St. Christopher's Catholic Primary School

Calculation Policy

Date: April 2024

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Contents page

Introduction

This policy contains the key procedures that are to be taught throughout the school. It has been written to ensure consistency and progression throughout the school. We are aiming to get each child to show fluency, reasoning and problem solving skills from EYFS – Year 6.

- For each operation, there are four stages, starting with the practical methods that support conceptual understanding moving through to methods that allow children to demonstrate efficiency in procedural approaches.
- Although the main focus of this policy is showing the core **Concrete, Pictorial and Abstract** ways of solving Maths problems, it is important to recognise that the ability to calculate mentally lies at the heart of numeracy.
- Mental calculation is not at the exclusion of written recording and should be seen as complementary to and not as separate from it. In every written method there is an element of mental processing.
- Written recording both helps children to clarify their thinking and supports and extends the development of more *fluent* and sophisticated mental strategies.
- Children are encouraged to use the most efficient method for them, making sure they use ones they have a clear understanding of.
- The long-term aim is for children to be able to select an efficient method of their choice that is appropriate for a given task. They should do this by always asking themselves:

- **‘Do I need to use manipulatives to help me?’**
- **'Can I do this using drawings or jottings?'**
- **'Do I need to use a written method?'**
- **'Can I do this in my head?'**

Our mental calculation journey

Grid shows KS1 number bonds to secure – practised throughout school.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

EYFS
Rapid recall
Say number names to 10
Know number bonds to 5
Mental strategies
+ 1 to any number to 10
-1 from any number to 10
Notice number bonds to 5

Year 1
Rapid recall
Y1 facts on grid– including associated subtraction facts
Mental strategies
+ 0 + 1 and + 2 (and –) to any number up to 20 (Just 0, 1, or 2 more/less)
+/- 10 to any 1 digit number including zero:10 + 7 = 17
Notice **Number bonds** to 10
Doubling and halving: double facts and halves to 5 + 5 (and 10 + 10)
Near number bonds to add two one digit numbers: "7 + 2 = 9 because 7 + 3 = 10 so it's just one less" or “8 + 3 mist be 11 because 8 + 2 = 10”

Near double facts e.g. "3 + 4 = 7 because double 3 is 6 so it's just one more".
Partitioning: Use number facts to add TO + O: "24 + 3… I know that 3 + 4 = 7 so 20 + 7 = 27"
Adjusting: 'make ten' supported by models and images e.g. 8 + 6 = 8 + 2 + 4

Year 2
Rapid recall
Y1 and 2 facts on grid– including associated subtraction facts
2, 5 and 10 times table multiplication and division facts
Mental strategies
Number bonds to 10 and **near number bonds** to add two or three single digit numbers
Spot **doubles** and **near doubles** to add two or three single digit numbers
Use **number bonds** to 20 and near number bonds to 20 to add 2 numbers
+ 10 to any 2 digit number (support with models, images and hundred square)
Partitioning: Calculations with whole numbers which do not involve crossing place value boundaries- e.g. 23 + 45= ? by 40 + 5 +20 + 3 or 40 + 23 + 5
Counting on or back in tens and ones to add or subtract – flexibility with number line
Adjusting +/- 9 and 11 by adding 10 then subtracting or adding 1
Adjusting: 'make ten' supported by models and images e.g. 8 + 6 = 8 + 2 + 4
+/- multiples of 10 where the answer is between 0 and 100 (e.g. 70 + 30 = 100, 20 + 40 = 60)
Doubling and halving: Derives doubles and halves of multiples of 10 up to 100
Doubling and halving: Find the doubles to 100 using partitioning and halves of any even number to 100

Year 3
Rapid recall
3, 4 and 8 times table and associated division facts
Multiply 2 digit number by 10
+/- multiples of 10 where the answer is between 0 and 100 (e.g. 70 + 30 = 100, 20 + 40 = 60)
Doubles and halves of multiples of 10 up to 100
Mental strategies
Counting on or back in fives from any multiple of 5– e.g. 35+15=? by counting on in steps of 5 from 35
Counting on or back in hundreds from any number e.g. 570 + 300= ? by counting on in hundreds from 570
Partitioning: Calculations with whole numbers which involves crossing place value boundaries e.g. 42 – 28= ? by 42 – 2 – 20 - 6
Adjusting multiples of 10 e.g. 38 + 68= ? by 38 + 70 – 2 or 45 – 29 = 45 – 30 + 1
Adjusting: 'make ten' progressing to multiples of ten e.g 28 + 13 = 30 + 11
Near doubles to numbers under 20 e.g. 18 + 16 is double 18 and subtract 2 or double 16 and add 2
Near doubles to multiples of 10 e.g. 60 + 70 is double 60 and add 10 or double 70 and subtract 10
Doubling and halving: Find the doubles and halves of any two-digit number and any multiple of 10 or 100– e.g. half 680 or double 73

Doubling and halving: Multiply and divide by 4 by doubling/halving twice and 8 by doubling/halving again. – e.g. 34 x 4 = 34 x 2 x 2.

Year 4
Rapid recall
All multiplication and division facts up to 12 x 12
+/- multiples of 10 beyond 100 e.g. 50 + 60 = 110
+ or – multiples of 100 up to 1000
Half of any even number to 100
Multiply and 2 or 3 digit number by ten
Mental strategies
Counting on or back in tenths and/or hundredths- e.g. 3.2 + 0.6 = ? by counting on in tenths. 1.7 + 0.55=? by counting on in tenths and hundredths – flexibility with a number line
Adjusting multiples of 10 or 100 e.g. 138 + 69= ? by 138 + 70 – 1 or 299 – 48 = 300 – 48 – 1
Adjusting 'make ten' progressing to 3 digit numbers e.g. 128 + 32 = 130 + 30
Partitioning: Calculations with decimal numbers not crossing place value boundaries then crossing boundaries. E.g. 3.2 + 2.1 progressing to 3.7 + 6.8
Near doubles to 100 e.g. 75 + 76 is double 76 and subtract 1 or double 75 and add 1.
Doubling and halving: Find the doubles and halves of any number up to 1,000 by partitioning

Year 5
Rapid recall
+/- multiples of 1000
Multiply and divide any number by 10 and 100
Halves of any number to 100 (e.g. half of 22 = 11, half of 51 = 25.5)
Squares of all numbers up to 12
Cubes of 2, 3, 4 and 5
Mental strategies
Adjusting multiples with decimals e.g 2 ½ + 1 ¾ by 2½ + 2 – ¼ or 5.7 + 3.9 by 5.7 + 4.0 – 0.1
Decimal **near doubles** to whole numbers e.g. 2.5 + 2.6 is double 2.5 add 0.1 or double 2.6 subtract 0.1.
Doubling and halving: Find the doubles and halves of any number up to 10,000 by partitioning – e.g. half of 32,202 by halving 3,000, 2000, 200 and 2
Doubling and halving: Multiply by 50 by multiplying by 100 and halving e.g. 8 x 50= 8 x 100 divided by 2
Doubling and halving: Double and half decimal number with up to one decimal place by portioning – e.g. half of 8.4 by halving 8 and halving 0.4

Year 6
Rapid recall
Multiplication of multiples of 10 and 100 based on known facts (e.g. 40 x 40 = 1,600);
Mental strategies

Adjusting multiples with decimals e.g 2 ½ + 1 ¾ by 2½ + 2 – ¼ or 5.7 + 3.9 by 5.7 + 4.0 – 0.1
Decimal **near doubles** to whole numbers e.g. 2.5 + 2.6 is double 2.5 add 0.1 or double 2.6 subtract 0.1.
Doubling and halving: Find the doubles and halves of any number up to 10,000 by partitioning – e.g. half of 32,202 by halving 3,000, 2000, 200 and 2
Doubling and halving: Multiply by 50 by multiplying by 100 and halving e.g. 8 x 50= 8 x 100 divided by 2
Doubling and halving: Double and half decimal number with up to one decimal place by portioning – e.g. half of 8.4 by halving 8 and halving 0.4

Expectations for times tables for each year group:	
Year 1	Count in multiples of 2, 5 and 10. Recall and use all doubles to 10 and corresponding halves.
Year 2	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
Year 3	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
Year 4	Recall and use multiplication and division facts for multiplication tables up to 12x12.
Year 5	Revision of all times tables and division facts up to 12x12.
Year 6	Revision of all times tables and division facts up to 12x12.

The calculation sequence - applying the skills.

Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil's journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that's been taught to enable him/her move on to more advanced material.
It is therefore important to allow children to use this sequence to master the skills of calculation. In this document, for each operation, examples of different ways to ask children to solve the same calculation have been provided.

The Sequence	Prompts	Planning
Provide an estimate for the calculation	Using knowledge of number and the number system, rounding and approximating, make a reasonable estimate.	
Teach the calculation skill	What is the objective you are teaching? Include example questions, increasing in complexity, for both operations.	
Ensure you have taught the inverse	Plan example questions, increasing in complexity. Ensure methods used are in line with school calculation policy. Check that children understand that inverse can also be used to check calculations	
Devise similar calculations but include units	Which units do you need to include? Check the measures applicable to your year group for length, weight, capacity, money and time.	

Complete missing box questions	Include units in these questions as above. The box may cover single digits or an entire number. Vary the position of the missing box within the calculation.	
Complete word problems, 1 and 2 step, including units	Write problems, ensuring the numbers are sized correctly in line with the objective and that units are also used.	
Provide opportunities for open ended investigations	Plan example questions and investigations. Ensure children are working with the correct operations, appropriate size of numbers and use of units for context.	

Addition

It is important that children's mental methods of calculation are practised on a regular basis and secured alongside their learning and use of written methods of addition.

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use a written method accurately and with confidence.

Children are taught and acquire secure mental methods of calculation and written methods of calculation for addition which they know they can rely on when mental methods are not appropriate.

This policy shows the possible stages of each written method for addition, each stage building towards a more refined method.

There are some key basic skills that children need to help with addition, which include:

• counting
• estimating
• recalling all addition **pairs** to 10, 20 and 100 (7 + 3 = 10, 17 + 3 = 20, 70 + 30 = 100)
• knowing number **facts** to 10 (6 + 2 = 8)
• adding mentally a series of one-digit numbers (5 + 8 + 4)
• adding multiples of 10 (60 + 70) or of 100 (600 + 700) using the related addition fact, 6 + 7,
and their knowledge of place value

• partitioning two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways (432 into 400 + 30 + 2 and also into 300 + 120 + 12)
• understanding and using addition and subtraction as inverse operations.

Key Vocabulary:

add, plus, more than, total, sum of, Bar model, part-part-whole, number line, tens frame, base 10, place value counters, missing numbers

Using and applying is a key theme and one of the aims of National Curriculum and before children move onto the next stage in written calculation it is important that their skills are broadened through their use and application in a range of contexts – see the calculation sequence (pg 3).

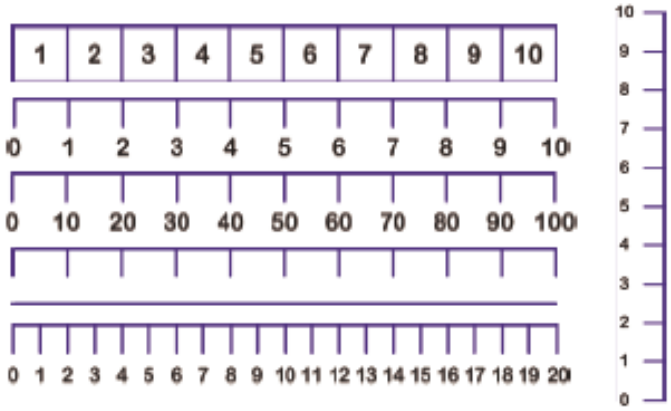
Progression across the year groups Addition		
	Typical calculations	Suitable methods
Y1	U+U TU + U (to 20 including zero)	Practical Number line
Y2	TU + U TU + multiples of 10 TU + TU U + U + U	Practical Number line Expanded columnar
Y3	HTU + U HTU + TU HTU + HTU	Number line Expanded columnar Column
Y4	THTU + HTU THTU + THTU	Expanded columnar Column
Y5	THTU.t + THTU.t THTU.th + THTU.th	Expanded columnar Column
Y6	THTU.tht + THTU.tht	Column

*Children in year 2 can move onto column method, providing children are secure with previous methods.

Stage 1: Practical (combining) and adding on (increasing)

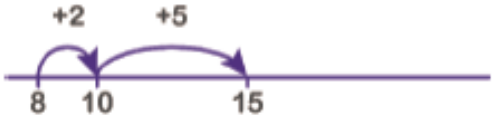
Prior to recording addition steps on a number line, children will work practically with equipment where they are **combining** sets of objects. As they become more confident, this practical addition of sets of objects will be mirrored on a number line so that the two are being done together and children are **adding on**. This will prepare them for the abstract concept of adding numbers rather than objects.

Stage 2: Number tracks and number lines



Steps in addition can be recorded on a number line. The steps often bridge through a multiple of 10 and, this is more efficient if children know how to partition 1-digit numbers.

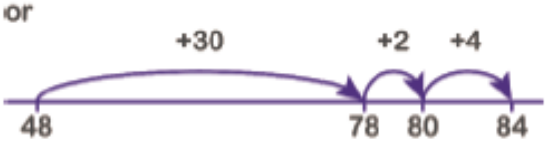
8 + 7 = 15



In this example, 7 has been partitioned into 2 and 5 which makes bridging through 10 more efficient

48 + 36 = 84

or



In these examples, the 6 in 36 has been partitioned into 2 and 4 which makes bridging through 10 more efficient

With practice, children will need to record fewer jumps

Stage 3: Partitioning (expanded columnar method)

Partition both numbers into tens and units or hundreds, tens and units (using a grid makes this easier)..

48 + 36 = 84

	40	8	
+	30	6	
	70	$^{1}4$	84

148 + 36 = 184

	100	40	8	
+		30	6	
	100	70	$^{1}4$	184

This builds on children's mental maths skills of partitioning and recombining 40 + 30 = 70

8 + 6 = 14

48 + 36 = 84

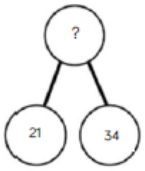
Stage 4: Efficient (column method)

48	148	48.56
+ 36	+ 36	+ 32.23
84	184	80.79
1	1	1

Children should be encouraged to estimate their answers first

Column addition remains efficient when used with larger whole numbers or decimals, and when adding more than two numbers, once learned, the method is quick and reliable.

Conceptual variation; different ways to ask children to solve 21 + 34



?	
21	34

Word problems:
In year 3, there are 21 children and in year 4, there are 34 children.
How many children in total?

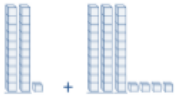
21 + 34 = 55. Prove it

21
+34
___

21 + 34 =

☐ = 21 + 34

Calculate the sum of twenty-one and thirty-four.



Missing digit problems:

10s	1s
	?
?	5

Subtraction

It is important that children's mental methods of calculation are practised on a regular basis and secured alongside their learning and use of written methods of subtraction.

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use a written method accurately and with confidence.

Children are taught and acquire secure mental methods of calculation and written methods of calculation for subtraction which they know they can rely on when mental methods are not
appropriate.

This policy shows the possible stages of each written method for subtraction, each stage building towards a more refined method.

There are some key basic skills that children need to help with subtraction, which include:

• counting
• estimating
• recalling all addition **pairs** to 10, 20 and 100 along with their inverses (7 + 3 = 10, 10 – 3 = 7, 17 + 3 = 20, 20 – 3 = 17, 70 + 30 = 100, 100 – 30 = 70)
• knowing number **facts** to 10 and their inverses (6 + 2 = 8, 8 - 2 = 6)
• subtracting multiples of 10 (160 - 70) using the related subtraction fact, 16 - 7, and their knowledge of place value
• partitioning two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways (432 into 400 + 30 + 2 and also into 300 + 120 + 12)
• understanding and using subtraction and addition as inverse operations.

Key vocabulary:

take away, less than, the difference, subtract, minus, fewer, decrease, exchange.

Using and applying is a key theme and one of the aims of National Curriculum and before children move onto the next stage in written calculation it is important that their skills are broadened through their use and application in a range of contexts – see the calculation sequence (pg 3).

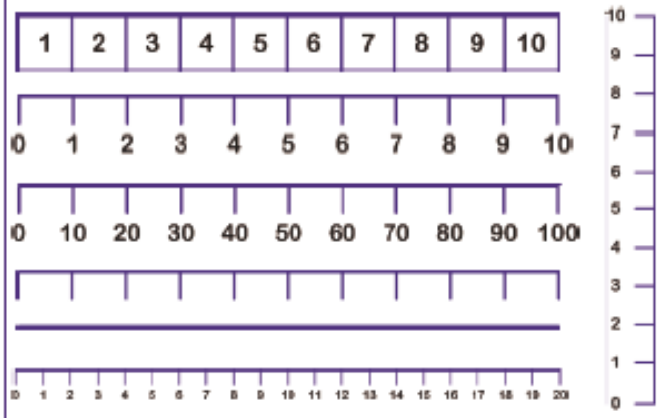
Progression across the year groups Subtraction		
	Typical calculations	Suitable methods
Y1	U-U TU - U (to 20 including zero)	Practical Number line
Y2	TU - U TU - multiples of 10 TU - TU U - U - U	Practical Number line Expanded columnar
Y3	HTU - U HTU – TU HTU - HTU	Number line Expanded columnar Column
Y4	THTU - HTU THTU - THTU	Expanded columnar Column
Y5	THTU.t - THTU.t THTU.th - THTU.th	Expanded columnar Column
Y6	THTU.tht - THTU.tht	Column

*Children in year 2 can move onto column method, providing children are secure with previous methods.

Stage 1: Practical (taking away)

Prior to recording subtraction steps on a number line, children will work practically with equipment where they are 'taking away' a small group from a larger set of objects. As they become more confident, this practical subtraction will be mirrored on a number line so that the two are being done together. This will prepare them for the abstract concept of subtracting numbers rather than objects.

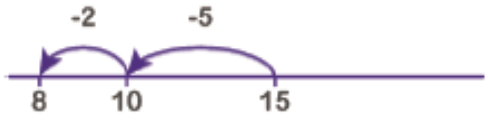
Stage 2: Number tracks and number lines



Counting back (to be introduced before counting up)

Steps in subtraction can be recorded from right to left on a number line. The steps often bridge through a multiple of 10 and, this is more efficient if children know how to partition 1-digit numbers.

15 - 7 = 8



In this example, 7 has been partitioned into 2 and 5 which makes bridging through 10 more efficient

74 - 27 = 47

or

In these examples, 27 has been partitioned into tens and units then the 7 in 27 has been partitioned into 3 and 4 which makes bridging through 10 more efficient

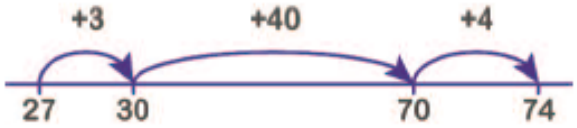
174 - 27 = 147

With practice, children will need to record fewer jumps.

See next page for continuation of stage 2.

Counting up (to be introduced after counting back)

Steps in subtraction can be recorded from left to right on a number line. The steps often bridge through a multiple of 10.



or

When carrying out money calculations that involve finding change or when calculating time duration, children should use this method

With practice, children will need to record fewer jumps.

They will decide whether to count back or forwards, seeing both as 'finding the difference'. It is useful to ask children whether counting up or back is the more efficient for calculations such as 57 – 12 or 86 – 77.

Stage 3: Partitioning (expanded columnar method)

Partition both numbers into tens and units or hundreds, tens and units (using a grid makes this easier).

	60 70	1 4	
-	20	7	
	40	7	47

	100	60 70	1 4	
		20	7	
	100	40	7	147

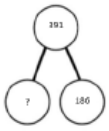
Stage 4: Efficient (column method)

$\overset{6}{\cancel{7}}\overset{1}{\cancel{4}}$	$1\overset{6}{\cancel{7}}\overset{1}{\cancel{4}}$	48.56
- 27	- 27	- 32.23
47	147	16.33

Children should be encouraged to estimate their answers first

Column subtraction remains efficient when used with larger whole numbers or decimals, once learned, the method is quick and reliable.

Conceptual variation; different ways to ask children to solve 391 - 186



391	
186	?

Raj spent £391, Timmy spent £186.
How much more did Raj spend?

Calculate the difference between 391 and 186.

□ = 391 – 186

391
-186
—

What is 186 less than 391?

Missing digit calculations

3 9 □
- □ □ 6
—
□ 0 5

Multiplication

It is important that children's mental methods of calculation are practised on a regular basis and secured alongside their learning and use of written methods of multiplication.

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use a written method accurately and with confidence.

Children are taught and acquire secure mental methods of calculation written methods of calculation for multiplication which they know they can rely on when mental methods are not appropriate.

This policy shows the possible stages of each written method for multiplication, each stage building towards a more refined method.

There are some key basic skills that children need to help with multiplication, which include:

• counting
• estimating
• understanding multiplication as repeated addition
• recalling all multiplication facts to 12 × 12
• partitioning numbers into multiples of one hundred, ten and one
• working out products (70 × 5, 70 × 50, 700 × 5, 700 × 50) using the related fact 7 × 5 and their knowledge of place value
• adding two or more single-digit numbers mentally
• adding multiples of 10 (60 + 70) or of 100 (600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value
• adding combinations of whole numbers
• understanding and using division and multiplication as inverse operations.

Key vocabulary:

double, times, multiplied by, the product of, groups of, lots of, equal groups, exchange

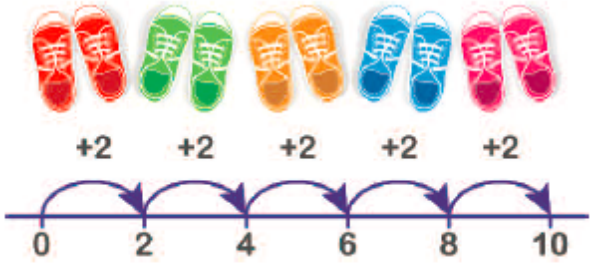
Using and applying is a key theme and one of the aims of National Curriculum and before children move onto the next stage in written calculation it is important that their skills are broadened through their use and application in a range of contexts – see the calculation sequence (pg 3).

Progression across the year groups
Multiplication

	Typical calculations	Suitable methods
Y1	U x U	Practical (repeated addition) Practical and pictorial arrays
Y2	U x U	Practical (repeated addition) Practical and pictorial arrays
Y3	TU x U	Grouping on a number line progressing into Expanded (grid) and into Short
Y4	TU x U HTU x U	Expanded (grid) progressing into Short
Y5	HTU x U THTU x U TU x TU	Expanded (grid) progressing into Short Expanded (grid) progressing into Long
Y6	THTU x U TU x TU HTU x TU THTU x TU U.t x U U.th x U U.t x TU U.t x TU	Short Expanded (grid) progressing into Long Long Expanded (grid) progressing into Short Expanded (grid) progressing into Long

Stage 1: Practical (repeated addition)

Children will work practically with equipment grouping objects to see multiplication as repeated addition. As they become more confident, this practical grouping of objects will be mirrored on a number line using the vocabulary 'lots of', 'groups of', 'how many lots', 'how many times' so that the two are being done together. This will prepare them for the abstract concept of multiplying numbers rather than objects.

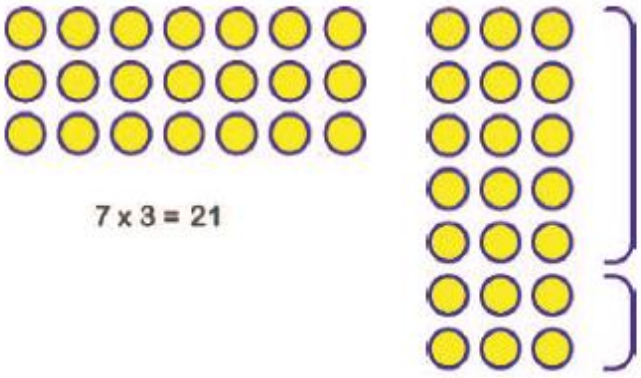


This image can be expressed as:

- 2 multiplied by 5
- two, five times
- 5 groups of 2
- 5 lots of 2
- 5 jumps of 2 on a number line

Stage 2: Practical and pictorial arrays (towards grid method)

Children use arrays to demonstrate their understanding of commutativity for multiplication facts



7 x 3 = 21

3 x 7 = 21

Children use their knowledge of known multiplication tables

This 3 x 7 array can also be seen as 3 x 5 add 3 x 2

Stage 3: Partitioning (grid method)

24 x 3 = 72

x	20	4	
3	60	12	72

24 x 32 = 768

x	20	4	
30	600	120	720
2	40	8	48
			768

Stage 4: Short (column)

24 x 3 = 72

```
  24
x  3
  72
  1
```

1241 x 3 = 3723

```
  1241
x    3
  3723
  1
```

Stage 5: Long (column)

24 x 32 = 768

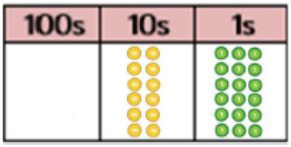
```
  24
x 32
  48
 720
 1
 765
```

1245 x 13

```
  1245
x   13
  3735
 12450
 16185
```

In the examples given, it is also correct to multiply starting with the tens digit (ie multiplying by the most significant digit first)

Conceptual variation; different ways to ask children to solve 6 × 23

	Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week? With the counters, prove that 6 x 23 = 138	Find the product of 6 and 23 6 × 23 = □ = 6 × 23 6 × 23 23 × 6	What is the calculation? What is the product? 

Division

It is important that children's mental methods of calculation are practised on a regular basis and secured alongside their learning and use of written methods of division.

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use a written method accurately and with confidence.

Children are taught and acquire secure mental methods of calculation and written methods of calculation for division which they know they can rely on when mental methods are not appropriate.

This policy shows the possible stages of each written method for division, each stage building towards a more refined method.

There are some key basic skills that children need to help with subtraction, which include:

• counting
• estimating
• understanding division as repeated subtraction
• partitioning two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways (432 into 400 + 30 + 2 and also into 300 + 120 + 12)
• recalling multiplication and division facts to 12 × 12
• recognising multiples of one-digit numbers and dividing multiples of 10 or 100 by a single-digit number using their knowledge of division facts and place value
• knowing how to find a remainder working mentally, for example, find the remainder when 48 is divided by 5
• understanding and using division and multiplication as inverse operations.

Key vocabulary:

share, group, divide, divided by, half, divisor, dividend, quotient, remainder, exchange.

Using and applying is a key theme and one of the aims of National Curriculum and before children move onto the next stage in written calculation it is important that their skills are broadened through their use and application in a range of contexts – see the calculation sequence (pg 3).

Progression across the year groups
Division

	Typical calculations	Suitable methods
Y1	U ÷ U TU ÷ U	Practical sharing Number-line grouping
Y2	U ÷ U TU ÷ U	Practical sharing Number-line grouping
Y3	TU ÷ U	Grouping on a number line progressing into Short
Y4	TU ÷ U HTU ÷ U	Grouping on a number line progressing into Short Short (remainders to be expressed as r)
Y5	HTU ÷ U THTU ÷ U	Short (remainders to be expressed as r, then as a fraction and as a decimal)
Y6	THTU ÷ U HTU ÷ TU THTU ÷ TU U.th ÷ U TU.th ÷ U HTU.th ÷ U THTU.th ÷ U	Short (remainders to be expressed as r, then as a fraction and as a decimal) Long (remainders to be expressed as r, then as a fraction and as a decimal) Short (remainders to be expressed as a decimal)

Stage 1: Practical (sharing)

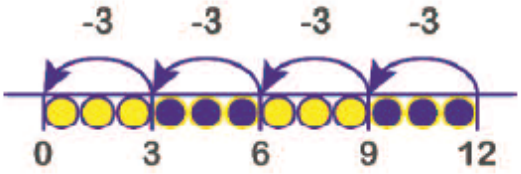
Children will work practically with equipment sharing objects one to one.

12 cakes are shared equally between 3 people.

Stage 2: Number lines (grouping)

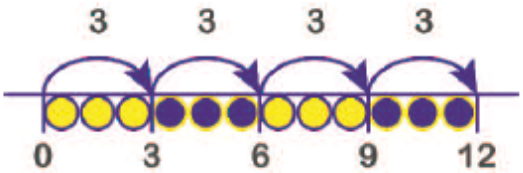
Children will move from sharing objects practically to grouping them, this will be mirrored on a number line, working from right to left so that they see division as repeated subtraction. This will prepare them for the abstract concept of dividing numbers rather than objects.

Each cake box holds 3 cakes, if I have 12 cakes, how many cake boxes will I need?



How many times can I subtract 3 from 12?

Using their knowledge of the inverse relationship between multiplication and division, children can use their multiplication tables when grouping on a number line, working from left to right.



How many groups of 3 are there in 12?

First without and then with remainders and ensuring that divisors offer an appropriate level of challenge.

Stage 3: Short division

372 ÷ 3 = 124 432 ÷ 15 = 28 r12

$$\begin{array}{r} 124 \\ 3\overline{)372^{1}} \end{array}$$

$$\begin{array}{r} 28_{r12} \\ 15\overline{)432^{13}} \end{array}$$

$$\begin{array}{r} 28\frac{12}{15} \\ 15\overline{)432^{13}} \end{array}$$

remainder as a fraction

$$\begin{array}{r} 28\frac{4}{5} \\ 15\overline{)432^{13}} \end{array}$$

$$\begin{array}{r} 28.8 \\ 15\overline{)432^{13}} \end{array}$$

remainder as a decimal

Stage 4: Long division

560 ÷ 24 = 23 r8 432 ÷ 15 = 28 r12

$$\begin{array}{r} 23_{r8} \\ 24\overline{)560} \\ 48 \\ \hline 80 \\ 72 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 28_{r12} \\ 15\overline{)432} \\ 300 \quad 15\times20 \\ \hline 132 \\ 120 \quad 15\times8 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 28.8 \\ 15\overline{)432.0} \\ 30\downarrow \\ \hline 132 \\ 120 \\ \hline 12\,0 \\ 12\,0 \\ \hline 0 \end{array}$$

(12 ÷ 15 = 0.8)

remainder as a decimal

$$\begin{array}{r} 28\frac{4}{5} \\ 15\overline{)432} \\ 30\downarrow \\ \hline 132 \\ 120 \\ \hline 12 \\ 12 \end{array}$$

(0.8 = $\frac{4}{5}$)

remainder as a fraction

With long division, there is the opportunity to teach an expanded method first (ie chunking)

Conceptual variation; different ways to ask children to solve 615 ÷ 5

Using the part whole model below, how can you divide 615 by 5 without using short division?

I have £615 and share it equally between 5 bank accounts. How much will be in each account?

615 pupils need to be put into 5 groups. How many will be in each group?

$5\overline{)615}$

615 ÷ 5 =

□ = 615 ÷ 5

What is the calculation?
What is the answer?