Year 7 Curriculum Overview

Year 7		HT1	HT2	HT3	HT4	HT5	HT6
Mathematics	Topic	Algebraic Thinking	Place Value & Proportion	Applications of Number	Directed Number & Fractional Thinking	Lines & Angles	Reasoning with Number
	Why this and why now?	**Sequences** Pupils will be used to spotting and developing patterns from primary. This is continued in this unit before developing more formal methods to find the nth term rules. This topic helps to build the idea of linear sequence which is used with equation of a straight line and proportion. The pupils will also use this topic later when they develop techniques with quadratic sequences. **Algebraic Notation** Pupils use their knowledge of function machines from primary to develop algebraic skills in this area. This unit of work is the building block for many units of work as the pupils develop their algebraic skills through their education. Algebra plays a key part	**Place value and ordering integers and decimals** The majority of this material builds on what is taught at primary school. This is an excellent opportunity to secure knowledge and fill in gaps with prior learning. There will be an opportunity to extend pupil knowledge through standard form. This topic is again a building block for many future topics. Pupils being fluent is basic numeracy is important for all future topics as well as having basic skills for life. **Fraction, decimal and percentage equivalence** Again, this topic allows for further depth of material taught at	**Solving problems with addition and subtraction** This material builds on what is taught at primary school. This is an excellent opportunity to secure knowledge and fill in gaps with prior learning. There will be an opportunity to extend pupil knowledge through more complex standard form calculations. This work is further extended in spring term 2 as well as being a basic building block for the entire maths curriculum. **Solving problems with multiplication and division** Again, this topic allows for further depth of material taught at primary. Problems involving trapezia and some algebraic manipulation will also be covered in this topic	**Directed number** This material builds on what is taught at primary school. This is an excellent opportunity to secure knowledge and fill in gaps with prior learning. There will be an opportunity to extend pupil knowledge through looking at solutions to square roots and exploring higher powers and roots. This topic is crucial as a building block for numerous future topics. The pupils have to be fluent with directed number as they attempt more difficult topics in mathematics. (Directed number often causes confusion as it has not been fully understood) **Fractional Thinking** This material builds on what is taught at primary school. This is	**Constructing, measuring and using geometric notation** The pupils will have had limited experience of this topic at primary. It is therefore important to embed these skills at an early stage. This topic is crucial for future geometry work. This topic leads into loci and bearings. **Geometric Reasoning** Pupils will have a basic understanding of triangles and most quadrilaterals but this learning will be supplemented with properties of shapes up to a decagon. Pupils will also become fluent with angles in parallel lines. Pupils have to be fluent with the geometric reasoning as they build skills throughout their schooling. This is important later for circle theorem and geometric proof work	**Developing number sense** Pupils have been taught a number of techniques for numeracy. This topic looks at when best to apply certain techniques. Pupils need to develop a "feel" for mathematics to apply the correct method at the correct time. This is a basic building block for numerous topics in the curriculum moving forward and is crucial especially for pupils who study the foundation course at GCSE. **Sets and probability** Pupils will develop their use of sets and probability in this topic. This will be predominately new learning.

		especially in the Higher mathematics curriculum. **<u>Equalities and Equivalence</u>** The pupils further develop the use of the equals sign and start to solve basic equations. The equivalence sign is also introduced as a new symbol at this stage. Solving basic equations is a building block for numerous topics. It is also an area that is used across different topic areas especially for problem solving and finding unknows.	primary. The decimal topic taught previously can be explored in more depth. Each of these areas is developed in more detail. Many topic areas require fluency in these basic skills. These skills are also essential for A level and calculus.	This work is further extended in spring term 2 and Yr8 Autumn 1 as well as being a basic building block for the entire maths curriculum **<u>Fractions and percentages of amounts</u>** Again, this topic allows for further depth of material taught at primary. The pupils will further extend their knowledge by looking at fractions and percentages greater than 1. This unit of work is further extended in Year 8 Autumn 2.	an excellent opportunity to secure knowledge and fill in gaps with prior learning. There will be an opportunity to extend pupil knowledge through looking at mixed number fractions and extending further to algebraic fractions Again, this topic is crucial as pupils move forward with their mathematics. They need to be fluent with their fraction skills to order to access algebraic manipulation in future years as well as across a variety of numeracy strands.		This is a crucial topic for HCF and LCM work. As we progress through the curriculum more notation will be developed and use of Venn diagrams with more complexity. **<u>Prime numbers and Proof</u>** This unit develops work from primary and builds on the work in the previous unit. This work will help to develop skills for future work on algebraic proof and number sense.
	What is the essential knowledge that needs to be remembered?	**Sequences** Represent sequences in tables and graphs Recognise the difference between linear and non-linear sequences. Explain term-to-term rules in words. **Algebraic Notation** Use inverse operations to find the input given the output	**Place value and ordering integers and decimals** Recognise the place value of any number in an integer up to one billion Understand and write integers up to one billion in words and figures Work out intervals on a number line Position integers on a number line	**Solving problems with addition and subtraction.** Properties of addition and subtraction Mental strategies for addition and subtraction Use formal methods for addition of integers Use formal methods for addition of decimals Use formal methods for subtraction of integers	**<u>Directed number.</u>** Understand and use representations of directed numbers Order directed numbers using lines and appropriate symbols Perform calculations that cross zero Add directed numbers Subtract directed numbers Multiplication of directed numbers	**<u>Constructing, measuring and using geometric notation</u>** Understand and use letter and labelling conventions including those for geometric figures Draw and measure line segments including geometric figures Understand angles as a measure of turn Classify angles	**<u>Developing number sense</u>** Know and use mental addition and subtraction strategies for integers Know and use mental multiplication and division strategies for integers Know and use mental arithmetic strategies for decimals

		Use diagrams and letters with 2 functions machines Find the function machines given a 2-step expression Generate sequences given an algebraic rule Represent 1 and 2 step functions graphically **Equalities and Equivalence** Solve 1 step linear equations involving + / - x / ÷ inverse operations Understand the meaning of like and unlike terms Understand the meaning of equivalence by simplifying algebraic expressions by collecting like terms and using the equivalence symbol ≡	Round integers to the nearest power of ten Compare 2 numbers using $=, \neq, <, >, \leq, \geq$ Order a list of integers Find the range of a set of numbers Find the median of a set of numbers Understand place value for decimals Position decimals on a number line Compare and order any number up to 1 billion Round a number to 1 Standard Form (H) **Fraction, decimal and percentage equivalence** Represent tenths and hundredths as diagrams Represent tenths and hundredths on number lines Interchange between fractional and decimal number lines Convert between fractions and decimals – tenths & hundredths Convert between fractions and decimals – eights and & thousandths (H) Understand the meaning of percentage using a hundred square	Use formal methods for subtraction of decimals Choose the most appropriate method: mental strategies, formal written or calculator Solve problems in the context of perimeter Solve financial maths problems Solve problems involving tables and timetables Solve problems with frequency trees Solve problems with bar charts and line charts **Solving problems with multiplication and division.** Properties of multiplication and division Understand and use factors Understand and use multiples Multiply and divide integers and decimals by powers of 10 Multiply by 0.1 and 0.01 (H) Convert metric units Use formal methods to multiply integers Use formal methods to multiply decimals	Multiplication and division of directed numbers Use a calculator for directed number calculations Evaluate algebraic expressions with directed number Introduction to two step equations Solve two-step equations Use order of operations with directed numbers Understand that positive numbers have more than one **Fractional Thinking.** Understand representations of fractions Convert between mixed numbers and fractions Add and subtract unit fractions with the same denominator Add and subtract fractions with the same denominator Add and subtract fractions from integers expressing the answer as a single fraction Understand and use equivalent fractions Add and subtract fractions where denominators share a	Measure angles up to 180 degrees Draw angles up to 180 degrees Draw and measure angles between 180 and 360. Identify perpendicular and parallel lines Recognise types of triangle Recognise types of quadrilateral Identify polygons up to a decagon Construct triangles SSS Construct triangles using SSS, SAS, ASA Construct more complex polygons Interpret simple pie charts using proportion Interpret pie charts using a protractor Draw pie charts **Geometric Reasoning** Understand and use the sum of angles at a point Understand and use the sum of angles on a straight line Understand and use the equality of vertically opposite angles Know and apply the sum of angles in a triangle Know and apply the sum of angles in a quadrilateral	Know and use mental arithmetic strategies for fractions Use factors to simplify calculations Use estimation as a method for checking mental calculations Use know number facts to derive other facts Use know algebraic facts to derive other facts Know when to use a mental strategy, formal written method or a calculator **Sets and probability** Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection of sets Understand and use the union of sets Understand and use the complement of a set (H) Know and use the vocabulary of probability Generate sample spaces for single events Calculate the probability of a single event Understand and use the probability scale

			Convert fluently between simple fractions, decimals and percentages Use and interpret pie charts Represent any fraction as a diagram Represent fractions on number lines Identify and use simple equivalent fractions Understand fractions as division Convert fluently between fractions, decimals and percentages Explore fractions above 1, decimals and percentages	Use formal methods to divide integers Use formal methods to divide decimals Understand and use order of operations Solve problems using the area of rectangles and parallelograms Solve problems using the area of triangles **<u>Fractions and percentages of amounts</u>** Find a fraction of a given amount Use a give fraction to find the whole or other fractions Find the percentage of a given amount using mental methods Find the percentage of a given amount using a calculator	simple common multiple. Add and subtract fractions with any denominator Add and subtract improper fractions and mixed numbers Use fractions in algebraic contexts Use equivalence to add and subtract decimals and fractions Add and subtract simple algebraic fractions (H)	Solve angle problems using properties of triangles and quadrilaterals Solve complex angle problems Find and use the angle sum of any polygon (H) Investigate angles in parallel lines (H) Understand and use parallel line angle rules Use known facts to obtain simple proofs	Know that the sum of probabilities of all possible outcomes is 1 **<u>Prime numbers and Proof</u>** Find and use multiples Identify factors of numbers and expressions Recognise and identify prime numbers Recognise square and triangular numbers Find common factors of a set of numbers including the HCF Find common multiples of a set of numbers including the LCM Write a number as a product of its prime factors Use a Venn diagram to calculate the HCF and LCM (H) Make and test conjectures Use counterexamples to disprove a conjecture
What is the assessment intent and how will you assess?	The assessment takes place at the end of each fortnight via a low stakes quiz. At the end of each topic students will sit an end of topic assessment. Cumulative half termly assessments will assess learning from class. 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 need to secure their learning in the key areas listed above. This will enable them to progress in the next unit of algebra if these key skills have been secured in long term learning.	Pupils will be confident in areas of numeracy and be fluent with FDP. Assessment will show current performance. This will be further assessed in the future with “Can you still”	Pupils will be secure and fluent with the 4 basic operations in mathematics as well as having a good grasp of fraction and percentage calculations.	Pupils will be secure at using directed numbers in various contexts including algebra. Fractional work will be extended to ensure pupils are confident with	Pupils should be confident with labelling and measuring angle work at the end of this half term. They will also be confident using appropriate mathematics instruments to draw and	Pupils will be able to understand number at a higher level. Their vocabulary will also increase to understand different types of number.	

			questions showing learning embedded into long term learning.	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.	mixed numbers and not just vulgar fractions. 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.	measure geometric shapes and their properties.	
How does it cover the NC?	**Sequences** ▪ Move freely between different numerical, algebraical and diagrammatic representations ▪ Make and test conjectures about patterns and relationships ▪ Use a calculator and other technologies to calculate results accurately and interpret them appropriately ▪ Generate terms of a sequence from a term-to-term rule ▪ Recognise arithmetic sequences ▪ Recognise geometric sequences and appreciate other sequences that arise **Understand and Use Algebraic Notation**	**Place Value and Ordering Integers and Decimals** ▪ Consolidate their understanding of the number system and place value to include decimals. ▪ Understand and use place value for decimals, measures and integers of any size. ▪ Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols $=, \neq, <, >, \leq, \geq$. ▪ Work interchangeably with terminating decimals and their corresponding fractions. ▪ Round numbers to an appropriate degree of accuracy.	**Addition and Subtraction** ▪ Use formal written methods, applied to positive integers and decimals. ▪ Recognise and use relationships between operations including inverse operations. ▪ Derive and apply formulae to calculate and solve problems involving: perimeter. ▪ Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line (or bar) charts for ungrouped data. **Multiplication and Division**	**Operations and Equations with Direct Number** ▪ select and use appropriate calculation strategies to solve increasingly complex problems ▪ use the four operations, including formal written methods, applied to integers, both positive and negative ▪ recognise and use relationships between operations including inverse operations ▪ use square and square roots ▪ use a calculator and other technologies to calculate results accurately and then interpret them appropriately ▪ substitute numerical values into formulae and	**Constructing, measuring and using geometric notation** ▪ Use language and properties precisely to analyse 2-D shapes. ▪ Begin to reason deductively in geometry including using geometrical constructions. ▪ Draw and measure line segments and angles in geometric figures, including interpreting scale drawings. ▪ Describe, sketch and draw using conventional notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons, and other polygons that are reflectively and rotationally symmetric ▪ Use the standard conventions for	**Developing Number Sense** ▪ Consolidate their numerical and mathematical capabilities from KS2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots. ▪ Select and use appropriate calculation strategies to solve increasingly complex problems. ▪ Begin to reason deductively in number and algebra. **Sets & Probability** ▪ Record, describe and analyse the frequency of outcomes of simple probability experiments

		▪ Move freely between different numerical, algebraical and diagrammatic representations. ▪ Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships. ▪ Recognise and use relationships between operations including inverse operations **Equality and Equivalence** ▪ Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships. ▪ Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms ▪ Use approximation through rounding to estimate answers	▪ Describe, interpret and compare observed distributions of a single variable through: the median and the range. ▪ Interpret and compare numbers in standard form. **FDP Equivalence** ▪ Consolidate their understanding of the number system and place value to include decimals, fractions. ▪ Move freely between different numerical representations [for example, equivalent fractions, fractions and decimals]. ▪ Extend their understanding of the number system; make connections between number relationships. ▪ Express one quantity as a fraction of another, where the fraction is less than one and greater than one. ▪ Define percentage as 'number of parts	▪ Use formal written methods, applied to positive integers and decimals. ▪ Recognise and use relationships between operations including inverse operations. ▪ Derive and apply formulae to calculate and solve problems involving: perimeter. ▪ Construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts and pictograms for categorical data, and vertical line (or bar) charts for ungrouped numerical data. **Fractions and Percentages of Amounts** ▪ Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions. ▪ Interpret fractions and percentages as operators.	expressions, including scientific formulae ▪ understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors ▪ simplify and manipulate algebraic expressions to maintain equivalence ▪ understand and use standard mathematical formulae **Addition and Subtraction of Fractions** ▪ move freely between different numerical, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals] ▪ express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1	labelling sides and angles ▪ Construct and interpret pie charts for categorical, ungrouped and grouped numerical data ▪ Identify and construct triangles **Developing geometric reasoning** ▪ Use language and properties precisely to analyse 2-D shapes. ▪ Begin to reason deductively in geometry including using geometrical constructions. ▪ Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right-angles, regular polygons, and other polygons that are reflectively and rotationally symmetric. ▪ Use the standard conventions for labelling sides and angles. ▪ Derive and illustrate properties of	involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale. ▪ Understand that the probabilities of all possible outcomes sum to 1. ▪ Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams. ▪ Generate theoretical sample spaces for single and combined events with equally likely and mutually exclusive outcomes and use these to calculate theoretical probabilities. ▪ Appreciate the infinite nature of the sets of integers, real and rational numbers. **Prime Numbers and Proof** ▪ Use the concepts and vocabulary of prime numbers, factors (or divisors),

		▪ Use algebraic methods to solve linear equations in one variable.	per hundred', interpret percentages as a fraction or a decimal. ▪ Compare two quantities using percentages. ▪ Work with percentages greater than 100%. ▪ Interpret pie charts.		▪ order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, , ≤, ≥ ▪ select and use appropriate calculation strategies to solve increasingly complex problems ▪ use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative ▪ work interchangeably with terminating decimals and their corresponding fractions	triangles, quadrilaterals, circles and other plane figures [for example, equal lengths and angles] using appropriate language and technologies. ▪ Apply angle facts, triangle similarity and properties of quadrilaterals to derive results about angles and sides, and use known results to obtain simple proofs. ▪ Understand and use the relationship between parallel lines and alternate and corresponding angles (H) ▪ Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons (H)	multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property. ▪ Use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4 and 5 ▪ Make and test conjectures about patterns and relationships; look for proofs or counterexamples. ▪ Begin to reason deductively in number and algebra.