

Key Stage 1

Year		Mental calculation	Written Calculation	Essentials
	Overview of KS1	<p>Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and beginning to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Y2 knowing the pairs of numbers which make all the numbers up to 10 at least. They will also have experienced and been taught pairs to 20. Their knowledge of number facts enables them to add several single-digit numbers, and to add/subtract a single digit number to/from a 2-digit number. Another important conceptual tool is their ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of this knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on or back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones. Children will be taught to count in 2s, 3s, 5s and 10s, and will have related this skill to repeated addition. They will have met and begun to learn the associated 2x, 3x, 5x and 10x tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. They will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.</p>		
		Mental calculation	Written Calculation	Essentials
Year 1	Multiplication	<p>Begin to count in 2s, 5s and 10s Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, etc. Double numbers to 10</p>		<p>Begin to count in 2s and 10s Double numbers to 5 using fingers</p>
	Division	<p>Begin to count in 2s, 5s and 10s Find half of even numbers to 12 and know it is hard to halve odd numbers Find half of even numbers by sharing Begin to use visual and concrete arrays or 'sets of' to find how many sets of a small number make a larger number.</p>		<p>Begin to count in 2s and 10s Find half of even numbers by sharing</p>

Year		Mental calculation	Written Calculation	Essentials
Year 2	Multiplication	<p>Count in 2s, 5s and 10s Begin to count in 3s. Begin to understand that multiplication is repeated addition and to use arrays (E.g. 3 x 4 is three rows of 4 dots) Begin to learn the 2x, 3x, 5x and 10x tables, seeing these as 'lots of', e.g. 5 lots of 2, 6 lots of 2, 7 lots of 2, etc. Double numbers up to 20 Begin to double multiples of 5 to 100 Begin to double two-digit numbers less than 50 with 1s digits of 1, 2, 3 4 or 5</p>		<p>Count in 2s, 5s and 10s Begin to use and understand simple arrays, e.g. 2 x 4 is two lots of four buns. Double numbers up to 10 Double multiples of 10 to 50</p>
	Division	<p>Count in 2s, 5s and 10s Begin to count in 3s Using fingers, say where a given number is in the 2s, 5s or 10s count. (E.g. 8 is the fourth number when I count in twos.) Relate division to grouping. (E.g. how many groups of five in fifteen?) Halve numbers to 20 Begin to halve numbers to 40 and multiples of 10 to 100 Find $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{3}{4}$ of a quantity of objects and of amounts (whole number answers)</p>		<p>Count in 2s, 5s and 10s Say how many rows in a given array. (E.g. how many rows of 5 in an array of 3 x 5) Halve numbers to 12 Find $\frac{1}{2}$ of amounts</p>

Lower Key stage 2

Overview of LKS2

In the lower juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.

This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers, e.g. when dividing by 5 or multiplying by 20. Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.

Year 3	Multiplication	<p>Know by heart all the multiplication facts in the 2x, 3x, 4x, 5x, 8x and 10x tables</p> <p>Multiply whole numbers by 10 and 100</p> <p>Recognise that multiplication is commutative</p> <p>Use place value and number facts in mental multiplication. (E.g. 30×5 is 15×10)</p> <p>Partition teen numbers to multiply by a single-digit number. (E.g. 3×14 as 3×10 and 3×4)</p> <p>Double numbers up to 50</p>	<p>Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by 'friendly' single digit numbers.</p>	<p>Know by heart the 2x, 3x, 5x and 10x tables</p> <p>Double given tables facts to get others</p> <p>Double numbers up to 25 and multiples of 5 to 50</p>
	Division	<p>Know by heart all the division facts derived from the 2x, 3x, 4x, 5x, 8x and 10x tables.</p> <p>Divide whole numbers by 10 or 100 to give whole number answers</p> <p>Recognise that division is not commutative.</p> <p>Use place value and number facts in mental division. (E.g. $84 \div 4$ is half of 42)</p> <p>Divide larger numbers mentally by subtracting the tenth multiple, including those with remainders. (E.g. $57 \div 3$ is $10 + 9$ as $10 \times 3 = 30$ and $9 \times 3 = 27$)</p> <p>Halve even numbers to 100, halve odd numbers to 20</p>	<p>Perform divisions just above the 10th multiple using the written layout and understanding how to give a remainder as a whole number.</p> <p>Find unit fractions of quantities and begin to find non-unit fractions of quantities</p>	<p>Know by heart the division facts derived from the 2x, 3x, 5x and 10x tables</p> <p>Halve even numbers up to 50 and multiples of ten to 100</p> <p>Perform divisions within the tables including those with remainders, e.g. $38 \div 5$.</p>

Year 4	Multiplication	<p>Know by heart all the multiplication facts up to 12×12.</p> <p>Recognise factors up to 12 of two-digit numbers.</p> <p>Multiply whole numbers and one-place decimals by 10, 100, 1000</p> <p>Multiply multiples of 10, 100, 1000 by single digit numbers. (E.g. 300×6 or 4000×8)</p> <p>Use understanding of place value and number facts in mental multiplication. (E.g. 36×5 is half of 36×10 and $50 \times 60 = 3000$)</p> <p>Partition 2-digit numbers to multiply by a single-digit number mentally. (E.g. 4×24 as 4×20 and 4×4)</p> <p>Multiply near multiples using rounding. (E.g. 33×19 as $33 \times 20 - 33$)</p> <p>Find doubles to double 100 and beyond using partitioning</p> <p>Begin to double amounts of money. (E.g. £35.60 doubled = £71.20.)</p>	<p>Use a vertical written method to multiply a one-digit by a 3-digit number (ladder)</p> <p>Use an efficient written method to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method)</p>	<p>Know by heart multiplication tables up to 10×10</p> <p>Multiply whole numbers by 10 and 100</p> <p>Use grid method to multiply a 2-digit or a 3-digit number by a number up to and including 6</p>
	Division	<p>Know by heart all the division facts up to $144 \div 12$.</p> <p>Divide whole numbers by 10, 100 to give whole number answers or answers with one decimal place</p> <p>Divide multiples of 100 by 1-digit numbers using division facts. (E.g. $3200 \div 8 = 400$)</p> <p>Use place value and number facts in mental division. (E.g. $245 \div 20$ is double $245 \div 10$)</p> <p>Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate. (E.g. $156 \div 6$ is $20 + 6$ as $20 \times 6 = 120$ and $6 \times 6 = 36$)</p> <p>Find halves of even numbers to 200 and beyond using partitioning</p> <p>Begin to halve amounts of money. (E.g. Half of £52.40 = £26.20)</p>	<p>Use a written method to divide a 2-digit or a 3-digit number by a single-digit number.</p> <p>Give remainders as whole numbers.</p> <p>Begin to reduce fractions to their simplest forms.</p> <p>Find unit and non-unit fractions of larger amounts.</p>	<p>Know by heart all the division facts up to $100 \div 10$.</p> <p>Divide whole numbers by 10 and 100 to give whole number answers or answers with one decimal place</p> <p>Perform divisions just above the 10th multiple using the written layout and understanding how to give a remainder as a whole number.</p> <p>Find unit fractions of amounts</p>

Upper Key stage 2

	Overview of LKS2	<p>Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions. They will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to two decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as $40,000 \times 6$ or $40,000 \div 8$. In addition, it is in Y5 and Y6 that children extend their knowledge and confidence in using written algorithms for multiplication and division. Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers, and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.</p>		
Year 5	Multiplication	<p>Know by heart all the multiplication facts up to 12×12.</p> <p>Multiply whole numbers and one-and two-place decimals by 10, 100, 1000, 10,000</p> <p>Use knowledge of factors and multiples in multiplication. (E.g. 43×6 is double 43×3, and 28×50 is $\frac{1}{2}$ of $28 \times 100 = 1400$)</p> <p>Use knowledge of place value and rounding in mental multiplication. (E.g. 67×199 as $67 \times 200 - 67$)</p> <p>Use doubling and halving as a strategy in mental multiplication. (E.g. $58 \times 5 =$ half of 58×10, and 34×4 is 34 doubled twice)</p> <p>Partition 2-digit numbers, including decimals, to multiply by a single-digit number mentally. (E.g. 6×27 as 6×20 (120) plus 6×7 (42) making 162 or 6.3×7 as 6×7 plus 0.3×7)</p> <p>Double amounts of money by partitioning. (E.g. £37.45 doubled = £37 doubled (£74) plus 45p doubled (90p) £74.90)</p>	<p>Use short multiplication to multiply a 1-digit number by a number with up to 4 digits</p> <p>Use long multiplication to multiply 3-digit and 4-digit number by a number between 11 and 20</p> <p>Choose the most efficient method in any given situation</p> <p>Find simple percentages of amounts (e.g. 10%, 5%, 20%, 155 and 50%)</p> <p>Begin to multiply fractions and mixed numbers by whole numbers ≤ 10, e.g. $4 \times \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$.</p>	<p>Know multiplication tables to 11×11</p> <p>Multiply whole numbers and one-place decimals by 10, 100 and 1000</p> <p>Use knowledge of factors as aids to mental multiplication. (E.g. $13 \times 6 =$ double 13×3 and 23×5 is $\frac{1}{2}$ of 23×10)</p> <p>Use grid method to multiply numbers with up to 4-digits by one-digit numbers.</p> <p>Use grid method to multiply 2-digit by 2-digit numbers.</p>

Division	<p>Know by heart all the division facts up to $144 \div 12$.</p> <p>Divide whole numbers by 10, 100, 1000, 10,000 to give whole number answers or answers with 1, 2 or 3 decimal places</p> <p>Use doubling and halving as mental division strategies. (E.g. $34 \div 5$ is $(34 \div 10) \times 2$)</p> <p>Use knowledge of multiples and factors, also tests for divisibility, in mental division. (E.g. $246 \div 6$ is $123 \div 3$ and we know that 525 divides by 25 and by 3)</p> <p>Halve amounts of money by partitioning. (E.g. Half of £75.40 = half of £75 (37.50) plus half of 40p (20p) which is £37.70)</p> <p>Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate. (E.g. $96 \div 6$ is $10 + 6$, as $10 \times 6 = 60$ and $6 \times 6 = 36$; $312 \div 3$ is $100 + 4$ as $100 \times 3 = 300$ and $4 \times 3 = 12$)</p> <p>Reduce fractions to their simplest form.</p>	<p>Use short division to divide a number with up to 4 digits by a number ≤ 12.</p> <p>Give remainders as whole numbers or as fractions.</p> <p>Find non-unit fractions of large amounts.</p> <p>Turn improper fractions into mixed numbers and vice versa.</p> <p>Choose the most efficient method in any given situation</p>	<p>Know by heart division facts up to $121 \div 11$</p> <p>Divide whole numbers by 10, 100 or 1000 to give answers with up to one decimal place.</p> <p>Use doubling and halving as mental division strategies</p> <p>Use efficient chunking to divide numbers ≤ 1000 by 1-digit numbers.</p> <p>Find unit fractions of 2 and 3-digit numbers</p>
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<p>Year 6</p>	<p>Multiplication</p>	<p>Know by heart all the multiplication facts up to 12×12. Multiply whole numbers and decimals with up to three places by 10, 100 or 1000, e.g. $234 \times 1000 = 234,000$ and $0.23 \times 1000 = 230$) Identify common factors, common multiples and prime numbers and use factors in mental multiplication. (E.g. 326×6 is 652×3 which is 1956) Use place value and number facts in mental multiplication. (E.g. $40,000 \times 6 = 24,000$ and $0.03 \times 6 = 0.18$) Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 (E.g. 28×25 is $\frac{1}{4}$ of $28 \times 100 = 700$) Use rounding in mental multiplication. (34×19 as $(20 \times 34) - 34$) Multiply one and two-place decimals by numbers up to and including 10 using place value and partitioning. (E.g. 3.6×4 is $12 + 2.4$ or 2.53×3 is $6 + 1.5 + 0.09$) Double decimal numbers with up to 2 places using partitioning <i>e.g. 36.73 doubled is double 36 (72) plus double 0.73 (1.46)</i></p>	<p>Use short multiplication to multiply a 1-digit number by a number with up to 4 digits</p> <p>Use long multiplication to multiply a 2-digit by a number with up to 4 digits</p> <p>Use short multiplication to multiply a 1-digit number by a number with one or two decimal places, including amounts of money.</p> <p>Multiply fractions and mixed numbers by whole numbers. Multiply fractions by proper fractions.</p> <p>Use percentages for comparison and calculate simple percentages.</p>	<p>Know by heart all the multiplication facts up to 12×12. Multiply whole numbers and one-and two-place decimals by 10, 100 and 1000. Use an efficient written method to multiply a one-digit or a teens number by a number with up to 4-digits by partitioning (grid method). Multiply a one-place decimal number up to 10 by a number ≤ 100 using grid method.</p>
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Division</p>	<p>Know by heart all the division facts up to $144 \div 12$.</p> <p>Divide whole numbers by powers of 10 to give whole number answers or answers with up to three decimal places.</p> <p>Identify common factors, common multiples and prime numbers and use factors in mental division. (E.g. $438 \div 6$ is $219 \div 3$ which is 73)</p> <p>Use tests for divisibility to aid mental calculation.</p> <p>Use doubling and halving as mental division strategies, e.g. to divide by 2, 4, 8, 5, 20 and 25. (E.g. $628 \div 8$ is halved three times: 314, 157, 78.5)</p> <p>Divide one and two place decimals by numbers up to and including 10 using place value. (E.g. $2.4 \div 6 = 0.4$ or $0.65 \div 5 = 0.13$, $\pounds 6.33 \div 3 = \pounds 2.11$)</p> <p>Halve decimal numbers with up to 2 places using partitioning e.g. <i>Half of 36.86 is half of 36 (18) plus half of 0.86 (0.43)</i></p> <p>Know and use equivalence between simple fractions, decimals and percentages, including in different contexts.</p> <p>Recognise a given ratio and reduce a given ratio to its lowest terms.</p>	<p>Use short division to divide a number with up to 4 digits by a 1-digit or a 2-digit number</p> <p>Use long division to divide 3-digit and 4-digit numbers by 'friendly' 2-digit numbers.</p> <p>Give remainders as whole numbers or as fractions or as decimals</p> <p>Divide a one-place or a two-place decimal number by a number ≤ 12 using multiples of the divisors.</p> <p>Divide proper fractions by whole numbers.</p>	<p>Know by heart all the division facts up to $144 \div 12$.</p> <p>Divide whole numbers by 10, 100, 1000 to give whole number answers or answers with up to two decimal places.</p> <p>Use efficient chunking involving subtracting powers of 10 times the divisor to divide any number of up to 1000 by a number ≤ 12. (E.g. $836 \div 11$ as $836 - 770$ (70×11) leaving 66 which is 6×11. So that we have $70 + 6 = 76$ as the answer).</p> <p>Divide a one-place decimal by a number ≤ 10 using place value and knowledge of division facts.</p> <p>.</p>
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