

Subject Curriculum Map

Intent – The maths curriculum is designed to ensure that all students make rapid progress and strive for mastery learning by developing fluency in skills and enjoyment in the application of these to unfamiliar problems. We foster this by breaking skills and problems down into small steps and ensure that students master each skill before moving on to the next through the process of deliberate practice. We then move on to developing mathematical reasoning and a deeper understanding through a variety of problem-solving techniques. Our pedagogy is driven by research and underpinned by the unwavering belief that every child can succeed in mathematics.

Implementation						
Term	1	2	3	4	5	6
Year 7	<p>Understanding of number underpins all the processes in mathematics, and we therefore begin year 7 by ensuring that all students have fluency in number work. We build on students understanding from primary school as well as introducing algebra, where students will begin to be able to generalise mathematical understanding. For some pupils this will be the first time they have been exposed to algebra. Algebraic fluency underpins a lot of the curriculum in KS4 and KS5, so it is vital that pupils become comfortable working in this format as early as possible.</p> <p>They will study the following units: 7.01 – Numerical skills – negative numbers and rounding 7.02 – Order of operations 7.03 – Introduction to algebra</p>	<p>In this term students again build and deepen their knowledge of number and shape from primary school. They also continue to develop their understanding of algebra by learning to expand and factorise expressions, this is a skill they will continue to develop all the way to the end of year 13.</p> <p>They will study the following units: 7.04 – Primes, factors and multiples 7.05 – Expanding and factorising 1 7.06 – Addition and subtraction 7.07 – Perimeter</p>	<p>The term starts by beginning to explore the idea of averages which they will continue to develop up until year 13. The focus shifts to ensure all students have a deep understanding of multiplication and division. This builds on KS2 with the use of negative numbers and decimals. The term finishes with the students practising the application of the skills in the context of area.</p> <p>They will study the following units: 7.08 – Mean 7.09 – Multiplication and division 7.10 – Area of triangles and quadrilaterals</p>	<p>The focus of this term is developing a deep understanding of fractions. Fractions underpin many complex mathematical topics, including ratios, rates, proportionality and gradient. Fluency with fractions also has several real-world applications which students will consider over the course of the term.</p> <p>They will study the following units: 7.11 – Fraction Manipulation 7.12 – Adding and subtracting fractions 7.13 - comparing and ordering fractions 7.14 – fractions of amounts</p>	<p>The focus of this term is recapping the geometric reasoning that students have developed in KS2 as well as introducing some new concepts such as rotation symmetry and equations of lines. Students will have the opportunity to apply the number and algebraic fluency they have studied to geometry. They will use deductive and spatial reasoning to build on their understanding of coordinates and begin to develop algebraic relationships between coordinates.</p> <p>They will study the following units: 7.15 – Polygons 7.16 – Angles facts 7.17 – Co-ordinates</p>	<p>This term students will focus on the concept of time. They will practice reading and writing the time as well as converting between seconds, minutes and hours. They will also get a chance to practice reading timetables and schedules to teach and prepare them with time management skills.</p> <p>They will study the following units: 7.18 - Time</p>
Year 8	<p>The focus of this term is building on the fluency and understanding of number that students began to develop in year 7. Students will revisit and extend the concepts of fractions and rounding. They will develop their understanding of number through the process of prime factorisation.</p> <p>They will study the following units: 8.01 – Powers and roots 8.02 – Prime factorisation 8.03 – Rounding and estimation 8.04 – Fractions</p>	<p>This term focuses on developing students’ understanding of algebraic manipulation and start to solve multiple step equations. Students will begin to model situations mathematically and express the result using a range of formal representations. Students will also develop their understanding of angles, including angles in parallel lines.</p> <p>They will study the following units: 8.05 – Solving equations 1 8.06 – Angles in parallel lines</p>	<p>This term students will develop their understanding of perimeter by investigating the circumference of circles and properties of circles. Students will begin to use proportional reasoning as they learn about recipes and currency conversions. They will also begin to link fractions, percentages and decimals and investigating how these concepts can be applied to real world situations.</p> <p>They will study the following units: 8.07 – Circumference 8.08 – Direct proportion 8.09 – Fractions, decimals and percentages 8.10 – Percentage calculations</p>	<p>This term builds on the previous terms work on proportional reasoning and applying this to ratios. Students will continue to build understanding of area and circles. This deepens the students’ understanding of shape by considering the area of composite shapes.</p> <p>They will study the following units: 8.11 – Ratio 1 8.12 – Area of circles</p>	<p>The focus of this term is introducing students to the concept of data collection and analysis to develop their evidence-based reasoning skills. Students will be encouraged to consider data critically and organise data in a clear and coherent way. Students will also look at what different ways data can be presented. They also investigate the benefits and limitations of the different averages.</p> <p>They will study the following units: 8.13 – Statistics 1 (presenting and interpreting data) 8.14 – Averages and spread</p>	<p>This term focuses on further developing students’ understanding of geometry, and the start of investigating three dimensional shapes. Students will link their knowledge of perimeter, area and polygons to 3 dimensional shapes.</p> <p>They will study the following units: 8.15 – 3D visualisation 8.16 – Volume 1</p>

Term	1	2	3	4	5	6
Year 9	<p>This term focuses on reinforcing and deepening the students' understanding of number, with a particular focus on procedural fluency and conceptual understanding. Students will explore recurring decimals, fractional and negative indices, error intervals and fraction calculations.</p> <p>They will study the following units: 9.01 – Decimal manipulation 9.02 – Estimation and limits of accuracy 9.03 – Related calculations 9.04 – HCF and LCM of large numbers 9.05 – Fraction calculations</p>	<p>This term focuses on linking students' understanding of number developed in term one to algebra. There is a particular focus on notation and manipulating algebraic expressions, including index laws and considering quadratic expressions. Students will also build on their number work by learning about how to work with numbers in standard form which is a key skills students will need later in the year in science.</p> <p>They will study the following units: 9.06 – Algebraic manipulation 9.07 – Index laws 9.08 – Standard form 9.09 – Expanding and factorising 2</p>	<p>This term begins by continuing to consolidate students' understanding of algebraic expressions. Students will then build on their proportional reasoning skills from year 8 by looking at real-life problems. Students then begin to learn about probability, with a particular emphasis on exploring the application of probability and the relationships between the probability of different events and ways of representing outcomes.</p> <p>They will study the following units: 9.10 – Forming expressions and substitution 9.11 – Direct and inverse proportion 9.12 – Probability 1</p>	<p>This term further deepens the students' understanding of algebra by practicing solving equations and extending this to solve linear inequalities. They will also look at pictorial and numerical sequences. The students will then move on to geometry, considering the application of Pythagoras's theorem.</p> <p>They will study the following units: 9.13 – Solving equations 2 9.14 – Inequalities 1 9.15 – Sequences 9.16 – Pythagoras's theorem</p>	<p>This term continues with a focus on geometry, and in particular linking geometrical reasoning with an understanding of algebra. Students will explore angle relationships in polygons. Students will then be introduced to the topic of vectors which builds throughout KS4 and KS5. They will use their new knowledge on vectors and spatial reasoning to describe and perform geometric transformations.</p> <p>They will study the following units: 9.17 – Interior and exterior angles 9.18 – Vectors 1 9.19 – Transformations 1</p>	<p>This term continues to focus on students' geometric skills and understanding of 3D shapes, area and circles. This sets them up well for the beginning of their GCSE journey in year 10.</p> <p>They will study the following units: 9.20 – Plans and elevations 9.21 – Arcs and sectors 9.22 – Surface area</p>
Year 10	<p>This term focuses on exploring algebraic relationships, in particular rearranging formulae and developing an understanding of linear graphs, and the relationships between them. The students will also consider solving equations with more than one unknown. Students will also continue their geometric reasoning with 3D shapes by looking at volume of composite solids.</p> <p>They will study the following units: F1/H1 – Rearrange formulae F2/H2 – Linear graphs F3/H3 – Linear simultaneous equations F4/H4 – Volume 2</p>	<p>This term students will continue to develop their proportional reasoning skills, looking at compound measures. The term will then move back to algebraic reasoning. Students will deepen understanding of algebra, considering quadratic equations and graphs. Higher students will look at more complex expanding and factorising as well as more complication graphs.</p> <p>They will study the following units: F5/H5 – Compound measures F6/H6 – Quadratic graphs, turning points and roots F7/H7 – Quadratics – algebraic (expanding, factorising, completing the square and quadratic formula) F8/H8 – Further graphs</p>	<p>This term focuses on probability, with a particular emphasis on exploring the application of probability and the relationships between the probability of different events. This term will then shift focus on students' understanding of statistics, and in particular the use of averages to interpret data.</p> <p>They will study the following units: F9/H9 – Probability 2 F10/H10 – Statistics 2 H11 – Cumulative frequency and box plots</p>	<p>Foundation This term foundation students further develop their proportional reasoning, considering further ratio. Students will also revisit percentages, looking at simple interest and growth and decay, with an application to different real-life scenarios.</p> <p>They will study the following units: F11 – Ratio 2 F12 – Growth and decay</p> <p>Higher This term higher students will start by revisiting percentages and furthering their knowledge by looking at simple interest and growth and decay, with an application to different real-life scenarios. They will further develop their proportional thinking by exploring ratios in more detail with a particular focus on how algebra can link to ratio. Students will then bring together their knowledge on shape and proportion by looking at similar shapes.</p> <p>H12 – Growth and decay H13 – Ratio 2 H14 – Ratio 3 H15 – Similar shapes</p>	<p>Foundation This term focuses on building students' understanding of geometry and, in particular, right-angled triangles. Students will learn to apply Pythagoras's theorem to a range of real-life scenarios. They will also use then angle reasoning and proportional reasoning to study scale diagrams.</p> <p>They will study the following units: F13 – Pythagoras review F14 – Bearings and scale drawings</p> <p>Higher This term deepens students' understanding of proportion, algebra, number, and geometry. Students start by using algebra to solve hard proportionality questions. Student will use their knowledge of numerical manipulation to start to explore surds. Students will build on their understanding of right-angle triangles from year 9 to include how to solve problems using right angled trigonometry.</p> <p>H16 – Algebraic proportion H17 – Surds H18 – Right angled trigonometry</p>	<p>Foundation Foundation students will follow a personalised revision programme they ensure they are ready for their EOY exams and starting year 11.</p> <p>Higher This term builds on number and geometric reasoning that students have gained in year 9. They will develop the concept of rounding and error intervals by looking at bounds and how this applies to real life. They will also use then angle reasoning, knowledge of trigonometry and proportional reasoning to study bearing and scale diagrams. They will also deepen their understanding of transformations and similar shapes by looking at tricky enlargements.</p> <p>They will study the following units: H19 – Bounds H20 – Bearings and scale drawings H21 – Transformations 2</p>

Term	1	2	3	4	5	6
Year 11	<p>Foundation Students begin year 11 reviewing all the algebra skills they have been building over KS3 and year 10. Students will then be encountering right angled trigonometry for the first time where they will tie in their knowledge of right-angled triangles from year 9. Students will then bring together their knowledge on shape and proportion by looking at similar shapes.</p> <p>They will study the following units: F15 – Algebra review F16 – Right angled trigonometry F17 – Similar shapes</p> <p>Higher This term begins with students learning how to convert recurring decimals into fractions, which builds on students understanding of number and solving equations. They continue to link number and equations by looking at quadratic sequences. Students will also develop their understanding of quadratics and algebraic substitution by solving quadratic simultaneous equations.</p> <p>They will study the following units: H22 – Recurring decimals H23 – Quadratic sequences H24 – Quadratic simultaneous equations</p>	<p>Foundation Students finish off the GCSE content by studying the last geometry topics: congruence, constructions and loci. F18 – Congruence F19 – Constructions and loci</p> <p>Higher This term continues to deepen students' understanding of angles and shape by studying trigonometry for non-right-angled triangles. The focus then shifts back to algebra. Students build on work in year 9 and year 10 by looking at graphical inequalities as well as quadratic inequalities. They will then be introduced to function notation which combines multiple algebraic skills and prepares them to study this further in A-level Maths.</p> <p>They will study the following units: H25 – Further trigonometry H26 – Inequalities 2 H27 - Functions</p>	<p>Foundation From term three students will be following personalised schemes of learning based on gaps identified in mock 1. This will be exams based preparing them to be successful in mock 2 next half term.</p> <p>Higher This term continues with a focus on algebra, with students learning about recurrence relations and algebraic proof, both of which are topics that are expanded on more throughout year 12 and 13. Students then complete there learning on angles by learning about circle theorems and how to apply them. Students will also look at the final statistical diagram which is histograms.</p> <p>They will study the following units: H28 – Iteration H29 – Algebraic proof H30 – Circle theorems H31 - Histograms</p>	<p>Foundation Students will continue to follow personalised schemes of learning which have been updated based on gaps identified in mock 2. This will be exams based preparing them to be successful in their summer exams.</p> <p>Higher This term continues with a focus on geometry, with students considering geometric proof, through congruence and vectors. They will recap distance time graphs and speed time graphs with a particular focus on estimating gradients of curves and the area underneath a curve. In A-level they learn how to do this algebraically. They will also look at graphical transformations and constructions and loci.</p> <p>They will study the following units: H32 – Vectors 2 H33 – Gradients and area under a graph H34 – Graphical transformations H35 – Congruence H36 – Constructions and loci</p>	<p>The final term of year 11 will focus on preparation for the upcoming GCSE exam, with particular emphasis on problem solving and application</p>	<p>Revision & Examinations</p>

Term	1	2	3	4	5	6
Year 12 A-level Maths	<p>Throughout A-level, we will develop and equip all students with great mathematical skills and understanding in order to tackle examination style questions and as well as using and applying these into real world problems. The course is split into 3 sections: pure mathematics, statistics and mechanics.</p> <p>Pure The focus of this term is bridging the gap between GCSE Mathematics and A level Mathematics. We ensure that all students will show fluent algebraic skills and understandings before moving onto challenging topics. Students will learn the following topics:</p> <ul style="list-style-type: none"> Algebraic expressions Quadratic equations and inequalities Transformations of graphs. Straight line graphs Algebraic methods 	<p>Pure This term is the start of more challenging but enjoyable topics. Students will be able to apply their algebraic skills they have acquired from GCSE Mathematics and in term one. This term students also develop knowledge of trigonometry from GCSE. It is a very important topic in A level Pure & Applied Mathematics as it underlies the foundation of differentiation, integration and mechanics. The topics are:</p> <ul style="list-style-type: none"> Binomial expansion Circles Trigonometric ratios Trigonometric identities Trigonometric equations Radians 	<p>Pure In pure students will build on their knowledge of vectors from GSCE. They will also build on all the algebraic work they have done so far by learning about differentiation which is their first insight into what calculus is. Students will learn the topics:</p> <ul style="list-style-type: none"> Vectors Differentiation <p>Statistics This term introduces statistics, where students begin to develop interpretation and analysis skills. Students will learn the topics:</p> <ul style="list-style-type: none"> Probability Conditional probability Data collection Measures of location and spread Representation of data Correlation Regression 	<p>Pure This term students will continue their journey through calculus by learning about integration. Differentiation and integration are so of the main topics within pure and applied mathematics both at A-level and degree level so we ensure that all students will show depth and great understandings of these topics.</p> <ul style="list-style-type: none"> Integration <p>Mechanics Students will also start learning about how they can apply their algebraic reasoning to real-life scenarios within mechanics, starting by looking at systems with constant acceleration.</p> <ul style="list-style-type: none"> Modelling in mechanics Constant acceleration <p>Statistics Students will start to delve into statistical distributions by looking at:</p> <ul style="list-style-type: none"> Binomial distribution 	<p>Pure In this term, students will start to develop their knowledge of growth and decay from GCSE by studying exponentials & logarithms. They will also build on their knowledge of sequences from GCSE by studying series.</p> <ul style="list-style-type: none"> Exponential and logarithms Arithmetic sequences and series Geometric sequences and series <p>Mechanics Students will continue their journey in mechanics by thinking about forces and how this affects motion of objects. They will also learn how they can apply differentiation and integration to describe motion of moving particles.</p> <ul style="list-style-type: none"> Forces & motion Further kinematics 	<p>The first four weeks in this term, all students will be preparing for their end of year assessment. After the end of year assessment, all students will be given valuable feedback on how to improve their results.</p>
Year 13 A-level Maths	<p>Pure The pure content for this term builds on GCSE and year 12 knowledge of functions, graphs and trigonometry. These topics underpin later, more complex year 13 mathematics that will be essential for unpicking and interpreting exam style questions</p> <ul style="list-style-type: none"> Functions & graphs Trigonometric functions Trigonometric modelling. <p>Mechanics Students will deepen their understanding of forces by considering systems which are</p>	<p>Pure Developing on ideas from year 12, in term 2 we explore more complex methods of differentiation, including the chain, product and quotient rules. In addition to the further differentiation, students look at a new way to describe interesting and sometimes unusual graphs and curves, through parametric equations.</p> <ul style="list-style-type: none"> Parametric equations Differentiation Numerical methods <p>Mechanics</p>	<p>Pure Developing on ideas from year 12, in term 3 we explore more complex methods of integration: reverse chain rule, by parts, and by substitution. Students also apply their knowledge of trigonometrical identities and partial fractions to solve difficult integration questions. They also see how integration can be applied to find area under a curve and how to apply the trapezium rule. Students will also learn how to use integration to solve differential equations which is an extremely useful topic for any students going on to study maths, physic or engineering at university.</p>	<p>Statistics This term consolidates much of the statistic portion of A level maths and therefore focuses heavily on exam style questioning, leading into their final term of sixth form. Students explore probability distributions in greater depth. Grounded in year 12 content on the binomial distribution, students extend these ideas to the normal distribution. Students compare the differences between the two types of distributions, learn methods of hypothesis testing, and how we can use the normal distribution to estimate certain binomial scenarios.</p> <ul style="list-style-type: none"> Statistical distribution 	<p>Term five will be the most important learning time for all our students. This is the term where we ensure that all our students are fully prepared to the best of their ability for the upcoming exams. We will plan and deliver lessons based on their weaknesses that we have identified from their previous assessment. Lastly, we will ensure that all our lessons are planned around examination style questions.</p>	<p>Revision & Examinations</p>

	<p>turning, by considering moments or systems on slopes or systems which account for friction.</p> <p>This term, students will study the following topics:</p> <ul style="list-style-type: none"> • Moments • Forces & friction 	<p>Students will begin by considering systems where particles are moving through the air and how to model this movement. They will then bring together all their knowledge about forces and apply this to more complex problems.</p> <ul style="list-style-type: none"> • Projectiles. • Application of forces 	<p>This term, students will study the following topics:</p> <ul style="list-style-type: none"> • Integration. <p>Mechanics</p> <p>This term students will be applying pure techniques such as vectors, differentiation and integration to applied situations. They will begin modelling how particles move through time and space.</p> <ul style="list-style-type: none"> • Further kinematics. 	<ul style="list-style-type: none"> • Binomial distribution • Hypothesis testing • Normal distribution 		
Term	1	2	3	4	5	6
Year 12 A-level Further Maths	<p>Further maths A-level is an extension of A-level maths, which is available for out most able students. It consists of 4 separate units, core pure 1, core pure 2 and two optional modules: decision and further mechanics.</p> <p>Core pure 1 Students begin to explore the idea of complex numbers, how you can use these to express solutions to equations as well as how you can geometrically describe them.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Complex numbers • Argand diagrams • Roots of polynomials <p>Decision 1 Students enter the wonderful world of decision maths. Where they learn to think like a computer and learn how to find the shortest path to just about anywhere!</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Algorithms • Graphs and networks • Algorithms on graphs • Route inspection • Travelling salesman problem 	<p>Core pure 1 Students will build massively on their GCSE knowledge of vectors moving from 2D, to 3D, to geometric problems and then delving into further maths content. Vector equations of a line, scalar products. Angles between vectors and planes and much more.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Vectors (year 12 and 13 normal maths) • Vectors (further maths) <p>Decision 1 This term in decision maths students focus on optimal solutions, learning how to maximise profit and minimise cost using a variety of algorithms and methods</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Critical path analysis • Linear programming • Simplex algorithm 	<p>Core Pure 1 This term introduces matrices and their incredible utility. Students will tackle inverse matrices, systems of equations and how to represent GCSE transformations (enlargement, rotation etc) as a matrix.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Matrices • Linear Transformations <p>Further Mechanics 1 Having finished learning decision maths students begin to study further mechanics. This begins with a thorough look at some of the most fundamental laws of the universe – conservation of energy and conservation of momentum.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Momentum & Impulse • Work, Energy & Power • Elastic Strings & Springs 	<p>Core Pure 1 This term sees students explore the sigma notation and how to represent series more formally. This leads into proof by induction – a method with great applicability across a range of mathematical problems</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Series • Proof by Induction <p>Further Mechanics 1 This term deals with collisions of all kinds as students model a wide range of physical situations using their acquired mechanics knowledge.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Elastic Collisions in 1D • Elastic Collisions in 2D 	<p>Pure In this term, the further maths content is put on pause as students learn vital prerequisites for further calculus and trigonometry.</p> <p>Students will learn the topics (all from A-level maths)</p> <ul style="list-style-type: none"> • Trigonometric functions • Trigonometric modelling • Parametric equations • Differentiation • Integration 	<p>The first four weeks in this term, all students will be preparing for their end of year assessment. After the end of year assessment, all students will be given valuable feedback on how to improve their results.</p>

<p>Year 13</p> <p>A-level Further Maths</p>	<p>Core Pure 2 Students begin the second of the pure maths modules, starting with a more in-depth look at complex numbers and complex equations.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Complex Numbers • Series <p>Further Mechanics 2</p> <p>Students will deepen their understanding of mechanics as they begin to study their second mechanics module.</p> <p>This term, students will study the following topics:</p> <ul style="list-style-type: none"> • Circular Motion • Centres of Mass 	<p>Core Pure 2 Developing on ideas from the previous year, students tackle harder calculus topics</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Methods in Calculus • Volumes of Revolution <p>Further Mechanics 2</p> <p>Students continue their exploration of centres of mass and then begin kinematics – the study of motion!</p> <p>This term, students will study the following topics:</p> <ul style="list-style-type: none"> • Further Centres of Mass • Kinematics 	<p>Core Pure 2 Continuing to develop on ideas from the previous year, students tackle the more advanced topics of hyperbolic functions and apply all their calculus skills to solve differential equations.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Hyperbolic Functions • Methods in Differential Equations <p>Further Mechanics 2</p> <p>This term sees students finish the further mechanics 2 module, with the final topic being dynamics – the study of forces and how they produce motion.</p> <p>Students will learn the following topics:</p> <ul style="list-style-type: none"> • Dynamics 	<p>Further maths students learn a vast amount of mathematical content, but the timing is such that students will finish learning new content before Easter. This allows students valuable time to revisit and recap some of the most crucial topics with their teachers and consolidate learning before term five begins.</p>	<p>Term five will be the most important learning time for all our students. This is the term where we ensure that all our students are fully prepared to the best of their ability for the upcoming exams. We will plan and deliver lessons based on their weaknesses that we have identified from their previous assessment. Lastly, we will ensure that all our lessons are planned around examination style questions.</p>	<p>Revision & Examinations</p>
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Impact:

Teachers collect formative feedback in every lesson via use of cold call, mini whiteboards and classroom circulation, this allows teachers to adapt lessons and give students live feedback. Students self-assess all work completed in lessons and where mistakes are made, they can correct this before leaving the lesson. Additionally, students will complete a cumulative assessment in January and June of each year. This will assess not only what the students have learned over the previous term, but also their understanding of all material taught in previous years. Following these assessments, each classroom teacher will complete an analysis of their class's assessment data. All information teachers collect will feed into daily retrieval and future assessments, with a focus on addressing any gaps in knowledge or understanding highlighted by the assessment. Students will also complete personalised online Sparx homework based on both current learning and previous learning. KS5 will complete weekly Up Learn tasks to compliment the learning within lessons. KS4 and KS5 students will also complete written homework which will have a focus on exam questions.