# CALCULATION METHODS POLICY

## All Saints Church of England Primary School

| | |
|---|---|
| **Date approved** | **Sept 2025** |
| **Review date** | **Sept 2026** |

**Our All Saints family shall arise and shine for the light of The Lord is upon us.**

All of our policies are written with the aim of improving our school and of realising our Christian vision:

Our All Saints family shall arise and shine  for the light of The Lord is upon us.

Our vision underpins every document, procedure and decision made within our setting. We are committed to enabling all members of our community to flourish and to ensuring that even in the darkest of times, when we follow the word of God, we can all live out our values to **ARISE** (achieve, respect, include, support and enjoy) when at school and **SHINE** long into our future.

*Based on the teachings of Isaiah 60:1*

# Addition

## Year 1

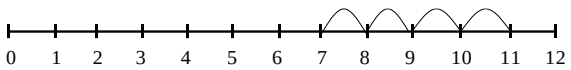
**+ = signs and missing numbers**

3 + 4 = □ □ = 3 + 4
3 + □ = 7 7 = □ + 4
□ + 4 = 7 7 = 3 + □
□ + ∇ = 7 7 = □ + ∇

Promoting covering up of operations and numbers.

**Number lines (numbered)**

7 + 4




Recording by - drawing jumps on prepared lines

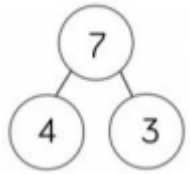
- constructing own lines

(Teachers model number lines with missing numbers)

*(Teachers model jottings appropriate for larger numbers)*

**Part whole model**

Combining two parts to make a whole:
part whole model – this supports the children in their understanding of aggregation and partitioning.




## Year 2

**+ = signs and missing numbers**

Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to :14 + 5 = 10 + □
and adding three numbers
32 + □ + □ = 100 35 = 1 + □ + 5

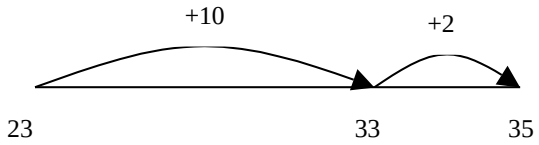
**Partition into tens and ones and recombine**

12 + 23 = 10 + 2 + 20 + 3
= 30 + 5
= 35

**refine to partitioning the second number only:**

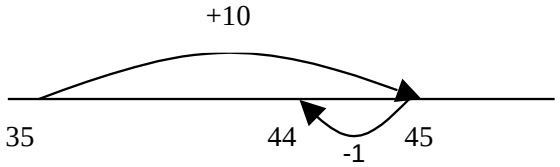
23 + 12 = 23 + 10 + 2
= 33 + 2
= 35

**Number lines**




*Add 9 or 11 by adding 10 and adjusting by 1*

35 + 9 = 44




**Part whole model**

Combining two parts to make a whole:
part whole model – this supports the children in their understanding of aggregation and partitioning.

## Year 3

**+ = signs and missing numbers**

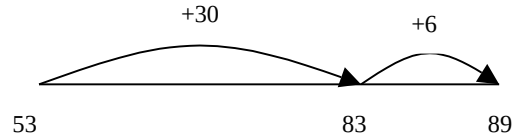
Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

**Partition into tens and ones and recombine**

Partition both numbers and recombine. Refine to partitioning the second number only e.g.

36 + 53 = 53 + 30 + 6
= 83 + 6
= 89

**Number lines**




**Part whole model**

Combining two parts to make a whole:
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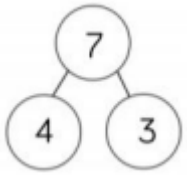



**Add a near multiple of 10 to a two-digit number**

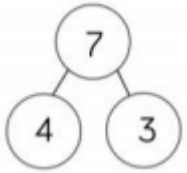
Continue as in Year 2 but with appropriate numbers
e.g. 35 + 19 is the same as 35 + 20 – 1.

**pencil and paper procedures**

83 + 42 = 125

80 + 3
+40 + 2
120 + 5 =125

83
+ 42
5
120



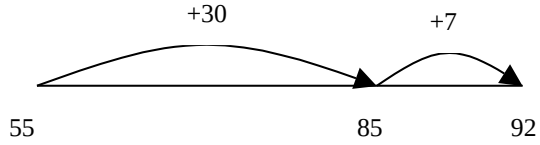

# Addition

## Year 4

**+ = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into tens and ones and recombine**
Either partition both numbers and recombine or partition the second number only e.g.
55 + 37 = 55 + 30 + 7
= 85 + 7
= 92

**Number lines**




**Add the nearest multiple of 10, then adjust**
Continue as in Year 2 and 3 but with appropriate numbers e.g. 63 + 29 is the same as 63 + 30 - 1

**Pencil and paper procedures**
358 + 73 = 431

300+50+8
\+ 70+3
300+120+11 = 431

358
73
11
120
300
431

Extend to decimals in the context of money (vertically)
£ 2.50 + £ 1.75 = £ 4.25

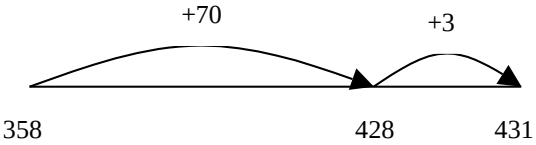
£ 2.50
+ £ 1.19
0.09

## Year 5

**+ = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into hundreds, tens and ones and recombine**
Either partition both numbers and recombine or partition the second number only e.g.
358 + 73 = 358 + 70 + 3
= 428 + 3
= 431

**Number lines**




**Add or subtract the nearest multiple of 10 or 100, then adjust**
Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. 458 + 79 = is the same as 458 + 80 - 1

**Pencil and paper procedures**
**Leading to formal method, showing numbers carried underneath**

358
\+ 73
431
11

Extend to numbers with at least four digits
3587 + 675 = 4262

3587
\+ 675
4262
111

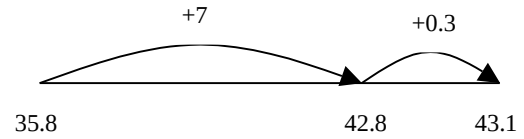
Revert to expanded methods if the children experience any difficulty.

## Year 6

**+ = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into hundreds, tens, ones and decimal fractions and recombine**
Either partition both numbers and recombine or partition the second number only e.g.
35.8 + 7.3 = 35.8 + 7 + 0.3
= 42.8 + 0.3
= 43.1

**Number lines**




**Add the nearest multiple of 10, 100 or 1000, then adjust**
Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc

**Pencil and paper procedures**
Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.
124.9 + 117.25 = 242.15

124.9
\+ 117.25
242.15
11

Revert to expanded methods if the children experience any difficulty.

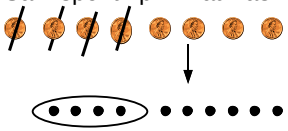
| | | |
|---|---|---|
| 0.60<br>3.00<br>£3.69 | Extend to decimals (same number of decimals places) and adding several numbers (with different numbers of digits).<br><br>*Model negative numbers using a number line.* | Extend to decimals (first with one or two decimal places and then more). |

# Subtraction

## Year 1

**Pictures / marks**

Sam spent 4p. What was his change from 10p?

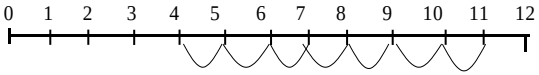


**- = signs and missing numbers**

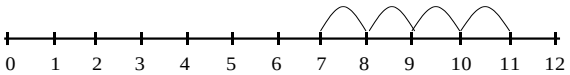
7 - 3 = □ □ = 7 - 3
7 - □ = 4 4 = □ - 3
□ - 3 = 4 4 = 7 - □
□ - ∇ = 4 4 = □ - ∇

**Number lines** (numbered)

11 – 7
**(Counting back)**




**The difference between** 7 and 11
**(Counting up)**




Recording by - drawing jumps on prepared lines
- constructing own lines

(Teachers model jottings appropriate for larger numbers)

## Year 2

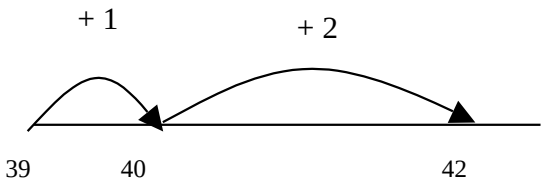
**- = signs and missing numbers**

Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - □

**Find a small difference by counting up**

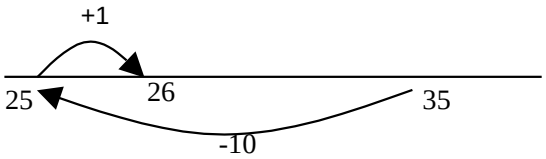
**Number lines**

42 – 39 = 3




*Subtract 9 or 11. Begin to add/subtract 19 or 21*

35 – 9 = 26




**Use known number facts and place value to subtract**
(partition second number only)

37 – 12 = 37 – 10 – 2
= 27 – 2
= 25

## Year 3

**- = signs and missing numbers**

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

**Find a small difference by counting up**

Continue as in Year 2 but with appropriate numbers
e.g. 102 – 97 = 5

**Subtract mentally a 'near multiple of 10' to or from a two-digit number**

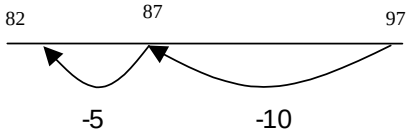
Continue as in Year 2 but with appropriate numbers
e.g. 78 – 49 is the same as 78 – 50 + 1

**Use known number facts and place value to subtract**

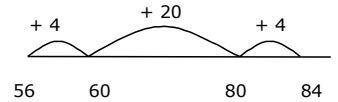
Continue as in Year 2, partitioning second number only, but with appropriate numbers and number lines
e.g.

**Number lines**

97 – 15 = 72




Complementary addition
84 – 56 = 28



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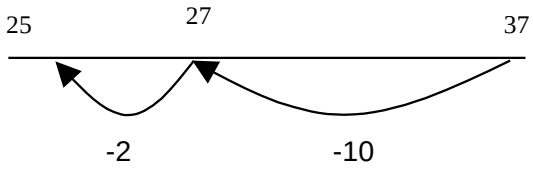
|---|---|---|
| |  | **Pencil and paper procedures**<br>Use of vertical subtraction in expanded form<br>e.g 87 – 56 = 80 + 7<br>- 50 + 6<br>30 + 1 = 31 |

| Subtraction | | |
|---|---|---|
| **Year 4** | **Year 5** | **Year 6** |

**- = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

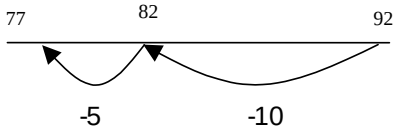
**Find a small difference by counting up**

e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below).

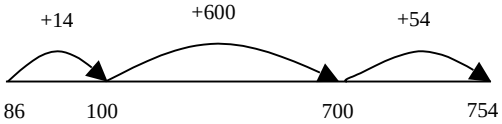
**Subtract the nearest multiple of 10, then adjust.**
Continue as in Year 2 and 3 but with appropriate numbers.

**Use known number facts and place value to subtract**
Partition second number only and demonstrate understanding through use of number lines
92 – 15 = 67

**Number lines**




Complementary addition
754 – 86 = 668




**Pencil and paper procedures**
Us e of vertical subtraction in expanded form as in Y3, moving on to use of decomposition in expanded form
e.g.

84 - 56 =

80 + 4
- 50 + 6
70 + 14
- 50 + 6
20 + 8 = 28

**- = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

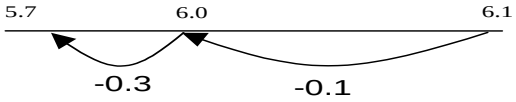
**Find a difference by counting up**

e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line (see complementary addition below).

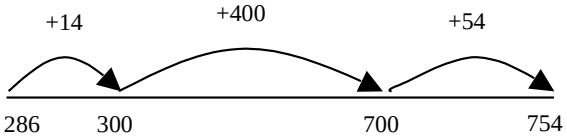
**Subtract the nearest multiple of 10 or 100, then adjust.**
Continue as in Year 2, 3 and 4 but with appropriate numbers.

**Use known number facts and place value to subtract**
6.1 – 0.4 = 5.7

**Number lines**
Model negative number system and calculations on number lines




Complementary addition
754 – 286 = 468




**Pencil and paper procedures**
Move on to formal written methods that include decomposition

358
- 73
285

Extend to numbers with at least 4 digits and decimals

Revert to expanded methods if the children experience any difficulty.

**- = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

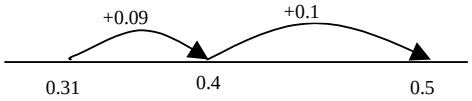
**Find a difference by counting up**

e.g. 0.5 – 0.31 = 0.19
This can be modelled on an empty number line (see complementary addition below).

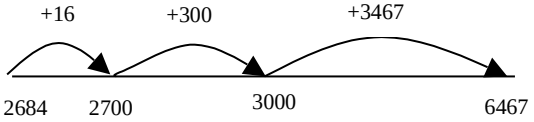
**Subtract the nearest multiple of 10, 100 or 1000, then adjust**
Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.

**Use known number facts and place value to subtract**
Continue as year 5

**Number lines**
Complementary addition 0.5 - 0.31 = 0.19




6467 – 2684 = 3783




**Pencil and paper procedures**
Extend formal written methods on to numbers with any amount of digits using decimals with 1 to 2 decimal places.
127.9 - 117.25 = 242.15

124.9
-117.25
7.65

When secure get pupils to round answers to a specified number of decimal places.

Revert to expanded methods if the children experience any difficulty.

# Multiplication

## Year 1

**Pictures and symbols**

There are 3 sweets in one bag.
How many sweets are there in 5 bags?

**Calculation is presented in pictorial form:**

Use of bead strings and apparatus to model 'groups of.'

3 x 5 =

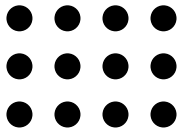
**Number lines**

3 x 3 = '3 jumps of 3'= 9

0 1 2 3 4 5 6 7 8 9 10 12 13 14

**Pencil and paper procedures**

Children draw arrays :

3 x 4 = '3 rows of 4' =  = 12

**Multiplication tables**

By the end of year 1 children should be able to count reliably forwards and backwards in **2**s, **5**s and **10**s.

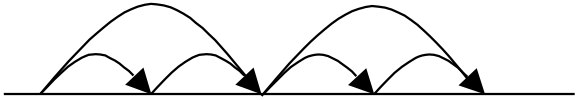
## Year 2

**x = signs and missing numbers**

7 x 2 = □ □ = 2 x 7
7 x □ = 14 14 = □ x 7
□ x 2 = 14 14 = 2 x □
□ x ∇ = 14 14 = □ x ∇

**Number lines**

Number lines should be used to show multiplication as being reversible eg; '4 lots of 2' is the same as '2 lots of 4'



0 1 2 3 5 6 7

**Doubling multiples of 2, 5 and 10 up to 50**

Children should understand doubling as being the same as 'multiplying by 2'

Double 15 = 15 x 2 **or** 2 x 15 = 30

**Partitioning**

Partitioning should also be taught through doubling and modelled by the teacher like so:

15 x 2 = (2x10 = 20)

(2 x 5 = 10)

Year 2 addition methods should then be used to find the answer of 30.

**Pencil and paper procedures**

Children draw arrays as in year 1, then extend to recording calculation as repeated addition.

3 x 4 = 4 +4 +4 = 12

**Multiplication tables**

By the end of year two children should be able to count reliably forwards and backwards in multiples of **3 as well as those expected by the end of year one.**
Children should also be starting to recall these facts when needed with increasing speed and accuracy.

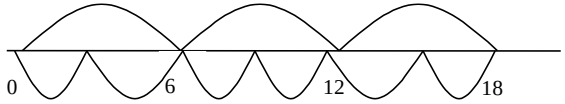
## Year 3

**x = signs and missing numbers**

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

**Number lines**

Continue to show on a number line the reversible nature of multiplication eg 6 x 3 is equal to 3 x 6



0 6 12 18

**Use known facts and place value to carry out simple multiplications**

14 x 7 = (7x10 = 70)

(7 x 7 = 28)

Year 3 addition methods should then be used to find the answer of 98.

**Pencil and paper procedures**

Continue to understand multiplication as repeated addition
e.g 7 x 4 = 4+4+4+4+4+4+4 = 28

Partitioning using a simple grid method should be used
for extension to multiply TU x U e.g. 35 x 3

| x | 30 | 5 |
|---|---|---|
| 3 | 90 | 15 |

90 + 15 = 105

**Multiplication tables**

By the end of year three children should be able to count reliably forwards and backwards in multiples of **4** and **6 as well as those expected by the end of year two.**
Children should also be given regular opportunities to recall these facts when needed with increasing speed and accuracy

# Multiplication

## Year 4

**x = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers

**Use known facts about partitioning and place value to carry out multiplication**

eg 23 x 4 =

23 x 4 = (20 x 4) + (3 x 4)
= ( 80 ) + ( 12 )
= 92

Extend on to 3 digit numbers
234 x 5 = (200x5) + (30x5) + (4x5)
= (1000) + (150) + (20)
= 1170

**Pencil and paper procedures**
Encourage children to record mental approximations first by rounding to the nearest ten before checking by using the **grid method**. To extend: mentally find difference between approximation and answer.
e.g

23 x 7 is approximately 20 x 10 = 200

| x | 20 | 3 |
|---|---|---|
| 7 | 140 | 21 |

140 + 21 = **161**. (Approximation was 39 over.)

Extend grid method onto TU X TU before taking children on to expanded column method for use with short multiplication (TU x U) and decimals only.
e.g. 39
x 7
63
+ 210
**273** **= 273**

**Multiplication tables**
By the end of year 4children should be able to rapidly recall **all tables from previous years** plus their **7**s , **8**s

## Year 5

**x = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers

**Use known facts about partitioning and place value to carry out multiplication**
As for Y4 but with higher numbers
e.g.

247 x 3 = 92

247 x 6 = (200 x 3) + (40 x 3) + (7 x 3)
= (600) + ( 120 ) + ( 21 )
= 741

**Pencil and paper procedures**
Grid method used as in year 5 but with higher numbers
e.g. HTU x TU

| **272 x 38 =** | **200** | **70** | **8** |
|---|---|---|---|
| **30** | 6000 | 2100 | 240 |
| **8** | 1600 | 560 | 64 |

7600 + 2660 + 304 **= 10,564**

Moving to formal written methods for short multiplication ( x 2 or 3 digits by 1 digit) and long multiplication (x 2 digits by 2 digits), carrying numbers underneath.

e.g. 245 x 7 = 2 4 5
x 7
**3115**

57 x 89 = 5 7
x 8 9
513
+ 4560
**5073**

Revert to expanded methods or grid methods if the children experience any difficulty.

**Multiplication tables**
By the end of year five children should be able to count reliably forwards and backwards in multiples of **11** and **12 as well as those expected by the end of all previous year groups.** Children should also be given

## Year 6

**x = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers

**Use known facts about partitioning and place value to carry out multiplication**
As for Y5 but with higher numbers

**Pencil and paper procedures**
Grid method from Y 5 can be used with appropriate numbers, extending onto decimals

e.g. **3.54 x 16 =**

| | **3** | **0.5** | **0.04** |
|---|---|---|---|
| **10** | 30 | 5 | 0.4 |
| **6** | 18 | 3 | 0.24 |

48 + 8 0.64 **= 56.64**
extending to decimals with two or more decimal places.

Formal written methods for short (3/4 digits x 1 digit) multiplication and long (3 / 4 digits x 2/3 digits) are secured and refined, carrying numbers underneath.

Eg 1673 x 8 = 1 6 7 3
X 8
**13384**

2873 x 132 = 2 8 7 3
x 1 3 2
5746
86190
287300
**379236**

Revert to expanded methods or grid methods if the children experience any difficulty.

**Multiplication tables**
By the end of year six children should be able to rapidly recall **all multiplication facts up to 12 x 12.** Children should be given regular opportunities to recall these facts with speed and accuracy and taught methods to remember them.

| | | |
|---|---|---|
| and **9**s. | regular opportunities to recall these facts with speed and accuracy and taught methods to remember them. | |

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# Division

## Year 1

**Pictures / marks**

12 children get into teams of 4 to play a game. How many teams are there?

**Calculation is presented in pictorial form by teacher :**

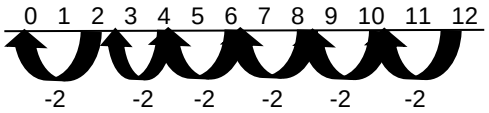
**Use of apparatus is modelled by teacher to demonstrate sharing process**

e.g 12 sticks 'shared between' 3 hoops = 4 sticks in each

**Number lines**

Teacher demonstrates showing division as repeated subtraction

12 shared between 2 = 'how many equal jumps of 2 can we get out of 12?' = 6




## Year 2

**÷ = signs and missing numbers**

6 ÷ 2 = □ □ = 6 ÷ 2
6 ÷ □ = 3 3 = 6 ÷ □
□ ÷ 2 = 3 3 = □ ÷ 2
□ ÷ ∇ = 3 3 = □ ÷ ∇

**Children produce their own pictorial representations for division problems and demonstrate their own understanding of the calculation process through use of practical apparatus**

See those modelled by the teacher in Y1.

**Understand division as sharing (*and*) grouping**

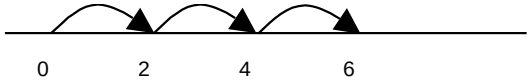
Children should be introduced to the concept that multiplication facts can be used to help solve division problems.

**The sharing approach:** 6 ÷ 2 **=**

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

**The grouping approach:** 6 ÷ 2 **=**

There are 6 sweets. How many people can have a group of 2 sweets each? (How many groups of 2 make 6?)




**Number lines**

Children use / draw number lines themselves to show division as repeated subtraction. **The idea of remainders is introduced**

e.g. 12 ÷ 5 = 2 equal sets of 5 and 2 left over


**Pencil and paper procedures**

Children represent division by creating markings and sharing into equal groups.

e.g 13 ÷ 3 = '13 shared into equal sets of 3' = 4 with 1 left over

## Year 3

**÷ = signs and missing numbers**

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

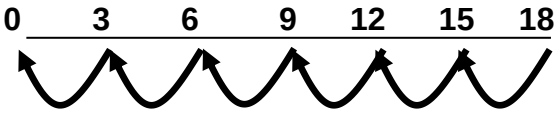
**Pupils demonstrate their understanding of the division calculation process through use of practical apparatus.**

See examples from previous year groups.

**Number lines**

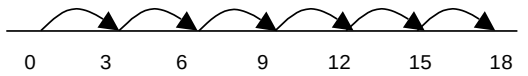
Children create number lines to show how division can be demonstrated as **repeated subtraction**
e.g.

18 ÷ 3 can be modelled as:
Sharing – 18 shared between 3




Or as **grouping** using multiplication facts e.g.

Grouping - How many groups of 3 make 18?




**Pencil and paper procedures**

Children record division calculations more formally in a horizontal way and, whenever possible, state the multiplication inverse that goes with it and is necessary for checking.

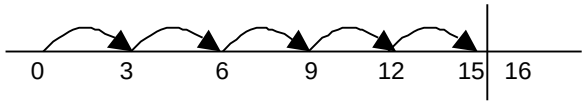
e.g. 35 ÷ 5 = 7 so (7 x 5 = 35)

**Remainders:**

These are recorded using the lower case letter 'r'
e.g. 16 ÷ 3 = 5 r1 so (5 x 3 + r1 = 16)

The concept of rounding remainders, depending on their context, is introduced for more able pupils.

Remainders on number lines are shown through use of a vertical line.
e.g.
16 ÷ 3 = 5r1



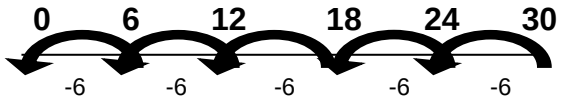
# Division

## Year 4

**÷ = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers.

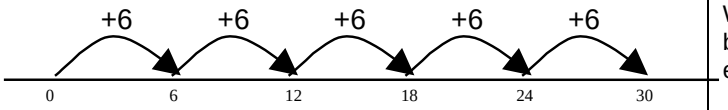
**Number lines**
30 ÷ 6 can be modelled as in previous year groups either by:

**sharing** – sharing whole number (30) into sets of 6 that are taken away and the number of equal groups then counted (repeated subtraction) e.g.




or

**grouping –** splitting whole number (30) into groups of 6 then counting how many equal groups there are




**Pencil and paper procedures**

Formal method of 'boxed division' is introduced for short division problems (dividing by 1 digit). Carrying over is recorded via the use of smaller digits inside the box.
e.g. 78 ÷ 4 =

```
   1 9  r 2
  ┌─────
4 │ 7 8
```

**so** (19 x 4 + r2 = 78)

More able children are encouraged to record inverse operation to check calculations and are then taken on to larger numbers eg HTU ÷ U .

## Year 5

**÷ = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers.

**Number lines**
Used as in previous year group with remainders identified by vertical line.

**Pencil and paper procedures**
Emphasis in Y5 is on securing and refining the formal written method of 'boxed division' when dividing by one digit.

Pupils are taken on to dividing 3 / 4 digit numbers by a single digit using the method introduced in Y4.
e.g. 3672 ÷ 6 =

```
   0 6 1 2
  ┌───────
6 │ 3 6 7 2
```

**so** (612 x 6 = 3672)

When boxed division is secure pupils are taken on to boxed division involving decimals
e.g. 93.47 ÷ 8 =

```
   1 1. 6 8   r 3
  ┌──────────
8 │ 9 3 .4 7
```

**so** (11.68 x 8 + r3 =93.47)

**Remainders**

Extend more able pupils onto expressing quotients as fractions
e.g.
61 ÷ 4 = **15 r1 = 15¼**

If needed pupils can be introduced to the concept of dividing a whole number by 2 digits (11 or 12) using the boxed division method.

## Year 6

**÷ = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers.

**Number lines**
Used as in previous year group with remainders identified by vertical line.

**Pencil and paper procedures**
In Y6 **for short division pupils continue with boxed division method.** For long division (dividing by HTU or more by 2 digits) pupils are introduced to the 'chunking method' which is based on the concept of repeated subtraction .
e.g. 977 ÷ 36 =

```
  977
- 360   (10 chunks of 36)
  617
- 360   (10 chunks of 36)
  257
- 180   (5 chunks of 36)
   77
-  72   (2 chunks of 36)
    5
```

Answer = 27 chunks of 36 r 5 = 27 r 5

When secure, this method can be refined and contracted so that 20 chunks of 36 can be subtracted in one go and then 7 chunks of 36, leading to the same answer but needing less time for formal recording.

To extend the 'chunking method' further pupils can be provided with larger numbers, expected to check calculations using inverse procedures and record answers expressing quotients as fractions and decimals.

987 ÷ 15 = **65 r 12 = 65 3/5 = 65.6**