knowledge by solving ratio problems, combining sets of ratios and linking them to map scales.
	Reasoning with number	Fractions	Apply the skills of adding, subtracting, multiplying and dividing fractions and finding fractions of amounts.
		Non-calculator methods	Follow the rules of BIDMAS for the four operations and apply them to multi-step problems.
	Developing algebra	Straight line graphs	Deepen the knowledge of gradients and intercepts and be able to fully use and understand the equation of a line, $y = mx + c$.
	Probability	Probability and tables	Apply the knowledge of probability to sample space diagrams, two-way tables, frequency trees and tree diagrams.
	Reasoning with number	Rounding and Estimating	Extend prior knowledge by rounding to differing degrees of accuracy and identifying error intervals.
	Geometric reasoning	Perimeter, area, and volume	Explore 2D shapes and extend the skills into 3D shapes with volume and surface area of prisms and their representation as nets.
	Statistical analysis	Interpret and represent data	Enhance the prior knowledge of averages by applying them to frequency tables and explore scatter graphs.
	Reasoning with algebra	Non-linear graphs	Grow their knowledge of graphs by working with quadratic and cubic curves, and using them to find approximate solutions.
	Developing geometry	Angles in parallel lines and polygons	Build on the knowledge of angle relationships exploring angles in parallel lines and polygons, and using them to prove geometric facts.
	Statistical analysis	Graphs and diagrams	Deciding on the most appropriate representation from pictograms, vertical line charts, pie charts, and stem and leaf diagrams.
	Geometric reasoning	Vectors	Build on prior knowledge of vectors by working with vector notation and applying the four key operations to vector problems.
	Reasoning with number	Factors, powers and surds	Using prime factorisation identify the highest common factors (HCF) and lowest common multiples (LCM), and introduce surds.
	Geometric reasoning	Pythagoras’ theorem and trigonometry	Become familiar with Pythagoras’ Theorem and solve problems using the Sine, Cosine and Tangent Ratios and their exact values.
	Reasoning with algebra	Simultaneous equations	Develop the skills of solving simultaneous equations with a increasing amount of complexity.

Curriculum coverage continued:			
	Topic	Sub topic	Coverage
Year 11- Foundation Paper	Multiplicative reasoning	Ratio and proportion	Develop multiplicative reasoning in a variety of contexts from best buys, conversion graphs, exchange rates and simple scale factors through to complex equations involving direct and inverse proportion.
	Geometric reasoning	Area and volume	Apply the prior knowledge to surface area and volume of cubes, cuboids, cylinders, cones, prisms, pyramids and spheres.
		Similarity and congruence	Build upon previous understanding of similar shapes and extend it into congruent shapes and proving congruency. .
	Algebraic reasoning	Sequences and proof	Represent sequences as algebraic rules and use algebra to replace numbers when attempting proof, including the use of arguments and counter examples.
	Reasoning with numbers	Standard Form	Apply the knowledge of adding, subtracting, multiplying and dividing numbers in standard form.
	Geometric reasoning	Working with circles	Develop knowledge of circles through calculating and problem solving with circumference and area, and extend these skills into area of sectors and arc lengths.
	Probability	Set notation and Venn diagrams	Identify probabilities from Venn diagrams using set notation.
	Algebraic reasoning	Functions and graphs	Explore non-linear graphs such as quadratic, cubic and reciprocal graphs and finding the roots of and turning points of quadratic equations graphically.
		Equations and formulae	Extend the knowledge of forming and solving linear equations and inequalities, and explore solving simultaneous equations.
	Proportional reasoning	Rates of change	Explore the links between rates of change e.g. speed, distance and time, and calculate using compound measures e.g. density and pressure.
	Geometric reasoning	Angles, bearings and trigonometry	Enhance prior angle knowledge of bearings and solve problems using Pythagoras’ Theorem and by applying the Sine, Cosine and Tangent Ratios.
		Constructions and loci	Build upon construction skills of using ruler and a pair of compasses and apply them to solving problems with loci.
		Transformations	Explore a variety of transformations such as enlargement, rotation and translations and reflections, including ones that are combined.
Wider Key Stage 4 Curriculum			
Competitions- Termly Mathematics Challenge and the International Mathematics Day competition.			
Homework expectations - work is set online weekly using Sparx Maths allow students time to consolidate on skills they have already covered in detail in lessons and so boosting the impact on their long term memory.			

MATHEMATICS KEY STAGE 4 CURRICULUM MAP			
By the end of Key Stage 4, students should:			
Know	Students to become fluent in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.		
Do	Students can reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. Students can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. Students should build on Key Stage 3 to further develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge in other subjects and in financial contexts.		
Appreciate	Students to appreciate that Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.		
Curriculum coverage			
	Topic	Sub topic	Coverage
Year 10- Higher Paper	Algebraic manipulation	Algebraic techniques	Recap on prior knowledge of simplifying, indices, expanding and factorising.
		Equations and inequalities	Deepen the understanding of solving equations and inequalities, and the re-arranging formulae covered in KS3.
		Quadratic expressions and equations	Build the awareness of manipulating quadratics expressions and solving their equations including the use of a difference of two squares, completing the square and the quadratic formula.
	Reasoning with number	Percentages and interest	Further explore percentages with repeated percentage change, growth and decay, and the financial literacy used in the outside world.
	Proportional reasoning	Ratio and scale	Enhance previous ratio knowledge by solving ratio problems, combining sets of ratios and link them to map scales.
	Reasoning with number	Fractions	Apply the skills of adding, subtracting, multiplying and dividing fractions, including algebraic fractions.
		Non-calculator methods	Follow the rules of BIDMAS for the four operations and apply them to multi-step problems. Convert recurring decimals to fractions.
	Developing algebra	Straight line graphs	Deepen the knowledge of gradients and intercepts and be able to fully use and understand the equation of a line, $y = mx + c$, perpendicular lines and representing inequalities on a graph.
	Proportional reasoning	Probability	Apply existing probability knowledge further with the use of tree diagrams and explore the concept of conditional probability.
	Reasoning with number	Rounding and Estimating	Extend prior knowledge by rounding to differing degrees of accuracy, identifying error intervals and upper and lower bounds.
	Geometric reasoning	Perimeter, area, and volume	Explore 2D shapes and calculate arc length and area of a sector and work with 3D shapes with volume and surface area of prisms.
	Statistical analysis	Interpret and representing data	Enhance the prior knowledge of averages by applying them to frequency tables, sampling and explore scatter graphs and correlation.
	Reasoning with algebra	Non-linear graphs	Apply the knowledge of graphs to quadratic and cubic curves, and explore area under a curve and the equation of a circle.
	Geometric reasoning	Angles	Build on the knowledge of angle relationships exploring angles in parallel lines and polygons and using them to prove geometric facts.
	Statistical analysis	Graphs and diagrams	Confidently use pie charts, stem and leaf diagrams, histograms, cumulative frequency diagrams and box plots.
	Geometric reasoning	Vectors	Build on prior knowledge of vectors by working with vector notation and applying the four key operations to vector problems.
	Reasoning with number	Factors, powers and surds	Problem solve using prime factorisation and explore manipulation of surds and rationalising the denominator.
	Geometric reasoning	Pythagoras’ theorem and trigonometry	Solve problems using Pythagoras’ Theorem, the Trigonometric Ratios, their exact values and extend these skills to the Sine and Cosine Rules.
	Reasoning with algebra	Simultaneous equations	Develop the skills of solving simultaneous equations with a increasing amount of complexity including linear and non linear equations.

Curriculum coverage continued:

	Topic	Sub topic	Coverage
Year 11- Higher Paper	Multiplicative reasoning	Ratio and proportion	Develop multiplicative reasoning in a variety of contexts from best buys, conversion graphs, exchange rates and simple scale factors through to complex equations involving direct and inverse proportion.
	Geometric reasoning	Area and volume	Apply the prior knowledge to surface area and volume of cubes, cuboids, cylinders, cones, prisms, pyramids and spheres.
		Similarity and congruence	Build upon previous understanding of similar shapes and extend it into congruent shapes and proving congruency.
	Algebraic reasoning	Sequences and proof	Represent sequences as algebraic rules and use algebra to replace numbers when attempting proof, including the use of arguments and counter examples.
	Reasoning with numbers	Standard Form	Apply the knowledge of adding, subtracting, multiplying and dividing numbers in standard form.
	Geometric reasoning	Working with circles theorems	Develop knowledge of circles through calculating and problem solving with circumference and area, and extend into area of sectors and arc lengths.
	Probability	Set notation and Venn diagrams	Identify probabilities from Venn diagrams using set notation.
	Geometric reasoning	Vectors	Build on prior knowledge of vectors by solving problems, including the use of ratios and collinear points, and using vectors in proof.
	Algebraic reasoning	Functions and graphs	Explore non-linear graphs such as quadratic, cubic, reciprocal, exponential and trigonometric graphs and confidently complete a variety of transformations of the graphs of functions.
		Equations and formulae	Extend the knowledge of forming and solving linear and quadratic equations and inequalities, understand the iterative process and explore solving simultaneous equations.
	Proportional reasoning	Rates of change	Explore the links between rates of change e.g. speed, distance and time, and calculate using compound measures e.g. density and pressure.
	Geometric reasoning	Angles, bearings and trigonometry	Enhance prior angle knowledge of bearings and solve problems using Pythagoras’ Theorem or by applying the Sine, Cosine and Tangent Ratios, the Sine Rule or the Cosine Rule.
		Constructions and loci	Build upon construction skills of using ruler and a pair of compasses and apply them to solving problems with loci.
		Transformations	Explore a variety of transformations such as enlargement, rotation and translations and reflections, including ones that are combined and explore invariant points.
Wider Key Stage 4 Curriculum			
Competitions- Termly Mathematics Challenge and the International Mathematics Day competition.			
Homework expectations - work is set online weekly using Sparx Maths allow students time to consolidate on skills they have already covered in detail in lessons and so boosting the impact on their long term memory.			

MATHEMATICS KEY STAGE 5 CURRICULUM MAP

By the end of Key Stage 5, students should:

Know	A Level Mathematics builds from GCSE Mathematics and introduces calculus and its applications. It emphasises how mathematical ideas are interconnected and how Mathematics can be applied to model situations mathematically using algebra and other representations, to help make sense of data, to understand the physical world and to solve problems in a variety of contexts, including social sciences and business.
Do	• use their mathematical knowledge to make logical and reasoned decisions in solving problems both within Pure Mathematics and in a variety of contexts, and communicate the mathematical rationale for these decisions clearly • reason logically and recognise incorrect reasoning, generalise mathematically and construct mathematical proofs • make deductions and inferences and draw conclusions by using mathematical reasoning
Appreciate	A Level Mathematics provides a framework within which a large number of young people continue the subject beyond GCSE level. It supports their mathematical needs across a broad range of other subjects at this level and provides a basis for subsequent quantitative work in a very wide range of higher education courses and in employment.

Curriculum coverage - Edexcel A Level Mathematics specification

	Topic	Sub topic	Coverage	Topic	Sub topic	Coverage
Year 12	Pure	Algebraic expressions	Expanding and factorising up to three brackets, using understanding of surds and indices.	Mechanics	Modelling in mechanics	Understand standard conventions used in mechanics (e.g. SI units, scalar & vector quantities, modelling conventions, etc.)
		Quadratics	Work with quadratic functions and their graphs.		Constant acceleration	Use and interpret displacement-time/velocity-time graphs. Derive and use constant acceleration formulae (suvat equations).
		Equations and inequalities	Solve simultaneous equations and inequalities graphically, through elimination or substitution.		Forces and motion	Draw force diagrams, and apply Newton’s Laws of motion. Solve problems involving connected particles.
		Graphs and transformations	Sketch and translate up to quartic graphs, and understand unfamiliar graphs (reciprocal, exponential, quintic, etc.).		Variable acceleration	Solve problems with variable acceleration, using understanding of differentiation and integration.
		Circles	Understand the equation of a circle, and solve for intersecting lines.			
		Algebraic methods	Rearrange algebraic fractions, use algebraic long division for polynomials. Construct proofs with algebra.	Statistics	Data collection	Understand terminology of data. Understand different types of sampling and types of data. Analyse the large data set.
		Binomial expansion	Understand and use the binomial expansion of (a + bx)n for positive integer n.		Measures of location and spread	Calculate measures of central tendency, location, spread, variance and standard deviation. Understand and use coding.
		Trigonometric ratios	Apply sine & cosine rules, solve problems involving triangles and sketch transformations of each trigonometric graph.		Representations of data	Identify outliers. Draw and interpret box plots, cumulative frequency diagrams and histograms. Compare two data sets.
		Trigonometric identities and equations	Understand how to manipulate expressions using trigonometric identities and solve within given regions.		Correlation	Draw and interpret scatter graphs and coefficients of regression. Understand that correlation does not imply causation. Understand when to use regression to make predictions.
		Vectors	Apply understanding of vectors in two dimensions to solve geometric problems, and problems in given contexts.		Probability	Understand and use mutually exclusive and independent events, tree diagrams and Venn diagrams.
		Differentiation	Understand differentiation from first principles, and use to find rates of change of any polynomial. Apply understanding to real-life models.		Statistical distributions	Understand and use simple, discrete probability distributions including the binomial distribution, as a model. Know the limitations of binomial distributions. Calculate probabilities from binomial distributions
		Integration	Understand that this is the inverse of differentiation. Evaluate indefinite and definite integrals involving any polynomial and apply to contextual problems.		Hypothesis testing	Understand and apply the language of statistical hypothesis testing (1 and 2 tailed), developed through a binomial model. Find critical regions and values.
		Exponentials and logarithms	Sketch and transform exponential graphs. Understand and apply [natural] logarithms using logarithmic laws.			

Curriculum coverage continued- Edexcel A Level Mathematics specification

	Topic	Sub topic	Coverage	Topic	Sub topic	Coverage
Year 13	Pure	Algebraic methods	Proof by contradiction. Write a single fraction as partial fractions.	Mechanics	Moments	Calculate the turning effects of forces on rigid bodies (and solve problems involving rods in [limiting] equilibrium).
		Functions and graphs	Understand and use the modulus function, mappings, domain, range, composite functions and apply transformations.		Forces and friction	Resolve forces involving smooth and rough surfaces. Understand and use the coefficient of friction to solve problems.
		Sequences and series	Understand arithmetic and geometric sequences, find the sum of n terms and the sum to infinity.		Projectiles	Model motion under gravity for objects projected either horizontally or at an angle. Resolve components of velocity and derive formulae for the paths of projectiles.
		Binomial expansion	Expand (a + bx) ⁿ where n is negative or a fraction.		Applications of forces	Finding unknown forces for systems in equilibrium. Resolve forces involving rough/smooth surfaces and connected particles.
		Radians	Know exact values, calculate arc length and sector area. Solve equations and use small angle approximations.		Further kinematics	Work with vectors for displacement/velocity/acceleration. Apply understanding of differentiation and integration to solve complex problems with variable acceleration.
		Trigonometric functions	Using secant, cosecant and cotangent , prove identities and solve equations.			
		Trigonometric identities	Know and use the addition formulae, double-angle formulae. Express a sinx ± b cosx in the form Rsin(x ± α) and a cosx ± b sinx in the form Rcos(x ± α)			
		Parametric equations	Convert parametric equations into cartesian form. Solve problems and use to model problems.	Statistics	Regression, correlation and hypothesis testing	Understand exponential models of bivariate data. Use change of variables to estimate coefficients. Understand and use PMCC. Carry out hypothesis testing for correlations.
		Differentiation	Differentiate trigonometric, exponentials, logarithmic functions and parametric equations. Use second derivative.		Conditional probability	Understand and use, probability formulae, set notation and conditional probability. Solve conditional probability problems using Venn diagrams, two-way tables and tree diagrams.
		Numerical methods	Locate roots, use iteration, and use the Newton-Raphson method. Solve problems in context.		The Normal Distribution	Understand and use the normal distribution curve. Find percentage points and critical values of the standard normal curve. Find unknown means and standard deviations of normal distributions. Carry out hypothesis testing for mean of a normal distribution.
		Integration	Reverse chain rule, use substitution, by parts and using partial fractions. Use the trapezium rule.			
		Vectors	Use vectors in 3-dimensios to solve geometric problems.			

Wider Key Stage 5 Curriculum

Homework expectations – students are issued with independent learning tasks linked with their lessons and completion is required as a foundation for their next lesson. They may also be given prior learning tasks, e.g. watching videos or completing some research, that are needed before commencing their next lesson.

Trips – University of Lincoln Maths Inspiration Day