



Golden Threads

- There are six key areas of study throughout – Number, Algebra, Ratio and Proportion, Geometry and Measure, Probability, and Statistics. Whilst these areas can appear distinct, students are encouraged to see the connections across mathematical ideas. We also look to develop their fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

Enrichment

- UKMT Junior Maths Challenge
- Weekly puzzle club
- Careers links

Review and Evaluation

July 2024

	Topics & Substantive Knowledge	Assessment	Misconceptions	Key Vocabulary	Knowledge Tracking
Term 1	<h3>Sequences</h3> <p>Rather than rushing to find rules for nth term, this topic explores sequences in detail using both diagrams & lists of numbers:</p> <ul style="list-style-type: none"> Describe & continue a sequence given diagrammatically Recognise the difference between linear & non-linear sequences Generate terms of a sequence from a term-to-term rule 	End of Term 1 – In class, 45minute assessment on the first three blocks of learning.	<p>Students may confuse the coefficient of n with the constant term in the nth term rule.</p> <p>Students may use a positive n when the sequence is decreasing.</p>	Ascending Commutative Descending Equation Evaluate Expression Geometric Identity Inverse Linear Non-linear Operation Substitute Variable	<p>Already Seen: In KS2 students should</p> <ul style="list-style-type: none"> - recognise, describe and generate linear number sequences and find the term-to-term rule. - use simple formulae - express missing number problems algebraically - find pairs of numbers that satisfy an equation with two unknowns - enumerate possibilities of combinations of two variables. <p>To Build Towards: Year 7 Term 3/4 – substituting & solving more complex equations, incl. with negative numbers Year 8 Term 3 - More complex nth term rules)</p>
	<h3>Algebraic Notation</h3> <p>The focus of this topic is developing a deep understanding of the basic algebraic forms. Function machines are used alongside bar models & letter notation.</p> <ul style="list-style-type: none"> Substitute values in expressions, rearrange & simplify expressions Use & interpret algebraic notation Generate sequences given an algebraic rule Represent one and two-step functions graphically 		<p>Believing that a letter can only stand for one particular number, different letters must stand for different numbers or letters can only stand for whole numbers.</p> <p>Confusing the variable, x with the operation, x.</p>		
	<h3>Equality and Equivalence</h3> <p>In this topic students are introduced to forming and solving one-step-linear equations, building on their study of inverse operations.</p> <ul style="list-style-type: none"> Use diagrams & letters to generalise number operations Understand & use fact families, numerically & algebraically Simplify & manipulate algebraic expressions by collecting like terms 		<p>Treating unlike terms as if they are like terms.</p> <p>Misunderstanding of what the equal sign represents: equality Vs do something.</p>		



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Term 2	<p>Place value and ordering numbers</p> <p>In this unit students will explore integers up to one billion & decimals to hundredths. Using & understanding number lines is a key strategy explored in depth:</p> <ul style="list-style-type: none"> • Understand & use place value for decimals, measures & integers of any size • Order positive & negative integers, decimals & fractions • Round numbers to an appropriate degree of accuracy • Find the Range & the Median of a set of numbers • Interpret & compare numbers in standard form (H) 	End of Term 2 – In class, 45minute assessment all Term 1 & 2 topics.	Seeing a digit as a number in its own right and not as a quantity where the value of each digit is determined by its place value	Convert Decimal Denominator Equivalent Improper Integer Interval Median Mixed number Numerator Range Round Significant figure	<p>Already Seen: In KS2, students will have covered place value extensively and the FDP equivalence. The have not seen the range or median (only the mean).</p> <p>To Build Towards: This knowledge underpins a vast range of topics. Year 7 Term 4 – Calculating with fractions.</p>
	<p>Fraction, decimal and percentage equivalence</p> <p>Building on the recent work on decimals, the key focus for this topic is for students to gain a deep understanding of the links between fractions, decimals and percentages so they can convert fluently between those most commonly seen in real-life.</p> <ul style="list-style-type: none"> • Represent fractions & decimals on a number line • Convert fluently between fractions decimals & percentages • Use & interpret basic pie charts • Identify and use simple equivalent fractions 		<p>Believing that fractions can be converted into decimals by essentially taking the numerator & denominator and just squidding them together separated by a decimal point.</p> <p>Students often consider percentages to be limited to 100%.</p> <p>The value of the frequency being used as the value of the angle in a Pie Chart.</p>		



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Term 3	<p>Addition and Subtraction</p> <p>The focus of this topic is building on the formal methods of addition and subtraction students have developed at Key Stage 2. Students will look at this in the context of interpreting and solving problems involving perimeter, money, bar charts and tables.</p> <ul style="list-style-type: none"> Use formal written methods, applied to positive integers and decimals Solve problems in the context of perimeter, financial maths, tables, bar charts and frequency trees Add and subtract numbers in standard form (H) 	End of Term 3 – In class, 45minute assessment on the three Term 3 blocks of learning.	Wrong place values used when adding or subtracting	Area Average Convert Denominator Equivalent Factors Mean Multiples Numerator Parallel Parallelogram Perpendicular Product Trapezium	<p>Already Seen: KS2 – formal methods of addition/ subtraction of integers and decimals. Understanding of perimeter.</p> <p>To Build Towards: Y8 Term 4 – Standard Form</p>
	<p>Multiplication and Division</p> <p>This topic focuses on multiplication & division. Students will understand how to form & solve two-step equations, convert units & solve problems in the context of perimeter & area.</p> <ul style="list-style-type: none"> Use formal written methods, applied to positive integers & decimals Understand and use factors and multiples Convert metric units Understand & use order of operations Solve problems involving area & perimeter of 2D shapes Solve problems using the mean Explore multiplication and division in algebraic expressions 		Believing that multiplication makes it bigger and dividing make it smaller.		<p>Already Seen: KS2 – multiplication/division of integers and decimals. Area of basic 2D shapes. Understanding of the mean, basic order of operations etc.</p> <p>To Build Towards: Yr8 Term 3 – Further algebra.</p>
	<p>Fractions and Percentages of amounts</p> <p>This block focuses on the key concept of working out fractions and percentages of quantities and the links between the two.</p> <ul style="list-style-type: none"> Find fractions of amounts Find a percentage of an amount using both mental methods and a calculator 		Not putting brackets around negative numbers when squaring them on a calculator		<p>Already Seen: KS2 – non-calculator methods for fraction & % of an amount.</p> <p>To Build Towards: Y8 Term 4 – Multipliers for percentages, finding the original.</p>



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Term 4	<p>Operations & Equations with Directed Number</p> <p>This block is designed to extend and deepen the students understanding of directed number as they will have limited experience of this from primary school.</p> <ul style="list-style-type: none"> Use the four operations, including formal written methods, applied to integers, positive and negative Use square and square roots (incl. the use of a calculator to calculate results) Substitute numerical values into formulae and expressions Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors Simplify and manipulate algebraic expressions to maintain equivalence 	End of Term 4 – In class, 45minute assessment all Term 3 & 4 topics.	Meaning behind negative numbers and consideration to when two negatives equal a positive.	Ascending Commutative Denominator Descending Evaluate Expression Inverse Numerator Product Solve Substitute	<p>Already Seen:</p> <p>KS2 – interpret negative numbers in context, count forwards and backwards with positive and negative numbers and calculate intervals across zero. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature.</p> <p>Year 7 Term 1 – Substitution and solving equations with positive numbers.</p> <p>To Build Towards:</p> <p>Year 8 Term 1 - Mixed Fractions Year 8 Term 4 - Order of Operations Year 9 Term 3 - Fraction Arithmetic</p>
	<p>Adding and Subtracting Fractions</p> <p>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 denominator, and to introduce the addition and subtract of fractions.</p> <ul style="list-style-type: none"> Convert Fractions, Decimals & Percentages Express one quantity as a fraction of another, where the fraction is < 1 and > 11 Order positive and negative integers, decimals and fractions 		Common denominators are needed to add and subtract fractions.		



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Term 5	<p>Construction, measurement & notation</p> <p>Students will build on their KS2 skills using rulers and protractors to construct and measure increasingly complex diagrams:</p> <ul style="list-style-type: none"> Draw and measure angles and triangles Identify types of triangles and polygons using appropriate mathematical language Construct and interpret Pie Charts 	<p>End of Term 5 – In class, 45minute assessment on the two Term 5 blocks of learning.</p>	<p>Reading off the wrong scale on the protractor.</p>	<p>Frequency Parallel Perpendicular Regular Vertex</p>	<p>Already Seen: KS2 – use of ruler and protractor</p> <p>To Build Towards: Year 9 Term 2 - Constructions</p>
	<p>Geometric reasoning</p> <p>This topic covers basic geometric language, names and properties of types of triangles and quadrilaterals and the names of other polygons:</p> <ul style="list-style-type: none"> Apply angle facts to solve problems involving angles in: straight lines, around a point, in a triangle, in quadrilaterals and in parallel lines. Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon. 		<p>Distinguishing between Hatch Marks to identify equality and Arrows to identify parallel lines.</p> <p>Adding all angles on the same line together even if they are in different places.</p>		<p>Already Seen: KS2 – properties of key 2D shapes, basic angle facts</p> <p>To Build Towards: Year 9 Term 2 - Constructions</p>
Term 6	<p>Developing number sense</p> <p>Using mental strategies on using a known fact to find other facts:</p> <ul style="list-style-type: none"> Employ decimals, fractions, powers and roots to solve problems. Begin to reason deductively using number and algebra 	<p>End of Term 6 – End of Year assessment on all Year 7 topics. In class - 45minutes.</p>	<p>When multiplying two numbers, thinking that halving each number and then multiplying is equivalent rather than halving one and doubling the other one.</p> <p>Lack of understanding of the Venn Diagram and particularly the intersect section.</p>	<p>Complement Counterexample Element Factor Intersection Multiple Mutually Exclusive Prime Number Sample Space Set (Universal) Union</p>	<p>Already Seen: Building on a range of Year 7 knowledge</p> <p>To Build Towards: A golden thread through multiple topics</p>
	<p>Sets and probability</p> <p>Students will learn about Sets, Set notation & probability:</p> <ul style="list-style-type: none"> Use appropriate language of probability and use the probability scale of 0 to 1 to solve problems. Construct and interpret Venn diagrams 		<p>Already Seen: N/A</p> <p>To Build Towards: Year 8 Term 6 - Probability</p>		
	<p>Prime numbers and proof</p> <p>Revisit factors and multiples to introduce the concept of Prime numbers:</p> <ul style="list-style-type: none"> Use factor knowledge to identify Prime Numbers Forming and testing conjectures 		<p>Already Seen: Year 7 Term 3 – Factors/Multiples</p> <p>To Build Towards: Year 9 Term 3 – Prime Factorisation</p>		