

## Number strand: Number and place value progression ks1-ks2

<b>Counting</b>					
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			count backwards through zero to include negative numbers	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	use negative numbers in context, and calculate intervals across zero
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100;	count in multiples of 6, 7, 9, 25 and 1000	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	
given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
<b>Comparing Numbers</b>					
use the language of equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
<b>Identifying, representing and estimating numbers</b>					
identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
<b>Reading and writing numbers</b>					
read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	

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			include the concept of zero and place value.		
<b>Understanding place value</b>					
Pupils begin to recognise place value in numbers beyond 20 by reading, writing counting and comparing numbers up to 100 (non-stat requirement)	recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
<b>Rounding</b>					
			round any number to the nearest 10, 100 or 1 000. round decimals with one decimal place to the nearest whole number	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000	round any whole number to a required degree of accuracy
<b>Problem solving</b>					
	use place value and number facts to solve problems	solve number problems and practical problems involving these ideas.	solve number and practical problems that involve all of the above and with increasingly large positive numbers	solve number problems and practical problems that involve all of the above	solve number and practical problems that involve all of the above

Number: Addition and Subtraction

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Number bonds					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100				
Mental calculations					
add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers adding three one-digit numbers	add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds		add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot				use their knowledge of the order of operations to carry out calculations involving the four operations
Written methods					
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs		add and subtract numbers with up to three digits, using formal written methods of	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and	add and subtract whole numbers with more than 4 digits, including using formal written methods	

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		columnar addition and subtraction	subtraction where appropriate	(columnar addition and subtraction)	
<b>Inverse operations, estimating and checking answers</b>					
	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	estimate the answer to a calculation and use inverse operations to check answers	estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
<b>Problem solving</b>					
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$	solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why  Solve problems involving addition, subtraction, multiplication and division

Number: Multiplication and division

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<b>Multiplication and division facts</b>					
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
count in multiples of twos, fives and tens (copied from Number and Place Value)	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward (copied from Number and Place Value)	count from 0 in multiples of 4, 8, 50 and 100 (copied from Number and Place Value)	count in multiples of 6, 7, 9, 25 and 1 000 (copied from Number and Place Value)	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 (copied from Number and Place Value)	
	recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	recall multiplication and division facts for multiplication tables up to $12 \times 12$		
<b>Mental calculation</b>					
		write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Written Methods)	use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	multiply and divide numbers mentally drawing upon known facts	perform mental calculations, including with mixed operations and large numbers
	show that multiplication of two numbers can be done in any order (commutative) and		recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers)	multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375)

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	division of one number by another cannot				for a simple fraction (e.g. $\frac{3}{8}$ ) (copied from Fractions)
<b>Written calculations</b>					
	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs	write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods (appears also in Mental Methods)	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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 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 one-digit number using the formal written method of short division and interpret remainders appropriately for the context	divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for the context 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

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Properties of Numbers: Multiples, factors, primes, square and cube numbers					
			<p>recognise and use factor pairs and commutativity in mental calculations (repeated)</p>	<p>identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.</p> <p>know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers</p> <p>establish whether a number up to 100 is prime and recall prime numbers up to 19</p>	<p>identify common factors, common multiples and prime numbers</p> <p>use common factors to simplify fractions; use common multiples to express fractions in the same denomination (copied from Fractions)</p>
				<p>recognise and use square numbers and cube numbers, and the notation for squared (<sup>2</sup>) and cubed (<sup>3</sup>)</p>	<p>calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm<sup>3</sup>) and cubic metres (m<sup>3</sup>), and extending to other units such as mm<sup>3</sup> and km<sup>3</sup></p> <p>use their knowledge of the order of operations to carry out calculations involving the four operations</p>

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<b>Inverse operations, estimating and checking answers</b>					
		estimate the answer to a calculation and use inverse operations to check answers (copied from Addition and Subtraction)	estimate and use inverse operations to check answers to a calculation (copied from Addition and Subtraction)		use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
<b>Problem solving</b>					
solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	solve problems involving multiplying and 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	<p>solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes</p> <p>solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign</p> <p>solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates</p>	<p>solve problems involving addition, subtraction, multiplication and division</p> <p>solve problems involving similar shapes where the scale factor is known or can be found (copied from Ratio and Proportion)</p>

Number: Fractions (including decimals and percentages)



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Counting in fractional steps					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Pupils should count in fractions up to 10, starting from any number and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line (Non Statutory Guidance)	count up and down in tenths	count up and down in hundredths		
Recognising fractions					
recognise, find and name a half as one of two equal parts of an object, shape or quantity	recognise, find, name and write fractions $\frac{1}{3}$ , $\frac{1}{4}$ , $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	
recognise, find and name a quarter as one of four equal parts of an object, shape or quantity		recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10.			
		recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators			
Comparing fractions					
		compare and order unit fractions, and fractions with the same denominators		compare and order fractions whose denominators are all multiples of the same number	compare and order fractions, including fractions $>1$

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Comparing decimals					
			compare numbers with the same number of decimal places up to two decimal places	read, write, order and compare numbers with up to three decimal places	identify the value of each digit in numbers given to three decimal places
Rounding including decimals					
			round decimals with one decimal place to the nearest whole number	round decimals with two decimal places to the nearest whole number and to one decimal place	solve problems which require answers to be rounded to specified degrees of accuracy
Equivalence (including decimals, fractions and percentages)					
	write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ .	recognise and show, using diagrams, equivalent fractions with small denominators	recognise and show, using diagrams, families of common equivalent fractions	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	use common factors to simplify fractions; use common multiples to express fractions in the same denomination
			recognise and write decimal equivalents of any number of tenths or hundredths	read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$ )  recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$ )
			recognise and write decimal equivalents to $\frac{1}{4}$ ; $\frac{1}{2}$ ; $\frac{3}{4}$	recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

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				denominator 100 as a decimal fraction	
<b>Addition and subtraction of fractions</b>					
		add and subtract fractions with the same denominator within one whole (e.g. $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ )	add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number  recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements $> 1$ as a mixed number (e.g. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$ )	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
<b>Multiplication and division of fractions</b>					
			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		multiply one-digit numbers with up to two decimal places by whole numbers  multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
					identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100

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					<p>and 1000 where the answers are up to three decimal places</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>use written division methods in cases where the answer has up to two decimal places</p>
<b>Problem solving</b>					
		solve problems that involve all of the above	solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number	solve problems involving numbers up to three decimal places	
			solve simple measure and money problems involving fractions and decimals to two decimal places.	solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{5}$ , $\frac{2}{5}$ , $\frac{4}{5}$ and those with a denominator of a multiple of 10 or 25.	

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Number: Ratio and proportion

Ratio and proportion					
			YEAR 6 OBJECTIVES ONLY FOR THIS STRAND	<p>solve problems involving similar shapes where the scale factor is known or can be found</p> <p>solve problems involving unequal sharing and grouping using knowledge of fractions and multiples</p>	<p>solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.</p> <p>solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison</p>