

By the End of Year 5								
Number						Measurement	Geometry	Statistics
Place Value	Addition and Subtraction	Multiplication and Division	Fractions, Decimals, Percent	Ratio and Proportion	Algebra		Properties of Shape	Position and Direction
read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers	compare and order fractions whose denominators are all multiples of the same number			convert between different units of metric measure [for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram, litre and millilitre]	identify 3-D shapes, including cubes and other cuboids, from 2-D representations	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
count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000	add and subtract numbers mentally with increasingly large numbers	know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths			understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.
interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	establish whether a number up to 100 is prime and recall prime numbers up to 19	recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number			measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres	draw given angles, and measure them in degrees (°)	
round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	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	add and subtract fractions with the same denominator, and denominators that are multiples of the same number			calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm²) and square metres (m²), and estimate the area of irregular shapes	identify: angles at a point and 1 whole turn (total 360°), angles at a point on a straight line and half a turn (total 180°), other multiples of 90°	
solve number problems and practical problems that involve all of the above	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency	multiply and divide numbers mentally, drawing upon known facts	multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams			estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]	use the properties of rectangles to deduce related facts and find missing lengths and angles, distinguish between regular and irregular polygons based on reasoning about equal sides and angles	
read Roman numerals to 1,000 (M) and recognise years written in Roman numerals	They practise mental calculations with increasingly large numbers to aid fluency (for example, 12,462 – 2,300 = 10,162).	divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context	read and write decimal numbers as fractions			solve problems involving converting between units of time	become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles	
Pupils identify the place value in large whole numbers.		multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents			use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling	use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools.	
They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.		recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)	round decimals with 2 decimal places to the nearest whole number and to 1 decimal place			use their knowledge of place value and multiplication and division to convert between standard units.	use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems.	
They should recognise and describe linear number sequences (for example, 3, 3 1/2, 4, 4 1/2), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add		solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes	read, write, order and compare numbers with up to 3 decimal places			calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically		
		solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	solve problems involving number up to 3 decimal places			calculate the area from scale drawings using given measurements.		
		solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal fraction			use all 4 operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days).		
		Pupils practise and extend their use of the formal written methods of short multiplication and short division	solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25					

apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.	Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions.
use and understand the terms factor, multiple and prime, square and cube numbers.	extend their knowledge of fractions to thousandths and connect to decimals and measures.
interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding	connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed
use multiplication and division as inverses to support the introduction of ratio in year 6	connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1 .
Distributivity can be expressed as $a(b + c) = ab + ac$.	practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a
understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements	continue to practise counting forwards and backwards in simple fractions.
use and explain the equals sign to indicate equivalence, including in missing number problems	continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. Pupils extend counting from year 4, using decimals and fractions including bridging 0.
	say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems.
	mentally add and subtract tenths, and one-digit whole numbers and tenths.
	practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1
	go beyond the measurement and money models of decimals, for example, by solving puzzles involving decimals.
	make connections between percentages, fractions and decimals and relate this to finding fractions of.

By the End of Year 6

Number									
Place Value	Addition and Subtraction	Multiplication and Division	Fractions, Decimals, Percent	Ratio and Proportion	Algebra	Measurement	Geometry	Position and Direction	Statistics
read, write, order and compare numbers up to 10,000,000 and determine the value of each digit	perform mental calculations, including with mixed operations and large numbers		use common factors to simplify fractions; use common multiples to express fractions in the same denomination	solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts	use simple formulae	solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate	draw 2-D shapes using given dimensions and angles	describe positions on the full coordinate grid (all 4 quadrants)	interpret and construct pie charts and line graphs and use these to solve problems
round any whole number to a required degree of accuracy	use their knowledge of the order of operations to carry out calculations involving the 4 operations		compare and order fractions, including fractions >1	solve problems involving the calculation of percentages (for example, of measures and such as 15% of 360) and the use of percentages for comparison	generate and describe linear number sequences	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 3 decimal places	recognise, describe and build simple 3-D shapes, including making nets	draw and translate simple shapes on the coordinate plane, and reflect them in the axes	calculate and interpret the mean as an average
use negative numbers in context, and calculate intervals across 0	solve problems involving addition, subtraction, multiplication and division		add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	solve problems involving similar shapes where the scale factor is known or can be found	express missing number problems algebraically	convert between miles and kilometres	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	Pupils draw and label a pair of axes in all 4 quadrants with equal scaling. This extends their knowledge of one quadrant to all 4 quadrants, including the use of negative numbers.	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts.
solve number and practical problems that involve all of the above	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	multiply simple pairs of proper fractions, writing the answer in its simplest form	solve problems involving unequal sharing and grouping using knowledge of fractions and multiples	find pairs of numbers that satisfy an equation with 2 unknowns	recognise that shapes with the same areas can have different perimeters and vice versa	illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius	Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes.	Pupils both encounter and draw graphs relating 2 variables, arising from their own enquiry and in other subjects.
Pupils use the whole number system, including saying, reading and writing numbers accurately.	use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	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	divide proper fractions by whole numbers	Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes).	enumerate possibilities of combinations of 2 variables	recognise when it is possible to use formulae for area and volume of shapes	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles		They should connect conversion from kilometres to miles in measurement to its graphical representation.
	Pupils practise addition, subtraction using the formal written methods of columnar addition and subtraction	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	associate a fraction with division and calculate decimal fraction equivalents	Pupils link percentages or 360° to calculating angles of pie charts.	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: missing numbers, lengths, coordinates	calculate the area of parallelograms and triangles	Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.		Pupils know when it is appropriate to find the mean of a data set.
	Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50, etc, but not to a specified number of significant figures.	identify common factors, common multiples and prime numbers	identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places	Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work.	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: formulae in mathematics and science	calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units (for example, mm³ and km³)	Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements.		
	Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.	Pupils practise multiplication and division for larger numbers, using the formal written methods of columnar short and long multiplication, and short and long division	multiply one-digit numbers with up to 2 decimal places by whole numbers	Pupils solve problems involving unequal quantities, for example, 'for every egg you need 3 spoonfuls of flour', '3/5 of the class are boys'. These problems are the foundation for later formal approaches to	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: equivalent expressions (for example, $a +$	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs.	These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 - (b + c)$.		
		Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.	use written division methods in cases where the answer has up to 2 decimal places		Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: generalisations of number patterns	They know approximate conversions and are able to tell if an answer is sensible.			
		Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50, etc, but not to a specified number of significant figures.	solve problems which require answers to be rounded to specified degrees of accuracy		Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: number puzzles (for example, what 2	Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature.			
		Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts			They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this.			

		Common factors can be related to finding equivalent fractions.	<p>Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator.</p> <p>Pupils should use a variety of images to support their understanding of multiplication with fractions.</p> <p>Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if</p> <p>They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators.</p> <p>Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, $3 \div 8 = 0.375$).</p> <p>Pupils multiply decimals by whole numbers, starting with the simplest cases, such as $0.4 \times 2 = 0.8$, and in practical contexts, such as measures and money.</p> <p>Pupils are introduced to the division of decimal numbers by one-digit whole numbers, initially, in practical contexts involving measures and money. They recognise division calculations as the</p> <p>Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations.</p>			<p>Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.</p>			
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