Calculation Policy

Addition

Year One

+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'.

2 = 1 + 1
2 + 3 = 4 + 1
3 = 3
2 + 2 + 2 = 4 + 2

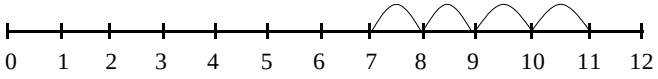
Missing numbers need to be placed in all possible places.

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

The Number Line

Children use a numbered line to count on in ones. Children use number lines and practical resources to support calculation and teachers *demonstrate* the use of the number line.

7+ 4



Year Two

+ = signs and missing numbers

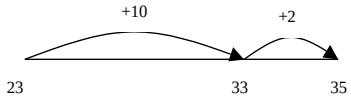
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
14 + 5 = 10 + □
and
32 + □ + □ = 100 35 = 1 + □ + 5

Partition into tens and ones and recombine

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

Count on in tens and ones

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



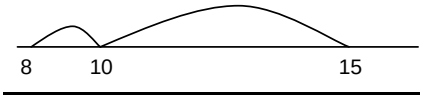
The Empty Number Line:
Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10

e.g.

Children should be able to partition the 7 to relate adding the 2 and then the 5.

8 + 7 = 15

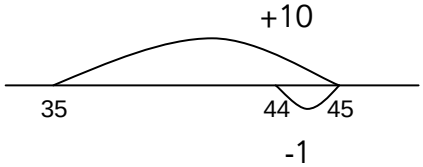


Add 9 or 11 by adding 10 and adjusting by 1

e.g.

Add 9 by adding 10 and adjusting by 1

35 + 9 = 44



Calculation Policy

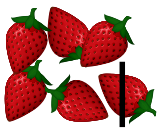
Subtraction

Year One

- = signs and missing numbers

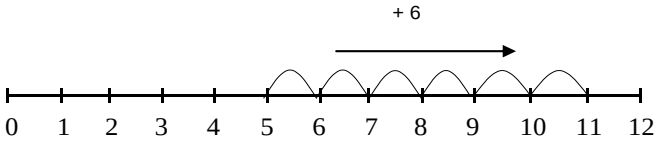
7 - 3 = □ □ = 7 - 3
7 - □ = 4 4 = □ - 3
□ - 3 = 4 4 = 7 - □
□ - ∇ = 4 4 = □ - ∇

- Understand subtraction as 'take away'



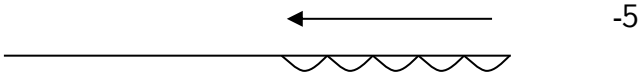
- Find a 'difference' by counting up;

I have saved 5p. The socks that I want to buy cost 11p. How much more do I need in order to buy the socks?



- Use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number.

I have 11 toy cars. There are 5 cars too many to fit in the garage. How many cars fit in the garage?



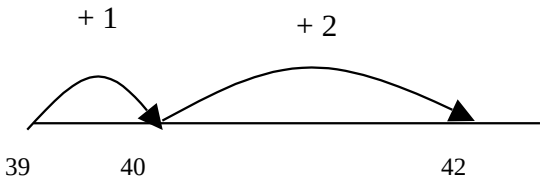
Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences
Recording by
- drawing jumps on prepared lines
- constructing own lines

Year Two

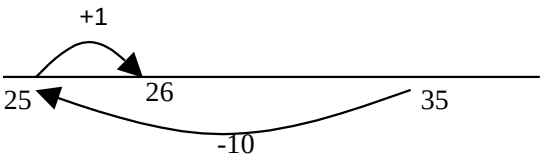
- = signs and missing numbers

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

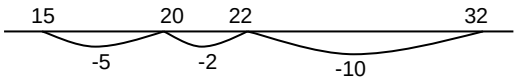
Find a small difference by counting up
42 – 39 = 3



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



Bridge through 10 where necessary
32 - 17

Calculation Policy

Multiplication

Year One

Multiplication is related to doubling and counting groups of the same size.

Looking at columns
2 + 2 + 2
3 groups of 2

Looking at rows
3 + 3
2 groups of 3

Counting using a variety of practical resources

Counting in 2s e.g. counting socks, shoes, animal's legs…
Counting in 5s e.g. counting fingers, fingers in gloves, toes…
Counting in 10s e.g. fingers, toes…

Pictures / marks

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

Year Two

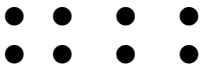
Mental Methods and Informal Written Methods

Emphasis on Knowing multiplication facts: 2s, 5s, 10s and 3s

x = signs and missing numbers

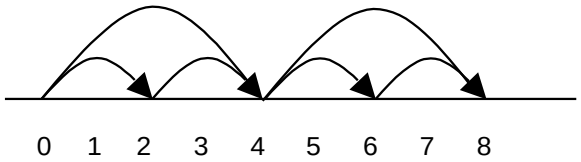
7 x 2 = □	□ = 2 x 7
7 x □ = 14	14 = □ x 7
□ x 2 = 14	14 = 2 x □
□ x ∇ = 14	14 = □ x ∇

Arrays and repeated addition



4 x 2 or 4 + 4

2 x 4 or 2 + 2 + 2 + 2

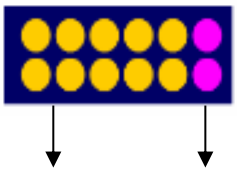


Doubling multiples of 5 up to 50

15 x 2 = 30

Partition

Children need to be secure with partitioning numbers into 10s and 1s and partitioning in different ways: 6 = 5 + 1 so e.g. Double 6 is the same as double five add double one.



AND double 15

10	+	5	
20	+	10	= 30

Calculation Policy

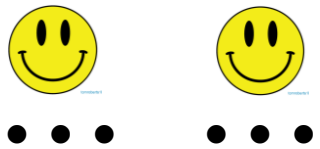
Division

Year One

Sharing

Requires secure counting skills
(see counting and understanding number strand).
Develops importance of one-to-one correspondence
See appendix for additional information on x and ÷ and aspects of number

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



Practical activities involving sharing, distributing cards when playing a game, putting objects onto plates, into cups, hoops etc.

Grouping

Sorting objects into 2s / 3s/ 4s etc
How many pairs of socks are there?

There are 12 crocus bulbs. Plant 3 in each pot.
How many pots are there?

Jo has 12 Lego wheels. How many cars can she make?

Year Two

÷ = signs and missing numbers

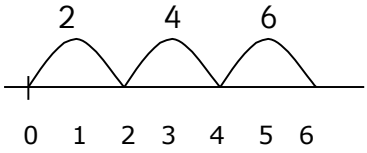
6 ÷ 2 = □	□ = 6 ÷ 2
6 ÷ □ = 3	3 = 6 ÷ □
□ ÷ 2 = 3	3 = □ ÷ 2
□ ÷ ∇ = 3	3 = □ ÷ ∇

Grouping

Link to counting and understanding number strand
Count up to 100 objects by grouping them and counting in tens, fives or twos:

Find one half, one quarter and three quarters of shapes and sets of objects
6 ÷ 2 can be modelled as:
There are 6 strawberries.
How many people can have 2 each? How many 2s make 6?

6 ÷ 2 can be modelled as:

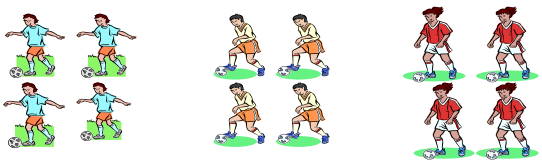


(counting up in 2s)

In the context of money count forwards and backwards using 2p, 5p and 10p coins

Practical grouping e.g. in PE

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



Introduce remainders in a practical context e.g. 27 chn into 5 groups.

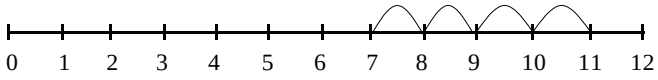
Calculation Policy

Addition

The Number Line

Children use a numbered line to count on in ones. Children use number lines and practical resources to support calculation and teachers *demonstrate* the use of the number line.

7+ 4



Partitioning into tens and ones and recombine

23 + 34

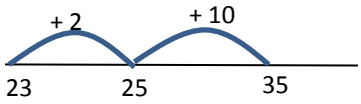
20+30 = 50

3 + 4 = 7

50 + 7 = 57

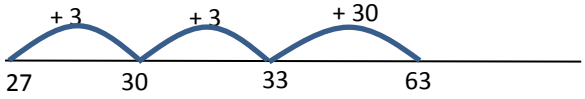
Count on in tens and ones on an empty number line no bridging through 10

23 + 12 =



The empty number line bridging through 10

27 + 36 =



Partitioning hundreds, tens and ones

234 + 345

200 + 300 = 500

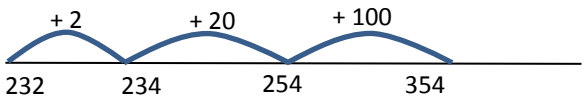
30 + 40 = 70

4 + 5 = 9

500 + 70 + 9 = 579

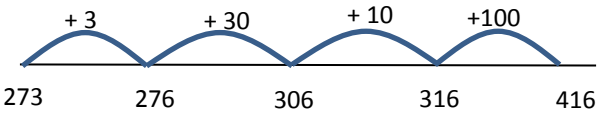
Count on in tens and ones on an empty number line no bridging through 100

232 + 122 =



Count on in tens and ones on an empty number line bridging through 100

273 + 143 =



Expanded column method

Use Diennes when introducing.

234 + 135 =

100s		10s		1s	
200		30		4	
100		30		5	
300	+	60	+	9	= 369

Column method

```
  324
+ 135
  459
```

Column method with any number of digits

```
 3224
   32
+ 133
 3389
```

Introduce decimals in the context of money/ measure

Children need to know to line the decimal point up, particularly when adding mixed amounts.

£7.38 + 145p

```
  £7.38
+ £1.45
  £8.83
    1
```

Extend to decimals with different numbers of place holders

```
 401.2
  26.85
+  0.71
 428.76
    1
```

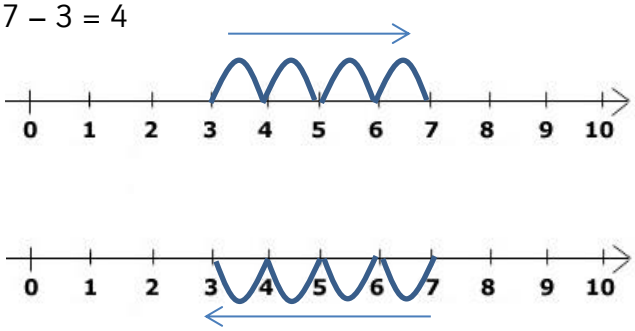
Calculation Policy

Subtraction

The marked number line

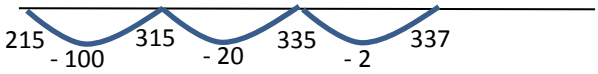
Children use a numbered line to count up and back in ones.

7 – 3 = 4



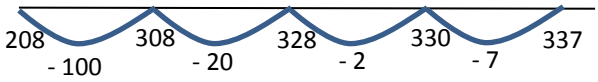
The unmarked number line no bridging

337 - 122

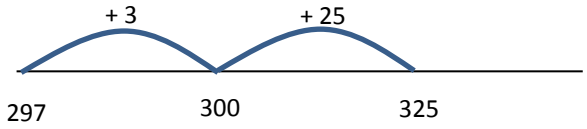


The unmarked number line bridging

337 - 129



The children need to recognise when it is more appropriate to count up (when the numbers are quite close) e.g. 325 – 297



Expanded column method- no exchanging

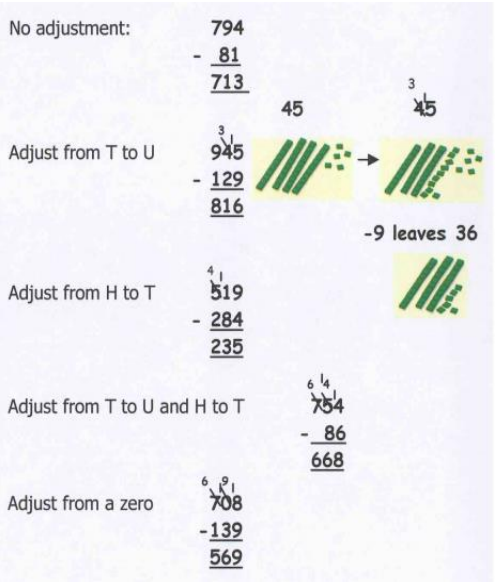
It is important that children are given a visualisation at this point to allow them to later understand exchanging.

345 – 221 = 124

300	40	5
-200	20	1
100	20	4

Introducing the column method

Use the Diennes to help demonstrate exchanging when necessary



It is important to tackle numbers with zeros, however children need to realise when it is more efficient to count on e.g. £10.00 - £1.76 is best solved counting on than using the column method.

Column method with decimals progressing to exchanging

£32.25
- £22.12
£10.13

↓

9 . ^{3}4 ^{1}2
- 6 . 2 8
3 . 1 4

Column method with numbers with different amount of decimal places

13.72 – 1.5

13.72
- 1.5
12.22

Using 0 as a place holder

14.7
- 3.42

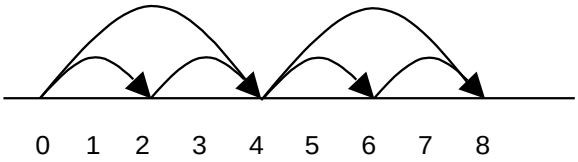
14.^{6}7 ^{1}0
- 3. 4 2
11. 2 8

Calculation Policy

Multiplication

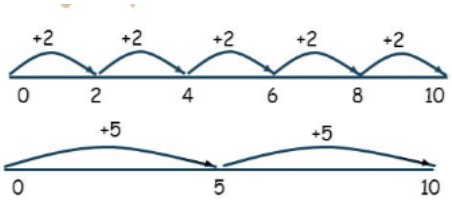
Arrays and repeated addition

● ● ● ● 4 x 2 or 4 + 4
● ● ● ●
2 x 4 or 2 + 2 + 2 + 2



Chunking on a number line

2x5=10 or 5x2=10



x10 and x100

Children must be shown that when you add 0 to a number nothing happens e.g. I have 24 sweets, I add 0 sweets. How many do I now have?

24 x 10

100s	10s	1s
	2	4
2	4	0

Partitioning

23 x 5 =

20 x 5 = 100
3 x 5 =15

100 + 15 = 115

x	20	3
5	100	15

Short multiplication TO x O

24 × 6 becomes

```
  2 4
×   6
-------
1 4 4
-------
  2
```

Answer: 144

Short multiplication TO x TO

24 × 16 becomes

```
    2
  2 4
×   1 6
-------
2 4 0
1 4 4
-------
3 8 4
-------
```

Answer: 384

Decimals using a grid

6 x 2.3 = 13.8

x	2	0.3
6	12	1.8

Decimals using formal written method

short multiplication

```
 24.92
X    7
174.44
```

long multiplication

```
  14.53
x   41
 14.53
581.20
595.73
```

Calculation Policy

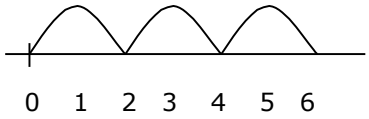
Division

Sharing

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

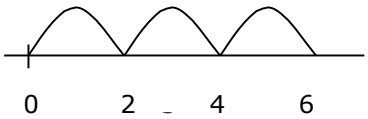
Grouping on a marked number line

6 ÷ 2 = 3



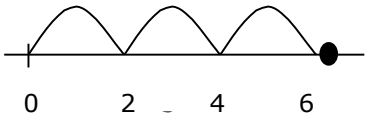
Groups on an unmarked number line

6 ÷ 2 = 3



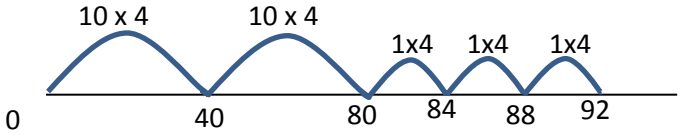
Groups on a number line with remainders

7 ÷ 2 = 3r1

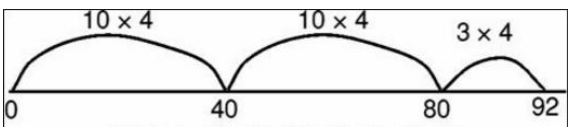


Chunks on a number line

92 ÷ 4 = 23

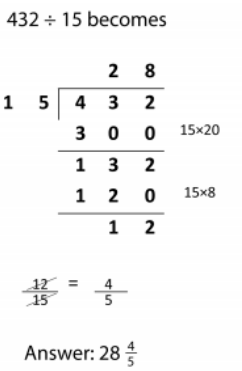


Efficient chunks on a number line



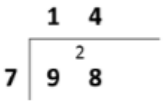
Long division formal written method

Ensure children are aware that long division is useful in situations where the divisor only goes into the whole number e.g. 145 ÷ 15



Short division formal written method

98 ÷ 7 becomes

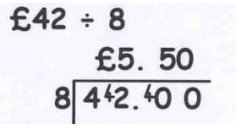


Answer: 14

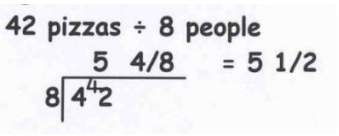
Formal written method with remainders as a fraction/ decimal

Children need to choose the most appropriate thing to do with the remainder- fraction, decimal or round up/ down.

1. money/ length- decimal



2. Objects that can be split into fractions



3. Objects that cannot be split into fraction/ decimals for example children

How many 8 seat cars are needed to transport 8 people?

42 ÷ 8 = 5r2 so you would need **6 cars**

Calculation Policy