Long Term Curriculum Map

Subject and Year: Year 7 Mathematics

Specification (KS4/5 only):

VOCABULARY

Dates taught / curriculum time	PRIOR KNOWLEDGE What should they already know / when was this last visited	CORE KNOWLEDGE What will they know at the end of this topic		MISCONCEPTIONS/ THRESHOLD CONCEPTS	AMBITION FOR ALL QUESTIONS	FORMAL ASSESSMENT
		Learn that…	Learn how to…			
HT1 Place value	Understanding of • the number system up to thousands	• Integers are whole numbers with no decimal part	• Read, write and understand the place value of integers up to one billion • Order positive and negative integers and decimals, use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ • Writing inequalities in words • Introduce inequalities on a number line • Introduce bounded inequalities • Decide if a number is odd or even • Use the correct units for length and using a ruler to measure length correctly. • Round numbers and measures to nearest 10, 100, 1000 • Round numbers and measures to decimal places • Estimate after rounding	• Forgetting place holders. E.g. 22 thousand and 5 = 225 • Reading numbers the wrong way e.g. 18 = eighty-one. • Measuring from the end of the ruler and not at the zero mark. • Ordering numbers based on the value of the digits, instead of place value. • (eg 96 > 102 as they have the bigger digits)	• What is an integer? • Can you give me an example of an integer? • What is a decimal? • Can you read this number (e.g. 46553) out loud? • Can you tell me the place value of (e.g. 5 in 16507)? • Can you order (e.g. 4, -7, 13, 29) from smallest to largest? • Can you explain how to use a ruler to measure a line? • Can you round (e.g. 467) to the nearest 10? • Can you round (e.g. 6.5578) to (e.g. 2 decimal places)?	Formal assessment at the end of HT1 X:\Teaching Departments\Maths\Resources 2021-2022\Assessments\HT1 40 marks – mixture of AO1, AO2 and AO3 Formal assessment at the end of HT2 50 marks – mixture of AO1, AO2 and AO3
HT1 Addition and subtraction	Understanding of • methods of addition and subtraction	• Addition can be done in any order (commutative) and subtraction cannot. • A bank statement shows the total credits and debits to a bank account • There is more than one way to give change, create an amount, pay for something	• Add and subtract integers of any size. • Add and subtract positive decimals greater than and less than one and with a different number of decimal places. • Represent addition and subtraction with a variety of different concrete and pictorial methods e.g. bar models, part-whole diagrams. • Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction. • Add and subtract decimals • answer questions where they need to perform an inverse operation involving the addition and subtraction of integers and decimals. • Financial maths – understand bank statements. • Estimate what a certain amount of money will buy (purchasing power) • Convert between pounds and pence. Understand decimal notation for money • Exchange notes for coins • Solve real life money problems	• Putting digits in the wrong position when using column addition. • Forgetting to carry over and leaving a double digit in the answer digit column • 0-6 = 0 in column subtraction- misunderstanding the zero as a place holder.	• Answering any simple adding/subtracting integers question mentally (e.g. 46 + 21) • If you're adding in using the column method and the sum of a column is greater than 10, what should you do? • If you're subtracting in a column and you need to subtract (e.g. 6 from 4), what should you do? • What is an inverse operation? • What is the inverse of multiplying? • What is the inverse of dividing? • What is a bank statement? What does it show? •	

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		Learn that…	Learn how to…			
			• Adding money and change • Compare and count money, including money investigations			
HT1 Multiplication	Understanding of • methods of multiplication and division • the terms factor and multiple • how to find factors and multiples for integers less than 50	• Multiplication is commutative and division is not. • A multiple is the result of multiplying a number by an integer	• Multiply and divide integers and decimals by 10, 100 and 1000 • Multiply integers up to 12x12 using mental methods • Multiply integers of any size, decimals with integers and decimals with decimals. • Confidently use the column method for long multiplication. • Find multiples of any given integer • Find the lowest common multiple LCM of any given integer.	• Multiplying by 10, place a zero on the end. • Incorrect place value when multiplying decimals • Mixing up factors and multiples	• How do you multiply by 10? • How do you divide by 10? • Answering any multiplication fact up to 12x12 (e.g. what is 7 multiplied by 8?)	
HT1 Division	• Understanding that a number can be divided into equal parts • Knowledge of times tables	• Mental and written methods can be used to divide numbers • Division may be referred to as sharing • A factor is a number that divides into another number exactly with no remainder • Divisibility tests can be carried out to see if a number is divisible by another number, without having to do the calculation	• Divide integers of any size by a one-digit whole number where the answer is an integer or a decimal • Divide numbers confidently using the 'bus stop' method • Apply divisibility tests correctly • Find factors of any given integer. • Find the HCF of two whole numbers by listing only at this point.	• Writing the wrong number under the 'bus stop' • Leaving as a remainder rather than a decimal • When using 'bus stop' method leaving a 0 in front of their answer e.g. 16/4 = 04	• Tell me a divisibility rule (what does a number need to end in to be divided by?) • What operation would I apply if someone asked me to share an amount? • Work out (insert division question)	
HT2 Powers and Roots	• Understanding of number skills involving multiplication	• a^2 = a x a, a^3 = a x a x a, etc. up to the power of 5 • a square root is the inverse of squaring • a cube root is the inverse of cubing	• Know powers of 10 and link with multiplying by 10, 100, 100 • Know negative powers of 10 and link with fractions • Calculate square numbers up to 12 • Prove why square numbers are square numbers • Calculate cube numbers up to 5 • Prove why cube numbers are square numbers • Square and cube large numbers and decimals using written methods • Calculate the square and cube roots of numbers • Calculate roots of negatives and decimals • Estimate with square and cube roots	• a^2 = a x 2 • When finding the square root you just halve the number • Squares are always bigger than the original number	• What is (insert number) squared? • What is (insert number) cubed? • What is the square root of (insert number)? • What is the cube root of (insert number)? • What is a square number? • What is a cube number?	

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		Learn that…	Learn how to…			
HT2 Prime Numbers and Factorisation	• Understanding of factors • Understanding of indices and how to use them	• A prime number has 2 factors which are 1 and itself • Numbers can be expressed as a product of primes by using prime factorisation • Each number can be expressed as a product of prime factors in only one way	• Identify prime numbers less than 20 and use methods to determine primes up to 100 • Use power notation in expressing a whole number as a product of its prime factors in index form e.g. 600 = 2^3 x 3 x 5^2	• 1 is a prime number • Prime numbers are only odd numbers • Circling numbers which are not prime when using a prime factor tree	• What is the definition of a prime number? • What are the prime factors of (insert small number)? • What is 2 x 2 x 2 x 3 (or other) in index form? • What is prime factorisation?	
HT2 Negative Numbers	• Basic number skills involving addition, subtraction, multiplication and division	• All positive integers have two square roots • The order of operations are brackets, indices, division and multiplication, addition and subtraction	• Use representations of directed numbers • Order directed numbers using lines and appropriate symbols • Link negatives to real life examples • Perform calculations that cross zero • Confidently add and subtract directed numbers • Confidently multiply and divide directed numbers • Use multiplication of negative numbers to show all positive integers have two square roots • Calculate order of operations with directed numbers • Use of a calculator for directed numbers	• Negative 10 is bigger than negative 2 • A negative number multiplied by a negative number is a negative number • A negative number divided by a negative number is a negative number • There is a positive and negative 0 • Calculations are worked out left to right	• Which is bigger -12 or -7? • What is -7 + 12? • What is 18 – 20? • What is 9 + -4? • What is -5 + -15? • What is 22 - -8? • What is 7 x -8? • What is -12 x -4? • What is -40/10? • What is 12/-6? • What is -24/-4? • What is the order of operations? • What are the multiplication rules for negative numbers? • How many square roots do all positive integers have?	
HT2/3 Fractions	• Understanding of basic number skills involving multiplication and division	• The number on top of a fraction is the numerator • The number on the bottom of a fraction is the denominator • A reciprocal is the fraction flipped e.g. $\frac{3}{4}$ becomes $\frac{4}{3}$ • An improper fraction is a fraction that is 'top heavy' • A mixed number is the combination of a whole number and a fraction • When dividing fractions by fractions you multiply by the reciprocal • Equivalent fractions are equal to each other • To add and subtract fractions we need a common denominator	• Represent fractions on a number line and in pictorial form • Simplify fractions down to their most basic form • Find equivalent fractions and use them in context • Order fractions • Convert confidently between mixed numbers and improper fractions. • Find a fraction of an amount • Express one quantity as a fraction of another • Use equivalent fractions to divide decimal numbers • Multiply a fraction by an integer • Multiply a fraction by a fraction • Multiply mixed numbers by fractions • Use knowledge of fraction multiplication to find fractions of any amounts	• Not realising fractions are divisions • Dividing numbers always makes the answer smaller • Reciprocating both factions when dividing • Only multiplying one part of the fraction when finding an equivalent one • Fractions are not equivalent if they do not have the same denominator	• What is the number on the top of a fraction called? • What is the number on the bottom of a fraction called? • What is a reciprocal? • What is an improper faction? Give an example • What is a mixed number? Give an example • Give an example of a pair of equivalent fractions • What is the first step when dividing fractions?	Formal assessment at the end of HT3 50 marks – mixture of AO1, AO2 and AO3

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		Learn that…	Learn how to…			
			• Calculate reciprocals of integers, fractions, decimals and negative numbers • Divide fractions by integers and integers by fractions • Divide fractions by fractions • Divide mixed numbers by fractions • Apply all fraction skills in problem solving settings • Add and subtract fractions with a common denominator • Find a common denominator for a pair of fractions • Add and subtract fractions with an unlike denominator • Add and subtract mixed numbers • Perform the four operations on negative fractions			
HT3 Percentages	• Understanding of basic number skills • Understanding of fractions and decimals	• Percentages are defined as 'parts per 100' • Percentages have fraction and decimal equivalents • Increasing is getting larger • Decreasing is getting smaller	• Interpret diagrams as percentages and vice versa • Convert between fractions and percentages and vice versa • Convert between decimals and percentages and vice versa • Order a mixture of fractions, decimals and percentages • Calculate key percentages of a quantity (e.g. 50%, 10%, 1% etc) by dividing both with a calculator and without (without the use of multipliers) • Express one quantity as a percentage of another • Increase and decrease by a percentage (without the use of multipliers)	• Percentages cannot be greater than 100 • To find a percentage you divide by that number, e.g. to find 20%, divide by 20 • If you decrease an amount by a percentage, you find that percentage of the number and that is the new amount • E.g. 26%>0.27 because 26>0.27	• What is a percentage? • What is increasing? • What is decreasing? • How can a percentage be expressed? • What is (insert percentage) as a fraction? • What is (insert percentage) as a decimal? • What is 50% of …. • What is 10% of …. • What is 1% of …. • Increase (insert number) by (insert percentage) • Decrease (insert number) by (insert percentage)	Formal assessment at the end of HT4 50 marks – mixture of AO1, AO2 and AO3 including prior content
HT4 Algebra	Some schools teach basic algebra in Year 6 – some not at all - Inequalities on number lines in HT1	• We represent an unknown or a variable with a letter • A term is a variable, a number or the product of variables and numbers • An expression is the combination of at least two terms using operators • An equation is a statement that the values of two mathematical expressions are equal	• Identify different variables, terms, coefficients • Identify differences between expressions, equations, formula, inequalities, terms • Identify like terms • Spot unlike terms • Simplify expressions by collecting like terms • Simplify expressions by multiplying or dividing terms • Write expressions algebraically (e.g. 2 x n = 2n, 3/x as fraction not division) • Expand a single bracket	• Not multiplying by the coefficient when substituting in (e.g. when x=2, 5x = 52) • Adding terms which are not like, e.g. 4x + 3 = 7x • Misconceptions around adding negative numbers, eg 4x + -3x = 7x • "Answers" always need to be on the	• What is a variable? • What is a term? • What is an expression? • What is an equation? • What is a coefficient? • What are like terms? • What is an inequality? • What does it mean to simplify? • What does it mean to expand? • How can inequalities be represented? • Solve (insert equation) • Solve (insert inequality)	

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		Learn that…	Learn how to…			
		• A coefficient is a number multiplier of a term • Like terms have the same unknowns • Inequalities are used to compare the size of numbers or variables • That the symbols >, <, ≥, and ≤ represent inequalities (and how to use them).	• Replace variables with given values, for single and mixed variables, including negative • Recognise the difference between an equation and an identity • Use a function machine to solve simple equations • Solve one and two step equations • Solve equations with brackets and/or fractions • Solve equations with unknowns on both sides • Represent solutions to inequalities on a number line • Solve linear inequalities (including brackets and/or fractions) • Solve bounded inequalities	right hand side of the equals • Dividing by a coefficient before moving a constant to the other side of the equation		
HT4 Sequences	Understanding of • Patterns • Simple number sequences • Continuing sequences • Finding missing terms • Square numbers	• A sequence is a pattern of numbers • An arithmetic sequence has a common difference • A geometric sequence has a common ratio • The term-to-term rule is the operation to go from one term to the next • The nth term rule is the rule that links the position in the sequence to the term • Squared, cubed and triangular numbers are types of sequences (and what the numbers are)	• Continue patterns and sequences • Recognise the pattern between terms • Identify if a sequence is arithmetic or geometric • Find the term to term rule for a sequence • Continue a sequence • Find missing terms in a sequence • Generate sequences from the nth term rule using substitution • Generate a given term (e.g. 50th) of a sequence • Find the zeroth term and the common difference of a sequence • Derive the nth term rule for a linear sequence • Verify if a term is in a sequence • Continue Fibonacci sequences • Give missing terms of a Fibonacci sequence	• Sequences can only go up in a common difference (i.e. adding not multiplying) • Not doing the inverse operation to go backwards in a sequence • Not multiplying by the coefficient when substituting (e.g. 5x = 52 when x = 2)	• What is a sequence? • Name a type of sequence • What is the differences between arithmetic and geometric sequences? • What is the term-to-term rule? • What is the nth term rule? • How do you find the nth term? • How do you generate a given term? • How do you verify a term is in a sequence? • What is a Fibonacci sequence and give an example? •	Formal assessment at the end of HT5 50 marks – mixture of AO1, AO2 and AO3 including prior content
HT5 Geometry (shape)	Understanding of • Shapes in two dimensions • Simple properties of shapes • Finding lines of symmetry • Finding rotational symmetry • Regular and irregular polygons	• We use notation to give information about shapes and what shape notation means • Shapes can either be drawn accurately or not to scale • Vertices are the angular points of a shape • Edges are a line segment on the boundary joining one	• Identify a shape given some properties • Label a shape with the correct notation • Give the rotational order of symmetry of a shape • Identify lines of symmetry in a shape • Identify different types of quadrilaterals and their properties • Identify different types of triangles and their properties	• Mixing up shape notation (e.g. the notation for parallel lines is for equal sides etc) • Not doing different pairs of notches for pairs of equal sides, just doing one notch for all sides	• What are vertices? • What are edges? • What is a polygon? • Is a circle a polygon? Why or why not? • What is line symmetry? • What is rotational symmetry? • What is a four sided shape called? • Name a type of quadrilateral • List some of the properties of (e.g. a square)	

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		vertex (corner point) to another. • Polygons are shapes where all edges are straight • Line symmetry is a line that cuts a shape exactly in half • Rotational symmetry is the number of distinct orientations in which it looks exactly the same for each rotation.			• Name a type of triangle • If a triangle has two equal sides, what is it called?	
HT5 Perimeter and Area of Basic Shapes	• Understanding of multiplication Understanding of basic shapes e.g. what is a triangle	• Perimeter is the distance around the outside of a 2D shape • Area of a square, rectangle and parallelogram is base x height • Area of triangle is $\frac{1}{2}$ x base x height • Area of a trapezium is $(\frac{a+b}{2})$ x height	• Measure the perimeter of any 2D shape using a ruler in centimetres, millimetres and metres. • Calculate the perimeter of any 2D shape (not circles) • Apply formula to find the area of a square • Apply formula to find the area of a rectangle • Apply formula to find the area of a triangle • Apply formula to find the area of a trapezium • Identify the base and height of shapes • Identify 'a' and 'b' in trapeziums • Apply knowledge of shapes to find missing lengths to calculate the area	• Using a side length instead of the perpendicular height • Multiply all lengths given together • Apply the wrong formula • Not thinking a and b are interchangeable	• What is perimeter? • How can we calculate perimeter? • If we have the perimeter of a shape and one missing side length, how could we find the missing length? • What is area? • What is the formula used to calculate the area of a rectangle? • What is the formula used to calculate the area of a parallelogram? • What is the formula used to calculate the area of a triangle? • What is the formula used to calculate the area of a trapezium?	
HT6 Geometry - Angles	Understanding of • Types of angles • How to draw and measure angles using a protractor • Identifying angles which are multiples of 90°	• Angles are the space (measured in degrees) between two intersecting lines at the point where they meet • Angles can be classified as acute, right, obtuse, straight, reflex or a full turn • Angles on a straight-line sum to 180° • Angles around a point sum to 360° • Angles in a triangle sum to 180° • Angles in a quadrilateral sum to 360° •	• Identify types of angles • Read the scale on a protractor • Estimate the size of angles without measuring • Draw and measure acute and obtuse angles • Draw and measure reflex angles by finding the 'missing' angle • Calculate missing angles in straight lines, triangles, quadrilaterals and around a point • Solve equations including angles • Calculate missing angles when combined.	• Measuring from the wrong side of the protractor • Mixing up angle rules • Only subtracting given angle in a rectilinear figure, not all given angles • Obtuse is the largest angle	• How are angles measured? • How many degrees are in a right angle? • What is the angle range for an acute angle? • What is the angle range for an obtuse angle? • What is the angle range between a reflex angle? • What do angles on a straight-line sum to? • What do angles around a point sum to? • What do angles in a triangle sum to? • What do angles in a quadrilateral sum to? •	Formal assessment at the end of HT6 50 marks – mixture of AO1, AO2 and AO3

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		Learn that…	Learn how to…			
HT6 Statistics	• Interpret and present data using bar charts, pictograms, and tables • Interpret and present discrete and continuous data • Read information off tables • Interpret and construct pie charts (90 and 180) and line graphs • Construct tall charts • Sort information into categories	• Primary data is data that is collected by a researcher from first-hand sources • Secondary data is data gathered from studies, surveys, or experiments that have been run by other people or for other research • Quantitative data is numerical information (numbers) • Qualitative data is descriptive information • Discrete data can only take certain values (like whole numbers) • Continuous data can take any value (within a range) • Ordinal data is data that can be ordered and measured • Nominal data is data that cannot be ordered and measured • Sampling is when information is collected from a certain group within a population Hypothesis is a pre-determined estimate Independent variable and control variable is what you are testing and controlling • Frequency is the number of times an event occurs • We can display data in pictograms and bar charts	• Identify different types of data • Explain and apply different sampling methods to given situations • Identify the optimal sampling method for an investigation • How to conduct an experiment • Write numbers in a tally chart • Label axis and title a graph • Draw a pictogram • Use a key • Draw a bar chart for a given set of data • Interpret bar charts and pictograms • Use bar charts and histograms to compare sets of data • Use data from a bar chart or frequency diagram • Understand the difference between bar charts and histograms	• Confusing data types • Quantitative and qualitative data are the same • Primary and secondary data are the same • Not counting the cross in a tally chart as the fifth time • Confusing bar charts and histograms and when each is best used • Using an unrelated key for the displayed data	• What is the difference between primary and secondary data? • What is the difference between quantitative and qualitative data? • What is the difference between discrete and continuous data? • What is the difference between ordinal and nominal data? • What does frequency mean? • Give an example of a sampling method and describe when it would be used • When is a key used in statistics and why is it needed? • Give an example of a technique used to display data • What is the difference between a bar chart and histogram?	