Fletching CEP School
Progression through the Written Calculations Policy

This policy reflects the school’s progression through written calculations based on the requirements of the new mathematics framework, from Year 1 to Year 6.

Mental calculations and skills still need to be and must be taught alongside the written method. Once written methods are introduced, mental skills must be kept sharp by continuing to develop and apply them with appropriate examples.

Children should work through the school’s agreed progression in order that they know and understand a compact standard method for each numerical operation by the end of Year 6.

In our classes, children will be at different stages in their move towards efficiency. Whilst the children will be taught at the age related expectation, their work will be differentiated to the stage of development at which they are working.

However the majority of children should be at what is expected for their age by the end of each year as stated in the statutory requirements for each year group.

The children should be using and applying these skills in different contexts and real world situations.

Year 1
Addition and subtraction:
- Read, write and interpret mathematical statements involving addition and subtraction.
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract one-digit and two-digit numbers to 20, including zero.
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.

Multiplication and division:
- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representation and arrays with the support of the teacher.

Year 2:
Addition and subtraction:
- Solve problems with addition and subtraction:
  1. Using concrete objects and pictorial representations, including those involving number, quantities and measures.
  2. Apply their increasing knowledge of (mental) and written methods.
- Recall and use addition and subtraction facts to 20 fluently and derive and use related facts to 100.
- Add and subtract numbers using concrete objects, pictorial representations and mentally
• Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.
• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

**Multiplication and division:**
• Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication, division and equals signs.
• Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts
• Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers.
• Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

**Year 3:**
**Addition and subtraction:**
• Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
• Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.
• Add and subtract numbers mentally.
• Estimate the answer to a calculation and use inverse operations to check answers.

**Multiplication and division:**
• 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.
• 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.
• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.

Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

**Year 4:**
**Addition and subtraction:**
• Add and subtract numbers with up to four digits using formal written methods of addition and subtraction.
• Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why.
• Estimate and use inverse operations to check answers to a calculation.
**Multiplication and division:**
- Multiply two-digit and three-digit numbers by a one digit number using formal written methods.
- 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.
- Recall multiplication and division facts for multiplication tables up to 12 x 12.
- Use place value, known and derived facts to multiply and divide mentally.

*Pupils solve two-step problems in contexts, choosing the appropriate operation/s, working with increasingly harder numbers.*

**Year 5:**

**Addition and subtraction:**
- Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- Add and subtract numbers mentally with increasingly large numbers.
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

*Pupils practice the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.*

**Multiplication and division:**
- Identify multiples and factors.
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
- Establish whether a number up to 100 is prime and recall prime numbers up to 19.
- 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 and divide numbers mentally, drawing upon known facts.
- Divide numbers up to 4 digits by a one-digit number using formal written method of short division and interpret remainders appropriately for the context.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Recognize and use square numbers and cube numbers and the notation for squared (2) and cubed (3).
- Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
- Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple ratios.

*Pupils practice and extend their use of the formal written methods of short multiplication and short division.*
Year 6:
Addition, subtraction, multiplication and division:

- Add and subtract negative integers.
- 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 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.
- 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 context.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Use knowledge of the order of operations to carry out calculations involving the four operations.
- Solve addition and subtraction multi-step problems in contexts, deciding which operations to use.
- Solve problems involving addition, subtraction, multiplication and division.

Pupils practice addition, subtraction, multiplication and division for larger numbers, using the formal written methods of column addition and subtraction, short and long multiplication and short and long division.

At all stages it is essential that once the children have acquired the necessary skills they apply them to problem solving and investigations. Word problems should include problems involving money and measures including time.

All staff will focus on the correct use of mathematical language (vocabulary) at all stages of development. E.g. calculation in place of sum; correct use of place value terms.

Judgments will need to be made as to whether pupils possess sufficient of these skills to progress. Different prerequisite skills are needed for each operation.

Monitoring of Written Calculations

The coordinator will ensure that all staff are aware of progression through calculations, so that children are being taught appropriate methods for their stage and ability, which are in line with our agreed policy. This includes book sampling, monitoring of plans, pupil interviews, test analyses etc.

The following are standards in all areas of mathematics that we expect the majority of children to achieve for written calculations.
PROGRESSION THROUGH WRITTEN CALCULATIONS FOR ADDITION

Stage 1
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.

They use number-lines and practical resources to support calculation and teachers demonstrate the use of the number-line.

3 + 2 = 5

Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.

8 + 5 = 13

Bead strings can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.

Stage 2
Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.
First counting on in tens and ones.

34 + 23 = 57

Then helping children to become more efficient by adding the units in one jump.

34 + 23 = 57

Followed by adding the tens in one jump and the units in one jump.

34 + 23 = 57

Bridging through ten can help children become more efficient.

37 + 15 = 52
Number squares (100 squares) may be used to support this stage. For example, to add 1 move one square to the right; to add 10 count on 10 squares and when this is secure express it as moving down one row (the equivalent to 10).

**Stage 3**

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

- **Count on from the largest number irrespective of the order of the calculation.**

  \[38 + 86 = 124\]

- **Compensation**

  \[49 + 73 = 122\]

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Adding the least significant digits first

\[
\begin{array}{ccc}
67 & + & 24 \\
11 & (7 + 4) & 12 & (7 + 5) \\
80 & (60 + 20) & 140 & (60 + 80) \\
91 & & 200 & \\
 & & 352 & \\
\end{array}
\]
This will be modelled to the children using Dienes rods or Numicon to provide a picture of the calculation.

**Stage 4**
From this, children will begin to carry below the line.

\[
\begin{array}{ccc}
625 & + & 783 & + & 367 \\
+ & 48 & + & 42 & + & 85 \\
\hline
673 & + & 825 & + & 452
\end{array}
\]

**Using similar methods, children will:**
- add several numbers with different numbers of digits;
- begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;
- know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p. £3.59 + 0.78 £4.37

**Stage 5**
Children should extend the carrying method to numbers with at least four digits.

\[
\begin{array}{ccc}
587 & + & 3587 \\
+ & 475 & + & 675 \\
\hline
1062 & + & 4262
\end{array}
\]

**Using similar methods, children will:**
- add several numbers with different numbers of digits;
- begin to add two or more decimal fractions with up to three digits and the same number of decimal places;
- know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm. 3.20 + 2.80 6.00m

Children will have been taught to convert to the same measure before attempting a calculation involving measures.

**Stage 6**
Children should extend the carrying method to number with any number of digits.

\[
\begin{array}{ccc}
7648 & + & 6584 & + & 42 \\
+ & 1486 & + & 5848 & + & 3642 \\
\hline
9134 & + & 12432 & + & 786 \\
\hline
11944 & + & 4681 & + & 3
\end{array}
\]
Using similar methods, children will
✓ add several numbers with different numbers of digits;
✓ begin to add two or more decimal fractions with up to four digits and either one or two decimal places;
✓ know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71.

\[
\begin{align*}
401.20 \\
+ 26.85 \\
+ 0.71 \\
\hline
428.76
\end{align*}
\]

Children will not be moved onto the next stage if:

1) They are not ready.
2) They are not confident.

Children will be encouraged to approximate their answers before calculating. Children will be encouraged to check their answers after calculation using an appropriate strategy. Children will be encouraged to consider if a mental calculation would be appropriate before using written methods. However, if asked to show a written method they should use one of the above examples.
PROGRESSION THROUGH WRITTEN CALCULATIONS FOR SUBTRACTION

Stage 1
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

They use number-lines and practical resources to support calculation. Teachers demonstrate the use of the number-line.

6 – 3 = 3

The numberline should also be used to show that 6 - 3 means the ‘difference between 6 and 3’ or ‘the difference between 3 and 6’ and how many jumps they are apart.

Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.

13 – 5 = 8

Bead strings can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

13 – 5 = 8
Children will begin to use empty number lines to support calculations.

**Stage 2**

**Counting back**

As counting back leads on to decomposition the children need lots of practise at this skill. Counting on should be taught as a mental strategy.

✓ First counting back in tens and ones.

\[
47 - 23 = 24
\]

✓ Then helping children to become more efficient by subtracting the units in one jump.

\[
47 - 23 = 24
\]

✓ Subtracting the tens in one jump and the units in one jump.

\[
47 - 23 = 24
\]

✓ Bridging through ten can help children become more efficient.

\[
42 - 25 = 17
\]

Children will continue to use empty number lines with increasingly large numbers.
Number squares (100 squares) may be used to support this stage. For example, to subtract 1 move one square to the left; to subtract 10 count back 10 squares and when this is secure express it as moving up one row (the equivalent to 10).

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

**Stage 3**

**Partitioning and decomposition**

This process should be demonstrated using arrow cards to show the partitioning and base 10 materials to show the decomposition of the number.

\[
\begin{array}{c}
89 \\
-57
\end{array}
\]

\[
\begin{array}{c}
80 \\
50
\end{array}
\]

\[
\begin{array}{c}
9 \\
7
\end{array}
\]

\[
\begin{array}{c}
30 \\
20
\end{array}
\]

\[
\begin{array}{c}
2 \\
6
\end{array}
\]

Initially, the children will be taught using examples that do not need the children to exchange.

From this the children will begin to exchange.

\[
\begin{array}{c}
71 \\
-45
\end{array}
\]

Step 1

\[
\begin{array}{c}
70 \\
-40
\end{array}
\]

\[
\begin{array}{c}
1 \\
5
\end{array}
\]

Step 2

\[
\begin{array}{c}
60 \\
-40
\end{array}
\]

\[
\begin{array}{c}
11 \\
5
\end{array}
\]

\[
\begin{array}{c}
20 \\
6
\end{array}
\]

\[
\begin{array}{c}
= \\
= \\
= 26
\end{array}
\]

This would be modelled using Dienes rods or Numicon in order to provide the children with a picture of the calculation.

This would be recorded by the children as

\[
\begin{array}{c}
60 \\
-40
\end{array}
\]

\[
\begin{array}{c}
11 \\
5
\end{array}
\]

\[
\begin{array}{c}
20 \\
6
\end{array}
\]

\[
\begin{array}{c}
= 26
\end{array}
\]

The calculation should be read as e.g. take 5 away from 1.
Children should know that units line up under units, tens under tens, and so on.

**Partitioning and decomposition**

\[
\begin{array}{rrrr}
754 & = \\
- & 86
\end{array}
\]

**Step 1**

\[
\begin{array}{rrrr}
700 & 50 & 4 \\
- & 80 & 6
\end{array}
\]

**Step 2**

\[
\begin{array}{rrrr}
700 & 40 & 14 & (adjust from T to U) \\
- & 80 & 6
\end{array}
\]

**Step 3**

\[
\begin{array}{rrrr}
600 & 140 & 14 & (adjust from H to T) \\
- & 80 & 6
\end{array}
\]

This would be recorded by the children as

\[
\begin{array}{rrrr}
600 & 140 & 14 \\
- & 80 & 6 \\
\hline
600 & 60 & 8 = 668
\end{array}
\]

**Stage 4**

**Decomposition**

\[
\begin{array}{r}
6 \ 141 \\
754 \\
- 86 \\
\hline
668
\end{array}
\]

Children should:

- be able to subtract numbers with different numbers of digits;
- using this method, children should also begin to find the difference between two three-digit sums of money, with or without ‘adjustment’ from the pence to the pounds;
- know that decimal points should line up under each other.

For example:

\[
\begin{array}{rrrr}
£8.95 & = \\
-£4.38
\end{array}
\]

**Step 1**

\[
\begin{array}{rrrr}
8 & 0.9 & 0.05 \\
- & 4 & 0.3 & 0.08
\end{array}
\]

**Step 2**

\[
\begin{array}{rrrr}
8 & 0.8 & 0.15 & (adjust from T to U) leading to 8.85 \\
- & 4 & 0.3 & 0.08 & 1 \\
\hline
4 & 0.5 & 0.07 = £4.57
\end{array}
\]

\[
\begin{array}{rrrr}
8 & 0.8 & 0.15 & (adjust from T to U) leading to 8.85 \\
- & 4 & 0.3 & 0.08 & 1 \\
\hline
4 & 0.5 & 0.07 = £4.57
\end{array}
\]
Alternatively, children can set the amounts to whole numbers, i.e. 895 – 438 and convert to pounds after the calculation.

**Step 1**

\[
\begin{array}{ccc}
800 & 90 & 5p \\
-400 & -30 & -8p \\
\end{array}
\]

**Step 2**

\[
\begin{array}{ccc}
800 & 80 & 15p \\
-400 & -30 & -8p \\
400 & 50 & 7p = 457p \ £4.57 \\
\end{array}
\]

This would be recorded by the children as

\[
\begin{array}{ccc}
800 & 90 & 5p \\
-400 & -30 & -8p \\
\end{array}
\]

**Decomposition**

\[
\begin{array}{c}
614 \\
754 \\
- 286 \\
468
\end{array}
\]

**Children should:**

- be able to subtract numbers with different numbers of digits;
- begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;
- know that decimal points should line up under each other.

**Decomposition**

\[
\begin{array}{c}
513 \\
6467 \\
- 2684 \\
3783
\end{array}
\]

**Children should:**

- be able to subtract numbers with different numbers of digits;
- be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;
- know that decimal points should line up under each other.

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children will not be moved onto the next stage if:

3) they are not ready.
4) they are not confident.
Children will be encouraged to approximate their answers before calculating. Children will be encouraged to check their answers after calculation using an appropriate strategy. Children will be encouraged to consider if a mental calculation would be appropriate before using written methods. However, if asked to show a written method they should use one of the above examples.
PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

Stage 1

Children will experience equal groups of objects and will count in 2s and 10s and begin to count in 5s. They will work on practical problem solving activities involving equal sets or groups.

Stage 2

Children will develop their understanding of multiplication and use jottings to support calculation:

✓ Repeated addition

3 times 5 is 5 + 5 + 5 = 15; 3 lots of 5; 5 lots of 3; 3 x 5 or 5 x 3

Repeated addition can be shown easily on a number line:

5 x 3 = 5 + 5 + 5

and on a bead string:

5 x 3 = 5 + 5 + 5
✓ **Commutativity**

Children should know that $3 \times 5$ has the same answer as $5 \times 3$. This can also be shown on the number line.

![Number Line Diagram]

✓ **Arrays**

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.

![Array Diagram]

**Stage 3**

Children will continue to use:

✓ **Repeated addition**

4 times 6  
$6 + 6 + 6 + 6 = 24$;  
4 lots of 6;  
6 lots of 4;  
4 x 6  or  6 x 4

Children should use number lines or bead strings to support their understanding.

![Number Line with Beads Diagram]

✓ **Arrays**

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.
Children will also develop an understanding of

✓ Scaling

e.g. Find a ribbon that is 4 times as long as the blue ribbon

![Diagram showing a 5 cm ribbon and a 20 cm ribbon](image)

✓ Using symbols to stand for unknown numbers to complete equations using inverse operations

\[ \Box \times 5 = 20 \quad 3 \times \triangle = 18 \quad \Box \times \bigcirc = 32 \]

✓ Partitioning

\[ 38 \times 5 = (30 \times 5) + (8 \times 5) \]
\[ = 150 + 40 \]
\[ = 190 \]

**Stage 4**

Children will continue to use arrays where appropriate leading into the grid method of multiplication.

**Grid method**

**TU x U**

(Short multiplication – multiplication by a single digit)

23 \times 8

Children will approximate first

23 \times 8 \text{ is approximately } 25 \times 8 = 200

\[
\begin{array}{c|c|c}
\times & 8 \\
\hline
20 & 160 \\
3 & 24 \\
\hline
\end{array}
\]

\[ + \quad 24 \]

\[ 184 \]
HTU x U
Short multiplication – multiplication by a single digit.

346 x 9

Children will approximate first
346 x 9 is approximately 350 x 10 = 3500

<table>
<thead>
<tr>
<th></th>
<th>x 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>2700</td>
</tr>
<tr>
<td>40</td>
<td>360</td>
</tr>
<tr>
<td>6</td>
<td>54</td>
</tr>
</tbody>
</table>


Stage 5

Using the expanded method
Children will approximate first
23 x 8 is approximately 25 x 8 = 200

\[
\begin{array}{ccc}
23 & \times 8 \\
\, & 24 & (3 \times 8) \\
\, & 160 & (20 \times 8) \\
\, & 194 & \\
\end{array}
\]

346 x 9 is approximately 350 x 10 = 3500

\[
\begin{array}{ccc}
346 & \times 9 \\
\, & 54 & (6 \times 9) \\
\, & 360 & (40 \times 9) \\
\, & 2700 & (300 \times 9) \\
\, & 3114 & \\
\end{array}
\]
Stage 6
Using the compact method – standard algorithm.

Children will approximate first
23 x 8 is approximately 25 x 8 = 200

\[
\begin{array}{c}
23 \\
\times \ 8 \\
\hline
184 \\
\end{array}
\]

346 x 9 is approximately 350 x 10 = 3500

\[
\begin{array}{c}
346 \\
\times \ 9 \\
\hline
3114 \\
\end{array}
\]

Stage 7
TU x TU

As with TU x U and HTU x U the children will move from the grid method to the expanded method to the standard algorithm.

(Long multiplication – multiplication by more than a single digit)

38 x 72

Children will approximate first
38 x 72 is approximately 70 x 40 = 2800

\[
\begin{array}{ccc}
x & 70 & 2 \\
30 & 2100 & 60 \\
8 & 560 & 16 \\
\hline
2100 & + & 560 \\
+ & 60 & + 16 \\
+ & 2736 & \\
\end{array}
\]

\[
\begin{array}{c}
38 \\
\times \ 72 \\
\hline
16 \quad (2 \times \ 8) \\
60 \quad (2 \times 30) \\
560 \quad (70 \times \ 8) \\
2100 \quad (70 \times 30) \\
\hline
2736 \\
\end{array}
\]
As their confidence develops children will be encouraged to handle larger numbers using the strategies they have been taught,

*Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other. A strategy that can be used is to ask the children to remove the decimal point, solve the calculation and then replace the decimal point.*

e.g. $4.9 \times 3$

Children will approximate first
$4.9 \times 3$ is approximately $5 \times 3 = 15$

\[
\begin{array}{c}
\times & 4 & 0.9 \\
3 & 12 & 2.7 \\
\hline
& 12 & \\
& 2.7 & \\
\hline
& 14.7 & \\
\end{array}
\]

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

5) they are not ready.
6) they are not confident.

Children will be encouraged to approximate their answers before calculating.

Children will be encouraged to consider if a mental calculation would be appropriate before using written methods. However, if asked to show a written method they should use one of the above examples.
PROGRESSION THROUGH CALCULATIONS FOR DIVISION

Stage 1
Children will understand equal groups and share items out in play and problem solving.

Stage 2
Children will develop their understanding of division and use jottings to support calculation

✓ Sharing equally
6 sweets shared between 2 people, how many do they each get?

✓ Grouping or repeated subtraction
There are 6 sweets, how many people can have 2 sweets each?

✓ Repeated subtraction using a number line or bead string
12 ÷ 3 = 4
The bead bar will help children with interpreting division calculations such as $10 \div 5$ as ‘how many 5s make 10?’

✓ Using symbols to stand for unknown numbers to complete equations using inverse operations

$\square \div 2 = 4 \quad 20 \div \triangle = 4 \quad \square \div \triangle = 4$

**Stage 3**

Ensure that the emphasis is on grouping rather than sharing.

Children will continue to use:

✓ Repeated subtraction using a number line

Children will use an empty number line to support their calculation.

$24 \div 4 = 6$

Children should also move onto calculations involving remainders.

$13 \div 4 = 3 \, r \, 1$

✓ Using symbols to stand for unknown numbers to complete equations using inverse operations

$26 \div 2 = \square \quad 24 \div \triangle = 12 \quad \square \div 10 = 8$

**Stage 4**

Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s – numbers with which the children are more familiar.

$72 \div 5$

$-2 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5 \quad -5$
Moving onto:

Then onto the vertical method:

Short division TU ÷ U

72 ÷ 3

\[
\begin{array}{c}
3 ) 72 \\
- 30 \\
\hline
42 \\
- 30 \\
\hline
12 \\
- 6 \\
\hline
6 \\
- 6 \\
\hline
0 \\
\end{array}
\]

Answer: \( 24 \)

(1x3=3 2x3=6 5x3=15 10x3=30)

Leading to subtraction of other multiples.

96 ÷ 6

\[
\begin{array}{c}
6 ) 96 \\
- 60 \\
\hline
36 \\
- 36 \\
\hline
0 \\
\end{array}
\]

Answer: \( 16 \)

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?
Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?
Answer: 8 (the remaining 6 apples still need to be placed into a box)
**Stage 5**

Children will use the standard for short division for example:

96 ÷ 6 becomes

\[
\begin{array}{c}
6 \\
\hline
96 \\
\end{array}
\]

97 ÷ 6 becomes

\[
\begin{array}{c}
6 \\
\hline
97 \\
\end{array}
\]

The remainder can be written as a remainder depending on the context i.e. 16 r 1 becomes \(16\frac{1}{6}\)

**Stage 6**

Children will continue to use the standard algorithm to solve short division TU ÷ U.

Children can start to subtract larger multiples of the divisor, e.g. 30x

**Short division HTU ÷ U**

196 ÷ 6

\[
\begin{array}{c}
6 \\
\hline
196 \\
- 180 \\
- 16 \\
- 12 \\
\hline
\end{array}
\]

Answer: \(32\) remainder 4 or \(32 r 4\)

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

This will lead to using the standard algorithm:

196 ÷ 6

\[
\begin{array}{c}
6 \\
\hline
196 \\
\end{array}
\]
**Stage 7**

Children will continue to use written methods to solve short division $TU \div U$ and $HTU \div U$.

Long division $HTU \div TU$

$972 \div 36$

\[
36 ) 972 \\
\underline{- 720} \\
252 \\
\underline{- 252} \\
0
\]

\[
\begin{array}{c}\text{20x} \\
\text{7x} \\
\end{array}
\]

(1x36=36, 2x36=72, 5x36=180, 10x36=360)

Answer : 27

Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3 \frac{2}{10}$ which could then be written as $3 \frac{1}{5}$ in its lowest terms.

This will lead to the standard algorithm:

$972 \div 36$

\[
36 ) 972 \\
\underline{- 720} \\
252 \\
\underline{- 252} \\
0
\]

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

$87.5 \div 7$

\[
7 ) 87.5 \\
\underline{- 70.0} \\
17.5 \\
\underline{- 14.0} \\
3.5 \\
\underline{- 3.5} \\
0
\]

\[
\begin{array}{c}\text{10x} \\
\text{2x} \\
\text{0.5x} \\
\end{array}
\]

Answer : 12.5

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children will not progress onto the next stage if:
1) they are not ready.
2) they are not confident.

Children will be encouraged to approximate their answers before calculating. Children will be encouraged to check their answers after calculation using an appropriate strategy. Children will be encouraged to consider if a mental calculation would be appropriate before using written methods. However, if asked to show a written method they should use one of the above examples.