Calculation Policy Guidance

Year 1

Addition

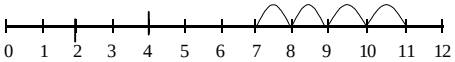
+ = signs and missing numbers

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

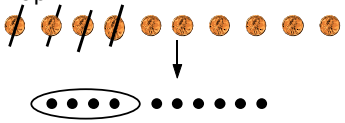
(Teacher model number lines with missing numbers)

(Teachers model jottings appropriate for larger numbers)

Subtraction

Pictures / marks

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

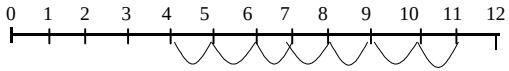


- = signs and missing numbers

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

Number lines (numbered)

11 – 7
(Counting back)



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

(Teachers model jottings appropriate for larger numbers)

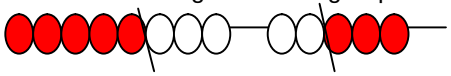
Multiplication

Pictures and symbols

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

(Recording on a number line modelled by the teacher when solving problems)

Use of bead strings to model groups of.



Division

Pictures / marks

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

Calculation Policy Guidance

Year 2

Addition

+ = 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

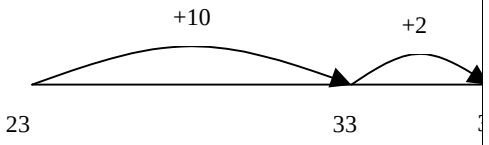
32 + □ + □ = 100 35 = 1 + □ + 5

Partition into tens and ones and recombine

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

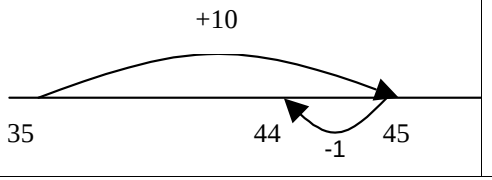
Refine to partitioning the second number only:

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



Add 9 or 11 by adding 10 and adjusting by 1

35 + 9 = 44



Subtraction

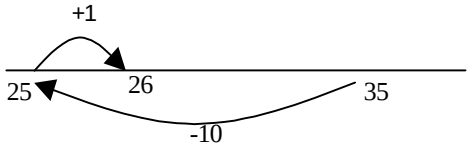
- = signs and missing numbers

Continue using a range of equations as in Year 1 but with appropriate numbers.

Extend to 14 + 5 = 20 - □

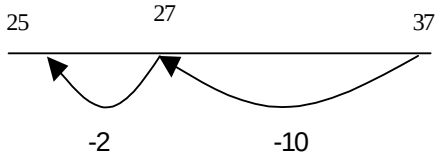
Subtract 9 or 11. Begin to add/subtract 19 or 21

35 – 9 = 26



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

37 – 12 = 37 – 10 – 2
= 27 – 2
= 25

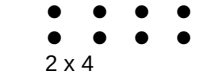


Multiplication

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 ∇

Arrays and repeated addition

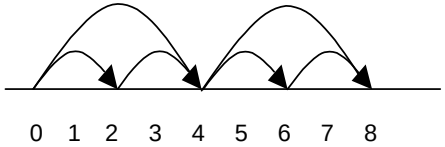


4 x 2 or 4 + 4

2 x 4

or repeated addition

2 + 2 + 2 + 2



Doubling multiples of 5 up to 50

15 x 2 = 30

Partition

x	10	5
2	20	10

Division

÷ = signs and missing numbers

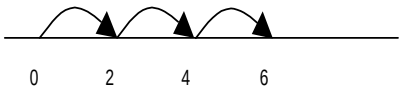
6 ÷ 2 = □ □ = 6 ÷ 2
6 ÷ □ = 3 3 = 6 ÷ □
□ ÷ 2 = 3 3 = □ ÷ 2
□ ÷ ∇ = 3 3 = □ ÷ ∇

Understand division as sharing and grouping

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

6 ÷ 2 can be modelled as:

Grouping – There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)



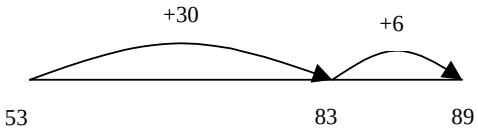
Calculation Policy Guidance

Year 3

Addition

+ = 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



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

	G&T	
80 + 3	83	83
+40 + 2	+ 42	+ 42
120 + 5 =125	120	5
	5	120
	125	125

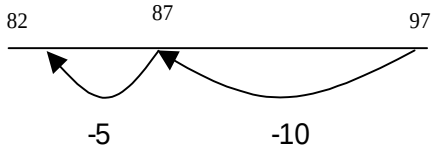
Subtraction

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

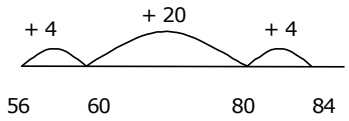
Find a small difference by counting up
Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5

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 but with appropriate numbers e.g.
97 – 15 = 72



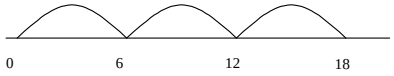
Pencil and paper procedures
Complementary addition
84 – 56 = 28



Multiplication

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

Number lines
6 x 3



Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).

Doubling multiples of 5 up to 50
35 x 2 = 70

Partition

x	30	5
2	60	10

Use known facts and place value to carry out simple multiplications

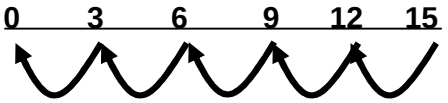
Use the same method as above (partitioning), e.g. 32 x 3 = 96

x	30	2
3	90	6

Division

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

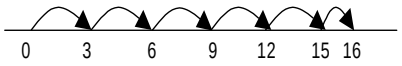
Understand division as sharing and grouping
15 ÷ 3 can be modelled as:
Sharing – 15 shared between 3 (see Year 2 diagram)
OR



Or
18 ÷ 3 can be modelled as:
Sharing – 18 shared between 3 (see Year 2 diagram)

Grouping - How many 3's make 18?

Remainders
16 ÷ 3 = 5 r1
Sharing - 16 shared between 3, how many left over?
Grouping – How many 3's make 16, how many left over?
e.g.



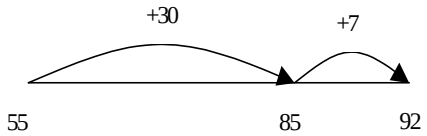
Calculation Policy Guidance

Year 4

Addition

+ = 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



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
either **or**

300+50+8	358
+ 70+3	73
300+120+11 = 431	11
	120
	300
	431

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

£ 2.50
+ £ 1.75
£ 4.25
1

(Revert to expanded methods if the children experience any difficulty.)

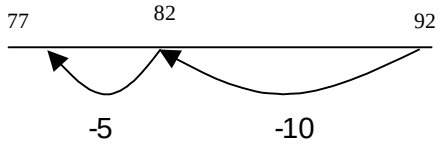
Subtraction

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

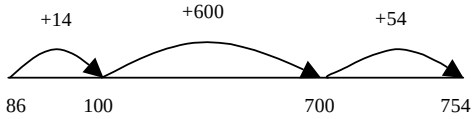
Find a small difference by counting up
e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below).

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
92 – 15 = 77



Pencil and paper procedures
Complementary addition
754 – 86 = 668



Multiplication

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

Partition
23 x 4 = 92

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

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
23 x 7 is approximately 20 x 10 = 200

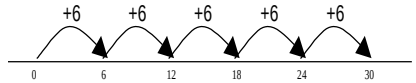
x	20	3
7	140	21

x	70	2
30	2100	60
8	560	16

Division

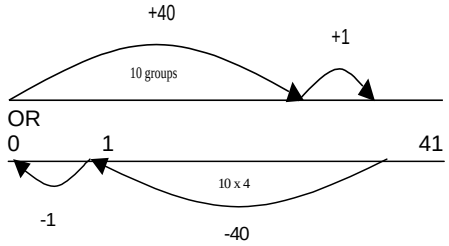
÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

Sharing and grouping
30 ÷ 6 can be modelled as:
grouping – groups of 6 taken away and the number of groups counted e.g.



sharing – sharing among 6, the number given to each person

Remainders
41 ÷ 4 = 10 r1



OR 41 = (10 x 4) + 1

Pencil and paper procedures
72 ÷ 5 lies between 50 ÷ 5 = 10 and 100 ÷ 5 = 20

72
- 50 (10 groups) or (10 x 5)
22
- 20 (4 groups) or (4 x 5)
2

Answer : 14 remainder 2

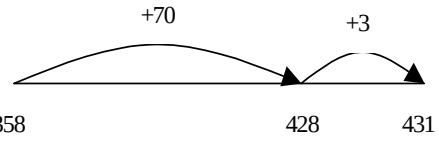
Calculation Policy Guidance

Year 5

Addition

+ = 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



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 for G&T children.

```
  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.
Extend to decimals (same number of decimals places) and adding several numbers (with different numbers of digits).
Model negative numbers using a number line.

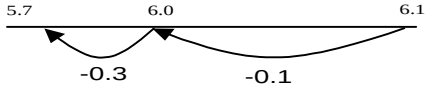
Subtraction

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

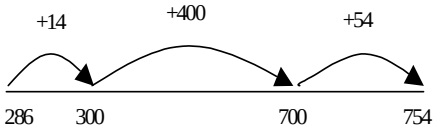
Find a difference by counting up
e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line (see complementary addition below).

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



Pencil and paper procedures
Complementary addition
754 – 286 = 468



OR ***754 - 286 = 468***

```
 14 (300)        can be refined to     14  (300)
400 (700)                             454 (754)
 54 (754)                             468
468
```

Multiplication

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

Partition
47 x 6 = 92

47 x 6 = (40 x 6) + (7 x 6)
= (240) + (42)
= 282

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
72 x 38 is approximately 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

Extend to simple decimals with one decimal place.

```
 12.5
x  2
 1.0   (2.0 x 0.5 )
 4.0   (2.0 x 2.0 )
20.0   (2.0 x 10.0 )
25.0
```

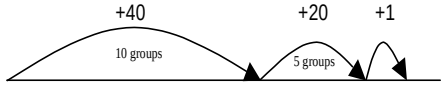
Moving to formal methods of multiplication for decimals. Carrying numbers underneath.

Division

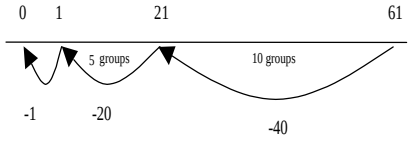
÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

Sharing and grouping
Continue to understand division as both sharing and grouping (repeated subtraction).

Remainders
Quotients expressed as fractions or decimal fractions
61 ÷ 4 = 15 ¼ or 15.25



OR



Pencil and paper procedures
256 ÷ 7 lies between 210 ÷ 7 = 30 and 280 ÷ 7 = 40

```
  256
-  70   (10 groups)   or (10 x 7)
  186
-  140  (20 groups)   or (20 x 7)
   46
-   42   (6 groups)    or (6 x 7)
    4   (36 groups) or (36)
```

Answer: 36 remainder 4

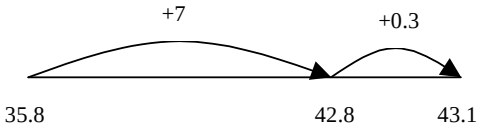
Calculation Policy Guidance

Year 6

Addition

+ = 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



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

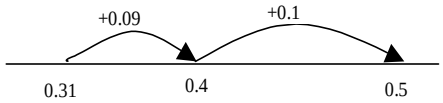
Pencil and paper procedures
Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.
124.9 + 117.25 = 242.15

```
  124.9
+ 117.25
  242.15
   11
```

Revert to expanded methods if the children experience any difficulty.
Extend to decimals (either one or two decimal places).

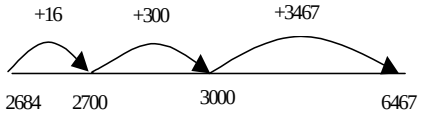
Subtraction

- = 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

Pencil and paper procedures
Complementary addition
6467 – 2684 = 3783



OR ***6467 – 2684 = 3783***

16 (2700) can be refined to
316 (3000)
300 (3000)
3467 (6467)
3467 (6467)
3783
3783

(Decomposition for G&T children only when secure.)

Multiplication

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

Partition
87 x 6 = 522

87 x 6 = (80 x 6) + (7 x 6)
= (480) + (42)
= 522

OR

```
 87
 X6
 42   ( 6 x 7)
480   ( 6 x 80)
522   (units, then tens, hundreds etc)
```

OR
Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
372 x 24 is approximately 400 x 20 = 8000

x	300	70	2
20	6000	1400	40
4	1200	280	8

Extend to decimals with up to two decimal places.

```
 12.5
x2.5
 1.25  (2.5 x 0.5 )
 5.0   (2.5 x 2.0 )
25.0   (2.5 x 10.0 )
31.25
```

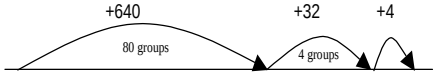
Moving to formal methods of multiplication for decimals. Carrying numbers underneath.

Division

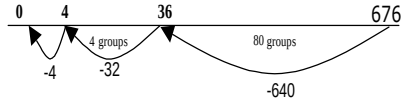
÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

Sharing and grouping
Continue to understand division as both sharing and grouping (repeated subtraction).

Remainders
Quotients expressed as fractions or decimal fractions
676 ÷ 8 = 84.5



OR



Pencil and paper procedures
977 ÷ 36 is approximately 1000 ÷ 40 = 25

```
  977                          977
- 360  (10 groups)          - 720
(20 groups)
  617                          257
- 360  (10 groups)  refine  - 180
(5 groups)
  257                 to       77
- 180  (5 groups)           - 72
(2 groups)
   77                           5
- 72   (2 groups)
    5
```

Answer: $27\ ^{5}/_{36}$
(Formal method to continue to be taught to present Y6 04 – 05)