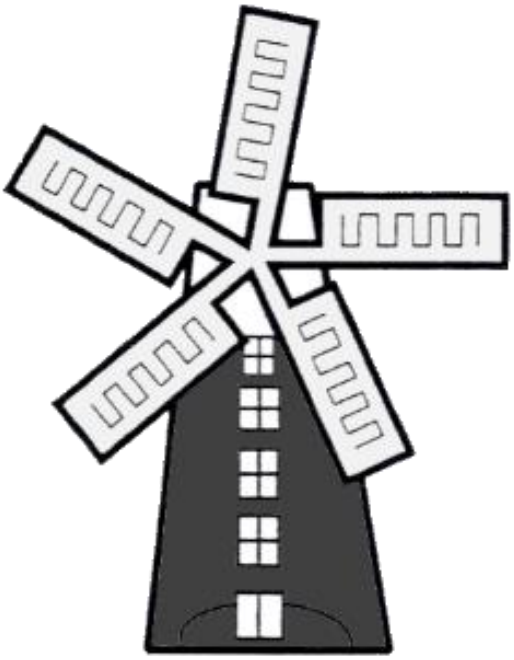
The St. Peter & St. Paul CE Primary School Burgh-Le-Marsh

"Striving for excellence together in a caring Christian community."



RESPECT COMPASSION COURAGE

PROGRESSION IN CALCULATION

REVISION HISTORY:
Implemented January 2014
Reviewed and updated September 2014
Reviewed and updated November 2017

INTRODUCTION

Children are introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved. Over time children learn how to use models and images, such as empty number lines, to support their mental and informal written methods of calculation. As children's mental methods are strengthened and refined, so too are their informal written methods. These methods become more efficient and succinct and lead to efficient written methods that can be used more generally. By the end of Year 6 children are equipped with mental, written and calculator methods that they understand and can use correctly. When faced with a calculation, children are able to decide which method is most appropriate and have strategies to check its accuracy. At whatever stage in their learning, and whatever method is being used, it must still be underpinned by a secure and appropriate knowledge of number facts, along with those mental skills that are needed to carry out the process and judge if it was successful.

The overall aim is that when children leave our school they:

- have a secure knowledge of number facts and a good understanding of the four operations;
- are able to use this knowledge and understanding to carry out calculations mentally and to apply general strategies when using one-digit and two-digit numbers and particular strategies to special cases involving bigger numbers;
- make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads;
- have an efficient, reliable, compact written method of calculation for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally;
- use a calculator effectively, using their mental skills to monitor the process, check the steps involved and decide if the numbers displayed make sense. Although this is not currently tested in SATs, this is a valuable and indeed necessary mathematical life-skill.

MENTAL METHODS OF CALCULATION - OVERVIEW

Oral and mental work in mathematics is essential, particularly so in calculation. Early practical, oral and mental work must lay the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts. Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied. Ongoing oral and mental work provides practice and consolidation of these ideas. It must give children the opportunity to apply what they have learned to particular cases, exemplifying how the rules and laws work, and to general cases where children make decisions and choices for themselves.

The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers or a 'feel' for numbers is the product of structured practice and repetition. It requires an understanding of number patterns and relationships developed through directed enquiry, use of models and images and the application of acquired number knowledge and skills. Secure mental calculation requires the ability to:

- recall key number facts instantly – for example, all addition and subtraction facts for each number to at least 10 (Year 2), sums and differences of multiples of 10 (Year 3) and multiplication facts up to 12 × 12 (Year 4);
- use taught strategies to work out the calculation – for example, recognise that addition can be done in any order and use this to add mentally a one-digit number or a multiple of 10 to a one-digit or two-digit number (Year 1), partition two-digit numbers in different ways including into multiples of ten and one and add the tens and ones separately and then recombine (Year 2), when applying mental methods in special cases (Year 5);
- understand how the rules and laws of arithmetic are used and applied – for example, to add or subtract mentally combinations of one-digit and two-digit numbers (Year 3), and to calculate mentally with whole numbers and decimals (Year 6).

PROGRESSION IN ADDITION

Children should use mental methods where appropriate, but for calculations that they cannot do in their heads, they should use an efficient written method accurately and with confidence. It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for addition.

To add successfully, children need to be able to:

- recall all addition pairs to 9 + 9 and complements in 10;
- add mentally a series of one-digit numbers, such as 5 + 8 + 4;
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value;
- partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

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:

- they are not ready.
- they are not confident.

Children should be encouraged to approximate their answers before calculating and to check their answers after calculation using an appropriate strategy. Children should also be encouraged to consider if a mental calculation would be appropriate before using written methods**.**

Mental calculation strategies

Mental recall of number bonds

6 + 4 = 10 ☐ + 3 = 10 25 + 75 = 100 19 + ☐ = 20

Use near doubles

6 + 7 = double 6 + 1 = 13

Addition using partitioning and recombining

34 + 45 = (30 + 40) + (4 + 5) = 79

Counting on or back in repeated steps of 1, 10, 100, 1000

86 + 57 = 143 (by counting on in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

Add the nearest multiple of 10, 100 and 1000 and adjust

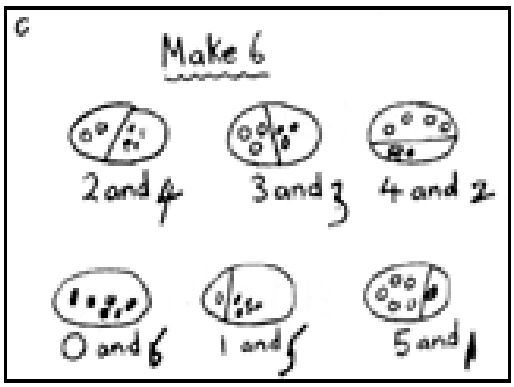
24 + 19 = 24 + 20 – 1 = 43 458 + 71 = 458 + 70 + 1 = 529

Use the relationship between addition and subtraction

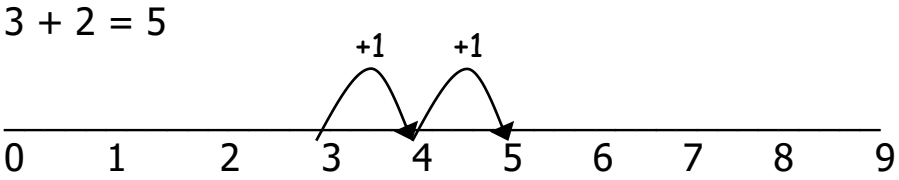
36 + 19 = 55 19 + 36 = 55
55 – 19 = 36 55 – 36 = 19

Reception and Year 1

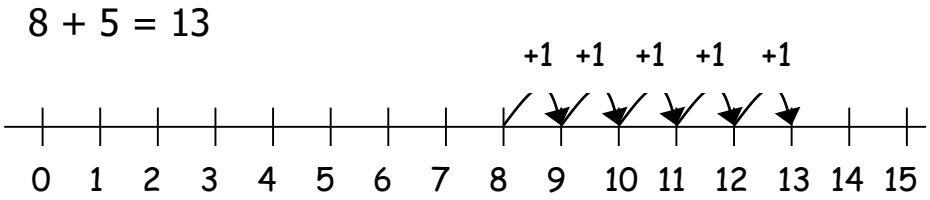
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. Initially addition and subtraction are introduced through one more and one less (thereby introducing the concept of using the inverse operation). They develop ways of recording calculations using pictures, etc.



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



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



In addition to these methods, children will learn to add tens and ones using partitioning, moving to the column method using practical apparatus (e.g. 'bundles of coloured sticks' and a place value grid). Recording addition in columns supports place value and prepares for formal written methods with larger numbers.

Year 2

In addition to mental methods, children will learn to add using partitioning, moving to the column method using practical apparatus (e.g. 'bundles of coloured sticks' and a place value grid). Recording addition in columns supports place value and prepares for formal written methods with larger numbers.

Children should be able to add (using objects, pictorial/written representation or mental methods as appropriate):

- A two-digit number and ones
- A two-digit number and tens
- Two two-digit numbers (sometimes known as 'compact standard with carrying')
- Three one-digit numbers

$$\begin{array}{r} 21 \\ +\ 48 \\ \hline 69 \end{array} \qquad \begin{array}{r} 79 \\ +\ 12 \\ \hline 91 \end{array}$$

Children should recognise that addition can be done in any order (commutative). They should also recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Year 3

Children will build on their understanding of place value and will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods.

34 + 45
(30 + 40) =70
(4 + 5) = 9
50 + 9 = 79

Children will continue to 'carry'. Note that carried digits are written smaller between the 'answer line' and the 'calculation'.

$$\begin{array}{r} 625 \\ +\ 48 \\ \hline 673 \end{array} \qquad \begin{array}{r} 783 \\ +\ 42 \\ \hline 825 \end{array} \qquad \begin{array}{r} 367 \\ +\ 85 \\ \hline 452 \end{array}$$

Year 4

Children will continue to 'carry'. Note that carried digits are written smaller between the 'answer line' and the 'calculation'.

```
  625        783        367
+  48      +  42      +  85
    1          1         1 1
-----      -----      -----
  673        825        452
```

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.

Year 5

Children should extend the carrying method to numbers with at least four digits. Note that carried digits are written smaller between the 'answer line' and the 'calculation'.

```
  587        3587
+ 475      +  675
  1 1        1 1 1
-----      ------
 1062       4262
```

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.

Year 6

Children should extend the carrying method to number with any number of digits. Note that carried digits are written smaller between the 'answer line' and the 'calculation'.

```
  7648
+ 1486
  1 1 1
 9134
```

```
  6584
+ 5848
  1 1 1
 12432
```

```
    42
  6432
+ 4681
   786
     3
  1 2 1
 11944
```

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.

PROGRESSION IN SUBTRACTION

Children should use mental methods where appropriate, but for calculations that they cannot do in their heads, they should use an efficient written method accurately and with confidence. It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for subtraction.

To subtract successfully, children need to be able to:

- recall all addition and subtraction facts to 20
- subtract multiples of 10 (such as 160 - 70) using the related subtraction fact, 16 - 7, and their knowledge of place value
- partition two-digit and three-digit numbers into multiples of one hundred, ten and one in different ways (e.g. partition 74 into 70 + 4 or 60 + 14).

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:

- they are not ready.
- they are not confident.

Children should be encouraged to approximate their answers before calculating and to check their answers after calculation using an appropriate strategy. Children should also be encouraged to consider if a mental calculation would be appropriate before using written methods.

Mental calculation strategies

Mental recall of addition and subtraction facts

10 – 6 = 4 17 - ☐ = 11
20 - 17 = 3 10 - ☐ = 2

Find a small difference by counting up

82 – 79 = 3

Counting on or back in repeated steps of 1, 10, 100, 1000

86 - 52 = 34 (by counting back in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

Subtract the nearest multiple of 10, 100 and 1000 and adjust

24 - 19 = 24 - 20 + 1 = 5
458 - 71 = 458 - 70 - 1 = 387

Use the relationship between addition and subtraction

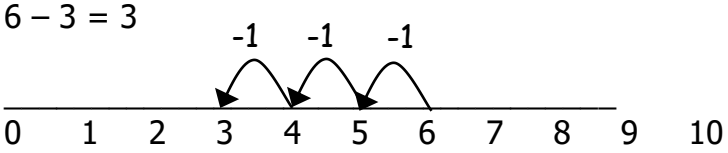
36 + 19 = 55 19 + 36 = 55
55 – 19 = 36 55 – 36 = 19

Reception and Year 1

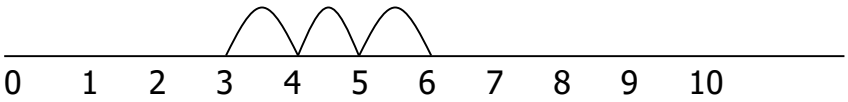
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

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

6 – 3 = 3

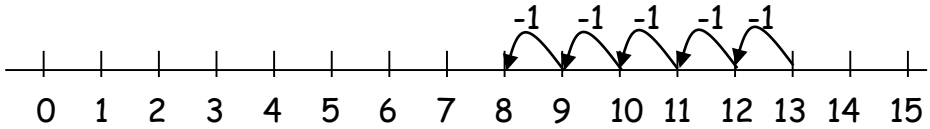


The number line should also be used to show that 6 - 3 means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.



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

13 – 5 = 8



In Year 1, children should recognise that subtraction cannot be done in any order (is not commutative). They should also recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

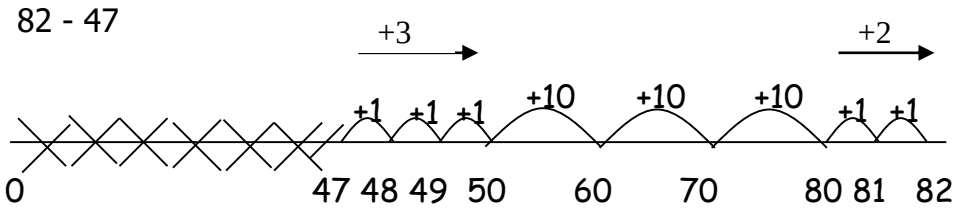
Apparatus (for example 'bundles of coloured sticks' and place-value grids) may be used to support early column subtraction in Year 1.

Year 2

Children may use empty number lines to support calculations (particularly mental strategies).
If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc., it can be more efficient to count on. **This supports 'finding the difference' mentally.**

e.g. Count up from 47 to 82 in jumps of 10 and jumps of 1, moving to jading units in one jump.

The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'.



Children become more efficient with counting on by:

- Adding the units in one jump;
- Adding the tens in one jump and the units in one jump;
- Bridging through ten.

Children should be able to subtract (using objects, pictorial/written representation or mental methods as appropriate):

- A two-digit number and ones
- A two-digit number and tens
- Two two-digit numbers

Children should recognise that subtraction cannot be done in any order (is not commutative).
They should also recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Apparatus (for example 'bundles of coloured sticks' and place-value grids) will be used to support early column subtraction (leading to 'decomposition').

e.g. 96
- 21
75

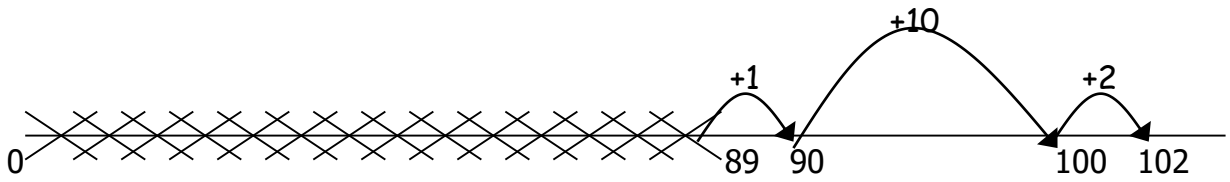
Year 3

Children may continue to use empty number lines with increasingly large numbers.

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

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc. counting on using a number line should be used.

102 – 89 = 13



Decomposition

$$\begin{array}{r} {}^{6}\not{7}\,{}^{1}\not{5}4 \\ -\ \ 86 \\ \hline 668 \end{array}$$

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.

Year 4

Decomposition

```
  614 1
  7 5 4
-   86
  668
```

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.

Year 5

Decomposition

```
  614 1
  7 5 4
-  286
  468
```

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.

Year 6

Decomposition

```
  5 13 1
  6 4 6 7
- 2 6 8 4
  3 7 8 3
```

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.

PROGRESSION IN MULTIPLICATION

Children should use mental methods where appropriate, but for calculations that they cannot do in their heads, they should use an efficient written method accurately and with confidence. It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for multiplication.

To multiply successfully, children need to be able to:

- recall all multiplication facts to 12 × 12;
- partition number into multiples of one hundred, ten and one;
- work out products such as 70 × 5, 70 × 50, 700 × 5 or 700 × 50 using the related fact 7 × 5 and their knowledge of place value;
- add two or more single-digit numbers mentally;
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value;
- add combinations of whole numbers using the column method (see above).

Note: *It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for multiplication.*

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:

- they are not ready.
- they are not confident.

Children should be encouraged to approximate their answers before calculating and to check their answers after calculation using an appropriate strategy. Children should also be encouraged to consider if a mental calculation would be appropriate before using written methods**.**

Tables facts

Tables should be taught every day from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 1	Count in 2s, 5s and 10s from different multiples, making connections between arrays, number patterns and counting in 2s, 5s and 10s
Year 2	Recall and use multiplication and division facts for: 2 times table 5 times table 10 times table
Year 3	*As year 2 and…* Recall and use multiplication and division facts for: 3 times table 4 times table 8 times table
Year 4	Derive and recall all multiplication and division facts up to 12 x 12
Years 5 & 6	Derive and recall *quickly* all multiplication and division facts up to 12 x 12

Mental calculation strategies

Using and applying division facts
Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc.

Use closely related facts already known
13 x 11 = (13 x 10) + (13 x 1)
= 130 + 13
= 143

Multiplying by 10 or 100
Knowing that the effect of multiplying by 10 is a shift in the digits one place to the left.
Knowing that the effect of multiplying by 100 is a shift in the digits two places to the left.

Partitioning
23 x 4 = (20 x 4) + (3 x 4)
= 80 + 12
= 102

Use of factors
8 x 12 = 8 x 4 x 3

Many mental calculation strategies will continue to be used.
They are not replaced by written methods.

Reception and Year 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.

Children will experience equal groups of objects.

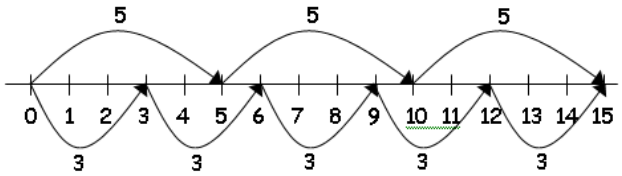
They will work on practical problem solving activities involving equal sets or groups.

They will count in 2s and 10s and begin to count in 5s. They move to counting in 3s (on a grid and in their head) and explore doubles (e.g. 2+2, 3+3).

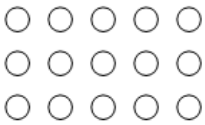
Year 2

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

Repeated addition and Commutativity
Children should know that 3 x 5 has the same answer as 5 x 3. This may also be shown on the number line.



Arrays and Grouping
Children should be able to model a multiplication calculation using an array.



5 x 3 = 15

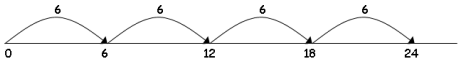
3 x 5 = 15

Partitioning (if secure)
23 x 4 = (20 x 4) + (3 x 4)
= 80 + 12
= 102

Year 3

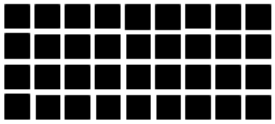
Repeated Addition and Commutativity

Children should continue to know that 6 x 4 has the same answer as 4 x 6. This can also be shown on the number line.



Arrays

Children should be able to model a multiplication calculation using an array.



9 x 4 = 36

9 x 4 = 36

Scaling

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

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

☐ x 5 = 20 3 x △ = 18 ☐ x ○ = 32

Partitioning

38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190

Short Multiplication

This recording method continues, with carry digits recorded below the line.
Reinforce the need to estimate first.

38 x 7 is approximately 40 x 7 = 280

$$\begin{array}{r} 38 \\ \times\ 7 \\ \hline 266 \\ {\scriptstyle 5} \end{array}$$

Year 4

Short Multiplication

This recording method continues, with carry digits recorded below the line.
Reinforce the need to estimate first.

38 x 7 is approximately 40 x 7 = 280

$$\begin{array}{r} 38 \\ \times\ 7 \\ \hline 266 \\ \hline 5 \end{array}$$

Year 5

Short multiplication – multiplication by a single digit

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

$$\begin{array}{r} 346 \\ \times\ 9 \\ \hline 3114 \end{array}$$

Long multiplication – multiplication by more than a single digit
The aim is for most children to use this long multiplication method for TU × TU by the end of Year 5.

E.g. 56 × 27 is approximately 60 × 30 = 1800.

$$\begin{array}{r} 56 \\ \times\ 27 \\ \hline 1120 \\ 392 \\ \hline 1512 \\ \hline 1 \end{array} \qquad \begin{array}{l} 56 \times 20 \\ 56 \times\ 7 \end{array}$$

Year 6

Short multiplication – decimals

E.g. 34.6 x 9

Children will approximate first

34.6 x 9 is approximately 35 x 10 = 3500

```
   34.6
X   9
  ____
  311.4
```

Long multiplication – multiplication by more than a single digit

Children who are already secure with multiplication for TU × U and TU × TU should have little difficulty in using the same method for HTU × TU.

e.g. 286 × 29 is approximately 300 × 30 = 9000

```
  286
×  29
 5720     286 × 20
 2574     286 ×  9
 8294
  1
```

Multiplication of two decimals (for once secure in all other aspects of multiplication)

e.g. 4.5 x 5.1

This should be done by multiplying 45 x 51 (as above) and then, as both multipliers were multiplied by 10, dividing the answer by 10 twice (i.e. dividing by 100).

45 x 51 = 2295 so 4.5 x 5.1 = 22.95

Children should notice that because of this, the number of decimal digits in the answer should equal the total number of decimal digits in the question.

PROGRESSION IN DIVISION

Children should use mental methods where appropriate, but for calculations that they cannot do in their heads, they should use an efficient written method accurately and with confidence. It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for division.

To carry out written methods of division successful, children also need to be able to:

- understand division as repeated subtraction;
- estimate how many times one number divides into another – for example, how many sixes there are in 47, or how many 23s there are in 92;
- multiply a two-digit number by a single-digit number mentally;
- subtract numbers using the column method.

Note: *It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for division.*

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:

- they are not ready.
- they are not confident.

Children should be encouraged to approximate their answers before calculating and to check their answers after calculation using an appropriate strategy. Children should also be encouraged to consider if a mental calculation would be appropriate before using written methods**.**

Tables facts

Tables should be taught every day from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2	Recall and use multiplication and division facts for: 2 times table 5 times table 10 times table
Year 3	*As year 2 and…* Recall and use multiplication and division facts for: 3 times table 4 times table 8 times table
Year 4	Derive and recall all multiplication and division facts up to 12 x 12
Years 5 & 6	Derive and recall *quickly* all multiplication and division facts up to 12 x 12

Mental calculation strategies

Using and applying division facts
Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc.

Dividing by 10 or 100
Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.
Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Use of factors
378 ÷ 21 378 ÷ 3 = 126 378 ÷ 21 = 18
126 ÷ 7 = 18

Use related facts
Given that 1.4 x 1.1 = 1.54
What is 1.54 ÷ 1.4, or 1.54 ÷ 1.1?

Many mental calculation strategies will continue to be used.
They are not replaced by written methods.

Reception and Year 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.

Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.

In Year 1, children will also divide shapes into 2 (halving) and into groups of 4 (finding ¼).

Year 2

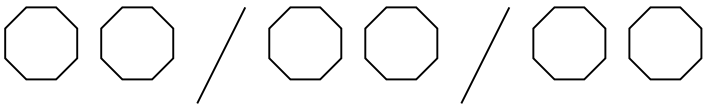
Children will develop their understanding of division and use jottings and images to support calculation. For example:

Sharing equally

6 sweets are shared between 2 people. How many do they each get?

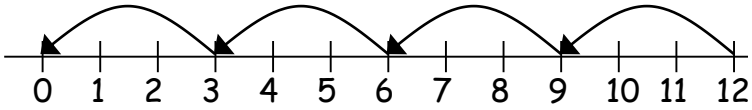
Grouping or repeated subtraction

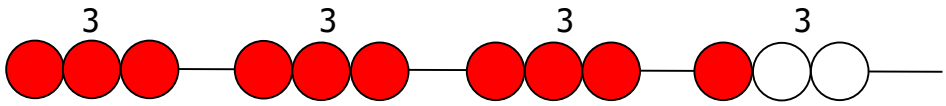
There are 6 sweets, how many people can have 2 sweets each?



Repeated subtraction using a number line or bead string

12 ÷ 3 = 4





The bead string will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'

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

☐ ÷ 2 = 4 20 ÷ △ = 4 ☐ ÷ △ = 4

Higher attainers may move onto Children calculations involving simple remainders.

e.g. 13 ÷ 4 = 3 r 1

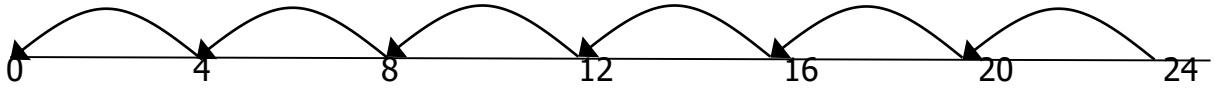
Year 3

Children will continue to use:

Repeated subtraction

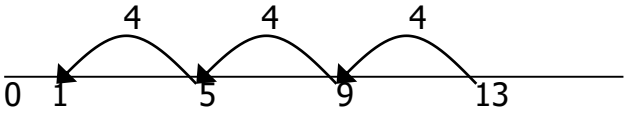
Children might use an empty number line or jottings to support their calculation.

24 ÷ 4 = 6



Children should also move onto calculations involving remainders.

13 ÷ 4 = 3 r 1



Children should then be able to find a remainder mentally, for example the remainder when 34 is divided by 6. Any remainders should be shown as integers (5 remainder 4 or 5 r 4).

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

26 ÷ 2 = ☐ 24 ÷ △ = 12 ☐ ÷ 10 = 8

Year 4

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)

Short division

Short division of a two-digit number can be introduced to children who are confident with multiplication and division facts and with subtracting multiples of 10 mentally, and whose understanding of partitioning and place value is sound.

$$3\overline{)8^{2}1}\quad 2\ 7$$

This can be extended to HTU ÷ U and beyond for the higher attainers.
Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2

Year 5

Short division

Short division of a three-digit number and beyond can be introduced to children who are confident with multiplication and division facts and with subtracting multiples of 10 mentally, and whose understanding of partitioning and place value is sound.

$$3\overline{)2\ 9^{2}1}\quad 9\ 7$$

Remainders are given as integers (whole numbers). Higher attainers could give answers as decimals by writing in the decimal point and 0 place holders in the decimal places. Children should be reminded to align decimal points. For example, 145 ÷ 4 becomes 145.00 ÷ 4.

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.

Long division

Secure Year 5 children could be extended to long division as shown for Year 6.

Year 6

Short division
Answers may be expressed either with a remainder, as a decimal or as a mixed number.

e.g. 73 ÷ 5 = 14 r 3 = 14.6 = 14 3/5

If the children were dividing 32 by 10, the answer might be shown as $3\ ^{2}/_{10}$ which could then be written as $3\ ^{1}/_{5}$ in its lowest terms.

Dividing a decimal by a whole number
Remember to keep the decimal points aligned in the question and the answer.

e.g. 4.05 ÷ 9

$$\begin{array}{r} 0.45 \\ 9\overline{)\,4.^{4}0^{4}5} \end{array}$$

e.g. 2.4 ÷ 5

$$\begin{array}{r} 0.48 \\ 5\overline{)\,2.^{2}4^{4}0} \end{array}$$

Long division
The next step is to tackle HTU ÷ TU (and beyond for higher attainers) which for most children will be in Year 6. The next digit to be introduced during the calculation is 'parachuted' down. Arrows can be drawn if necessary to support this process.

$$\begin{array}{r} 23 \\ 24\overline{)\,560} \\ -480 \\ \hline 80 \\ -72 \\ \hline 8 \end{array}$$

Answer: 23 R 8

432 ÷ 15 becomes

$$\begin{array}{r} 28.8 \\ 15\overline{)\,432.0} \\ 30 \\ \hline 132 \\ 120 \\ \hline 120 \\ 120 \\ \hline 0 \end{array}$$

Answer: 28·8