Year 7 and 8 Maths Overview

		HT1 ALGEBRAIC THINKING	HT2 APPLICATIONS OF NUMBER	HT3 DIRECTED NUMBER FRACTIONAL THINKING	HT4 PROPORTIONAL REASONING	HT5 ALGEBRAIC TECHNIQUES	HT6 DEVELOPING NUMBER
		Included in every Maths lesson: Recall multiplication and division facts up to 12×12, and recognise products in multiplication tables as multiples of the corresponding number.					
Learning outcomes/composite knowledge: Pupils will be able to…		**LO1: Sequences (Y7)** To explore sequences **LO2: Understand and use algebraic notation (Y7)** To understand and use algebraic notation **LO3: Equality and Equivalence (Y7)** To form and solve one- step linear equations and to consider equivalence and the difference between this and equality	**LO1: Solving Problems with Addition and Subtraction (Y7)** To solve problems with addition and subtraction **LO2: Solving Problems with Multiplication and Division (Y7)** To solve problems with multiplication and division **LO3: Fractions and Percentages of Amounts (Y7)** To use fractions and percentages to find quantities of amounts	**LO1: Operations and Equations with Directed Number (Y7)** To use operations and equations with directed number **LO2: Addition and Subtraction of Fractions (Y7)** To apply the rules of addition and subtraction of fractions	**LO1: Ratio and Scale (Y8)** To work with ratio and scale **LO2: Multiplicative Change (Y8)** To understand multiplicative change **LO3: Multiplying and Dividing Fractions (Y8)** To apply the rules of multiplying and dividing fractions	**LO1: Brackets, Equations and Inequalities (Y8)** To gain confidence working with brackets, equations and inequalities **LO2: Sequences (Y8)** To generate sequences when given a rule **LO3: Indices (Y8)** To explore powers using the index laws	**LO1: Fractions and Percentages (Y8)** To convert between, and to calculate using fractions, decimals and percentages **LO2: Standard Index Form (Y8)** To investigate and calculate with numbers in standard index form **LO3: Number Sense (Y8)** To solidify number fluency and solve problems using number sense
Knowledge Components	Declarative Knowledge:	**LO1: Sequences (Y7)** • I know what a sequence is. • I know what linear and numerical mean. • I know the difference between linear and non-linear sequences. **LO2: Understand and use algebraic notation (Y7)** • I know what inverse means. • I know the meaning of equality • I know what like and unlike terms are. • I know what substitute means **LO3: Equality and Equivalence (Y7)** • I know the meaning of equivalence. • I know what fact families are	**LO1: Solving Problems with Addition and Subtraction (Y7)** • I know what the properties of addition and subtraction and multiplication and division are • I know what the most appropriate method to use is: mental strategies, formal written or calculator **LO2: Solving Problems with Multiplication and Division (Y7)** • I know what factors and multiples are • I know what the correct order of operations is	**LO1: Operations and Equations with Directed Number (Y7)** • I know what directed numbers are • I know what two-step equations are **LO2: Addition and Subtraction of Fractions (Y7)** • I understand representations of fractions • I know what equivalent fractions are	**LO1: Ratio and Scale (Y8)** • I understand the meaning and representation of ratio and ratio notation • I understand π as the ratio between diameter and circumference **LO2: Multiplicative Change (Y8)** • I understand scale factors as multiplicative representations **LO3: Multiplying and Dividing Fractions (Y8)** • I know what product means • I know what a reciprocal is	**LO1: Brackets, Equations and Inequalities (Y8)** • I know what inequalities are • I can identify formulae, expressions, identities and equations **LO3: Indices (Y8)** • I know what the addition and subtraction law for indices is	**LO1: Fractions and Percentages (Y8)** • I know what methods are appropriate to solve percentage problems **LO2: Standard Index Form (Y8)** • I know what 'powers of 10' means • I know what standard form is **LO3: Number Sense (Y8)** • I know what rounding means • I know what significant figures are • I know what estimate means • I know what the order of operations is • I know what the metric units of weight and capacity are

	Procedural Knowledge:	**LO1: Sequences (Y7)**
		• I know how to describe and continue a sequence given diagrammatically.
		• I know how to predict and check the next term(s) of a sequence
		• I know how to represent sequences in tabular and graphical forms
		• I know how to continue numerical linear and non-linear sequences
		• I know how to explain the term-to-term rule of numerical sequences in words.
		
		LO2: Understand and use algebraic notation (Y7)
		• I know how to find the output of a single function machine
		• I know how to use inverse operations to find the input given the output
		• I know how to use diagrams and letters to generalise number operations
		• I know how to use diagrams and letters with single function machines
		• I know how to substitute values into single operation expressions
		• I know how to find numerical inputs and outputs for a series of two function machines
			LO1: Solving Problems with Addition and Subtraction (Y7)
			• I know how to use mental strategies for addition and subtraction
			• I know how to use formal methods for addition of integers and decimals
			• I know how to use formal methods for subtraction of integers and decimals
			• I know how to solve problems in the context of perimeter
			• I know how to solve financial maths problems
			• I know how to solve problems involving tables and timetables
			• I know how to solve problems with frequency trees, bar charts and line charts
			
			LO2: Solving Problems with Multiplication and Division (Y7)
			• I know how to use factors and multiples
			• I know how to multiply and divide integers and decimals by powers of 10
			• I know how to convert metric measures
			• I know how to use formal methods to multiply integers and decimals
			• I know how to use formal methods to divide integers and decimals
			• I know how to use order of operations
				LO1: Operations and Equations with Directed Number (Y7)
				• I know how to use directed numbers
				• I know how to order directed numbers using lines and appropriate symbols
				• I know how to perform calculations that cross zero
				• I know how to add, subtract, multiply and divide directed numbers
				• I know how to use a calculator for directed number calculations
				• I know how to evaluate algebraic expressions with directed number
				• I know how to solve two-step equations
				• I know how to use order of operations with directed numbers
				
				LO2: Addition and Subtraction of Fractions (Y7)
				• I know how to convert between mixed numbers and fractions
				• I know how to add and subtract fractions:
				  ○ with the same denominator
				  ○ from integers expressing the answer as a single fraction
				  ○ where denominators share a simple common multiple
				  ○ with any denominator
				  ○ that are improper or mixed numbers
					LO1: Ratio and Scale (Y8)
					• I know how to solve problems involving ratios of the for 1:n and n:1
					• I know how to solve proportional problems involving the ratio m:n
					• I know how to divide a value into a given ratio
					• I know how to express ratios in their simplest integer form
					• I know how to compare ratios and related fractions
					
					LO2: Multiplicative Change (Y8)
					• I know how to solve problems involving direct proportion
					• I can explore relationships between similar shapes
					• I know how to draw and interpret scale diagrams
					• I know how to interpret maps using scale factors and ratios
					
					LO3: Multiplying and Dividing Fractions (Y8)
					• I know how to represent multiplication of fractions
					• I know how to multiply a fraction by an integer
					• I know how to find the product of a pair of fractions
						LO1: Brackets, Equations and Inequalities (Y8)
						• I know how to form algebraic expressions
						• I know how to use directed number with algebra
						• I know how to multiply out a single bracket
						• I know how to factorise into a single bracket
						• I know how to expand multiple single brackets and simplify
						• I know how to solve equations, including with brackets
						• I know how to form and solve inequalities
						• I know how to use formulae, expressions, identities and equations
						
						LO2: Sequences (Y8)
						• I know how to generate sequences given a:
						  ○ Rule in words
						  ○ Simple or complex algebraic rule
						
						LO3: Indices (Y8)
						• I know how to add and subtract expressions with indices
						• I know how to simplify algebraic expressions by multiplying and dividing indices
						• I know how to use the addition and subtraction law for indices
							LO1: Fractions and Percentages (Y8)
							• I know how to convert between and calculate with fractions, decimals and percentages with and without a calculator
							• I know how to convert between decimals and percentages greater than 100%
							• I know how to calculate percentage increase and decrease using a multiplier
							• I know how to express one number as a fraction or a percentage of another with and without a calculator
							• I know how to work with percentage change
							
							LO2: Standard Index Form (Y8)
							• I know how to work with numbers:
							  ○ Greater than 1 in standard form
							  ○ Between 0 and 1 in standard form
							• I know how to use positive and negative powers of 10
							• I know how to compare and order numbers in standard form
							• I know how to add, subtract, multiply and divide numbers in standard form
							• I know how to calculate with numbers in standard form, mentally, formally and using a calculator
							• I know how to round numbers to:
							  ○ Powers of 10
							  ○ 1 significant figure

		HT1 **ALGEBRAIC THINKING**	HT2 **APPLICATIONS OF NUMBER**	HT3 **DIRECTED NUMBER** **FRACTIONAL THINKING**	HT4 **PROPORTIONAL REASONING**	HT5 **ALGEBRAIC TECHNIQUES**	HT6 **DEVELOPING NUMBER**
		• I know how to use diagrams and letters with a series of two function machines • I know how to substitute values into two-step expressions • I know how to generate sequences given an algebraic rule • I know how to represent one- and two-step functions graphically **LO3: Equality and Equivalence (Y7)** • I know how to use fact families, numerically and algebraically • I know how to solve one-step linear equations involving +/−/ ×/÷ using inverse operations • I know how to simplify algebraic expressions by collecting like terms, using the ≡ symbol	• I know how to solve problems using the area of rectangles, parallelograms and triangles • I know how to solve problems using the mean **LO3: Fractions and Percentages of Amounts (Y7)** • I know how to find a fraction of a given amount • I know how to use a given fraction to find the whole and/or other fractions • I know how to find a percentage of a given amount using mental methods and a calculator	• I know how to use equivalent fractions • I know how to use fractions in algebraic contexts • I know how to use equivalence to add and subtract decimals and fractions	• I know how to divide an integer/fraction by a fraction • I know how to use the reciprocal • I know how to divide any pair of fractions		○ A given number of decimal places **LO3: Number Sense (Y8)** • I know how to estimate the answer to a calculation • I know how to calculate using the order of operations • I know how to calculate with money • I know how to convert metric units of weight and capacity • I know how to solve problems involving time and the calendar
National Curriculum reference		Link to Mathematics programme of study: key stage 3 – National curriculum in England: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239058/SECONDARY_national_curriculum_-_Mathematics.pdf					
Common misconceptions		Link to Mathematics guidance: Key Stage 3 Non-statutory guidance for the national curriculum in England: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1056795/KS3_NonStatutory_Guidance_Sept_2021_FINAL_NCETM.pdf Contains lots of information and examples of common difficulties and misconceptions per topic					