Mathematics Curriculum Plans 2021 – 2022

Curriculum Plan – Year 7					
Term 1		**Term 2**		**Term 3**	
No. of Weeks	8	7	7	5	5	7
Topic Title & WRHS Code	7N1 – Place Value & Operators	7N2 – Operators & Special Numbers	7N3 – FDP	7A1 – Basic Algebra	7R1 – Ratio & Proportion	7G1 – Basic Geometry
N.C Codes	N1, N2, N4, N5, N6, N8, N13	N3, N4, N7, N16	N4, N9, N10, N11, R3	A1, A3, A4	R4, R5, R6, R9	N12, R1, G1, G6, G7, G14
Pupils should know… (Core knowledge and concepts to learned)	count in multiples of 6, 7, 9, 25 and 1000 understanding of negative numbers recognise the place value up to four digits order & compare numbers beyond 1000 round any number to the nearest 10, 100 or 1000 add and subtract numbers with up to 4 digits	recall multiplication and division facts for multiplication tables up to 12 × 12 multiply values up to three digits identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers establish whether a number up to 100 is prime and recall prime numbers up to 19	use common factors to simplify fractions; use common multiples to express fractions in the same denomination compare and order fractions, including fractions > 1 add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions multiply simple pairs of proper fractions, writing the answer in its simplest divide proper fractions by whole numbers	express missing number problems algebraically	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line measure the perimeter of simple 2-D shapes find the area of rectilinear shapes by counting squares calculate and compare the area of rectangles (including squares), and including using standard units calculate the area of parallelograms and triangles

			solve problems involving the calculation of percentages			
Pupils should be able to do… (Skills being developed)	I can compare and order positive & negative integers & decimals I can round numbers integers, decimal place and significant figures I can multiply & divide values by powers 10 I can round numbers to powers of 10 I can add & subtract integer & decimal values	I can multiply integer and decimal values I can divide integer and decimal values I can identify and use square numbers from 1 to 15 (including roots) I can identify and use cube numbers from 1 to 5 and 10 (including roots) I can identify and use multiples of a values from 1 to 15 and beyond to find LCM I can identify and use factors of a value to find HCF I can identify and use prime numbers I can use prime factorisation to find LCM and HCF	I understand decimals are parts of a whole in context of tenths, hundredths, thousandths etc. I can simplify fractions using common factors and recognise when 2 fractions are equivalent I understand that a percentage means 'parts per hundred' I can convert between and work with terminating decimals and their equivalent fractions (comparing and ordering) I can convert between and work with fractions and their equivalent percentages, including when the denominator is not a factor of 100 (comparing and ordering)	I can use letters to represent unknown quantities (including all operators) I can write an expression from a description I can collect like terms to simplify an expression I can expand single and double brackets I can factorise single and double brackets	I can identify quantities in direct proportion I can use ratio notation I can find equivalent ratios and simplify a ratio I can divide a quantity into parts using a given ratio I can use fractions and percentages to describe and compare proportion I understand the relationship between fractions/percentages, ratios and proportions	I can recognise and choose appropriate units of lengths in context I can convert between units of length using powers of 10 I can name 2D shapes and describe their properties using key geometric terminology e.g. points, lines, polygons, regular, irregular, quadrilateral, right angles, parallel, perpendicular, symmetry etc. I can recognise and differentiate between 2D shapes from their properties I can calculate perimeters of 2D shapes, including compound shapes I can use knowledge of perimeter, the properties of shapes

				I can convert between and work with percentages and their equivalent decimals, including percentages greater than 100 (comparing and ordering)			and inverse operations to calculate missing lengths
				I can convert between common non-terminating decimals and their equivalent fractions and percentages			I can find areas by counting squares and part squares
				I can calculate fractions of a quantity, including improper fractions and mixed numbers			I can find the area of rectangles and shapes made from rectangles (including compound shapes)
				I can calculate percentages of a quantity (non-calculator), including percentage increase/decrease			I can derive and use the formulae for the area of a triangle (including compound shapes)
				I can compare and order fraction/percentages of a quantity			I can derive and use the formulae for the area of a parallelogram and trapezium (including compound shapes)
				I can calculate an original amount following an increase/decrease			I can use knowledge of area, the properties of shapes and inverse operations to calculate missing lengths
				I can multiply fractions including			I can use two areas off the sides of a right-angled triangle to find a missing

			improper fractions and mixed numbers I can divide by a fraction including improper fractions and mixed numbers I can add and subtract fractions including improper fractions and mixed numbers			area and in turn a length
Why are we doing this now? How does it build on prior learning and prepare for knowledge and learning still to come?	Introducing Number concepts met in Primary and develop this further during the HT	Introducing HCF & LCM concepts met in Primary and develop this further during HT2	Introducing FDP concepts met in Primary and develop this further during HT3 linking to Number from HT1 & HT2	Introducing Algebra concepts met in Primary and develop this further during HT5 linking this to all areas of the curriculum met so far.	Introducing Ratio & Proportion concepts met in Primary and develop this further during HT6 and linking this to HT3.	Introducing Geometry concepts met in Primary and develop this further during HT4, linking to all areas of the curriculum met so far.

Curriculum Plan – Year 8						
	Term 1		Term 2		Term 3	
No. of Weeks	8	7	7	5	5	7
Topic Title & WRHS Code	7R1 – Ratio & Proportion 7N2 – Special Numbers	8N1 – More Finances 8A1 – Formulae	8A2 - Equations	8A3 - Sequences	8P1 – Probability	8G1 – Geometric Constructions
N.C Codes	R4, R5, R6, R9, N3, N7, N16	N6, N10, R8, A2, A3, A5, A6	A3, A4, A7	A14, A15, A16	A2, A6, P1, P2, P3, P4	A2, A6, A7, G3, G5, G6, G7, G10, G11, G12, G14 G16
Pupils should know… (Core knowledge and concepts to learned)	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers establish whether a number up to 100 is prime and recall prime numbers up to 19 | calculate percentages of a quantity (non-calculator), including percentage increase/decrease

use simple formulae | express missing number problems algebraically | recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule | make connections between percentages, fractions and decimals | know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles

draw given angles, and measure them in degrees (°)

use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems |
| *Pupils should be able to do… (Skills being developed)* | I can identify quantities in direct proportion I can use ratio notation | I can calculate percentage change | I can write an equation from a given scenario | I can identify and generate next terms in arithmetic, | I can describe the likelihood of an event happening, | I can describe what an angle is and categories different types of angle sizes |

	I can find equivalent ratios and simplify a ratio I can divide a quantity into parts using a given ratio I can use fractions and percentages to describe and compare proportion I understand the relationship between fractions/percentages, ratios and proportions I can identify and use square numbers from 1 to 15 (including roots) I can identify and use cube numbers from 1 to 5 and 10 (including roots) I can identify and use multiples of a values from 1 to 15 and beyond to find LCM I can identify and use factors of a value to find HCF I can identify and use prime numbers I can use prime factorisation to find LCM and HCF	I can calculate an original value using percentages I can calculate compound interest for appreciation and depreciation I can substitute values into an expression I can write a formula given a description I can substitute values into a formula I can rearrange to find a new subject of the formula	I can solve a linear equation I can solve non-linear equations, including factorising	geometric and quadratic sequences I can identify special sequences including triangular and Fibonacci sequences I can find the nth term for an arithmetic I can use the nth term to find any term in a sequence	using words and a numerical scale I can use tables, grids and Venn diagrams to list probabilities systematically I can estimate probabilities for single and combined events with equally likely and mutually exclusive events I can calculate theoretical probabilities	I can measure and draw angles using a protractor and compass I can identify different types of angles with parallel lines and intersections I can calculate interior and exterior angles in polygons I can identify different trigonometric ratio I can use trigonometric ratios to calculate angles and missing lengths in right-angled triangles
Why are we doing this now? How does it build on prior	Introducing Ratio & Proportion concepts met in Primary and develop this further during HT6	Building on knowledge from 7N3 – making links with real life contexts.	Continuing to build upon 7A1 and 8A1/8A2 – students will use algebra to	Building on the knowledge from 7A1 – students will further the	Building on knowledge from KS2 – making links with real life contexts.	Building on knowledge from 7G1 – making links with real life contexts.

| *learning and prepare for knowledge and learning still to come?* | and linking this to HT3.

Introducing HCF & LCM concepts met in Primary and develop this further during HT1 | Students will have an opportunity to explore financial literacy.

Building on the knowledge from 7A1 – students will further the understanding of the use of algebra during this HT. | solve problems with linear and quadratic contexts. | understanding of the use of algebra during this HT. | Students will be justifying their answers mathematically and communicating verbally, extending into other areas of maths when possible. | Students will be justifying their answers mathematically and communicating verbally, extending into other areas of maths when possible.
8G1.2 will introduce Trigonometry which will build upon all previous geometric work. |

Curriculum Plan – Year 9						
	Term 1		Term 2		Term 3	
No. of Weeks	8	7	7	5	5	7
Topic Title & WRHS Code	8G1 – Geometric Constructions	9A1 – Inequalities 9N1 – Efficiency and Accuracy	9G2 – Circles & 3D Shapes	9R1 – Further Measurements	8R1 – Graphs and Conversions	9D1 – Averages & Investigation
N.C Codes	A2, A6, A7, G3, G5, G6, G7, G10, G11, G12, G14 G16	N13, N14, A3	A2, A6, A7, G2	R1, R2, R10	A10, R1, R9	S1, S3
Pupils should know… *(Core knowledge and concepts to learned)*	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles draw given angles, and measure them in degrees (°) use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems	can solve a linear equation can round numbers integers, decimal place and significant figures	illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces recognise and name common 2-D and 3-D shapes identify 2-D shapes on the surface of 3-D shapes	Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate use multiplication and division as inverses to support the introduction of ratio by multiplying and dividing by powers of 10 in scale	solve comparison, sum and difference problems using information presented in a line graph convert between different units of metric measure understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	calculate and interpret the mean as an average interpret and construct simple pictograms, tally charts, block diagrams and simple tables interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
Pupils should be able to do…	I can describe what an angle is and	I can describe an inequality using words	I can identify and describe parts of circle	I can use compound units such as speed,	I can correctly draw a set of axes	I can calculate the mode, median, mean

(Skills being developed)	categories different types of angle sizes I can measure and draw angles using a protractor and compass I can identify different types of angles with parallel lines and intersections I can calculate interior and exterior angles in polygons I can identify different trigonometric ratio I can use trigonometric ratios to calculate angles and missing lengths in right-angled triangles	I can show an inequality on a number line I can write an inequality when given a number line I can round integers and decimal values to one, two and three significant figures I can estimate calculations by rounding to one significant figure, including fractional calculations I can use inequalities to compare values I can use bounds to round values	I can calculate the circumference of a circle and perimeter of compound shapes with arcs I can calculate the area of a circle and area of compound shapes with arcs I can draw the net of a 3D shape and calculate the area of a net I can calculate the surface area of simple prisms and compound prisms I can calculate the surface area of a sphere, cone and pyramid I can calculate the volume of simple prisms and compound 3D shapes I can calculate the volume of a sphere, cone and pyramid	acceleration, density, pressure I can use scale factors, scale diagrams and maps	I can plot a set of values of on a graph I can describe using words the relationship of two variables plotted on a graph I can describe using an equation or formula, the relationship of two variables plotted on a graph I can use a graph to estimate a conversion of one variable into another variable, including metric & imperial units of measure and currency exchange	and the range for a discrete set of data I can calculate the mode, median, mean and the range for a continuous and grouped set of data I can identify an outlier for a set of data I can display continuous data using a cumulative frequency table and graph I can display continuous data using a box plot I can display data using a scatter graph and use a line of best fit to make predictions I can display and read data from a pie chart I can investigate a chosen topic and report back my findings
Why are we doing this now? How does it build on prior learning and	Building on knowledge from 7G1 – making links with real life contexts. Students will be	Building on knowledge from number and algebra Year 7 & Year 8. Developing problem	Building on knowledge from geometry Year 7 & 8, developing problem solving skills and	Building on knowledge from geometry Year 7 & Year 8. Further developing skills		Building on knowledge from data Year 7, further developing students'

prepare for knowledge and learning still to come?	justifying their answers mathematically and communicating verbally, extending into other areas of maths when possible. 8G1.2 will introduce Trigonometry which will build upon all previous geometric work.	solving and efficient working skills.	linking this to number and algebra in previous year's work.	with geometric tools to solve problems and solving real life problems with different compound measures.		ability to analyse data.

Curriculum Plan – Year 10					
	Term 1		**Term 2**		**Term 3**
No. of Weeks	8	7	7	5	5	7
Topic Title	Number	Algebra/Statistics	Number	Shape, Space & Measures.	Shape, space & measures and Algebra	Algebra
Pupils should know… (Core knowledge and concepts to learned)	Integers, Place value Decimals (F) Indices, powers and roots Factors, multiples and primes, Estimation, Standard Form Surds	Algebra: the basics Expressions and substitution into formulae Rearranging and solving equations Expanding Brackets Factorising Sequences Averages including those from tables Estimate of the mean from grouped tables Displaying Data including Bar charts, Histograms of equal and unequal widths, Cumulative frequency curves, Pie Charts, Line Graphs, Pictograms, Scatter Diagrams, including LOBF and outliers. Sampling. Stem-Leaf and Box-Whisker	Fractions, including ordering, simplifying, equivalent, the four rules including mixed numbers, fractional amounts, fractions to decimals and decimals to fractions including recurring decimals to fractions Percentages including, of an amount, equivalence between fractions, decimals and percentages, percentage increase/decrease including the use of the multiplier, reverse percentages, simple interest and compound interest. Ratio & Proportion including simplifying ratios, unit ratios, sharing an amount	Angles properties including measuring angles [link to pie charts], angle facts on a line and around a point, angles in triangles, parallel lines and angles in polygons. Pythagoras' Theorem & Trigonometry including right - angled triangles and trigonometry in any triangle. Pythagoras' and Trigonometry in 3D. Exact values of Trigonometric functions and linking this to Surds.	Mensuration: Perimeter and area of plane shapes including circles and trapeziums. The volume of cuboids, prisms, cones and spheres including frustums and hemispheres, The surface area of prisms, spheres and cones. Graphs including straight-line graphs (plotting points & drawing, finding gradients, finding the equation of a line, perpendicular lines and their equation) Real-life Graphs, including V/T and D/T graphs. Exponential graphs and linking this to compound interest.	Algebra, including a recap of expanding & factorising, expanding triple brackets, rearranging formulae, factorising quadratics to solve a quadratic equation, solving quadratics by completing the square and by using the quadratic formula, algebraic proof. Simultaneous equations including quadratic simultaneous equations, inequalities including quadratic inequalities.

			into a given ratio, proportions based on sharing ratio, the ratio of three or more values when not given explicitly. currencies, recipes and inverse proportion (variation)		Solving equations from graphs including locating roots to an equation and recognising turning points to the curve.	
Pupils should be able to do… (Skills being developed)	Understand how the number system works, calculate efficiently, estimate sums and recognise whether the estimated sum will be an underestimate or overestimate	Students will develop their algebraic manipulation and equation solving skills and adapt these in solving problems linked to other areas of mathematics

Students will develop their analytical skills when analysing statistical diagrams and charts and being able to interpret these with making conclusions. Students will also be able to recognise or calculate any of the three measures of average. | Students should be able to use all the skills gained in KS3 and should be able to recognise terminating/recurring fractions as well as changing recurring decimals back into fractions.

Students should also be able to calculate competently with percentages including solving more complex problem solving & reasoning questions including compound interest.

Students will also be able to build on their prior knowledge on Ratio & Proportion by | Angles are built up from KS3 where the development of reasoning is encouraged in this section. Students are modelled to use the correct terminology and reasoning so that they are able to answer questions fully.

Pythagoras' Theorem and Trigonometry are used in a variety of settings, especially in looking at A level mathematics – core and | Students should be able to calculate the perimeter, area & volume of a range of shapes by either splitting the shape into more manageable parts or by using formula to help them calculate.

Coordinate geometry/real-life graphs build from KS3 where equations of lines develop into recognising parallel & perpendicular lines and being able to draw/recognise different types of curves. | Students should be able to solve any equation given to them from the KS4 specification as these builds on skills from the earlier Algebra section. Students should also recognise how the difference of two squares can be used in rationalising the denominator of a surd. |

			looking at the more complex skills of direct & inverse proportion (variation)	Mechanics, when solving problems associated with Newton's Laws of Motion.		
Why are we doing this now? How does it build on prior learning and prepare for knowledge and learning still to come?	All skills are built on from KS3. Calculation skills are used further in all areas of mathematics, such as Algebra, statistics & data. Surds are used in Pythagoras and Trigonometry when calculating with exact values	Statistics can be studied further at A level but prior to this the topic helps students to analyse data and make inferences – developing reasoning skills. Algebra is used across all areas of mathematics in a number of different ways – these include problems associated with area/perimeter/volume, trigonometry & Pythagoras, later this year, and develop other more complex equation solving skills. These skills are taken further in A level mathematics	Fractions are used across mathematics, such as calculations involving probability and solving equations. Percentages are linked to real-life problems to do with finance. Ratio and proportion is linked to real-life problems as well as linking towards A level with variation.		Mensuration builds on the skills from KS3 and looks at more complex shapes. Mensuration is used in many real-life aspects from gardening, decorating, building furniture as well as looking at more complex mathematical formula and the uses within Algebra. Coordinate geometry and curves are used extensively in A level mathematics helping students to picture how graphs change and recognise the properties of graphs.	Knowledge from KS3 and earlier in the year builds on the student's ability to solve more complex equations. These skills are built on further in A level mathematics especially looking at the properties of quadratics.

Curriculum Plan – Year 11						
	Term 1		**Term 2**		**Term 3**	
No. of Weeks	8	7	7	5	5	7
Topic Title	Probability & Shape, Space & Measures	Shape, Space & Measures.	Number, Algebra, Shape, Space & Measures	Revision	Revision	
Pupils should know… (Core knowledge and concepts to learned)	Probability including using words to describe events, listing all outcomes, calculating simple probability (one event), calculating the probability of two or more events by using a probability tree including conditional probability, experimental probability & relative outcomes, probability from Venn-Diagrams Transformations including recognising symmetry (linear & rotational) & congruency. Describing transformations	Loci & Construction including drawing plans and elevations, bisecting angles and drawing perpendicular lines. Similarity & Congruence including similar triangles and finding missing sides. Identifying similarity & congruency within triangles and finding the lengths, surface areas and volumes of similar shapes.	Multiplicative reasoning including compound measures (density & Pressure) (F) Algebraic proof, Algebraic fractions and rationalising the denominator (H) Circle Theorem (H) Vectors (H) Standard form & rules of indices (F) Quadratic Graphs (F)	The 5 R's – using topics from the QLA	The 5 R's – using topics from the QLA	

	including rotations, reflections, enlargement and translations and linking this to vectors in 2D. Describing two or more transformations as a single transformation.					
Pupils should be able to do… *(Skills being developed)*	Students should be able to calculate the probability of one or two events, be able to list outcomes and look at more complex problems associated with probability including, conditional probability, the use of Venn diagrams and links made across other areas of mathematics, such as algebra (quadratics) Students should be able to describe	Students should be able to use loci and constructions in problem solving, be able to construct accurate angles by using compass & ruler only and be able to solve more complex problems linked to plans/diagrams. Bearings will also be taught here. Students will be able to identify similar & congruent triangles by looking at the properties of such shapes and find the lengths of	Calculate speed, pressure & density and apply this in problems Prove algebraically a variety of theorems and use these in using the conjugate in rationalising the denominator in surds. Prove and use all the circle theorems Use geometric vectors in proof of geometric reasoning Calculate indices and use the rules of indices (multiplying and dividing) for numbers in standard form Being able to plot a quadratic graph and use this in solving quadratic equations (roots of the equation)	Revise for topics in preparation for the PPEs in HT4 and the GCSE examinations	Revise for topics in preparation for the GCSE examinations	

	transformations, including a single transformation for a shape that has had multiple transformations acted upon it.	missing sides. Further on students will be able to calculate the volume and surface areas of similar shapes by using ratio.				
Why are we doing this now? *How does it build on prior learning and prepare for knowledge and learning still to come?*	Probability is covered in Year 9 where mutually exclusive events are covered. This is built up to include conditional probability diagrams	Ratio plays a big part in similar shapes and this is used in any similar triangles/shapes calculations. Students will need to be confident in tackling ratio problems Constructions & drawing angles and shapes have been met before at KS3 so building on knowledge learned so far.	These topics are the outliers and need previous knowledge to be able to complete them, for example, circle theorem uses congruency/similarity/Pythagoras' Compound measures uses basic algebraic equations to solve problems Rationalising the denominator uses knowledge from before on surds as well as the properties of the difference of two squares and the conjugate to eliminate more complex surds (rational $\pm$ irrational) in the denominator. Vectors uses the properties of parallel lines in coordinate geometry. Standard form uses simplifying algebraic expressions when multiplied or divided	Recap/spaced learning/retrieval. Exam practice though targeted lessons and ensuring that students are revising effectively	Recap/spaced learning/retrieval. Exam practice though targeted lessons and ensuring that students are revising effectively	

			Quadratic graphs are used from drawing straight line graphs leading into curves and recognising where a curve intercepts the coordinate axes.			