

## Mathematics Progression of Knowledge and Skills KS2

	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
<b>Number and Place Value</b>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>count from 0 in multiples of 4, 8, 50 and 100; finding 10 or 100 more than a given number</li> <li>recognise the place value of each digit in a three-digit number (hundreds, tens, ones)</li> <li>compare and order numbers up to 1000</li> <li>identify, represent and estimate numbers using different representations</li> <li>read and write numbers to at least 1000 in numerals and in words</li> <li>solve number problems and practical problems involving these ideas</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>count in multiples of 6, 7, 9, 25 and 100</li> <li>find 1000 more or less than a given number</li> <li>count backwards through zero to include negative numbers</li> <li>recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones)</li> <li>order and compare numbers beyond 1000</li> <li>identify, represent and estimate numbers using different representations</li> <li>round any number to the nearest 10, 100 or 1000</li> <li>solve number and practical problems that involve all of the above and with increasingly large positive numbers</li> <li>read Roman numerals to 100 (I to C) and understand how, over time, the numeral system changed to include the concept of zero and place value</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit</li> <li>count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000</li> <li>interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero</li> <li>round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000</li> <li>solve number problems and practical problems that involve all of the above</li> <li>read Roman numerals to 1000 (M) and recognise years written in Roman numerals</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>read, write, order and compare numbers up to 10 000 000 and determine the value of each digit</li> <li>round any whole number to a required degree of accuracy</li> <li>use negative numbers in context, and calculate intervals across zero</li> <li>solve number problems and practical problems that involve all of the above</li> </ul>

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<b>Addition and Subtraction</b>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"><li>add and subtract numbers mentally, including:<ul style="list-style-type: none"><li>-a three-digit number and ones</li><li>-a three-digit number and tens</li><li>- a three-digit number and hundreds</li></ul></li><li>add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</li><li>estimate the answer to a calculation and use inverse operations to check answers</li><li>solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction</li></ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"><li>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</li><li>estimate and use inverse operations to check answers to a calculation</li><li>solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why</li></ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"><li>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</li><li>add and subtract numbers mentally with increasingly large numbers</li><li>use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy</li><li>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li></ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"><li>solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li></ul>
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Fractions	<p><b>Pupils should be taught to:</b></p> <p>count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10</p> <p>recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions with small denominators</p> <p>recognise and use fractions as numbers; unit fractions and non-unit fractions with small denominators</p> <p>recognise and show, using diagrams, equivalent fractions with small denominators</p> <p>add and subtract fractions with the same denominator within one whole (e.g. <math>\frac{5}{7} + \frac{1}{7} = \frac{6}{7}</math>)</p> <p>compare and order unit fractions with the same denominators</p> <p>solve problems that involve all of the above</p>	<p><b>Pupils should be taught to:</b></p> <p>recognise and show, using diagrams, families of common equivalent fractions</p> <p>count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten</p> <p>solve problems involving increasingly harder fractions to calculate quantities, including non-unit fractions where the answer is a whole number</p> <p>add and subtract fractions with the same denominator</p> <p>recognise and write decimal equivalents of any number of tenths or hundredths</p> <p>recognise and write decimal equivalents to <math>\frac{1}{4}</math>; <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math></p> <p>find the effect of dividing a one or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths</p> <p>round decimals with one decimal place to the nearest whole number</p> <p>compare numbers with the same number of decimal places up to two decimal places</p> <p>solve simple measures and money problems involving fractions and decimals to two decimal places</p>	<p><b>Pupils should be taught to:</b></p> <p>compare and order fractions whose denominators are all 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>recognise mixed numbers and improper fractions and convert from one to the other and write mathematical statements <math>&gt;1</math> as a mixed number (e.g. <math>\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1 \frac{1}{5}</math>)</p> <p>add and subtract fractions with the same denominator and denominators that are multiples of the same number</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 (e.g. <math>0.71 = \frac{71}{100}</math>)</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>read, write, order and compare numbers with up to 3 decimal places</p> <p>solve problems involving numbers up to 3 decimal places</p>	<p><b>Pupils should be taught to:</b></p> <p>use common factors to simplify fractions; use common multiples to express fractions in the same denomination</p> <p>compare and order fractions including fractions <math>&gt;1</math></p> <p>add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</p> <p>multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. <math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math>)</p> <p>divide proper fractions by whole numbers (e.g. <math>\frac{1}{3} \div 2 = \frac{1}{6}</math>)</p> <p>associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. <math>\frac{3}{8}</math>)</p> <p>identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</p> <p>multiply one-digit numbers with up to two decimal places by whole numbers</p> <p>use written division methods in cases where the answer has up to two decimal places</p>
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<h1>Measures</h1>	<p><b>Pupils should be taught to:</b></p> <p>measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)</p> <p>measure the perimeter of simple 2-D shapes</p> <p>add and subtract amounts of money giving change, using both £ and p in practical contexts</p> <p>tell and write the time from an analogue clock, including using Roman numerals from 1 to XI, and 12 hour and 24 hour clocks</p> <p>estimate and read time to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as am/pm, morning, afternoon, noon and midnight</p> <p>know the number of seconds in a minute and the number of days in each month, year and leap year</p> <p>compare durations of events, for example to calculate the time taken by particular events or tasks.</p>	<p><b>Pupils should be taught to:</b></p> <p>convert between different units of measure (e.g. kilometre to metre; hour to minute)</p> <p>measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres</p> <p>find the area of rectilinear shapes by counting</p> <p>estimate, compare and calculate different measures, including money in pounds and pence</p> <p>read, write and convert time between analogue and digital 12 and 24-hour clocks</p> <p>solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days</p>	<p><b>Pupils should be taught to:</b></p> <p>convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)</p> <p>understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</p> <p>measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres</p> <p>calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm<sup>2</sup>) and square metres (m<sup>2</sup>) and estimate the area of irregular shapes</p> <p>estimate volume (e.g. using 1 cm<sup>3</sup> blocks to build cuboids (including cubes)) and capacity (e.g. using water)</p> <p>solve problems involving converting between units of time</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>Pupils should be taught to:</b></p> <p>solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate</p> <p>use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places</p> <p>convert between miles and kilometres</p> <p>recognise that shapes with the same areas can have different perimeters and vice versa</p> <p>recognise when it is possible to use formulae for area and volume of shapes</p> <p>calculate the area of parallelograms and triangles</p>

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					calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm <sup>3</sup> ) and cubic metres (m <sup>3</sup> ) and extending to other units (e.g. mm <sup>3</sup> and km <sup>3</sup> )
<b>Geometry</b>	<b>Properties of shape</b>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them with increasing accuracy</li> <li>recognise angles as a property of shape and associate angles with turning</li> <li>identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle</li> <li>Identify horizontal and vertical lines and pairs</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes</li> <li>identify acute and obtuse angles and compare and order angles up to two right angles by size</li> <li>identify lines of symmetry in 2-D shapes presented in different orientations</li> <li>complete a simple symmetric figure with respect to a specific line of symmetry</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>identify 3-D shapes, including cubes and cuboids, from 2-D representations</li> <li>know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles</li> <li>draw given angles, measuring them in degrees (°)</li> <li>identify <math>\supseteq</math> angles at a point and one whole turn (total 360°) <math>\supseteq</math> angles at a point on a straight line and <math>\frac{1}{2}</math> a turn (total 180°) <math>\supseteq</math> other multiples of 90°</li> <li>use the properties of a rectangle to deduce related facts and find missing lengths and angles</li> <li>distinguish between regular and irregular polygons based on reasoning about equal sides and angles</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>draw 2D shapes using given dimensions and angles</li> <li>recognise, describe and build simple 3-D shapes, including making nets</li> <li>compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons</li> <li>illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius</li> <li>recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles</li> </ul>

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	<b>Position, direction and motion</b>		<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>describe positions on a 2-D grid as coordinates in the first quadrant</li> <li>describe movement between positions as translations of a given unit to the left/right and up/down</li> <li>plot specified points and draw sides to complete a given polygon</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>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</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>describe positions on the full coordinate grid (all four quadrants)</li> <li>draw and translate simple shapes on the coordinate plane, and reflect them in the axes</li> </ul>
<b>Statistics</b>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>interpret and present data using bar charts, pictograms and tables</li> <li>solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs</li> <li>solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>solve comparison, sum and difference problems using information presented in a line graph</li> <li>complete, read and interpret information in tables, including timetables</li> </ul>	<p><b>Pupils should be taught to:</b></p> <ul style="list-style-type: none"> <li>interpret and construct pie charts and line graphs and use these to solve problems</li> <li>calculate and interpret the mean as an average</li> </ul>	