

Y6	National Curriculum	Addition	Subtraction	Models and images	Maths Talk																		
	<p>Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.</p> <p>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.</p> <p>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.</p> <p>Perform mental calculations, including with mixed operations and large numbers.</p> <p>Identify common factors, common multiples and prime numbers.</p> <p>Use their knowledge of the order of operations to carry out calculations involving the 4 operations.</p>	<p>Know by heart all the multiplication and division facts up to $12 \times 12/144 \div 12$.</p> <p>Multiply (whole numbers and decimals with up to three places) and divide (whole numbers) by powers of 10 to give whole number answers or answers with up to three decimal places. E.g. $47,310 \div 1000$</p> <table border="1" data-bbox="392 343 1713 494"> <tr> <td>100,000s</td> <td>10,000s</td> <td>1000s</td> <td>100s</td> <td>10s</td> <td>1s</td> <td>0.1s ($\frac{1}{10}$s)</td> <td>0.01s ($\frac{1}{100}$s)</td> <td>0.001s ($\frac{1}{1000}$s)</td> </tr> <tr> <td></td> <td>4</td> <td>7</td> <td>3</td> <td>1 4</td> <td>6 7</td> <td>3</td> <td>1</td> <td>6</td> </tr> </table> <p>Identify common factors, common multiples and prime numbers and use factors in mental multiplication. (E.g. 326×6 is 652×3 which is 1956) and 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:</p> <ul style="list-style-type: none"> - 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 $28 \times 100 = 700$) - 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) - Double decimal numbers with up to 2 places using partitioning; e.g. <i>36.73 doubled is double 36 (72) plus double 0.73 (1.46)</i> - 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> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>36.73</p> <p>↙ ↘</p> <p>72 + 1.46 = 73.46</p> </div> <div style="text-align: center;"> <p>36.86</p> <p>↙ ↘</p> <p>18 + 0.43 = 18.43</p> </div> </div> <p>Use place value and number facts:</p> <ul style="list-style-type: none"> - In mental multiplication. (E.g. $40,000 \times 6 = 24,000$ and $0.03 \times 6 = 0.18$) - In division to 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 $0.65 \div 5 = 0.13$, $\pounds 6.33 \div 3 = \pounds 2.11$) - 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 $6 + 1.5 + 0.09$) - Use rounding in mental multiplication. (34×19 as $(20 \times 34) - 34$) <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>Choose the most efficient method in any given situation</p> <p>Use rounding and approximation to estimate and check answers</p>	100,000s	10,000s	1000s	100s	10s	1s	0.1s ($\frac{1}{10}$ s)	0.01s ($\frac{1}{100}$ s)	0.001s ($\frac{1}{1000}$ s)		4	7	3	1 4	6 7	3	1	6		<p>Concrete apparatus: counting equipment, numicon, multilink, etc.</p> <p>Fingers</p> <p>Bead string/bead bar/beaded line</p> <p>number line</p> <p>100 grid</p> <p>Bar model</p> <p>Arrays</p> <p>Fraction wall</p> <p>Fraction strips</p>	<p>Counting on and back in multiples</p> <p>Clever counting (all tables)</p> <p>Doubling</p> <p>Halving</p> <p>Set/lots of/array</p> <p>Division</p> <p>'undoes' multiplication</p> <p>'Inverse operations'</p> <p>Factors fit into numbers</p> <p>Counting in fractions</p> <p>Prime numbers</p> <p>Prime factors</p> <p>Composite (non-prime) numbers</p>
100,000s	10,000s	1000s	100s	10s	1s	0.1s ($\frac{1}{10}$ s)	0.01s ($\frac{1}{100}$ s)	0.001s ($\frac{1}{1000}$ s)															
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Solve problems involving addition, subtraction, multiplication and division.
 Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
 Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
 Multiply simple pairs of proper fractions, writing the answer in its simplest form
 Divide proper fractions by whole numbers.
 Multiply one-digit numbers with up to 2 decimal places by whole numbers.
 Use written division methods in cases where the answer has up to 2 decimal places.

Use grid multiplication to multiply 1- and 2-digit numbers by a number with up to 4 digits
 Use grid multiplication/vertical written algorithm (ladder) to multiply 1- and 2-digit numbers by a number with one or two decimal places, including amounts of money, E.g. £23.67 x 5

x	20	3	0.60	0.07	
5	100	15	1.80	0.35	117.15

Example of vertical (ladder) - *This can be taken to long multiplication for pupils who are confident and accurate.*

$$\begin{array}{r}
 3472 \\
 \times 16 \\
 \hline
 20832 \\
 34720 \\
 \hline
 55552
 \end{array}$$

Multiply fractions and mixed numbers by whole numbers.
 Multiply fractions by proper fractions.
 Use percentages for comparison and calculate simple percentages.
NB: grid method is default method for all children

Use efficient chunking or short division (bus stop) to divide a number with up to 4 digits by a 1-digit or a (easy) 2-digit number:

$$\begin{array}{r}
 1264 \\
 6 \overline{) 753824}
 \end{array}$$

Use efficient chunking to divide 3-digit and 4-digit numbers by 2-digit numbers.

Give remainders as whole numbers or as fractions or as decimals

Written methods:

Efficient chunking, e.g. $3786 \div 36 =$

$$3600 \text{ (x100)} \quad 3786 \div 36 = 105 \frac{6}{36} = 105 \frac{1}{6}$$

$$7200 \quad -3600 = 36 \times 100$$

$$10800 \quad 186$$

$$14400 \quad -180 = 36 \times 5$$

$$18000 \quad 6$$

Example of long division – *only for pupils who are confident and accurate.*

$$\begin{array}{r}
 200+50+1 \quad 15 \\
 15 \overline{) 3765} \quad 30 \\
 \underline{3000} \quad 45 \\
 765 \quad 60 \\
 \underline{750} \quad 75 \\
 15 \quad 90
 \end{array}$$

Divide a one-place or a two-place decimal number by a number ≤ 12 using multiples of the divisors.

Divide proper fractions by whole numbers, e.g.

$$\frac{1}{4} \div 3 = \frac{1}{12}$$

NB: Efficient chunking method is default method for all children

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 Fingers
 Bead string/bead bar/beaded line
 number line
 100 grid
 Bar model
 Arrays
 Fraction wall
 Fraction strips

Counting on and back in multiples
 Clever counting (all tables)
 Doubling
 Halving
 Set/lots of/array
 Division
 'undoes' multiplication
 'Inverse operations'
 Factors fit into numbers
 Counting in fractions
 Prime numbers
 Prime factors
 Composite (non-prime) numbers