

MULTIPLICATION GUIDELINES – Written Arithmetic

Year Four

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Written compact method

- Multiply two-digit and three-digit numbers by a one-digit number using the formal written layout

- Include calculations that involve missing digits and use the formal written layout to help solve them

eg. $\begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} \times \begin{array}{|c|} \hline 3 \\ \hline \end{array} = \begin{array}{|c|c|} \hline 8 & \square \\ \hline \end{array}$

- Ensure that columns are labelled and the multiplication sign is on the right-hand side

Example 1: 23 x 7 = 161

$$\begin{array}{r} \text{H T U} \\ 23 \\ \underline{7} \times \\ 161 \\ 2 \end{array}$$

Example 2: 423 x 8 = 3,384

$$\begin{array}{r} \text{Th H T U} \\ 423 \\ \underline{8} \times \\ 3384 \\ 12 \end{array}$$

Year Five

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Written compact method

- Multiply numbers up to 4 digits by a one-digit or two-digit number using a formal written method, including long multiplication for two-digit numbers.

- Include calculations that involve missing digits

eg.

$$\begin{array}{r} 4 \square \\ \times \square 6 \\ \hline 246 \\ 820 \\ \hline 1066 \end{array}$$

- Ensure that columns are labelled and the multiplication sign is on the right-hand side

Example 1: 4,217 x 8 = 33,736

$$\begin{array}{r} \text{TTh Th H T U} \\ 4217 \\ \underline{8} \times \\ 33736 \\ 115 \end{array}$$

Example 2: 678 x 54 = 36,612

$$\begin{array}{r} \text{TTh Th H T U} \\ 678 \\ \underline{54} \times \\ 2712 \quad (678 \times 4) \\ \underline{33} \\ 33900 \quad (678 \times 50) \\ \underline{34} \\ 36612 \\ 1 \end{array}$$

NB. To avoid confusion, children can cross through the number they've carried into the next column, when they've added it.

Year Six

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Written compact method

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

- Multiply one-digit numbers with up to two-decimal places by whole numbers.

- Include calculations that involve missing digits or missing numbers.

- Ensure that columns are labelled and the multiplication sign is on the right-hand side

Example 1: 2,678 x 54 = 144,612

$$\begin{array}{r} \text{HTThTh Th H T U} \\ 2678 \\ \underline{54} \times \\ 10712 \quad (2678 \times 4) \\ \underline{233} \\ 133900 \quad (2678 \times 50) \\ \underline{334} \\ 144612 \\ 1 \end{array}$$

NB. To avoid confusion, children can cross through the number they've carried into the next column, when they've added it.

Example 2: 1.52 x 6 = 9.12

$$\begin{array}{r} \text{U . t h} \\ 1.52 \\ \underline{6} \times \\ 9.12 \\ 31 \end{array}$$

MULTIPLICATION GUIDELINES – Mental Arithmetic

Year Four	Year Five	Year Six
<p><u>Mental</u></p> <p><u>Mental Fluency</u> Practise mental calculations to aid fluency.</p> <p><u>x table knowledge</u> Recall multiplication facts for multiplication tables up to 12×12.</p> <p><u>Place value</u> Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together three numbers. Eg. Use $3 \times 7 = 21$ to work out $30 \times 7 = 210$ and $300 \times 7 = 2100$</p> <p><u>Commutativity</u> Recognise and use factor pairs and commutativity in mental calculations. Eg Know that 12 can be made using 12×1, 2×6, 3×4 and these calculations can be done in any order.</p> <p><u>Distributive law</u> Use the distributive law to multiply two digit numbers by one digit numbers. Eg. 14×4 $10 \times 4 = 40$ $4 \times 4 = 16$ $40 + 16 = 56$</p> <p><u>Decimals and place value</u> Find the effect of dividing a one- or two-digit number by 10 and 100</p>	<p><u>Mental</u></p> <p><u>Mental Fluency</u> Practise mental calculations with increasingly large numbers to aid fluency.</p> <p><u>x table knowledge</u> Recall multiplication facts for multiplication tables up to 12×12.</p> <p><u>Using known facts</u> Multiply numbers mentally, drawing upon known facts</p> <ul style="list-style-type: none"> Using multiplication facts for multiplication tables up to 12×12 along with place value knowledge eg $7 \times 5 = 35$ so $70 \times 50 = 3500$. Using factors of numbers eg. 16×6 could be done as $16 \times 2 \times 3$ <p><u>Multiples</u> Identify multiples of numbers including solving puzzles Eg My age is a multiple of 8. Next year my age will be a multiple of 7. How old am I?</p> <p><u>Squared and cubed numbers</u> Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)</p> <ul style="list-style-type: none"> Know all square numbers up to 12×12. Use these square numbers to work out squares of multiples of 10 eg $30 \times 30 = 900$ <p><u>Place value</u> Multiply whole numbers and those involving decimals by 10, 100 and 1,000</p> <ul style="list-style-type: none"> Be able to explain the effect on the number by multiplying by 10, 100 or 1000. Solve puzzles eg. The product is 400. At least one of the numbers is a multiple of 10. What two numbers could have been multiplied together? Are there any other possibilities? 	<p><u>Mental</u></p> <p><u>Mental Fluency</u> Perform mental calculations, including with mixed operations and large numbers to aid fluency.</p> <p><u>x table knowledge</u> Perform mental calculations, including with mixed operations and large numbers.</p> <ul style="list-style-type: none"> Using multiplication facts for multiplication tables up to 12×12 when solving more difficult calculations. Eg. To calculate 24×15, they multiply 24×10 and then halve this to get 24×5, adding these two results together. They record their method as $(24 \times 10) + (24 \times 5)$. Alternatively, they work out $24 \times 5 = 120$ (half of 24×10), then multiply 120 by 3 to get 360. <p><u>Place value</u> Multiply numbers and those involving decimals by 10, 100 and 1,000 giving answers up to three decimal places.</p> <ul style="list-style-type: none"> Be able to explain the effect on the number by multiplying by 10, 100 or 1000. Work out: 17.036×10, $\times 100$, $\times 1000$. <p><u>Identifying multiples and factors</u></p> <ul style="list-style-type: none"> How can you use factors to multiply 17 by 12? Start from a two-digit number with at least six factors, e.g. 72. How many different multiplication facts can you make using what you know about 72? What facts involving decimals can you derive?