Maths 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 in to 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	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. They will study the following KPIs: 7.01 – place value and number sense 7.02 – addition and subtraction 7.03 – perimeter 7.04 – rounding and estimation	The focus of this term is multiplication and division, ensuring all students have a deep understanding of the links between operations and how and when these should be applied. It finishes with the students practising the application of the skills in the context of area. They will study the following KPIs: 7.05 – multiplication and division 7.06 – factors and multiples 7.07 – area of rectangles, triangles and parallelograms	The focus of this term is developing a deep understanding of fractions. Fractions underpin many complex mathematical topics, including ratios, rates, proportionality and slope. Fluency with fractions also has a number of real-world applications which students will consider over the course of the term. They will study the following KPIs: 7.08 – fractions as part of a whole 7.09 – adding and subtracting fractions 7.10 – comparing fractions 7.11 – fractions as an operation	The focus of this term is introducing the concept of algebra and 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 years 9, 10 and 11 so it is vital that pupils become comfortable working in this format as early as possible. They will study the following KPIs: 7.12 – order of operations 7.13 – basic rules of algebra 7.14 – expanding and factorising 7.15 – substitution	The focus of this term is developing the students' geometric reasoning. Students will have the opportunity to apply the number and algebraic fluency they have studied to geometry. They will use deductive and spatial reasoning and problem-solving skills. They will study the following KPIs: 7.16 – apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles and angles in polygons 7.17 – polygons 7.18 – symmetry and reflections 7.19 – co-ordinates	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. They will study the following KPIs: 7.20 – mean 7.21 – two-way tables
Year 8	This focus of this term is building on the fluency and understanding of number that students began to develop in year 7. Students will revisit the concepts of fractions and rounding and have the opportunity to develop these further. They will develop their understanding of number through the process of prime factorisation, and will begin to link fractions, percentages and multiplication. They will study the following KPIs: 8.01 – indices 8.02 – prime factorisation 8.03 – rounding and estimation 8.04 – fractions 8.05 - percentages	The focus of this term is developing students' understanding of algebraic manipulation and begin to apply this to solve equations. Students will begin to model situations mathematically and express the result using a range of formal representations. They will develop their understanding of coordinates and begin to develop algebraic relationships between coordinates. Students will also develop their understanding of angles, including angles in parallel lines. They will study the following KPIs: 8.06 & 8.07 – solving linear equations 8.08 – coordinates 8.10 – angles	The focus of this term is developing students' understanding of geometry, and in particular units of measure, including the relationship between linear, quadratic and cubic measurements. They will also develop their understanding of perimeter by investigating the circumference of circles and properties of circles. They will study the following KPIs: 8.09- Units of Measurement 8.12 – Circumference	The focus of this term is multiplicative relationships and how they can be expressed. Students will begin to develop their proportional reasoning skills. They will build their understanding of fractions and percentages throughout the term, investigating how these concepts can be applied to real world situations. They will study the following KPIs: 8.13- proportional reasoning 8.14 – fractions, decimals and percentages 8.15 – ratio	This term begins with deepening the students' understanding of shape, including considering the area of composite shapes. Students will also develop their understanding of data, with a focus on how data can be best presented. They also investigate the benefits and limitations of the different averages. They will study the following KPIs: 8.16 – area of composite shapes 8.17 – presenting and interpreting data 8.18 – averages	This term focuses on further developing students' understanding of geometry, and the start of investigating three dimensional shapes. Students will begin to see the connections between the geometry they have studied earlier in their schooling and real-world application such as design and engineering. They will study the following KPIs: 8.19 – 3D visualisation 8.20 – volume of prisms

Year 9	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, and different types of numbers. They will study the following KPIs: 9.01 – place value and number properties 9.02 – four rules (decimal focus) 9.03 – factors, multiples and primes 9.04 – indices, powers and roots 9.06 – ratio	This term develops the students' understanding of the relationship between fractions, decimals and percentages. In particular students will consider proportional reasoning and repeated percentage change. They will study the following KPIs: 9.07 – FDP 9.08 – fractions 9.09 – percentages 9.10 - proportion	This term focuses on linking students' understanding of number developed in term one and two to algebra. There is a particular focus on notation and manipulating algebraic expressions, including considering quadratic expressions and more complex factorising. They will study the following KPIs: 9.11 – notation 9.12 – simplifying and index laws 9.13 – expanding and factorising 9.14 – expressions and substitution	This term further deepens the students' understanding of algebra, moving in to solving linear equations and linear inequalities. The students' will then move on to geometry, considering in particular perimeter and area, and the application of Pythagoras's theorem. Students will work on problems linking algebra and geometry to deepen their understanding. They will study the following KPIs: 9.15 – linear equations 9.16 – linear inequalities 9.17 – perimeter, area and measure 9.18 – Pythagoras's theorem	This term continues with a focus on geometry, and in particular linking geometrical reasoning with an understanding of algebra. Students will explore angles, and the relationships between different angles in parallel lines, in addition to deepening their understanding of two- and three-dimensional shapes. 9.19 – properties of shapes 9.20 – angle facts 9.21 – parallel lines 9.22 – circles 9.23 – volume and surface area	This term focuses on students' algebra skills and developing their understanding of sequences and patterns. Students will go on to begin to explore basic vectors, and their application in geometry. They will study the following KPIs: 9.24 – sequences 9.25 - vectors
Term	**1**	**2**	**3**	**4**	**5**	**6**
Year 10	This term focuses on exploring algebraic relationships, in particular rearranging formulae and developing an understanding of linear graphs, and the relationships between them. Students will also continue to develop their proportional reasoning skills, looking at compound measures. They will study the following KPIs: 10.05 – rearrange formulae 10.01 – linear graphs 10.02 – y = mx + c 10.03 – compound measures	This term will deepen students' understanding of algebra, considering quadratic equations and graphs, as well as more complex expanding and factorising. The students will also consider solving equations with more than one unknown. They will study the followings KPIs: 10.04 – quadratic graphs, turning points and roots 10.06 – further expanding and factorising 10.07 – linear simultaneous equations 10.08 – further graphs 10.10 – capture and recapture This term will focus on students' understanding of statistics, and in particular the use of averages to interpret data.	This term focuses on probability, with a particular emphasis on exploring the application of probability and the relationships between the probability of different events. Students will also consider different representations of number, including standard form, and further develop their proportional reasoning skills. They will study the following KPIs: 10.09 – probability 10.11 – standard form 10.12 – proportion (further) 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 deepens students' understanding of number, considering the manipulation of surds and recurring decimals. It also explores real life problems through discussion of bounds and error intervals. They will study the following KPIs: 10.13 – surds 10.14 – recurring decimals 10.15 – bounds This term focuses on students understanding of percentages, considering in particular percentage increase and decrease. Students will also develop their understanding of shape, considering volume and surface area.	This term further develops students' proportional reasoning, considering further ratio. Students will also revisit percentages, looking at simple interest and growth and decay, with an application to different rea- life scenarios. They will study the following KPIs: 10.16 – growth and decay 10.18 – simple interest 10.19 – ratio (further) This term focuses on students' understanding of geometry and, in particular, right-angled triangles. Students will learn to apply trigonometric ratios and Pythagoras's theorem to a range of real-life scenarios.	This term focuses on an exploration of shape, with students encountering right-angled trigonometry for the first time, and applying proportional reasoning to similar shapes. They will also look at plans and elevations, and constructions and loci. They will study the following KPIs: 10.20 – right-angled trigonometry 10.21 – plans and elevations 10.22 – constructions and loci 10.21 – similar shapes This term focuses on a further exploration of shape, looking at angles in polygons. Students will also revisit sequences, consolidating their understanding of linear equations.
Year 11	This term develops students' understanding of algebra to consider algebraic proof. They will also develop their understanding of quadratics, using a range of methods to solve them, and more complex simultaneous equations. They will study the following KPIs:	This term focuses on geometry, revisiting angle facts and developing an understanding of these through bearings, circle theorems, and further trigonometry. They will study the following KPIs: 11.06 – bearings 11.07 – circle theorems	This term continues with a focus on geometry, with students considering geometric proof, through congruence and vectors. They will also look at transformations and further statistics. They will study the following KPIs: 11.09 – statistics (further) 11.10 – transformations	This term focuses on students' understanding of more complex graphs, considering area under a graph and gradients of curves. Students will also encounter kinematic equations and graphical transformations. They will study the following KPIs:	The final term of year 11 will focus on preparation for the upcoming GCSE exam, with particular emphasis on problem solving and application.	

	11.01 – algebraic proof 11.02 – solving quadratics and further simultaneous equations 11.03 – functions 11.04 – iteration 11.05 – quadratic inequalities This term focuses on deepening students' proportional reasoning skills, considering in particular compound measures. Students will also look at representations of number in standard form.	11.08 – further trigonometry and trigonometric graphs This term consolidates students' understanding of algebra, considering rearranging formulae, linear simultaneous equations and more complex graphs.	11.11 – congruence 11.12 – vectors This term focuses on geometry, with students learning different types of transformations and consolidating this with an understanding of vectors.	11.13 – gradients (further) and area under a graph 11.14 – kinematics 11.15 – graphical transformations This term further deepens students' understanding of geometry, considering plans and elevations and constructions and loci. They will also re-visit proportional reasoning through similar shapes.		
Term	**1**	**2**	**3**	**4**	**5**	**6**
Year 12	The focus of this term is bridging the gap between GCSE Mathematics and AS level Mathematics where students will learn the following topics: • algebraic expressions, • quadratic equations & inequalities • transformations of graphs. Also, this term introduces statistics where students will learn the topics: • data collection • measures of location and spread • representation of data. We ensure that all students will show fluent algebraic skills and understandings before moving onto challenging topics.	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. The topics are: • straight line graphs • circles • algebraic methods • binomial expansion • vectors. This term is also the continuity of statistics where students will learn topics: • correlation • probability • statistical distributions.	This term introduces the topics: • trigonometric ratios • trigonometric identities • trigonometric equations. The topics on trigonometry are very important in AS level Pure & Applied Mathematics as it underlies the foundation of differentiation, integration and mechanics. Also, this term introduces the most important topic in statistics where students will learn hypothesis testing. It is also start of the mechanics course where students will learn the topic on modelling.	This term introduces the topics on differentiation and integration. As in term three, these topics are the foundation of year two A level mathematics. We ensure that all students will show depth and great understandings of these topics. In applied mathematics, students will continue to study topics in mechanics which are: • constant acceleration • forces & motion.	In this term, students will continue to study the topic on integration and then we will start on exponentials & logarithms. As mentioned in term four, students must ensure to show depth and great mathematics understanding within these topics before moving onto year two mathematics. In mechanics, students will finish the topic on forces and motion, and then move on to variable acceleration.	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 a valuable feedback on how to improve their results. In the last 3 weeks, students will start studying for their year 2 course mathematics where they will learn topics on: • algebraic methods • functions & graphs.
Year 13	Throughout the year, we will develop and equip all students with great mathematical skills and understandings in order to tackle examination style questions and as well as using and applying these into real world problems. Due to the demand of the new A level Mathematics, we will ensure that all students are being exposed and challenged through exam style questions in lessons.	This term, students will study the following topics: • binomial expansion • parametric equations • differentiation • numerical methods • integration.	This term, students will study the following topics: • vectors • regression • moments • forces & friction • projectiles.	This term, students will study the following topics: • conditional probability • normal distribution • application of forces • further kinematics.	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.	Revision & Examinations

	This term, students will study the following topics: • algebraic methods • functions & graphs • sequences & series • radians • trigonometric functions • trigonometric modelling.				Lastly, we will ensure that all our lessons are planned around examination style questions.	

Impact:

Over the course of their study of mathematics we will use fortnightly cumulative formative diagnostic assessments to ensure that students are consistently retrieving their knowledge of different facts and processes. Using this style of assessment, we will make use of the advantages of spaced practice and the retrieval effect. 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 previously taught. Following these assessments, each classroom teacher will complete an analysis of their class's assessment data. This information, along with the information from fortnightly assessments, will feed in to memory platforms and future assessments, with a focus on addressing any gaps in knowledge or understanding highlighted by the assessment. Students will also complete weekly Hegarty homework based on both current learning and previous learning, with the addition of written exam questions on current learning for KS4 and KS5 classes.