

# CURRICULUM MAP (Long term plan)

SUBJECT: Maths

YEAR GROUP 7

	Cycle 1 Autumn	Cycle 2 Spring	Cycle 3 Summer
<b>Substantive knowledge</b> – Essential knowledge & conceptual understanding of the National Curriculum	Number and Proportion <b>NP1 – Place Value &amp; the Number Line</b> <b>NP2 – Addition &amp; Subtraction</b> <b>NP3 – Multiplication &amp; Division</b>	Number and Proportion and Algebra <b>NP4 – Powers, Roots and Primes</b> <b>NP5 – Order of Operations</b> <b>NP6 – Directed Number</b> <b>A1 – Introduction to Algebraic Thinking</b>	Number and Proportion, Algebra and Geometry <b>NP7 – Fractions</b> <b>NP8 – Percentages, Fractions and Decimals</b> <b>A2 – Manipulating and Simplifying Expressions 1</b> <b>GM1 – Drawing, Measuring and Constructing</b>
<b>Disciplinary knowledge</b> - what skills are practised?	<b>NP1 – Place Value &amp; the Number Line:</b> <ul style="list-style-type: none"> <li>- Writing integers and decimals in expanded form and in words.</li> <li>- Ordering positive integers and decimals, placing on a number line.</li> <li>- Ordering positive and negative numbers, placing on a number line, symmetry of the number line about 0.</li> <li>- Multiplying/dividing by positive and negative powers of 10.</li> <li>- Rounding 'to the nearest', d.p. and s.f.</li> <li>- Common metric conversions.</li> <li>- Finding the midpoint of two numbers.</li> <li>- The median of discrete data and working in different bases (e.g. binary).</li> </ul>	<b>NP4 – Powers, Roots and Primes:</b> <ul style="list-style-type: none"> <li>- Squares to <math>15^2</math> and cubes to <math>10^3</math> by heart.</li> <li>- Calculating powers, evaluating numerical expressions with powers, understanding index form.</li> <li>- Roots as inverses of powers.</li> <li>- Addition and subtraction rules with positive indices.</li> <li>- Prime numbers, product of primes, using the primes as building blocks (Fundamental Theorem of Arithmetic).</li> <li>- Applying the prime factorisation to find the factors of (large) numbers, intro to HCF with primes.</li> </ul> <b>NP5 – Order of Operations:</b> <ul style="list-style-type: none"> <li>- Commutativity and fluency in calculation.</li> </ul>	<b>NP7 – Fractions:</b> <ul style="list-style-type: none"> <li>- Concept of a fraction, multiple visual representations - shading shapes, bar models, placing on a number line.</li> <li>- Proper and improper fractions.</li> <li>- Equivalent fractions, simplifying fractions, comparing the size of fractions through common denominator or common numerator.</li> <li>- Complement of a fraction (able to find <math>1-p</math>, given <math>p</math>).</li> <li>- Adding and subtracting fractions, including proper, improper and mixed.</li> <li>- Fraction of an amount by a bar model, expressing one number as a fraction of another, find original amount if you know a fraction of it.</li> </ul>

	<p><b>NP2 – Addition &amp; Subtraction:</b></p> <ul style="list-style-type: none"> <li>- Strategies for addition and subtraction of positive integers and decimals, including counting up/down in different intervals (incl. decimals).</li> <li>- Complement of a decimal (able to find 1-p, given p).</li> <li>- Inverting addition and subtraction, additive inverse, additive identity.</li> <li>- Using the commutative and associative laws to help calculation.</li> <li>- Extending additive number sense to unknowns, working with equality.</li> <li>- Zero pairs.</li> <li>- Finding the perimeter of a polygon.</li> <li>- Basic angle facts (straight line, round a point, vertically opposite, in a triangle).</li> <li>- Mean &amp; range of a dataset and applications &amp; problems, including money problems and using different bases, continuing linear sequences.</li> </ul> <p><b>NP3 – Multiplication &amp; Division:</b></p> <ul style="list-style-type: none"> <li>- Multiplication tables to 12x12.</li> <li>- Mental and written strategies for multiplication of positive integers and decimals, formal and informal techniques, commutativity, associativity and distributivity.</li> <li>- Multiples and LCM (by systematic listing).</li> <li>- Division of positive integers and decimals, writing division as a fraction, formal and informal techniques, incl. distributivity.</li> </ul>	<ul style="list-style-type: none"> <li>- Order of operations with the four operations.</li> <li>- Order of operations including exponents.</li> <li>- Breaking the order of operations with brackets.</li> <li>- Writing numerical expressions using the order of operations, practice with integers and decimals.</li> </ul> <p><b>NP6 – Directed Number:</b></p> <ul style="list-style-type: none"> <li>- Negative numbers in context (temperature, finance) and on a number line (vertical and horizontal).</li> <li>- Ordering positive and negative numbers, using symbols, placing on a number line.</li> <li>- Addition of directed numbers.</li> <li>- Subtraction of directed numbers (as addition of additive inverse).</li> <li>- Symmetry of subtraction (<math>a-b=n</math>, <math>b-a=-n</math>).</li> <li>- Multiplication and division with negative numbers.</li> <li>- Powers of negative numbers.</li> <li>- Order of operations with negatives.</li> <li>- Applications (contextual) and problems.</li> </ul> <p><b>A1 – Introduction to Algebraic Thinking:</b></p> <ul style="list-style-type: none"> <li>- Generalising number to algebra, concept of an 'unknown variable'.</li> <li>- Simplifying simple additive linear expressions with no more than three variables.</li> </ul>	<ul style="list-style-type: none"> <li>- Multiplying and dividing fractions, fraction of an amount (incl. fractions of fractions) with link to multiplying.</li> <li>- Increasing and decreasing by a fraction by multiplying.</li> <li>- Multiplication of a number by its reciprocal gives 1.</li> <li>- Order of operations with fractions.</li> <li>- Problems: worded fraction problems and binary fractions.</li> </ul> <p><b>NP8 – Percentages, Fractions and Decimals:</b></p> <ul style="list-style-type: none"> <li>- Equivalence of FDP, techniques to convert, ordering FDP.</li> <li>- Recurring and terminating decimals.</li> <li>- Multiple representations of % - shading shapes, bars.</li> <li>- % of an amount, percentages greater than 100%.</li> <li>- Percentage of an amount with decimal multipliers.</li> <li>- Expressing one number as a % of another.</li> <li>- Percentage increase and decrease (finding the % and adding/subtracting), fraction increase and decrease.</li> <li>- The effect of multiplying by numbers between 0 and 1 compared with numbers greater than 1 and applications.</li> <li>- Problems, including interpreting pie charts and simple interest.</li> </ul>
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	<ul style="list-style-type: none"> <li>- Divisibility rules.</li> <li>- Inverse operations, multiplicative inverse creating the multiplicative identity, non-commutativity and non-associativity of division.</li> <li>- Extending multiplicative and additive number sense to unknowns.</li> <li>- Factors and HCF (by systematic listing), coprime numbers.</li> <li>- Multiplicative reasoning: getting from one number to another by multiplying - rectilinear area - volume of cubes and cuboids and volume of cubes and cuboids.</li> </ul>	<ul style="list-style-type: none"> <li>- Solving simple 'unknown value' problems, using a range of symbols, including blank boxes and letters.</li> <li>- Substituting numbers for variables presented as a range of symbols, including blank boxes and letters.</li> </ul>	<p><b>A2 – Manipulating and Simplifying Expressions 1:</b></p> <ul style="list-style-type: none"> <li>- Algebraic notation - <math>ab</math> for <math>a*b</math>, <math>3y</math> for <math>y+y+y</math> and <math>3*y</math>, <math>a^4</math> for <math>a*a*a*a</math>, <math>a^2b</math> for <math>a*a*b</math>, <math>a/b</math> for division, coefficients as fractions not decimals, where brackets can be implied.</li> <li>- Collecting like terms.</li> <li>- Simplifying indices and coefficients when multiplying and dividing, multiplication rule for indices (power of a power).</li> <li>- Writing algebraic expressions.</li> </ul> <p><b>GM1 – Drawing, Measuring and Constructing:</b></p> <ul style="list-style-type: none"> <li>- Points, lines, rays and segments, using a ruler to measure lines, labelling segments correctly.</li> <li>- Using a protractor to measure angles, labelling angles correctly, type of angles, estimating angles.</li> <li>- Using a compass to draw circles and arcs.</li> <li>- Construct an equilateral triangle and a hexagon (60/120-degree angles).</li> <li>- Constructing triangles given SSS, SAS, ASA.</li> <li>- Constructing a perpendicular bisector, perpendicular from a point on/to a line, angle bisector, know that the shortest distance from a point to a line is the perpendicular, constructing a parallel line.</li> <li>- Constructing 30, 45, 90 angles.</li> </ul>
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<b>Key questions</b> (What is the learning about?)	Can students understand the difference between rounding to decimal places, powers of 10 and significant figures? Have students got secure methods for the four operations with whole numbers and decimals? Are students able to apply four operations knowledge to real life problems? Can students recognise that multiplicative reasoning applies to shape as well as calculations?	Can students differentiate between composite and prime numbers? Are students able to apply BIDMAS knowledge throughout the curriculum? Can students use the four operations with both positive and negative integers? Are students able to recognise and use relationships between operations including inverse operations?  Can students use algebra to generalise the structure of arithmetic, including formulating maths relationships?	Have students got secure methods for the four operations with whole numbers and fractions? Can students convert fluently between fractions, decimals and percentages? Are students able to manipulate and simplify expressions? Can students use a compass and a protractor with confidence? Are students able to use the standard conventions for labelling lines and angles?
<b>Assessment</b>	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: Place Value and the Number Line; Addition & Subtraction and Multiplication & Division. EOTT	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: Powers, Roots and Primes, Order of Operations, Directed Number and Introduction to Algebraic Thinking. EOTT	Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: Fractions, Percentages, Fractions and Decimals, Manipulating and Simplifying Expressions 1, Drawing, Measuring and Constructing. EOYT
<b>Literacy (L), Numeracy (N), Oracy (O) opportunities</b>	Word problems presented to students each lesson where they have to understand the mathematical vocabulary to solve the problems. Answers to questions posed by the teachers are answered using mathematical language with reasoning where appropriate developing key vocabulary and confidence in talking mathematically. Peer on peer support when answering questions in class. Key words are displayed at the beginning of a new lesson. Spellings are corrected during live marking and book reviews.		
<b>Cross Curricular Opportunities</b>	Links to Citizenship and money.	Directed number has links to Science (temperature). Algebra with ICT.	Drawing, measuring and constructing has links to DT and Art.

<b>SMSC / Character/Careers/Cultural Capital</b> (personal development)	<p><b>Spiritual</b> - In Maths lessons we aim to give all students an appreciation of the richness and power of maths and opportunities to develop deep thinking through problem solving and a safe place to question each other's methods or way of working.</p> <p><b>Moral</b> - Across the school, we encourage respect including teaching the value of listening to others views and opinions on problem solving. Students know it is okay to make mistakes and know this is how we learn; we encourage students to find their specific errors and then learn from these leading to deeper learning.</p> <p><b>Social</b> - In classrooms, we look for opportunities for pupils to use mini-whiteboards to promote self-esteem and build self-confidence. Collaborative learning in the classroom is encouraged in the form of listening and learning from each other which develops their mathematical voice and logical reasoning skills. We participate in team maths challenges for increased pupil involvement.</p>		
<b>Equality and Diversity</b>	Diverse representation used with slides presented to students. Maths display boards has a Mathematician of the Month and also Famous Mathematicians from Around the World.		
<b>Super Curriculum</b> (personal development)	F1 Maths in Motion Club UKMT Challenge Dr Frost Maths TT Rockstars	F1 Maths in Motion Club UKMT Challenge Dr Frost Maths TT Rockstars	F1 Maths in Motion Club and Trip UKMT Challenge Dr Frost Maths TT Rockstars