

Year 10 Curriculum Overview

All Year 10 students are following the White Rose Maths scheme of learning.

Year 10		HT1	HT2	HT3	HT4	HT5	HT6
Mathematics	Topic	Similarity	Developing Algebra	Geometry	Proportions and Proportional Change	Delving into Data	Using number & Expressions
	Areas of study	Congruence, similarity and enlargement; Trigonometry.	Representing solutions of equations and inequalities; Simultaneous equations.	Angles and bearings; Working with circles; Vectors.	Ratio and fractions; Percentages and interest; Probability.	Collecting, representing and interpreting data; Non-calculator methods.	Types of number and sequences. Indices and roots. Manipulating expressions.
	Why this and why now?	Building on their experience of enlargement and similarity in previous years, this unit extends students' experiences and looks more formally at dealing with topics such as similar triangles. It would be useful to use ICT to demonstrate what changes and what stays the same when manipulating similar shapes. Parallel line angle rules are revisited to support establishment of similarity. Congruency is introduced through considering what information is needed to produce a unique triangle. Higher level content extends enlargement to explore negative scale factors, and also looks at establishing that a pair of triangles are congruent through formal proof. Trigonometry is introduced as a special case of similarity within right-angled triangles. Emphasis is placed throughout the steps on linking the trig functions to	Students will have covered both equations and inequalities at key stage 3, and this unit offers the opportunity to revisit and reinforce standard techniques and deepen their understanding. Looking at the difference between equations and inequalities, students will establish the difference between a solution and a solution set; they will also explore how number lines and graphs can be used to represent the solutions to inequalities. As well as solving equations, emphasis needs to be placed on forming equations from given information. This provides an excellent opportunity to revisit other topics in the curriculum such as angles on a straight line/in shapes/parallel lines, probability, area and perimeter etc. Factorising quadratics to solve equations is covered in the Higher strand here and is revisited in the Core strand in Year 11.	As well as the formal introduction of bearings, this block provides a great opportunity to revisit other materials and make links across the mathematics curriculum. Accurate drawing and use of scales will be vital, as is the use of parallel line angles rules; all of these have been covered at Key Stage 3. Students will also reinforce their understanding of trigonometry and Pythagoras from earlier this year, applying their skills in another context as well as using mathematics to model real-life situations. This block also introduces new content whilst making use of and extending prior learning. The formulae for arc length and sector area are built up from students' understanding of fractions. They are also introduced to the formulae for surface area and volume of spheres and cones; here higher students can	This block builds on KS3 work on ratio and fractions, highlighting similarities and differences and links to other areas of mathematics including both algebra and geometry. The focus is on reasoning and understanding notation to support the solution of increasingly complex problems that include information presented in a variety of forms. The bar model is a key tool used to support representing and solving these problems. Although percentages are not specifically mentioned in the KS4 national curriculum, they feature heavily in GCSE papers and this block builds on the understanding gained in KS3. Calculator methods are encouraged throughout and are essential for repeated percentage change/growth and decay problems. Use of financial contexts is central to this block, helping students to maintain	This block builds on KS3 work on the collection, representation and use of summary statistics to describe data. Much of the content is familiar, both from previous study within and beyond mathematics (including Geography and Science) and from everyday life. The steps have been chosen to balance consolidation of existing knowledge with extending and deepening, particularly in terms of interpretation of results and evaluating and criticising statistical methods and diagrams. For students following Higher tier, there is additional content relating to continuous data including histograms, cumulative frequency diagrams, box plots and associated measures such as quartiles and the interquartile range. Again the emphasis with these topics should be on interpretation (particularly in making comparisons) and not just construction.	This block again mainly revises KS3 content, reviewing prime factorisation and associated number content such as HCF and LCM. Sequences is extended for Higher Tier to include surds and finding the formula for a quadratic sequence. This block consolidates the previous two blocks focusing on understanding powers generally, and in particular in standard form. Negative and fractional indices are explored in detail. Again, much of this content will be familiar from KS3, particularly for Higher tier students, so this consolidation material may be covered in less than two weeks allowing more time for general non-calculator and problem-solving practice. To consolidate the index laws, these can be revisited in the next block when simplifying algebraic expressions.

	ratios, rather than just functions. This key topic is introduced early in Year 10 to allow regular revisiting e.g. when looking at bearings. For the Higher tier, calculation with trigonometry is covered now and graphical representation is covered in Year 11.	Students now move on to the solution of simultaneous equations by both algebraic and graphical methods. The method of substitution will be dealt with before elimination, considering the substitution of a known value and then an expression. With elimination, all types of equations will be considered, covering simple addition and subtraction up to complex pairs where both equations need adjustment. Links will be made to graphs and forming the equations will be explored as well as solving them. The Higher strand will include the solution of a pair of simultaneous equations where one is a quadratic, again dealing with factorisation only at this stage.	enhance their knowledge and skills of working with area and volume ratios. Higher tier students are also introduced to four of the circle theorems; the remaining theorems will be introduced in Year 11 when these four will be revisited. Students will have met vectors to describe translations during Key Stage 3 This will be revisited and used as the basis for looking more formally at vectors, discovering the meaning of $-a$ compared to a to make sense of operations such as addition, subtraction and multiplication of vectors. This will connect to exploring 'journeys' within shapes linking the notation AB with $b - a$ etc. Higher tier students will then use this understanding as the basis for developing geometric proof, making links to their knowledge of properties of shape and parallel lines.	familiarity with the vocabulary they are unlikely to use outside school. This block also builds on KS3 and provides a good context in which to revisit fraction arithmetic and conversion between fractions, decimals and percentages. Tables and Venn diagrams are revisited and understanding and use of tree diagrams is developed at both tiers, with conditional probability being a key focus for Higher tier students.	This block revises and builds on KS3 content for calculation. Mental methods and using number sense are to be encouraged alongside the formal methods for all four operations with integers, decimals and fractions. Where possible this should be covered through problems, particularly multi-step problems in preparation for GCSE. The limits of accuracy of truncation are explored and compared to rounding, and Higher tier students will look at all aspects of irrational numbers including surds.	This final block of year 10 builds on the Autumn term learning of equations and inequalities, providing revision and reinforcement for Foundation tier students and an introduction to algebraic fractions for those following the Higher tier. This also allows all students to revise fraction arithmetic to keep their skills sharp. Algebraic argument and proof are considered, starting with identities and moving on to consider generalised number.
What is the essential knowledge that needs to be remembered?	<ul style="list-style-type: none"> To enlarge a shape by a positive scale factor To enlarge a shape by a fractional scale factor To enlarge a shape by a negative scale factor To be able to identify similar shapes To work out missing sides and angles in a pair of given shapes To be able to use parallel line rules to work out missing angles To understand the difference between congruency and similarity 	<ul style="list-style-type: none"> Understand the meaning of a solution Form and solve one-step and two-step equations Form and solve one-step and two-step inequalities Show solutions to inequalities on a number line Interpret representations on number lines as inequalities Represent solutions to inequalities using set notation Draw straight line graphs Find solutions to equations using straight line graphs Represent solutions to single inequalities on a graph 	<ul style="list-style-type: none"> Use cardinal directions and related angles Draw and interpret scale diagrams Understand and represent bearings Measure and read bearings Make scale drawings using bearings Calculate bearings using angles rules Solve bearings problems using Pythagoras and trigonometry Solve bearings problems using the sine and cosine rules 	<ul style="list-style-type: none"> Compare quantities using a ratio Link ratios and fractions Share in a ratio (given total or one part) Use ratios and fractions to make comparisons Link ratios and graphs Solve problems with currency conversion Link ratios and scales Use and interpret ratios of the form $1:n$ and $n:1$ Solve 'best buy' problems Combine a set of ratios Link ratio and algebra Apply ratio to area and volume problems 	<ul style="list-style-type: none"> Understand populations and samples Construct a stratified sample Primary and secondary data Construct and interpret frequency tables and frequency polygons Construct and interpret two-way tables Construct and interpret line and bar charts (including composite bar charts) Construct and interpret pie charts Criticise charts and graphs Construct histograms Interpret histograms Find and interpret averages from a list 	<ul style="list-style-type: none"> Understand the difference between factors and multiples Understand primes and express a number as a product of its prime factors Find the HCF and LCM of a set of numbers Describe and continue arithmetic and geometric sequences Explore other sequences Describe and continue sequences involving surds Find the rule for the nth term of a linear sequence Find the rule for the nth term of a quadratic sequence

		<p>Higher tier students can explore areas and volumes of similar shapes and prove that a pair of triangles are congruent.</p> <p>Explore ratio in similar right-angled triangles Work fluently with the hypotenuse, opposite and adjacent sides Use the tangent, sine and cosine ratios to find missing side lengths Use tangent, sine and cosine to find missing angles Calculate sides in right-angled triangles using Pythagoras' Theorem Select the appropriate method to solve right angled triangle problems Work with key angles in right angled triangles Use trigonometry in 3D shapes (H) Use $\frac{1}{2}ab\sin C$ to find the area of a triangle (H) Understand and use the sine rule to find missing lengths and angles (H) Understand and use the cosine rule to find missing lengths and angles (H) Choosing and using the cosine and sine rules</p>	<p>Represent solutions to multiple inequalities on a graph Form and solve equations with unknowns on both sides Form and solve inequalities with unknowns on both sides Form and solve more complex equations and inequalities Solve quadratic equations by factorisation Solve quadratic inequalities in one variable</p> <p>Understand that equations can have more than one solution Determine whether a given (x, y) is a solution to a pair of linear simultaneous equations Solve a pair of linear simultaneous equations by substituting a known variable Solve a pair of linear simultaneous equations by substituting an expression (1) & (2) Solve a pair of linear simultaneous equations using graphs Solve a pair of linear simultaneous equations by subtracting equations Solve a pair of linear simultaneous equations by adding equations Use a given equation to derive related facts Solve a pair of linear simultaneous equations by adjusting one equation Solve a pair of linear simultaneous equations by adjusting both equations Form a pair of linear simultaneous equations from given information Form and solve pair of linear simultaneous equations from given information</p>	<p>Recognise and label parts of a circle Calculate fractional parts of a circle Calculate the length of an arc Calculate the area of a sector Circle theorem: Angles at the centre and circumference Circle theorem: Angles in a semicircle Circle theorem: Angles in the same segment Circle theorem: Angles in a cyclic quadrilateral</p> <p>Understand and represent vectors Use and read vector notation Draw and understand vectors multiplied by a scalar Draw and understand addition of vectors Draw and understand subtraction of vectors Explore vector journeys in shapes Explore quadrilaterals using vectors Understand parallel vectors</p>	<p>Convert and compare fractions, decimals and percentages Work out percentages of amounts (with and without a calculator) Increase and decrease by a given percentage Express one number as a percentage of another Calculate simple and compound interest Repeated percentage change Find the original value after a percentage change Solve problems involving growth and decay Understand iterative processes Solve problems involving percentages, ratios and fractions</p> <p>Know how to add, subtract and multiply fractions Find probabilities using equally likely outcomes Use the property that probabilities sum to 1 Using experimental data to estimate probabilities Find probabilities from tables, Venn diagrams and frequency trees Construct and interpret sample spaces for more than one event Calculate probability with independent events Use tree diagrams for independent events Use tree diagrams for dependent events</p>	<p>Find and interpret averages from a table Construct and interpret time series graphs Construct and interpret stem-and-leaf diagrams Construct and interpret cumulative frequency diagrams Use cumulative frequency diagrams to find measures Construct and interpret box plots Compare distributions using charts and measures Compare distributions using complex charts and measures Construct and interpret scatter graphs Draw and use a line of best fit Understand extrapolation</p> <p>Mental/written methods of integer/decimal addition and subtraction Mental/written methods of integer/decimal multiplication and division The four rules of fraction arithmetic Exact answers Rational and irrational numbers (convert recurring decimals here) Understand and use surds Calculate with surds Rounding to decimal places and significant figures Estimating answers to calculations Understand and use limits of accuracy Upper and lower bounds Use number sense Solve financial maths problems Break down and solve multi-step problems</p>	<p>Square and Cube numbers Calculate higher powers and roots Powers of ten and standard form The addition and subtraction rules for indices Understand and use the power zero and negative indices Work with powers of powers Understand and use fractional indices Calculate with numbers in standard form</p> <p>Simplify algebraic expressions Use identities Add and subtract simple algebraic fractions Add and subtract complex algebraic fractions Multiply and divide simple algebraic fractions Multiply and divide complex algebraic fractions Form and solve equations and inequalities with fractions Solve equations with algebraic fractions Represent numbers algebraically Algebraic arguments and proof</p>
--	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

			Higher tier pupils will be able to determine whether a given (x, y) is a solution to both a linear and quadratic equation Solve a pair of simultaneous equations (one linear, one quadratic) using graphs Solve a pair of simultaneous equations (one linear, one quadratic) algebraically Solve a pair of simultaneous equations involving a third unknown				
What is the assessment intent and how will you assess?	The assessment takes place at the end of each half term. There are also end of topic tests that take place roughly every 2-3 weeks. Teachers check the progress and areas of concern are addressed through whole class teaching with targeted Do Nows and HW. Previous blocks are also assessed each week to assess Covid learning losses so that gaps can be filled whilst continuing with the curriculum.						
What should the end point look like?	Pupils should be fluent in finding lengths of similar shapes, enlarging a shape, and finding congruent shapes. Pupils should be able to apply what they have learnt in trigonometry to solve problems.	Pupils should be fluent in solving one step, two step and equations with unknowns on both sides. They should also know how to solve a simultaneous equation.	Pupils will be comfortable with bearings, be able to compare lengths using scale factors, apply Pythagoras' Theorem and trig ratios to find angles and lengths. They will be able to list circle properties and have knowledge of sectors. Pupils will be fluent in describing transformations using vector notation.	Pupils will be fluent in using ratios and fractions. They will be able to work with compound measures and be able to compare lengths, areas and volumes using ratio notation. Pupils will be fluent in using percentages. Pupils will be able to use tables, venn diagrams and tree diagrams to find probabilities. They will be able to calculate the probability of independent and dependent combined events.	Pupils will be fluent in constructing and interpreting information from tables and charts. They will be able to apply sampling to a set of data and be able to compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (including modal class) and spread. Pupils develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts • make and use connections between different parts of mathematics to solve problems	Pupils are fluent in factors, multiples, primes, HCF and LCM They can describe and continue sequences, recognise and use sequences of triangular, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric Pupils can also deduce expressions to calculate the nth term of linear sequences.	
	Half term assessment will show current performance. This will be further assessed in the future with "Can you still" questions showing learning embedded into long term learning. These tests will be used weekly to assess Covid learning losses so that gaps can be filled whilst continuing with the curriculum.						
How does it cover the NC?	The NC coverage can be found on page 17 and 18.	The NC coverage can be found on page 17 and 18. Edexcel GCSE and GCE 2014 (pearson.com)	The NC coverage can be found on page 18 and 20.	The NC coverage can be found on page 20 and 21.	The NC coverage can be found on page 21 and 22.	The NC coverage can be found on page 21 and 22.	

		Edexcel GCSE and GCE 2014 (pearson.com)		Edexcel GCSE and GCE 2014 (pearson.com)	Edexcel GCSE and GCE 2014 (pearson.com)	Edexcel GCSE and GCE 2014 (pearson.com)	Edexcel GCSE and GCE 2014 (pearson.com)
--	--	-----------------------------------------------------------------	--	-----------------------------------------------------------------	-----------------------------------------------------------------	-----------------------------------------------------------------	-----------------------------------------------------------------