



WAYCROFT
MULTI ACADEMY TRUST

Living and Learning Together

Progression in
Written Calculation
Year 6

This progression in written calculations has been written in consultation with the teaching staff and the New Curriculum for Mathematics to suit the current needs of our children.

Please note that children will move through this progression at different rates and teachers will use their professional judgement to decide when the most appropriate time is to move the children on. There may be occasions when other methods will be taught to suit the needs of individual pupils.

MULTIPLICATION

By the end of Year 6, Children should be able to:

- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. E.g. 285×63
- Multiply one-digit numbers with up to two decimal places by whole numbers. E.g. 7.56×34 .
- Recall multiplication and division facts for multiplication tables up to 12×12 .

Partitioning: This method is used during mental arithmetic tasks rather than being a written calculation.

e.g. $63 \times 8 = (60 \times 8) + (3 \times 8)$
 $= 480 + 24$
 $= 504$

Formal written method for short multiplication e.g. 5643×8

$$\begin{array}{r}
 5643 \\
 \times 8 \\
 \hline
 45144 \\
 \hline
 532
 \end{array}$$

Formal written method for short multiplication, involving decimals e.g. 4.83×6

4.83 is equivalent to $483 \times 6 \div 100$

$$\begin{array}{r}
 483 \\
 \times 6 \\
 \hline
 2898 \\
 \hline
 41
 \end{array}$$

$2898 \div 100 = 28.98$

Formal written method for long multiplication e.g. 285×63

$$\begin{array}{r}
 285 \\
 \times 63 \\
 \hline
 855 \\
 17100 \\
 \hline
 17955
 \end{array}$$

Formal written method for long multiplication, involving decimals e.g. 7.56×34

7.56 is equivalent to $756 \times 34 \div 100$

$$\begin{array}{r}
 756 \\
 \times 34 \\
 \hline
 3024 \\
 22680 \\
 \hline
 25704
 \end{array}$$

$25704 \div 100 = 257.04$

DIVISION

By the end of Year 6, Children should be able to:

- 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 decimals.
- Use written methods of division in cases where the answer has up to two decimal places.
- Recall multiplication and division facts for multiplication tables up to 12×12 .

Formal written method for short division e.g. $1838 \div 8$

Whole number remainder

$$\begin{array}{r} 229 \text{ r } 6 \\ 8 \overline{) 1838} \\ \underline{8} \\ 10 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Fraction remainder

$$\begin{array}{r} 229 \text{ r } \frac{3}{4} \\ 8 \overline{) 1838} \\ \underline{8} \\ 10 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Decimal remainder

$$\begin{array}{r} 229.75 \\ 8 \overline{) 1838.00} \\ \underline{8} \\ 10 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

Formal written method for short division involving decimals: E.g. $45.36 \div 6$

$$\begin{array}{r} 7.56 \\ 6 \overline{) 45.36} \\ \underline{6} \\ 15 \\ \underline{12} \\ 30 \\ \underline{30} \\ 6 \\ \underline{6} \\ 0 \end{array}$$

Expanded written method for division

e.g. $5836 \div 18$

$$\begin{array}{r}
 324 \text{ r } 4 \\
 18 \overline{) 5836} \\
 \underline{- 5400} \quad (18 \times 300) \\
 32 \\
 \overset{3}{\cancel{4}} \overset{1}{3} 2 \\
 \underline{- 360} \quad (18 \times 20) \\
 76 \\
 \underline{- 72} \quad (18 \times 4) \\
 4
 \end{array}$$

$5836 \div 18 = 324 \text{ r } 4$ or $324 \frac{2}{9}$.

Can also go further to turn the remainder into a decimal.

Expanded written method for division, involving decimals. E.g. $58.32 \div 18$

$$\begin{array}{r}
 3.24 \\
 18 \overline{) 58.32} \\
 \underline{- 54.00} \quad (18 \times 3) \\
 32 \\
 \overset{3}{\cancel{4}} \overset{1}{3} 2 \\
 \underline{- 3.60} \quad (18 \times 0.2) \\
 072 \\
 \underline{- 0.72} \quad (18 \times 0.04) \\
 0
 \end{array}$$

Formal written methods for long division e.g. $5836 \div 18$

$$\begin{array}{r}
 324 \text{ r } 4 \\
 18 \overline{) 5836} \\
 \underline{- 54} \quad \downarrow \\
 32 \\
 \overset{3}{\cancel{4}} \overset{1}{3} \quad \downarrow \\
 \underline{- 36} \quad \downarrow \\
 76 \\
 \underline{- 72} \\
 4
 \end{array}$$

$5836 \div 18 = 324 \text{ r } 4$ or $324 \frac{2}{9}$

Can also go further to turn the remainder into a decimal.

Formal written methods for long division involving decimals e.g. $58.32 \div 18$

$$\begin{array}{r}
 3.24 \\
 18 \overline{) 58.32} \\
 \underline{- 54} \quad \downarrow \\
 32 \\
 \overset{3}{\cancel{4}} \overset{1}{3} \quad \downarrow \\
 \underline{- 3.6} \quad \downarrow \\
 072 \\
 \underline{- 0.72} \\
 0
 \end{array}$$

ADDITION

Oral work, practical activities, informal jottings; picture, words and symbols.

By the end of Year 6, Children should be able to:

- Add larger numbers, including those involving decimals.

Formal written method of addition, involving whole numbers e.g. 456 247 + 363 845

$$\begin{array}{r}
 4 5 6 2 4 7 \\
 + 3 6 3 8 4 5 \\
 \hline
 8 2 0 0 9 2 \\
 \hline
 1 1 1 1
 \end{array}$$

Formal written method of addition, involving decimals e. g. 52.48 + 45.37

$$\begin{array}{r}
 5 2 4 8 \\
 + 4 5 3 7 \\
 \hline
 9 7 8 5 \\
 \hline
 1
 \end{array}$$

SUBTRACTION

Oral work, practical activities, informal jottings; picture, words and symbols.

By the end of Year 6, Children should be able to:

- Subtract larger numbers, including those involving decimals.

Formal written method of subtraction, involving whole numbers e.g. 746 297 - 354 841

$$\begin{array}{r}
 \overset{6}{\cancel{7}} \overset{1}{4} \overset{5}{\cancel{6}} \overset{1}{2} 9 7 \\
 - 3 5 4 8 4 1 \\
 \hline
 3 9 1 4 5 6
 \end{array}$$

Formal written method of subtraction, involving decimals e.g. 65.78 - 49.37

$$\begin{array}{r}
 \overset{5}{\cancel{6}} \overset{1}{5} 7 8 \\
 - 4 9 3 7 \\
 \hline
 1 6 4 1
 \end{array}$$