

## Mathematics Year Group Performance Indicators

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Calculators should not be used as a substitute for good written and mental arithmetic. They should therefore only be introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure. In both primary and secondary schools, teachers should use their judgement about when ICT tools should be used.

## Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

*In order for children to be judged as working at the expected level they should demonstrate achievement of the majority of descriptors, including all of the red criteria on most occasions by the end of the year.*

| Year 1 performance indicators Maths |  |
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| Number and Place Value:             | Count to & across 100, forwards & backwards, beginning with 0 or 1, or from any given number   |
|                                     | Count, read & write numbers to 100 in numerals; count in multiples of twos, fives & tens   |
|                                     | Given a number, identify one more & one less   |
|                                     | Identify & represent numbers using objects & pictorial representations including the number line, & use the language of: equal to, more than, less than (fewer), most, least |
|                                     | Read & write numbers from 1 to 20 in numerals & words (at a level consistent with their increasing word reading and spelling knowledge).                                     |

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| <b>Number Addition and Subtraction</b>    | Read, write & interpret mathematical statements involving addition (+), subtraction (-) & equals (=) signs  |
|   | Represent & use number bonds & related subtraction facts within 20  |
|   | Add & subtract one-digit & two-digit numbers to 20, including zero  |
|   | Solve one-step problems that involve addition & subtraction, using concrete objects & pictorial representations, & missing number problems such as<br>$7 = \square - 9$   |
| <b>Number Multiplication and Division</b> | Solve one-step problems involving multiplication & division, by calculating the answer using concrete objects, pictorial representations & arrays with the support of the teacher   |
| <b>Number Fractions</b>                   | Recognise, find & name a half as one of two equal parts of an object, shape or quantity   |
|   | Recognise, find & name a quarter as one of four equal parts of an object, shape or quantity   |
| <b>Measurement</b>                        | Compare, describe & solve practical problems for:<br><i>lengths &amp; heights [e.g. long/short, longer/shorter, tall/short, double/half]</i><br><i>mass/weight [e.g. heavy/light, heavier than, lighter than]</i><br><i>capacity &amp; volume [e.g. full/empty, more than, less than, half, half full, quarter]</i><br><i>time [e.g. quicker, slower, earlier, later]</i> |
|   | Measure & begin to record the following:<br><i>lengths &amp; heights</i><br><i>mass/weight</i><br><i>capacity &amp; volume</i><br><i>time (hours, minutes, seconds)</i>   |
| <b>Measurement</b>                        | Recognise & know the value of different denominations of coins & notes  |
|   | Sequence events in chronological order using language [e.g. before & after, next, first, today, yesterday, tomorrow, morning, afternoon & evening]  |
|   | Recognise & use language relating to dates, including days of the week, weeks, months & years   |
|   | Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times   |

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| <b>Geometry - Properties of Shape</b>    | <p>Recognise and name common 2-D &amp; 3-D shapes, including:</p> <p><i>2-D shapes [e.g. rectangles (including squares), circles &amp; triangles]</i></p> <p><i>3-D shapes [e.g. cuboids (including cubes), pyramids &amp; spheres]</i></p> |
| <b>Geometry - Position and direction</b> | Describe position, direction & movement, including whole, half, quarter & three-quarter turns   |

| <b>Year 2 performance indicators Maths</b>  |  |
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| <b>Number and Place Value:</b>  | Count in twos, fives and tens from 0 and use counting strategies to solve problems   |
|   | Recognise the place value of each digit in a two-digit number (tens, ones)   |
|   | Identify and represent numbers using different representations including the number line   |
|   | Compare and order numbers from 0 up to 100; use less than (<), equals (=) and greater than (>) signs   |
|   | Read and write numbers to at least 100 in numerals   |
|   | Use place value and number facts to solve problems   |
|   | Partition two-digit numbers into different combinations of tens and ones. This may include using apparatus.  |
| Count in steps of 2, 3 and 5 from 0, and in 10s to 100, forwards and backwards  |  |
| <b>Number Addition and Subtraction</b>  | <u>Solve problems with addition and subtraction:</u> using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods. |
|   | Use number bonds and related subtraction facts within 20 (e.g. $18 = 9 + ?$ ; $15 = 6 + ?$ )   |
|   | Use number bonds to 20 to derive and use related facts up to 100   |
|   | Recall doubles and halves to 20  |
|   | Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot   |
|   | Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.  |
| Use estimation to check that their answers to a calculation are reasonable (e.g. knowing that $48 + 35$ will be less than 100). |  |

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|   | <p><u>Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</u></p> <ul style="list-style-type: none"> <li>• a two-digit number and ones (where regrouping is not required)</li> <li>• a two-digit number and tens (where regrouping is not required)</li> <li>• 2 two-digit numbers (they can demonstrate using concrete apparatus or pictorial representations)</li> <li>• Adding 3 one-digit numbers</li> </ul> |
|   | Subtract mentally a two-digit number from another two-digit number when there is no regrouping required (e.g. 74 - 33)  |
| <b>Number Multiplication and Division</b> | Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables to solve simple problems, demonstrating an understanding of commutativity as necessary.  |
|   | Recognise odd and even numbers  |
|   | Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs   |
|   | Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.  |
| <b>Number Fractions</b>                   | Identify $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{2}{4}$ , $\frac{3}{4}$ and knows that all parts must be equal parts of the whole  |
|   | Find, name and write fractions $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape and set of objects or quantity.   |
|   | Write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$   |
| <b>Measurement</b>                        | Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ( $^{\circ}\text{C}$ ); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels  |
|   | Compare and order lengths, mass, volume/capacity and record the results using $>$ , $<$ and $=$   |
|   | Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value  |
|   | Use different coins to make the same amounts of money   |
|   | Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change  |
|   | Compare and sequence intervals of time  |
|   | Read the time on the clock to the nearest 15 minutes  |
|   | Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times  |
|   | Know the number of minutes in an hour and the number of hours in a day.   |
|   | Read scales in divisions of ones, twos, fives and tens in a practical situation where all numbers on the scale are given  |
| <b>Geometry - Properties</b>              | Recognise and name triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres from a group of shapes or  |

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| <b>of Shape</b>                          | from pictures of the shapes   |
|  | Describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line   |
|  | Describe the properties of 3-D shapes, including the number of edges, vertices and faces  |
|  | Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]   |
|  | Compare and sort common 2-D and 3-D shapes and everyday objects.  |
| <b>Geometry - Position and direction</b> | Order and arrange combinations of mathematical objects in patterns and sequences  |
|  | Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line; distinguish between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise) |
| <b>Statistics</b>                        | Interpret and construct simple pictograms, tally charts, block diagrams and simple tables   |
|  | Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.  |
|  | Ask and answer questions about totaling and comparing categorical data.   |

### Lower Key stage 2 Years 3-4

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and

their knowledge of spelling.

*In order for children to be judged as working at the expected level they should demonstrate achievement of the majority of descriptors, including all of the red criteria on most occasions by the end of the year.*

| <b>Year 3 performance indicators maths</b> |  |
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| <b>Number and Place Value:</b>             | Count from 0 in multiples of 4, 8, 50 & 100  |
|  | Find 10 or 100 more or less than a given number  |
|  | Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)   |
|  | Compare & order numbers up to 1000   |
|  | Identify, represent & estimate numbers using different representations   |
|  | Read & write numbers up to 1 000 in numerals & in words (at a level consistent with their increasing word reading and spelling knowledge).   |
|  | Solve number problems & practical problems involving these ideas   |
| <b>Number Addition and Subtraction</b>     | 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> <li>• add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</li> </ul> |
|  | Estimate the answer to a calculation and use inverse operations to check answers   |

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|  | Solve problems, including missing number problems, using number facts, place value, & more complex addition & subtraction   |
| <b>Number Multiplication and Division</b>    | <b>Recall &amp; use multiplication &amp; division facts for the 3, 4 &amp; 8 multiplication tables</b>  |
|  | Write & calculate mathematical statements for multiplication & division using the multiplication tables that they know, including for <b>two-digit numbers times one-digit numbers</b> , using mental & progressing to formal written methods |
|  | Solve problems, including missing number problems, involving multiplication & division, including positive integer scaling problems & correspondence problems in which n objects are connected to m objects                                   |
| <b>Number Fractions</b>                      | <b>Count up &amp; down in tenths</b> ; recognise that tenths arise from dividing an object into 10 equal parts & in dividing one-digit numbers or quantities by 10  |
|  | Recognise, find & write fractions of a discrete set of objects: unit fractions & non-unit fractions with small denominators   |
|  | Recognise & use fractions as numbers: unit fractions & non-unit fractions with small denominators   |
|  | Recognise & show, using diagrams, equivalent fractions with small denominators  |
|  | <b>Add and subtract fractions with the same denominator within one whole (e.g. <math>5/7 + 1/7 = 6/7</math>)</b>  |
|  | <b>Compare &amp; order unit fractions, &amp; fractions with the same denominators</b>   |
| Solve problems that involve all of the above |   |
| <b>Measurement</b>                           | Measure, compare, add & subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)  |
|  | Measure the perimeter of simple 2-D shapes  |
|  | Add & subtract amounts of money to give change, using both £ & p in practical contexts  |
|  | <b>Tell &amp; write the time from an analogue clock, including using Roman numerals from I to XII, &amp; 12-hour &amp; 24-hour clocks</b>   |
|  | <b>Estimate &amp; read time with increasing accuracy to the nearest minute</b> ; record & compare time in terms of seconds, minutes & hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon & midnight                   |
|  | Know the number of seconds in a minute & <b>the number of days in each month</b> , year & leap year   |
|  | Compare durations of events [e.g. to calculate the time taken by particular events or tasks]  |
| <b>Geometry - Properties of Shape</b>        | Draw 2-D shapes & make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations & describe them   |
|  | Recognise angles as a property of shape or a description of a turn  |
|  | Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn & four a complete turn.  |
|  | Identify whether angles are greater than or less than a right angle   |
|  | Identify horizontal & vertical lines & pairs of perpendicular & parallel lines  |
| <b>Statistics</b>                            | Interpret & present data using bar charts, pictograms & tables  |
|  | Solve one-step & two-step questions [e.g. 'How many more?' & 'How many fewer?'] using information presented in scaled bar charts & pictograms & tables  |

**Lower Key stage 2:** Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

| Year 4 performance indicators Maths  |  |
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| Number and Place Value:  | Count in multiples of 6, 7, 9, 25 & 1000   |
|  | Find 1000 more or less than a given number   |
|  | Count backwards through zero to include negative numbers   |
|  | Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, & ones)   |
|  | Order & compare numbers beyond 1000  |
|  | Identify, represent & estimate numbers using different representations   |
|  | Round any number to the nearest 10, 100 or 1000  |
|  | Solve number & practical problems that involve all of the above & with increasingly large positive numbers   |
| Read Roman numerals to 100 (I to C) & know that over time, the numeral system changed to include the concept of zero & place value.  |  |
| Number Addition and Subtraction  | Add & subtract numbers with up to 4 digits using the formal written methods of columnar addition & subtraction   |
|  | Estimate and use inverse operations to check answers to calculation  |
|  | Solve addition & subtraction two-step problems in contexts, deciding which operations & methods to use & why   |
| Number Multiplication and Division   | Recall multiplication & division facts for multiplication tables up to 12 × 12   |
|  | Use place value, known & derived facts to multiply & divide mentally, including: multiplying by 0 & 1; dividing by 1; multiplying together three numbers |
|  | Recognise & use factor pairs & commutativity in mental calculations  |
|  | Multiply two-digit & three-digit numbers by a one-digit number using formal written layout   |
|  | Estimate & use inverse operations to check answers to a calculation  |
| Solve problems involving multiplying & adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects |  |
| Number Fractions (including  | Recognise & show, using diagrams, families of common equivalent fractions  |
|  | Count up & down in hundredths; recognise that hundredths arise when dividing an object by one hundred & dividing tenths by ten                           |
|  | Solve problems involving increasingly harder fractions to calculate quantities, & fractions to divide quantities, including non-unit                     |

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| <b>decimals)</b>  | fractions where the answer is a whole number   |
|   | Add & subtract fractions with the same denominator   |
|   | Recognise & write decimal equivalents of any number of tenths or hundredths  |
|   | Recognise & write decimal equivalents to $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$   |
|   | Find the effect of dividing a one- or two-digit number by 10 & 100, identifying the value of the digits in the answer as ones, tenths & hundredths |
|   | Round decimals with one decimal place to the nearest whole number  |
|   | Compare numbers with the same number of decimal places up to two decimal places  |
|   | Solve simple measure & money problems involving fractions & decimals to two decimal places   |
| <b>Measurement</b>  | Convert between different units of measure [e.g. kilometre to metre; hour to minute]   |
|   | Measure & calculate the perimeter of a rectilinear figure (including squares) in centimetres & metres  |
|   | Find the area of rectilinear shapes by counting squares  |
|   | Estimate, compare & calculate different measures, including money in pounds & pence  |
| <b>Measurement - Time</b>   | Read, write & convert time between analogue & digital 12- & 24-hour clocks   |
|   | Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days                                      |
| <b>Geometry - Properties of Shape</b>   | Compare & classify geometric shapes, including quadrilaterals & triangles, based on their properties & sizes                                       |
|   | Identify acute & obtuse angles & compare & order angles up to two right angles by size   |
|   | Identify lines of symmetry in 2-D shapes presented in different orientations   |
|   | Complete a simple symmetric figure with respect to a specific line of symmetry   |
| <b>Geometry - Position and direction</b>  | Describe positions on a 2-D grid as coordinates in the first quadrant  |
|   | Describe movements between positions as translations of a given unit to the left/right & up/down   |
|   | Plot specified points & draw sides to complete a given polygon   |
| <b>Statistics</b>   | Interpret & present discrete & continuous data using appropriate graphical methods, including bar charts & time graphs.                            |
|   | Solve comparison, sum & difference problems using information presented in bar charts, pictograms, tables & other graphs                           |
| <b>Lower Key stage 2:</b> Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling. |  |

## Upper Key stage 2 Years 5-6

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

*In order for children to be judged as working at the expected level they should demonstrate achievement of the majority of descriptors, including all of the red criteria on most occasions by the end of the year.*

| Year 5 performance indicators Maths |  |
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| Number and                          | Read, write, order & compare numbers to at least 1 000 000 & determine the value of each digit |

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| <b>Place Value:</b>   | Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000  |
|   | Interpret negative numbers in context, count forwards & backwards with positive & negative whole numbers, including through zero   |
|   | Begin to round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 & 100 000  |
|   | Solve number problems and practical problems that involve all of the above   |
|   | Read Roman numerals to 1 000 (M) & recognise years written in Roman numerals.  |
| <b>Number Addition and Subtraction</b>  | Begin to add & subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition & subtraction).   |
|   | Begin to add & subtract numbers mentally with increasingly large numbers .   |
|   | Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.  |
|   | Solve addition & subtraction multi-step problems in contexts, deciding which operations & methods to use & why.  |
| <b>Number Multiplication and Division</b>   | Begin to recognise multiples & factors, including finding all factor pairs of a number, & common factors of two numbers .  |
|   | Know & use the vocabulary of prime numbers, prime factors & composite (non-prime) numbers .  |
|   | Begin to establish whether a number up to 100 is prime & recall prime numbers up to 19 .   |
|   | Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.                                    |
|   | Multiply & divide numbers mentally drawing upon known facts.   |
|   | Begin to divide numbers up to 4 digits by a one-digit number using the formal written method of short division & interpret remainders appropriately for the context.                 |
|   | Multiply & divide whole numbers & those involving decimals (up to 3dp) by 10, 100 & 1000.  |
|   | Begin to recognise & use square numbers & cube numbers, & the notation for squared ( $^2$ ) & cubed ( $^3$ ) .   |
|   | Solve problems involving multiplication & division including using their knowledge of factors & multiples, squares & cubes.  |
| Solve problems involving multiplication & division, including scaling by simple fractions and problems involving simple ratios. |  |
| <b>Number - Fractions (including decimals and percentages)</b>  | Compare & order fractions whose denominators are all multiples of the same number.   |
|   | Identify, name & write equivalent fractions of a given fraction, represented visually, including tenths & hundredths.  |
|   | Recognise mixed numbers & improper fractions & convert from one form to the other & write mathematical statements $> 1$ as a mixed number [e.g. $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$ ]. |
|   | Begin to add & subtract fractions with the same denominator & denominators that are multiples of the same number.  |
|   | Multiply proper fractions & mixed numbers by whole numbers, supported by materials & diagrams.   |
|   | Read & write decimal numbers as fractions [e.g. $0.71 = 71/100$ ].   |
| Recognise & use thousandths & relate them to tenths, hundredths & decimal equivalents.  |  |

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|  | Round decimals with two decimal places to the nearest whole number & to one decimal place.  |
|  | Read, write, order & compare numbers with up to three decimal places.   |
|  | Solve problems involving number up to three decimal places.   |
|  | Recognise the per cent symbol (%) & begin to understand that per cent relates to 'number of parts per hundred', & write percentages as a fraction with denominator 100, & as a decimal.                                     |
|  | Solve problems which require knowing percentage & decimal equivalents of $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{5}$ , $\frac{2}{5}$ & $\frac{4}{5}$ & those fractions with a denominator of a multiple of 10 or 25.      |
| <b>Measurement</b>   | Convert between different units of metric measure (e.g. kilometre & metre; centimetre & metre; centimetre & millimetre; gram & kilogram; litre & millilitre).   |
|  | Understand & use approximate equivalences between metric units & common imperial units such as inches, pounds & pints .   |
|  | Begin to measure & calculate the perimeter of composite rectilinear shapes in centimetres & metres.   |
|  | Begin to calculate & compare the area of rectangles (including squares), & including using standard units, square centimetres (cm <sup>2</sup> ) & square metres (m <sup>2</sup> ) & estimate the area of irregular shapes. |
|  | Estimate volume [e.g. using 1 cm <sup>3</sup> blocks to build cuboids (including cubes)] & capacity [e.g. using water] .  |
|  | Begin to solve problems involving converting between units of time.   |
|  | Use all four operations to solve problems involving measure [e.g. length, mass, volume, money] using decimal notation, including scaling.   |
| <b>Geometry - Properties of Shape</b>  | Identify 3-D shapes, including cubes & other cuboids, from 2-D representations.   |
|  | Know angles are measured in degrees: estimate & compare acute, obtuse & reflex angles.  |
|  | Draw given angles, & measure them in degrees (°).   |
|  | Identify:<br>angles at a point & one whole turn (total 360°)<br>angles at a point on a straight line & $\frac{1}{2}$ a turn (total 180°)<br>other multiples of 90°  |
|  | Use the properties of rectangles to deduce related facts & find missing lengths & angles.   |
|  | Distinguish between regular & irregular polygons based on reasoning about equal sides & angles.   |
| <b>Geometry - Position and direction</b>   | Identify, describe & represent the position of a shape following a reflection or translation, using the appropriate language, & know that the shape has not changed.  |
| <b>Statistics</b>  | Solve comparison, sum & difference problems using information presented in a line graph.  |
|  | Complete, read & interpret information in tables, including timetables.   |
| <b>Upper key stage 2:</b> Pupils should read, spell and pronounce mathematical vocabulary correctly. |   |

**By the end of year 6**, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

| Year 6 performance indicators Maths  |   |
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| <b>Number and Place Value:</b>   | Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit   |
|  | Demonstrate an understanding of place value, including large numbers and decimals (e.g. what is the value of the '7' in 276,541?; find the difference between the largest and smallest whole numbers that can be made from using three digits; $28.13 = 28 + ? + 0.03$ ).   |
|  | Round any whole number to a required degree of accuracy   |
|  | Use negative numbers in context, and calculate intervals across zero  |
|  | Solve number and practical problems that involve all of the above.  |
| <b>Number Addition, Subtraction, Multiplication and Division</b>   | Calculate mentally, using efficient strategies such as manipulating expressions using commutative and distributive properties to simplify the calculation (e.g. $53 - 82 + 47 = 53 + 47 - 82 = 100 - 82 = 18$ ; $20 \times 7 \times 5 = 20 \times 5 \times 7 = 100 \times 7 = 700$ ; $53 \div 7 + 3 \div 7 = (53 + 3) \div 7 = 56 \div 7 = 8$ ) |
|  | Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication  |
|  | Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context  |
|  | Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context   |
|  | Perform mental calculations, including with mixed operations and large numbers  |
|  | Identify common factors, common multiples and prime numbers   |
|  | Use their knowledge of the order of operations to carry out calculations involving the four operations  |
|  | Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why  |
|  | Use formal methods to solve multi step problems   |
| Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. |   |
| <b>Number - Fractions (including decimals and</b>  | Recognise the relationship between fractions, decimals and percentages and can express them as equivalent quantities (e.g. one piece of cake that has been cut into 5 equal slices can be expressed as $\frac{1}{5}$ or 0.2 or 20% of the whole cake).  |
|  | Compare and order fractions, including fractions $> 1$ Use common factors to simplify fractions; use common multiples to express fractions in the same denomination   |

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| <b>percentages)</b>                                | Calculate using fractions, decimals or percentages (e.g. knowing that 7 divided by 21 is the same as $7/21$ and that this is equal to $1/3$ ; 15% of 60; $11 \frac{2}{3} + 3 \frac{4}{9}$ ; $7 \frac{9}{10}$ of 108; $0.8 \times 70$ ) |
|  | Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions  |
|  | Multiply simple pairs of proper fractions, writing the answer in its simplest form [e.g. $1/4 \times 1/2 = 1/8$ ]  |
|  | Divide proper fractions by whole numbers [e.g. $1/3 \div 2 = 1/6$ ]  |
|  | Associate a fraction with division and calculate decimal fraction equivalents [e.g. 0.375] for a simple fraction [e.g. $3/8$ ]   |
|  | 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  |
|  | Multiply one-digit numbers with up to two decimal places by whole numbers  |
|  | Solve problems which require answers to be rounded to specified degrees of accuracy  |
|  | Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.   |
| <b>Ratio and Proportion</b>                        | Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts   |
|  | Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison   |
|  | Solve problems involving similar shapes where the scale factor is known or can be found  |
|  | Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.  |
| <b>Algebra</b>                                     | Use simple formulae  |
|  | Substitute values into a simple formula to solve problems (e.g. perimeter of a rectangle or area of a triangle).   |
|  | Generate and describe linear number sequences  |
|  | Express missing number problems algebraically  |
| <b>Measurement</b>                                 | Find pairs of numbers that satisfy an equation with two unknowns   |
|  | Calculate with measures (e.g. calculate length of a bus journey given start and end times; convert 0.05km into m and then into cm).  |
|  | Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate   |
|  | 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 up to three decimal places    |
|  | Convert between miles and kilometres   |
|  | Recognise that shapes with the same areas can have different perimeters and vice versa   |
|  | Recognise when it is possible to use formulae for area and volume of shapes  |
| Calculate the area of parallelograms and triangles |  |

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|  | Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres ( $\text{cm}^3$ ) and cubic metres ( $\text{m}^3$ ), and extending to other units [for example, $\text{mm}^3$ and $\text{km}^3$ ].        |
| <b>Geometry - Properties of Shape</b>  | Draw 2-D shapes using given dimensions and angles   |
|  | Use mathematical reasoning to find missing angles (e.g. the missing angle in an isosceles triangle when one of the angles is given; the missing angle in a more complex diagram using knowledge about angles at a point and vertically opposite angles) |
|  | Recognise, describe and build simple 3-D shapes, including making nets  |
|  | Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons  |
| <b>Geometry - Position and direction</b>   | Describe positions on the full coordinate grid (all four quadrants)   |
|  | Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.   |
| <b>Statistics</b>  | Interpret and construct pie charts and line graphs and use these to solve problems  |
|  | Calculate and interpret the mean as an average.   |
| <p><b>Upper key stage 2:</b> Pupils should read, spell and pronounce mathematical vocabulary correctly.</p> <p><b>By the end of year 6,</b> pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.</p> |   |