



# Year 5

Mathematics Curriculum 2019 - 2020

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## RATIONALE

This maths curriculum has been designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum. It has also has been designed to incorporate more time for the children to apply their skills, demonstrate deeper understanding of mathematics and to see mathematics in everything we do, both across the rest of the curriculum in school and in the wider world.

The core principles of this curriculum should help to not only develop confidence in mathematics but should also look to develop children in to mathematicians.

A mathematician...

- Makes connections
- Shows fluency (choosing and using efficient methods, as well as known facts)
- Is able to reason about what they are doing
- Creates
- Checks (in different ways)
- Is resilient
- Explains
- Evaluates
- Models
- Invents
- Applies in a range of contexts
- Is curious
- Has confidence
- Uses mistakes to improve
- Is resourceful
- Is efficient

Lessons are crafted with care and are often perfected over time with input from other teachers, drawing on evidence from observations of pupils in class.

Lesson designs are set out in detail and use well-tested methods to teach a given mathematical topic. They include a variety of representations, which are needed to introduce and explore a concept effectively and set out related teacher explanations and questions to pupils.

All lessons will contain a range of representations; variation; stem sentences; intelligent practice; coherence; fluency; differentiation; careful choices and the opportunity to dive deeper for all (Dong Nao Jin).



## YEARLY PLAN

	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12
Autumn	Number: Place Value			Number: Addition and Subtraction		Statistics		Number: Multiplication and Division		Measurement: Perimeter and Area		
Spring	Number: Multiplication and Division		Number: Fractions				Geometry: Position and Direction	Number: Fractions			Number: Decimals & Percentages	
Summer	Number: Decimals				Geometry: Properties of Shape			Measurement: Converting Units		Measurements: Volume	Investigation / Assessment	

## HEURISTICS TO FOCUS ON DURING THE YEAR:

Draw Something

Act it out

Guess, check, improve

Make a systematic list

Work backwards

Solve part of the problem

Look for patterns



## LINKS TO MASTERY MATERIALS

[NCETM Teaching for Mastery](#)

[NCETM Mastery PD Materials](#)

[White Rose Materials For Units](#)

## TERMLY PLANS

### KEY FOR NRICH TASKS

Tasks badged with a * are suitable for the whole class	Tasks badged with a ** are suitable for the majority of the class	Tasks badged with a *** are for those who like a serious challenge
G = game	All NRICH tasks are categorised as problems.	I = investigation



AUTUMN

Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11				
<p><b>Number: Place Value</b></p> <p>Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.</p> <p>Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.</p> <p>NRICH: <a href="#">Space Distances</a> *</p> <p>Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero.</p> <p>NRICH: <a href="#">Tug Harder!</a> * G</p> <p>NRICH: <a href="#">Swimming Pool</a>*</p> <p>NRICH: <a href="#">Sea Level</a> * I</p> <p>Round any number up to 1,000,000</p>			<p><b>Number: Addition and Subtraction</b></p> <p>Add and subtract numbers mentally with increasingly large numbers.</p> <p>Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</p> <p>Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p>			<p><b>Statistics</b></p> <p>Solve comparison, sum and difference problems using information presented in a line graph.</p> <p>Complete, read and interpret information in tables including timetables.</p>			<p><b>Number: Multiplication and Division</b></p> <p>Multiply and divide numbers mentally drawing upon known facts.</p> <p>Multiply and divide whole numbers by 10, 100 and 1,000.</p> <p>NRICH: <a href="#">Multiply Multiples 1</a> *</p> <p>NRICH: <a href="#">Multiply Multiples 2</a> *</p> <p>NRICH: <a href="#">Multiply Multiples 3</a> *</p> <p>Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p> <p>NRICH: <a href="#">Sweets in a Box</a> * I</p> <p>NRICH: <a href="#">Which Is Quicker?</a> *</p> <p>NRICH: <a href="#">Multiplication Squares</a></p>			<p><b>Measurements: Perimeter and Area</b></p> <p>Measure and calculate the perimeter of composite rectilinear shapes in cm and m.</p> <p>NRICH: <a href="#">Area and Perimeter</a> * I</p> <p>NRICH: <a href="#">Through the Window</a> * I</p> <p>Calculate and compare the area of rectangles (including squares), and including using standard units, cm<sup>2</sup>, m<sup>2</sup></p> <p>NRICH: <a href="#">Shaping It</a> * I</p> <p>NRICH: <a href="#">Brush Loads</a> * I</p> <p>NRICH: <a href="#">Cubes</a> * I</p> <p>NRICH: <a href="#">Numerically Equal</a> **</p> <p>NRICH: <a href="#">Making Boxes</a> ** I</p> <p>NRICH: <a href="#">Ribbon Squares</a> ***</p>		



<p>to the nearest 10, 100, 1,000, 10,000 and 100,000</p> <p>Solve number problems and practical problems that involve all of the above.</p> <p>Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p> <p>NRICH: <a href="#">Roman Numerals</a> *</p>	<p>NRICH: <a href="#">Twenty Divided Into Six</a> **</p> <p>NRICH: <a href="#">Maze 100</a> **</p> <p>NRICH: <a href="#">Six Ten Total</a> ** I</p> <p>NRICH: <a href="#">Six Numbered Cubes</a> **</p> <p>NRICH: <a href="#">Reach 100</a> ***</p> <p>NRICH: <a href="#">Subtraction Surprise</a> *</p>		<p>* I</p> <p>NRICH: <a href="#">Flashing Lights</a> *</p> <p>NRICH: <a href="#">Abundant Numbers</a> * I</p> <p>NRICH: <a href="#">Factors and Multiples Game</a> * G</p> <p>NRICH: <a href="#">Pebbles</a> ** I</p> <p>NRICH: <a href="#">Three Dice</a> *</p> <p>NRICH: <a href="#">Factor Track</a> ** G</p> <p>Recognise and use square numbers and cube numbers and the notation for squared (<math>^2</math>) and cubed (<math>^3</math>)</p> <p>NRICH: <a href="#">Up and Down Staircases</a> *</p> <p>NRICH: <a href="#">One Wasn't Square</a> **</p> <p>NRICH: <a href="#">Cycling Squares</a> **</p> <p>NRICH: <a href="#">Picture a Pyramid ...</a> **</p>	<p>NRICH: <a href="#">Fitted</a> ***</p> <p>Estimate the area of irregular shapes.</p>
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			<p>Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.</p> <p>NRICH: <a href="#">Division Rules</a> * I</p> <p>NRICH: <a href="#">Odd Squares</a> *</p> <p>NRICH: <a href="#">Cubes Within Cubes</a> ***</p> <p>NRICH: <a href="#">Curious Number</a> *** I</p> <p>Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.</p> <p>NRICH: <a href="#">Two Primes Make One Square</a> ** I</p> <p>Establish whether a number up to 100 is prime and recall prime numbers up to 19</p>	
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AUTUMN SMALL STEPS

Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	
<b>Number: Place Value</b> <ul style="list-style-type: none"> <li>• Number to 10,000</li> <li>• Roman numerals to 1,000</li> <li>• Round to the nearest 10, 100 and 1,000</li> <li>• Number to 100,000</li> <li>• Compare and order numbers to 100,000</li> <li>• Round numbers within 100,000</li> <li>• Numbers up to a million</li> <li>• Counting in 10s, 100s, 1,000s, 10,000s and 100,000s</li> <li>• Compare and order numbers to a million</li> <li>• Round numbers to a million</li> <li>• Negative numbers</li> </ul>			<b>Number: Addition and Subtraction</b> <ul style="list-style-type: none"> <li>• Add whole numbers with more than 4-digits (column method)</li> <li>• Subtract whole numbers with more than 4-digits (column method)</li> <li>• Round to estimate and approximate</li> <li>• Inverse operations (addition and subtraction)</li> <li>• Multi-step addition and subtraction problems</li> </ul>			<b>Statistics</b> <ul style="list-style-type: none"> <li>• Read and interpret line graphs</li> <li>• Draw line graphs</li> <li>• Use line graphs to solve problems</li> <li>• Read and interpret tables</li> <li>• Two way tables</li> <li>• Timetables</li> </ul>		<b>Number: Multiplication and Division</b> <ul style="list-style-type: none"> <li>• Multiples</li> <li>• Factors</li> <li>• Common factors</li> <li>• Prime numbers</li> <li>• Square numbers</li> <li>• Cube numbers</li> <li>• Multiplying by 10, 100 and 1,000</li> <li>• Dividing by 10, 100 and 1,000</li> <li>• Multiples of 10, 100 and 1,000</li> </ul>		<b>Measurements: Perimeter and Area</b> <ul style="list-style-type: none"> <li>• Measure perimeter</li> <li>• Calculate perimeter</li> <li>• Area of rectangles</li> <li>• Area of compound shapes</li> <li>• Area of irregular shapes</li> </ul>	



SPRING

Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12			
<p><b>Number: Multiplication and Division</b></p> <p>Multiply and divide numbers mentally drawing upon known facts.</p> <p>Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2 digit numbers.</p> <p>NRICH: <a href="#">All the Digits</a> **</p> <p>NRICH: <a href="#">Trebling</a> *</p> <p>Divide numbers up to 4 digits</p>			<p><b>Number: Fractions</b></p> <p>Compare and order fractions whose denominators are multiples of the same number.</p> <p>Identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths.</p> <p>NRICH: <a href="#">Tumbling Down</a> *</p> <p>Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements &gt; 1 as a mixed number [for example <math>\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}</math>]</p> <p>NRICH: <a href="#">Balance of Halves</a> *</p> <p>Add and subtract fractions with the same denominator and denominators that are multiples</p>			<p><b>Geometry: Position and Direction</b></p> <p>Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.</p> <p>NRICH: <a href="#">Transformations on a Pegboard</a> *</p> <p>NRICH: <a href="#">More Transformations on a Pegboard</a> ** I</p>			<p><b>Number: Fractions</b></p> <p>Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.</p> <p>Read and write decimal numbers as fractions [for example <math>0.71 = \frac{71}{100}</math>]</p> <p>Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.</p>			<p><b>Number: Decimals and Percentages</b></p> <p>Read, write, order and compare numbers with up to three decimal places.</p> <p>NRICH: <a href="#">Greater Than or Less Than?</a> * I</p> <p>NRICH: <a href="#">Spiralling Decimals</a> *** G</p> <p>Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.</p> <p>Round decimals with two decimal places to the nearest whole number and to one decimal place.</p> <p>NRICH: <a href="#">Round the Dice</a></p>		



<p>by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.</p> <p>NRICH: <a href="#">Division Rules</a> * I</p> <p>Solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the use of the equals sign.</p> <p>NRICH: <a href="#">Highest and Lowest</a> * I</p> <p>NRICH: <a href="#">Make 100</a> ** I</p> <p>NRICH: <a href="#">Four Goodness Sake</a> ***</p>	<p>of the same number.</p> <p>NRICH: <a href="#">A4 Fraction Addition</a> *</p> <p>NRICH: <a href="#">A4 Fraction Subtraction</a> *</p> <p>NRICH: <a href="#">Linked Chains</a> *</p>			<p><a href="#">Decimals 2</a> *</p> <p>Solve problems involving number up to three decimal places.</p> <p>NRICH: <a href="#">Route Product</a> ** I</p> <p>NRICH: <a href="#">Forgot the Numbers</a> ** I</p> <p>Recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.</p> <p>Solve problems which require knowing percentage and decimal equivalents of <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{2}{5}</math>, <math>\frac{4}{5}</math> and those fractions with a denominator of a multiple of 10 or 25.</p>
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				NRICH: <a href="#">Matching Fractions, Decimals and Percentages</a> * <b>G</b>
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SPRING SMALL STEPS

Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	
<b>Number: Multiplication and Division</b> <ul style="list-style-type: none"> <li>• Multiply 4-digits by 1-digit</li> <li>• Multiply 2-digits (grid method)</li> <li>• Multiply 2-digits by 2-digits</li> <li>• Multiply 3-digits by 2-digits</li> <li>• Multiply 4-digits by 2-digits</li> <li>• Divide 4-digits by 1-digit</li> <li>• Divide with remainders</li> </ul>			<b>Number: Fractions</b> <ul style="list-style-type: none"> <li>• Equivalent fractions</li> <li>• Improper fractions to mixed numbers</li> <li>• Mixed numbers to improper fractions</li> <li>• Number sequence</li> <li>• Compare and order fractions less than 1</li> <li>• Compare and order fractions greater than 1</li> <li>• Add and subtract fractions (same denominators)</li> <li>• Add fractions within 1 (different denominators)</li> <li>• Add 3 or more fractions (different denominators)</li> <li>• Add fractions (different denominators)</li> <li>• Add mixed numbers (different denominators)</li> <li>• Subtract fractions (different denominators)</li> <li>• Subtract mixed numbers (different denominators)</li> <li>• Subtract mixed numbers - breaking the whole (different denominators)</li> <li>• Subtract 2 mixed numbers (different denominators)</li> </ul>			<b>Geometry: Position and Direction</b> <ul style="list-style-type: none"> <li>• Position in the first quadrant</li> <li>• Reflection</li> <li>• Reflection with coordinates</li> <li>• Translation</li> <li>• Translation with coordinates</li> </ul>	<b>Number: Fractions</b> <ul style="list-style-type: none"> <li>• Multiply unit fractions by an integer</li> <li>• Multiply non-unit fractions by an integer</li> <li>• Multiply mixed numbers by an integer</li> <li>• Fractions of an amount</li> <li>• Using fractions as operators</li> </ul>			<b>Number: Decimals and Percentages</b> <ul style="list-style-type: none"> <li>• Decimals up to 2d.p.</li> <li>• Decimals as fractions</li> <li>• Understand thousandths</li> <li>• Thousands as decimals</li> <li>• Rounding decimals</li> <li>• Order and compare decimals</li> <li>• Understand percentages</li> <li>• Percentages as fractions and decimals</li> <li>• Equivalent F.D.P</li> </ul>		

SUMMER



Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10		
<p><b>Number: Decimals</b></p> <p>Solve problems involving number up to three decimal places.</p> <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000.</p> <p>Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p>				<p><b>Geometry: Properties of Shapes</b></p> <p>Identify 3D shapes, including cubes and other cuboids, from 2D representations.</p> <p>Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p> <p>NRICH: <a href="#">Making Rectangles</a> **</p> <p>Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</p> <p>NRICH: <a href="#">Egyptian Rope</a> ** I NRICH: <a href="#">Bracelets</a> * I</p> <p>Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.</p> <p>Draw given angles, and measure them in</p>			<p><b>Measurement: Converting Units</b></p> <p>Convert between different units of metric measure [for example, km and m; cm and m; cm and mm; g and kg; l and ml]</p> <p>Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.</p> <p>Solve problems involving converting between units of time.</p>		<p><b>Measurements: Volume</b></p> <p>Estimate volume [for example using 1cm<sup>3</sup> blocks to build cuboids (including cubes)] and capacity [for example, using water]</p> <p>NRICH: <a href="#">Pouring Problem</a> **</p> <p>Use all four operations to solve problems involving measure.</p>		



	<p>degrees (<math>^{\circ}</math>)</p> <p>NRICH: <a href="#">The Numbers Give the Design</a> * I</p> <p>NRICH: <a href="#">Six Places to Visit</a> * NRICH: <a href="#">How Safe Are You?</a> * NRICH: <a href="#">Olympic Turns</a> ***</p> <p>Identify: angles at a point and one whole turn (total <math>360^{\circ}</math>), angles at a point on a straight line and <math>\frac{1}{2}</math> a turn (total <math>180^{\circ}</math>) other multiples of <math>90^{\circ}</math></p>		
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SUMMER SMALL STEPS

Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	
<b>Number: Decimals</b> <ul style="list-style-type: none"> <li>• Adding decimals within 1</li> <li>• Subtracting decimals within 1</li> <li>• Complements to 1</li> <li>• Adding decimals - crossing the whole</li> <li>• Adding decimals with the same number of decimal places</li> <li>• Subtracting decimals with the same number of decimal places</li> <li>• Adding decimals with a different number of decimal places</li> <li>• Subtracting decimals with a different number of decimal places</li> <li>• Adding and subtracting wholes and decimals</li> <li>• Decimal sequences</li> <li>• Multiplying by 10, 100 and 1,000</li> <li>• Dividing by 10, 100 and 1,000</li> </ul>				<b>Geometry: Properties of Shapes</b> <ul style="list-style-type: none"> <li>• Measuring angles in degrees</li> <li>• Measuring with a protractor</li> <li>• Draw lines and angles accurately</li> <li>• Calculating angles on a straight line</li> <li>• Calculating angles around a point</li> <li>• Calculating lengths and angles in shapes</li> <li>• Regular and irregular polygons</li> <li>• Reasoning about 3D shapes</li> </ul>			<b>Measurement: Converting Units</b> <ul style="list-style-type: none"> <li>• Kilograms and kilometres</li> <li>• Milligrams and millilitres</li> <li>• Metric units</li> <li>• Imperial units</li> <li>• Converting units of time</li> <li>• Timetables</li> </ul>		<b>Measurements: Volume</b> <ul style="list-style-type: none"> <li>• What is volume?</li> <li>• Compare volume</li> <li>• Estimate volume</li> <li>• Estimate capacity</li> </ul>	





## INVESTIGATIONS

NRich: [Finding All Possibilities](#)

NRich: [Ordered Working](#)