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Timeline	Topic	Key concepts and knowledge	Skills development	Rationale
Half Term 1	Number – Factors, Powers and Roots	Understand and use negative and fractional indices. Use operations including indices in the correct order. Use and calculate in standard form. Write any number as the product of prime factors. Use prime factors to find the HCF and LCM.	We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics. We will also look to increase student understanding of the real world applications of Maths.	Standard form allows students to gain an understanding of very large and very small numbers that are used to describe things such as distances in space or the size of atoms. In addition, resources in this topic allow for a realisation of the sheer size of objects in space.
	Statistics – Handling Data	Averages and range from a table. Drawing and analysing scatter graphs. Drawing and analysing a cumulative frequency graph. Drawing and analysing a boxplot. Calculating quartiles and the interquartile range.	During the handling data topic, students are regularly asked to interpret data presented to them in various forms. They are encouraged to debate, discuss and draw conclusions. Students are shown how to construct sentences to answer questions where they are required to evaluate a statement or a given chart/graph.	Students are shown how data can be presented in different ways to try and support different statements. This will make students think about whether they can always trust charts and show them what to look for to check if data/charts are intentionally misleading.
	Algebra – Algebraic Manipulation	Factorising expressions using a common factor. Expanding a pair of binomials. Expanding three binomials. Factorising a quadratic when a = 1.	During the Pythagoras' Theorem topic, extra emphasis is placed on the correct layout for mathematical working, in particular not putting and = between expressions that are not equal (something that students do often).	Teaching Pythagoras' Theorem provides an opportunity to look at the history – in particular how the Pythagoreans used mathematics purely for "mystical reasons" and not for any practical reasons (they believed all things were made of numbers). Also provides an opportunity to look at how the development of mathematics has often clashed with religions and/or formed new ones.
	Geometry - Pythagoras	Calculating a missing side in a right-angled triangle using Pythagoras' theorem.		

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| Half Term 2 | Geometry – Pythagoras and Trigonometry | Calculating a missing side in a right-angled triangle using Pythagoras' theorem. Calculating a missing side or angle in a right angled triangle using trigonometry. | We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics.

We will also look to increase student understanding of the real world applications of Maths.

Listing outcomes shows students how to think systematically so that all possibilities are included.

Students will be increasingly required to use formulae, substituting all types of numbers. | The fractions topic provides an opportunity to look at the history of fractions and how different civilisations developed their own systems for parts of the whole. For example, Ancient Egyptians used only unit fractions and built them up to make any fraction, but the Babylonians only used fractions with 60 as the denominator. Students could discuss why both of these had their uses, but would not be useful today.

The probabilities topic will allow students to better understand the statistics that could be presented to them later in life and also in the media. It also helps them better understand that not all outcomes are equally likely, and therefore make better decisions.

Developing geometrical reasoning further embeds their understanding of identifying properties of a shape and applying a variety or prior knowledge. |
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| | Geometry – Perimeter and Area and Volume | Surface area and volume of cuboids and prisms (including cylinders). Circumference and area of a circle. Area of compound shapes. Area and perimeter of sectors. Volume and surface area of pyramids, cones and spheres. | | |
| | Number – Fractions and Decimals | Adding, subtracting, multiplying and dividing with fractions and decimals. Knowing the link between recurring decimals and fractions. Algebraically convert recurring decimals to fractions. | | |
| | Probability | Listing outcomes in sample space diagrams. Using product rule for outcomes. Drawing and interpreting frequency trees. Understanding and calculating experimental probabilities. Using and calculating probabilities from a Venn diagram. | | |

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Half Term 3	Geometry – Angles	Understanding and using the properties of angles in parallel lines and polygons. Understand and use bearings.	We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics.	Angles in polygons provides an opportunity to look at tessellation and artwork that is created by 2D tessellation. The discussion can be had about shapes that do not tessellate in 2D, but can in 3D such as those that create a football.
	Algebra – Solving Linear Equations	Solving linear equations with one or two steps, which can also include brackets. Solving equations with unknowns on both sides. Solving inequalities. Solving equations with fractions.	We will also look to increase student understanding of the real world applications of Maths. While solving equations, students should be becoming increasingly fluent in their mathematical working. This should include correctly setting out their working with the balancing method. Students should be aware why they cannot just put all of their working out on one line linked with lots of =.	As the use of bearings is introduced, students should be made aware of the need for a measurement that is universal and is measured from a fixed point. There should be the discussion about what/who would need to use bearings, e.g ships and planes, and why. Percentages should be increasingly linked to financial situations that students will encounter in the future. In particular, the correct vocabulary should be used and explained so that students are aware of all of the terms early.
	Number – Percentages	Understanding and using decimal multipliers. Increasing or decreasing amounts by a percentage. Calculating simple and compound interest. Calculate the original amount after a given percentage increase or decrease.	Introduce the uses of percentages with regards to financial calculations and budgeting. Also improve their use of calculators, in particular the use of the indices button and being able to complete calculations in one step as opposed to multiple steps.	As more complex percentage calculations are taught, students can be introduced to the way in which income tax and national insurance deductions are made. There can also be the discussion about what this money is used for, and why it is calculated in the way that it is.

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Half Term 4	Algebra – Formula	Substituting into formulae. Deriving formulae. Rearranging formulae. Modelling using formulae.	We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics.	Students will be given formulae from a wide variety of contexts, with many coming from careers that they will choose in the future.
	Algebra – Linear Functions	Plotting vertical and horizontal lines on a coordinate grid. Plotting equations of the form y = mx + c. Drawing and interpreting real life graphs. Plotting lines of the form ax + by = c. Understand the properties of parallel lines.	We will also look to increase student understanding of the real world applications of Maths. By this point in their mathematics education, students should be fluent in substituting values into formulae both with and without a calculator.	Plans, elevations and scale drawings all provide students with the opportunity to develop skills that are akin to map reading and an awareness of the world around them. To help concrete these skills, maps and plans of the local area will be used to aid them in the understanding of the scales/sizes.
	Geometry – Shapes and Construction	Drawing and understanding nets of 3D shapes. Drawing and understanding plans and elevations. Drawing and interpreting scale diagrams. Drawing constructions accurately. Drawing the loci of points from a given set of constraints.	Students will be taught how to derive a formulae from a given situation, effectively translating from English into maths. During the loci and constructions topic, students will continue to develop their drawing skills using compasses and rulers.	Students will be shown many contextual linear graphs to show that they can be used to work with things such as interest rates, budgets etc. Students will be presented with many different situations in which loci can be used, and emphasis will be placed on ones that they can understand/have experienced.

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Half Term 5	Geometry – Transformations and Vectors	Perform and recognise rotations, reflections and translations on a coordinate axes. Perform and recognise enlargements with and without a centre of enlargement. Perform enlargements with fractional and negative scale factors. Understand and recognise invariance. Understand and use the properties of congruent triangles.	We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics. We will also look to increase student understanding of the real world applications of Maths. While performing transformations, students will develop their ability to work accurately when drawing on a coordinate grid.	Students will gain a better understanding about the relationship between area and volume units through the use of physical resources. While studying compound units, students will study speed, distance and time in depth which will give them the skills to better understand these units in real life. Students will be made aware that they actually use compound units regularly, and that compound units can be used in many different situations.
	Geometry – Measures	Convert between different metric units. Convert between metric units of area and volume. Understand and use compound units including density and pressure.	Students will develop their vocabulary surrounding shapes, and will be increasingly encouraged to be able to explain their answers. Students are shown how to construct their answers when asked to describe transformations.	There is an opportunity for some cross-curricular learning during the density and pressure topic, using demonstrations similar to the sciences.
	Algebra – Simultaneous Equations	Solve simultaneous equations graphically. Solve simultaneous equations algebraically.		Students will gain an understanding in how algebraic and graphical depictions of the same information can be useful at different times. Students will be exposed to many real-life situations containing problems that require simultaneous equations to solve.

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Half Term 6	Algebra – Non-Liner Functions	Plot and understand the properties of quadratic graphs. Plot and understand the properties of cubic graphs. Plot and understand the properties of reciprocal graphs. Plot and understand the properties of exponential graphs.	We want to develop students' ability to handle problem solving tasks. This will include introduce prior knowledge from other topics to increase the challenge in the current topics. We will also look to increase student understanding of the real world applications of Maths. Students investigate the different shapes of common graphs, and learn to identify key points to be able to categorise them.	Students will gain an understanding in how algebraic and graphical depictions of the same information can be useful at different times. The buying and selling of foreign currency involve providing excellent customer service to international travellers. Students will need to be able to determine, as part of their budget, how much money to exchange.
	Algebra – Algebraic Manipulation	Continue manipulating algebraic expressions.	Students should be taught the difference between a plot and a sketch.	When going shopping, with money and budgets highly important, students need to be able to work out if they are getting a good deal. Is it cheaper to buy the larger version or two smaller ones?
	Ratio and Proportion	Work with exchange rates and best buys.		
	Probability	Continue working with probability to represent the outcome of an event.	Students are increasingly expected to fluently manipulate algebraic expressions and work systematically when expanding brackets to ensure they include all terms.	

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