MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 3 Long Term Planning Year 7 2023-2024 INTENT:

Faculty Area: Mathematics

Autumn 1 – Algebraic Thinking			
Transition Unit (1 Week) ***Skills:-*** Resilience. Determination. Having a positive work ethic. Development of thinking skills. Recognition that is not a failure to make mistakes and get things wrong – the only failure is in giving up and not learning from them. Importance and expectation that they always do their very best. ***Activities:-*** Introduction of weekly starter activities. Introduction of weekly homework Baseline testing of pupils.			
Knowledge	***Exploring sequences (2 weeks)***	***Understand and use algebraic notation (2 weeks)***	***Equality and equivalence (2 weeks)***
Rationale	Rather than rushing to find rules for nth term, time is spent exploring sequences in detail, using both diagrams and lists of numbers. Technology is used to produce graphs so students can appreciate and use the terms "linear" and "non-linear" linking to the patterns they have spotted. Calculators are used throughout so number skills are not a barrier to finding the changes between terms or subsequent terms. Sequences are treated more formally later in this unit.	The focus here is developing a deep understanding of the basic algebraic forms, with more complex expressions being dealt with later. Function machines are use alongside bar models and letter notation, with time invested in single function machines and the links to inverse operations before moving on to series of two machines and substitution into short abstract expressions.	Students are introduced to forming and solving one-step linear equations, building on their study of inverse operations. The equations met will mainly require the use of a calculator, both to develop their skills and to ensure understanding of how to solve equations rather than spotting solutions. This work will be developed when two-step equations are met in the next place value unit and throughout KS3. The unit finishes with consideration of equivalence and the difference between this and equality, illustrated through collecting like terms.
National Curriculum Content Covered	- Move freely between different numerical, algebraic, graphical and diagrammatic representations - Make and test conjectures about patterns and relationships - use a calculator and other technologies to calculate results accurately and then 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	- Move freely between different numerical, algebraic, graphical 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 - Model situations or procedures by translating them into algebraic expressions - Substitute values in expressions, rearrange and simplify expressions - Use and interpret algebraic notation, including ab in place of $a \times b$ $3y$ in place of $y + y + y$ and $3 \times y$ a^2 in place of $a \times a$ ab in place of $a \times b$ $\frac{a}{b}$ in place of $a \div b$ - Generate terms of a sequence from a term-to-term rule - Produce graphs of linear functions of one variable	- 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 - Use algebraic methods to solve linear equations in one variable
Connections to Previous National Curriculum Content in Y6 (Statutory)	- Generate and describe linear number sequences - Use simple formulae - Describe positions on the full coordinate grid (all 4 quadrants)	- Use simple formulae - Generate and describe linear number sequences - Express missing number problems algebraically - Find pairs of numbers that satisfy number sentences involving two unknowns - Enumerate possibilities of combinations of two variables	- Solve problems which require answers to be rounded to specified degrees of accuracy - Express missing number problems algebraically - Find pairs of numbers that satisfy number sentences involving two unknowns - Enumerate possibilities of combinations of two variables
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Numeracy Ninja Booklets – core calculation/mental skills		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG	Why maths is important? R:\Faculties\Subjects\Maths\2023-2024\Careers Tasks\PiXL Futures - Maths - Year 7 (Short Lesson Starter) TO BE DONE AT THE BEGINNING OF THE YEAR		

MOOR PARK HIGH SCHOOL: CURRICULUM

Autumn 2 – Place Value and Proportion		
Knowledge	***Place value and ordering integers and decimals (3 weeks)***	***Fraction, decimal and percentage equivalence (3 weeks)***
Rationale	In this unit, students will explore integers up to one billion and decimals to hundredths, adapting these choices where appropriate for your groups e.g. standard index form *could* additionally be introduced to students. Using and understanding number lines is a key strategy explored in depth and will be useful for later work on scales for axes. When putting numbers in order, this is a suitable point to introduce both the median and the range, separating them from other measures to avoid getting them mixed up. Rounding to the nearest given positive power of ten is developed, alongside rounding to one significant figure. Decimal places will come later, again to avoid too similar concepts being covered at the same time. Topics from last term such as sequences and equations, will be interleaved into this unit.	Building on the recent work on decimals, the key focus for these three weeks is for students to gain a deep understanding of the links between fractions, decimals and percentages so that they can convert fluently between those most seen in real-life. Focus will be on multiples of one tenth and one quarter whilst more complex conversions could also be introduced. Whilst looking at percentages, pie charts will be introduced. In addition, various forms of representation of any fraction will be studied, focusing on equivalence, in an appropriate depth to the current attainment of students; this will be revisited later in the year. The focus is very much on a secure understanding of the most common fractions under one, but fractions above one can be touched upon.
National Curriculum Content Covered	• 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 =, ≠,<, >, ≤, ≥ • Work interchangeably with terminating decimals and their corresponding fractions • Round numbers to an appropriate degree of accuracy • Describe, interpret and compare observed distributions of a single variable through the median and the range • Interpret and compare numbers in standard form	• 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 1 and greater than 1 • Define percentage as 'number of parts per hundred', interpret percentages as a fraction or a decimal • Compare two quantities using percentages • Work with percentages greater than 100% • Interpret pie charts
Connections to Previous National Curriculum Content in Y6 (Statutory)	- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit - Round any whole number to a required degree of accuracy - Use negative numbers in context, and calculate intervals across 0 - Solve number and practical problems that involve all the above. - Calculate and interpret the mean as an average - Identify the value of each digit in numbers given to 3 decimal places - Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate	- Compare and order fractions, including fractions >1 - Associate a fraction with division and calculate decimal fraction equivalents - Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts - Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison - Interpret and construct pie charts and line graphs and use these to solve problems
Assessment	White Rose Maths skills check at the end of each unit (2 during this period)	
Homework	Numeracy Ninja Booklets – core calculation/mental skills	
Cultural Capital		
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.	
CIAG		

MOOR PARK HIGH SCHOOL: CURRICULUM

Spring 1 – Applications of Number			
Knowledge	***Solving problems with addition and subtraction (2 weeks)***	***Solving problems with multiplication and division (3 weeks)***	***Fractions and percentages of amounts (1 week)***
Rationale	The focus for these two weeks is building on the formal methods of addition and subtraction student have developed at Key Stage 2. All students will look at this in the context of interpreting and solving problems, for those whom these skills are secure, there will be even more emphasis on this. Problems will be drawn from the contexts of perimeter, money, interpreting bar charts and tables and looking at frequency trees. Calculators should be used to check and/or support calculations, with significant figures and equations explicitly revisited.	This allows for the study of forming and solving two-step equations both with and without a calculator. Unit conversions will be the main context as multiplication by 10, 100 and 1000 are explored. As well as distinguishing between multiples and factors, substitution and simplification can also be revised and extended. The emphasis will be on solving problems, particularly involving area of common shapes and finding the mean. Choosing the correct operation to solve to solve a problem will also be a focus. There will be some exploration of the order of operations which will be reinforced alongside much of this content next term when studying directed number.	This short block focuses on the key concept of working out fractions and percentages of quantities and the links between the two. This is studied in depth in Year 8 Spring Term 2 (Fractions and Percentages).
National Curriculum Content Covered	• 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	• Use formal written methods, applied to positive integers and decimals • Select and use appropriate calculation strategies to solve increasingly complex problems • Recognise and use relationships between operations including inverse operations • Use the concepts and vocabulary factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple • Change freely between related standard units (time, length, area, volume/capacity, mass) • Derive and apply formulae to calculate and solve problems involving perimeter and area of triangles, parallelograms and trapezia **[H]** • Substitute numerical values into formulae and expressions, including scientific formulae • Use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • Describe and compare observed distributions of a single variable through the mean	• Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions • Interpret fractions and percentages as operators
Connections to Previous National Curriculum Content in Y6	- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication - Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of long/short division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context - Perform mental calculations, including with mixed operations and large numbers - Use their knowledge of the order of operations to carry out calculations involving the 4 operations - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why - Solve problems involving addition, subtraction, multiplication and division - Identify common factors, common multiples and prime numbers - Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy - Interpret and construct pie charts and line graphs and use these to solve problems - Recognise when it is possible to use formulae for area and volume of shapes - Use simple formulae - Calculate the area of parallelograms and triangles - Calculate and interpret the mean as an average		- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts - Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison
Assessment	White Rose Maths skills check at the end of each unit (3 during this period)		
Homework	Numeracy Ninja Booklets – core calculation/mental skills		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG			

MOOR PARK HIGH SCHOOL: CURRICULUM

Spring 2 –	***Directed Number***	***Fractional Thinking***
Knowledge	***Operations and equations with directed number (3 weeks)***	***Addition and subtraction of fractions (3 weeks)***
Rationale	Students will only have had limited experience of directed number at primary school, so this block is designed to extend and deepen their understanding of this. Multiple representations and contexts will be used to enable students to appreciate the meaning behind operations with negative integers rather than relying on a series of potentially confusing "rules". As well as exploring directed number in its own right, this block provides valuable opportunities for revising and extending earlier topics, notably algebraic areas such as substitution and the solution of equations; in particular students will be introduced to two-step equations for the first time in this block. ***Interleaving/Extension of previous work*** • Use conventional notation for the priority of operations • Forming and solving linear equations, including two-step equations	This block builds on the Autumn term study of "key" fractions, decimals and percentages. It will provide more experience of equivalence of fractions with any denominators and to introduce the addition and subtraction of fractions. Bar models and concrete representations will be used extensively to support this. Adding fractions with the same denominators will lead to further exploration of fractions greater than one. Where judged appropriate, adding and subtracting with different denominators will be restricted to cases where one is a multiple of the other. ***Interleaving/Extension of previous work*** • Finding the range and the median • Substitution into algebraic formulae • Forming and solving linear equations, including two-step equations
National Curriculum Content Covered	• 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 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	• 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 • 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
Connections to Previous National Curriculum Content in Y6	- Use negative numbers in context, and calculate intervals across 0 - Use their knowledge of the order of operations to carry out calculations involving the 4 operations	- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination - Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
Assessment	White Rose Maths skills check at the end of each unit (2 during this period)	
Homework	Numeracy Ninja Booklets – core calculation/mental skills	
Cultural Capital		
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.	
CIAG		

MOOR PARK HIGH SCHOOL: CURRICULUM

Summer 1 – Lines and Angles		
Knowledge	***Constructing Measuring and Using Geometric Notation (3 weeks)***	***Developing Geometric Reasoning (3 weeks)***
Rationale	Students will build on their KS2 skills using rulers, protractors and other measuring equipment to construct and measure increasingly complex diagrams using correct mathematical notation. This will include three letter notations for angles, the use of hatch marks to indicate equality and the use of arrows to indicate parallel lines. Pie charts will be studied here to gain further practice at drawing and measuring angles. ***Interleaving/Extension of previous work*** • Revisit four operations	This block covers basic geometric language, names and properties of types of triangles and quadrilaterals, and the names of other polygons. Angles rules will be introduced and used to form short chains of reasoning. If judged appropriate pupils will take this further, investigating and using parallel line rules. ***Interleaving/Extension of previous work*** • Forming and solving linear equations • Revisiting addition and subtraction, including decimals
National Curriculum Content Covered	• 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 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 • Construct and interpret pie charts for categorical, ungrouped and grouped numerical data • Identify and construct triangles	• 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 triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • 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)**
Connections to Previous National Curriculum Content in Y6	- Draw 2-D shapes using given dimensions and angles - Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons - Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles - Interpret and construct pie charts and line graphs and use these to solve problems	
Assessment	White Rose Maths skills check at the end of each unit (2 during this period)	
Homework	Numeracy Ninja Booklets – core calculation/mental skills	
Cultural Capital		
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.	
CIAG		

MOOR PARK HIGH SCHOOL: CURRICULUM

Summer 2 – Reasoning with Number			
Knowledge	***Developing Number Sense (2 weeks)***	***Sets and Probability (2 weeks)***	***Prime Numbers and Proof (2weeks)***
Rationale	Students will review and extend their mental strategies with a focus on using a known fact to find other facts. Strategies for simplifying complex calculations will also be explored. The skills gained in working with number facts will be extended to known algebraic facts. ***Interleaving/Extension of previous work*** • Generating and describing sequences • Substitution into expressions • Order of operations	FDP equivalence will be revisited in the study of probability, where students will also learn about sets, set notation and systematic listing strategies. ***Interleaving/Extension of previous work*** • FDP equivalence • Forming and solving equations • Adding and subtracting fractions	Factors and multiples will be revisited to introduce the concept of prime numbers. If judged appropriate this will include using Venn diagrams from the previous block to solve more complex HCF and LCM problems. Odd, even, prime, square and triangular numbers will be used as the basis of forming and testing conjectures. The use of counterexamples will also be addressed. ***Interleaving/Extension of previous work*** • Generating and describing sequences • Factors and multiples
National Curriculum Content Covered	• Consolidate their numerical and mathematical capability from key stage 2 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	• Record, describe and analyse the frequency of outcomes of simple probability experiments 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	• Use the concepts and vocabulary of prime numbers, factors (or divisors), 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, 5 • Make and test conjectures about patterns and relationships; look for proofs or counterexamples • Begin to reason deductively in number and algebra
Connections to Previous National Curriculum Content in Y6	- Perform mental calculations, including with mixed operations and large numbers - Use their knowledge of the order of operations to carry out calculations involving the 4 operations - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why - Solve problems involving addition, subtraction, multiplication and division - Identify common factors, common multiples and prime numbers - Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination - Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions - Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts - Solve problems involving addition, subtraction, multiplication and division - Identify common factors, common multiples and prime numbers	- Solve problems involving addition, subtraction, multiplication and division - Identify common factors, common multiples and prime numbers - Perform mental calculations, including with mixed operations and large numbers
Assessment	White Rose Maths skills check at the end of each unit (3 during this period)		
Homework	Numeracy Ninja Booklets – core calculation/mental skills		
Cultural Capital			
Literacy	Mathematical key terms/vocabulary for each unit.	Correct terminology used when answering questions.	Read and understand written questions.
CIAG			