

Hampshire Medium Term Plans for Mathematics: Year 5

Term	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Half Term	Wk7	Wk8	Wk9	Wk10	Wk11	Wk12	End of Term		
Autumn	A1			B1				M1	C1			D1				
Spring	A2			B2				M2	C2			D2			M3	
Summer	A3			B3					C3			D3			M4	

Content common to all blocks	Block A	Block B	Block C	Block D
Fluency (Place value and a sense of number) Problem solving Reasoning	Addition and subtraction (for whole and part numbers) Geometry and Measure	Multiplication and division (for whole and part numbers) Statistics and Measure	Addition and subtraction (for whole and part numbers) Geometry and Measure	Multiplication and division (for whole and part numbers) Statistics and Measure

Notes

- Assessment Milestones (M1-4) based on HAM phase model, KPIs and end of year expectations.
- Big Ideas taken from NCETM Assessment for Mastery documents
- The use of concrete, pictorial and abstract multiple representations for number and calculation is implicit in every lesson.
- Recording should always show a range of representations including, as appropriate, the number line; use of Dienes, Numicon, Cuisenaire etc.; arrays; bar models; informal jottings; different ways to solve the same problem using the child's own recording methods and more formal methods when ready.

It is better to have five ways to solve one problem, than one way to solve five.

Can you: Say it; make it; draw it; write it; explain it?

Five Questions to support mathematical thinking

- **If you know this, then what else do you know?**
- **Can you give me an example of.... and another....and another...?**
- **What if you change....?**
- **Which is harder and which is easier.....?**
- **What is the same and what is different?**

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The Big Ideas in Mathematics: Y4: NCETM	
Number and PV	<ul style="list-style-type: none"> Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones. It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold.
Addition and Subtraction	<ul style="list-style-type: none"> Before starting any calculation it is helpful to think about whether or not you are confident that you can do it mentally. For example, $3689 + 4998$ may be done mentally, but $3689 + 4756$ may require paper and pencil. Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example $3682 - 2996$ is equivalent to $3686 - 3000$ (constant difference).
Multiplication and Division	<ul style="list-style-type: none"> Pupils have a firm understanding of what multiplication and division mean and have a range of strategies for dealing with large numbers, including both mental and standard written methods. They see the idea of factors, multiples and prime numbers as connected and not separate ideas to learn. They recognise how to use their skills of multiplying and dividing in new problem solving situations. Fractions and division are connected ideas: $36 \div 18 = 36/18 = 2$; $18/36 = 1/2$ Factors and multiples are connected ideas: 48 is a multiple of 6 and 6 is a factor of 48.
Fractions	<ul style="list-style-type: none"> Representations that may appear different sometimes have similar underlying ideas. For example $1/4$, 0.25 and 25% are used in different contexts but are all connected to the same idea.
Measurement	<ul style="list-style-type: none"> The relationship between area and perimeter is not a simple one. Increasing or decreasing area does not necessarily mean the perimeter increases or decreases respectively, or vice versa. Area is measured in square units. For rectangles, measuring the length and breadth is a shortcut to finding out how many squares would fit into each of these dimensions.

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Geometry	<ul style="list-style-type: none"> During this year, pupils increase the range of 2-D and 3-D shapes that they are familiar with. With 3-D shapes they think about the faces as well as the number of vertices and through considering nets think about the 2-D shapes that define the 3-D shapes. Pupils learn about a range of angle facts and use them to describe certain shapes and derive facts about them. Regular shapes have to have all sides and all angles the same. Although non-square rectangles have four equal angles, the fact that they do not have four equal sides means that they are not regular. Some properties of shapes are dependent upon other properties. For example, a rectangle has opposite sides equal because it has four right angles. A rectangle is defined as a quadrilateral with four right angles. It does not have to be defined as a quadrilateral with four right angles and two pairs of equal sides.
Statistics	<ul style="list-style-type: none"> Different representations highlight different aspects of data It is important to be able to answer questions about data using inference and deduction, not just direct retrieval.

Autumn Term Y5	Place Value and a Sense of Number	Problem Solving and Reasoning	Core Calculation (four rules for whole and part numbers)	Geometry, Measure and Statistics
A1	Read, write, order and compare numbers to at least 1,000,000. Determine the value of each digit	Solve problems to develop the use of heuristics: focus on being systematic.	<u>Addition and Subtraction</u> Solve multi-step addition and subtraction problems in contexts using a range of representations. Decide which operation and method to use and why.	<u>Geometry</u> Identify 3-D shapes including cubes and other cuboids from 2-D representations (nets) Know that angles are measured in degrees Estimate and compare acute, obtuse and reflex angles. Know that angles around a point (one complete turn) are equivalent to 360°. <u>Measure</u> Measure and calculate the perimeter of composite

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				rectilinear shapes in cm and m.
B1	Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 or 100,000. Use rounding to estimate solutions before calculating.	Solve problems involving converting between units of time and interpreting information from timetables.	<p><u>Multiplication and Division</u> Identify multiples and factors. Find all factor pairs of a number, and common factors of two numbers. Know prime numbers to 20. Multiply and divide whole numbers mentally drawing on known facts (use these to derive new facts) Multiply and divide part and whole numbers by 10 and 100</p> <p><u>Fractions</u> Compare and order, add and subtract fractions whose denominators are all multiples of the same number ($\frac{3}{4} + \frac{5}{8} = \frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1 \frac{3}{8}$). Use a bar model to support visual memory and understanding. Recognise mixed numbers and improper fractions. Convert from one form to the other (bar models) and write mathematical statements as above.</p>	<p><u>Statistics</u> Complete, read and interpret information in tables, including timetables</p> <p><u>Measure</u> Convert between different units of metric measure Calculate and compare the area of a rectangle or square using standard units (m^2, cm^2) Estimate the area of irregular shapes.</p>
Assessment Milestone 1				
HALF TERM				
C1	Count forwards and backwards in steps of powers of 10 for any given number up to 1,000,000 (steps of 0.01, 0.01 up to steps of 100,000)	Solve problems to develop the use of heuristics: focus on patterning	<p><u>Addition and Subtraction</u> Add and subtract whole numbers with more than four digits including using formal column methods alongside a full range of other representations (to demonstrate an understanding of structure and to support reasoning)</p>	<p><u>Geometry</u> Draw given angles and measure them in degrees. Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p>

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				Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. <u>Measure</u> Use four operations, decimal notation and scaling to solve problems involving length.
D1	Round numbers to the nearest power of 10 to estimate calculations Partition numbers to support multiplication and division (the distributive law: $36 \times 5 = (30 \times 5) + (6 \times 5)$)	Solve problems to develop the use of heuristics: focus on patterning.	<u>Multiplication and Division</u> Establish prime numbers to 50. Know that non-prime numbers are called composite numbers. Recognise and use square numbers with notation (n^2): Use arrays to show which numbers are square and which are not (25 can be drawn as a 5x5 square, 26 cannot) <u>Fractions</u> Add and subtract fractions with denominators being multiples of the same number.	<u>Measure</u> Use four operations, decimal notation and scaling to solve problems involving mass. <u>Statistics</u> Solve comparison, sum and difference problems using information presented in a line graph (continuous data)
CHRISTMAS HOLIDAYS				

Spring Term Y5	Place Value and a Sense of Number	Problem Solving and Reasoning	Core Calculation (four rules for whole and part numbers)	Geometry , Measure and Statistics
A2	Interpret negative numbers in context. Count forwards and backwards with positive and negative whole numbers through zero	Solve problems to develop the use of heuristics: focus on being systematic and making a list to find all possibilities	<u>Addition and Subtraction</u> Add and subtract increasingly large numbers mentally using doubles, near doubles, one/ten more and less. Important to use jottings, approximations and different representations, models	<u>Geometry</u> Know that angles at a point on a straight line are equal to 180° , right angles are equal to 90° . Explore other multiples of 90° in the

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			<p>and images. $3000 - 999$ is nearly $3000 - 1000$ $3000 - 183 = 3000 - 200 + 17$ $3000 - 2760$: count up from 2760 (240) – complements to 100 help (76+24).</p>	<p>context of parts of a turn. <u>Measure</u> Use four operations, decimal notation and scaling to solve problems involving money.</p>
B2	<p>Know all multiplication facts to 12x12 and be able to derive facts for much larger and much smaller numbers If I know that $11 \times 12 = 132$, then $13 \times 12 = 132 + 12 + 12$. Also $111 \times 12 = 10 \times 11 \times 12 + (1 \times 12)$. Use open and closed arrays to support derivations.</p>	<p>Solve problems to develop the use of heuristics: focus on being systematic and making a list to find all possibilities</p>	<p><u>Multiplication and Division</u> Multiply numbers up to 4-digits by a one or two digit number using a range of methods, including more formal written methods (long multiplication and short division~ chunking for 2-digit numbers with increasingly efficient chunks) <u>Fractions</u> Read and write decimal numbers as fractions ($0.61 = \frac{61}{100}$), up to thousandths. Round decimals with two dps to 1 dp and the nearest whole number Identify equivalent fractions (using the multiplicative relationship between numerator and denominator ~ for $\frac{1}{8}$ the denominator is always 8x the numerator) Recognise the % symbol as number of parts per hundred. Write percentages as a fraction or a decimal (e.g $20\% = 0.2 = \frac{1}{5}$)</p>	<p><u>Measure</u> Use four operations, decimal notation and scaling to solve problems involving area volume</p>
Assessment Milestone 2				
HALF TERM				
C2	<p>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals</p>	<p>Solve problems using geometric reasoning and questioning: If I know this, then what else do I know? What is the same and</p>	<p><u>Addition and Subtraction</u> Fluently solve addition and subtraction problems in context, selecting the best method to use and justifying their choice.</p>	<p><u>Geometry</u> Identify, describe and represent the position of a shape following a reflection</p>

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		what is different?	e.g. column addition for $546 + 328$ but informal partitioning for $546 + 122$ and near doubles for $546 + 554 (=550+550)$	or translation, using the appropriate language, and know that the shape has not changed. <u>Measure</u> Understand and use equivalences between common metric and imperial units such as inches, pounds and pints.
D2	<p>Increase fluency by using patterning and building from known facts. e.g. $0.02 \times 0.1 = ?$ $2 \times 1 = 2$ $0.2 \times 1 = 0.2$ $0.02 \times 1 = 0.02$ $0.02 \times 0.1 = 0.002$</p> <p>Read, write , order and compare numbers with up to three decimal places. Multiply and divide any number by 10,100 and 1000.</p>	Solve problems using multiplicative reasoning and questioning: What is the same and what is different? What if I change...?	<p><u>Multiplication and Division</u> Establish if a number is prime up to 100 (use the 100 square and eliminate all multiples (sieve of Eratosthenes)) Secure more formal written methods for multiplication and division, with appropriate models and images to support. Interpret remainders in context. Recognise square and cube numbers. Use correct notation (n^2, n^3)</p> <p><u>Fractions</u> Multiply proper fractions and mixed numbers by whole numbers, using materials and diagrams to support understanding of structure and reasoning</p> <p>Solve problems that require knowing % and decimals equivalents, including fractions with a denominator of 10 or 25</p>	<p><u>Measure</u> Estimate volume (using cm^3 blocks to construct cubes and cuboids) and capacity (using liquids and different containers ~ milk containers are good as you can get 1, 2 and 4 litres easily)</p>
Assessment Milestone 3				

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EASTER HOLIDAYS

Summer Term Y5	Place Value and a Sense of Number	Problem Solving and Reasoning	Core Calculation (four rules for whole and part numbers)	Geometry and Measure
A3	Explore different ways of partitioning numbers for different reasons. $36 + 17 = (30 + 10) + (6 + 7)$ $36 - 17 = (20 - 10) + (16 - 7)$	Solve problems using mathematical reasoning and questioning. Ensure that pupils can offer solutions with a wide range of representations, including concrete and pictorial to demonstrate an understanding of structure.	<u>Addition and Subtraction</u> Be able to add and subtract part and whole numbers, showing a variety of representations and justifying solutions.	<u>Geometry</u> Draw given angles, use an angle measurer accurately. Use angles to reason about regular and irregular polygons. Find missing angles around a point and on a straight line. <u>Measure</u> Calculate and measure the perimeter and area of compound rectilinear shapes. Find missing values for sides or areas.
B3	Round any number to an appropriate degree of accuracy to make the answer to a calculation make sense.	Solve problems using mathematical reasoning and questioning. Ensure that pupils can offer solutions with a wide range of representations, including concrete and pictorial to demonstrate an understanding of structure.	<u>Multiplication and Division</u> Develop division strategies, using the idea of division as the inverse of multiplication, to enable pupils to reason about multi-step solutions and interpret remainders in context. <u>Fractions</u> Link fractions to division. See that division by 2 is the same as halving the group etc. Use a bar model to support this idea. Secure an understanding of equivalence with proper and improper fractions. Introduce the idea of ratio as a fraction	<u>Measure</u> Construct cuboids from cm cubes. Calculate and count to find volumes. <u>Statistics</u> Time graphs (story graphs). Be able to interpret and construct line graphs that tell a story over time (e.g. of a journey)

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			(3:1 is the same as $\frac{3}{4}$ share and $\frac{1}{4}$ share)	
HALF TERM				
C3	Recognise and describe linear sequences using patterning. e.g. 2 ,5 ,8 , 11, 14 (Add three to find the next term)	Solve problems using mathematical reasoning and questioning. Ensure that pupils can offer solutions with a wide range of representations, including concrete and pictorial to demonstrate an understanding of structure.	<u>Addition and Subtraction</u> Secure formal written methods for addition and subtraction with models and images to encourage pupils to select effectively and reason appropriately. Solve multi-step problems in a range of contexts, with rounding for estimation	<u>Geometry</u> Compare and classify 2-D and 3-D shapes based on angle, side and symmetry properties. Use the terms parallel and perpendicular <u>Measure</u> Measure, compare and convert between units of length using knowledge of PV and reasoning (km, m, cm and mm). Practical contexts needed here.
D3	Recognise and describe the term-to-term rule of linear sequences using patterning for support. Include fractions and negative numbers as appropriate. e.g. 7 , 4 , 1 , -2 , -5 (term to term rule: subtract 3)	Solve problems using mathematical reasoning and questioning. Ensure that pupils can offer solutions with a wide range of representations, including concrete and pictorial to demonstrate an understanding of structure.	<u>Multiplication and Division</u> Continue to develop formal methods for multiplication and division. Solve multi-step problems in a range of contexts, with rounding for estimation. <u>Fractions</u> Link fractions to division. See that division by 2 is the same as halving the group etc. Be able to convert between common fractions, decimals and percentages using place value understanding and % as parts per hundred. Solve simple problems which include all three representations of part-whole to encourage pupils to shift easily between them.	<u>Measure</u> Measure, compare and convert between units of mass and capacity (g, kg, l and ml) using knowledge of PV and reasoning. Practical contexts needed here. <u>Statistics</u> Draw, compare and interpret simple pie charts where the sectors are multiples of 90°. Reason that this represents one quarter of the data.
END OF YEAR ASSESSMENT AND TRANSITION DIALOGUE (Milestone 4)				
SUMMER HOLIDAYS				

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UNIT PLANNING MODEL

Week	Date	Block	Unit	Big ideas, unit objectives, hot and cold tasks with key activities, resources, models and images. (now construct the connected learning journey – link to previous learning)
1	04-09-17	A1	Geometry	
2	11-09-17	A1	Addition and Subtraction	
3	18-09-17	A1	Addition and Subtraction	
4	25-09-17	A1	Statistics and Measure	
5	02-10-17	B1	Measure	
6	09-10-17	B1	Multiplication and Division	
7	16-10-17	B1	Division and Fractions	
Milestone 1				
Half Term				
8	30-10-17	C1	Geometry	
9	06-11-17	C1	Addition and Subtraction	
10	13-11-17	C1	Addition and Subtraction	
11	20-11-17	D1	Statistics and Measure	
12	27-11-17	D1	Fractions	
13	04-12-17	D1	Multiplication and Division	
14	11-12-17	D1	Multiplication and Division	
Christmas Holiday				

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What planning a learning journey looks like!

Identify key tasks ~ plan the journey ~ choose the 'cold task' ~ design the 'hot task'

