Southfields Primary School

Calculations
A guide for parents
Year 3 and 4

Addition - Year 3

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

Addition - Year 3

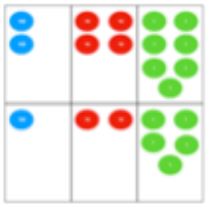
Missing number problems using a range of equations as in Year 1 and 2 with appropriate, larger numbers.

Partition into tens and ones
Partition both numbers and recombine.
Count on by partitioning the second number only e.g.

247 + 125 = 247 + 100 + 20 + 5
= 347 + 20 + 5
= 367 + 5
= 372

Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10. Number lines can still be used.

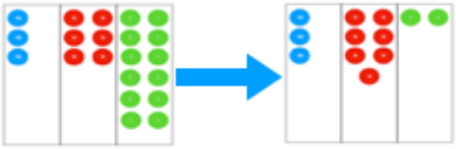
Towards a written method
Introduce expanded column addition modelled with place value containers (Dienes could be used for those who need a less abstract representation)



200 + 40 + 7
100 + 20 + 5
300 + 60 + 12 = 372

247
+125
12
60
300
372

Leading to children understanding the exchange between tens and ones.



Some children may begin to use a formal columnar algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.

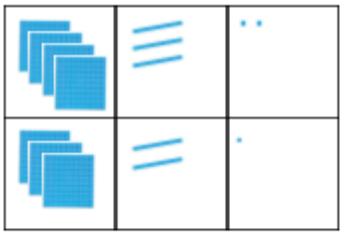
247
+125
372
1

Addition - Year 3

213 + 4 =

3 + 4 = 7
210 + 7 = 217

Add the ones, then the tens and then the hundreds



	Hundreds	Tens	Ones
	4	3	2
+	3	2	1
	7	5	3

432 + 321 = 753

Addition - Year 4

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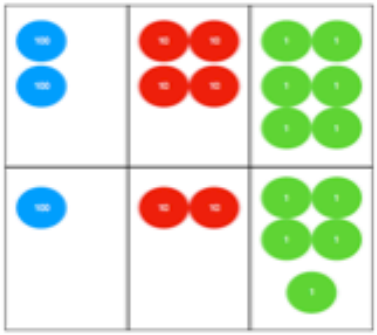
Addition - Year 4

Missing number/digit problems:

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.
Written methods (progressing to 4-digits)
Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.



200 + 40 + 6
100 + 20 + 5
300 + 60 + 11 = 371

246
+ 125
11
60
300
371

Compact written method
Extend numbers with at least four digits.

2634
+ 4517
7151
1 1

Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.

Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

72.8
+ 54.6
127.4
1 1

Subtraction - Year 3

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

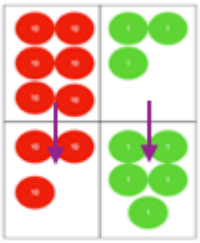
Subtraction - Year 3

Missing number problems e.g. ☐ = 43 - 27; 145 - ☐ = 138; 274 - 30 = ☐ ; 245 - ☐ = 195; 532 - 200 = ☐

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving (see Y1 ad Y2). Children should make choices about whether to use complementary addition or counting back, depending on the numbers involved.

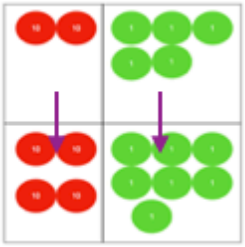
Written methods (progressing to 3-digits)

Introduce expanded column subtraction with no decomposition, modelled with place value counters (Dienes could be used for those who need a less abstract representation)



```
  90  8
-  30  5
  60  3
```

For some children this will lead to exchanging, modelled using place value counters (or Dienes).

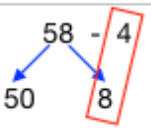


```
  60   1
  ~~70~~  2
-  40   7
  20   5
```

A number line and expanded column method may be compared next to each other.

Some children may begin to use a formal columnar algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not as a new method.

Subtraction - Year 3



8 - 4 = 4
50 + 4 = 54

	Hundreds	Tens	Ones
	9	7	5
-	7	2	3
	2	5	2

	H	T	O
		2	1
	8	~~3~~	1
-		2	6
	8	0	5

Cubes can be used

Link to the bar model

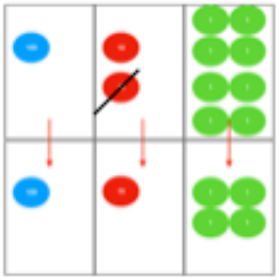
Subtraction - Year 4

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

Subtraction - Year 4

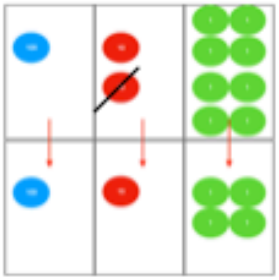
Missing number/digit problems: 456 + ☐ = 710; 1☐7 + 6 = 200; 60 + 99 + ☐ = 340; 200 - 90 - 80 = ☐; 225 - ☐ = 150; ☐ - 25 = 67; 3450 - 1000 = ☐; ☐ - 2000 = 900

Mental methods should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.
Written methods (progressing to 4-digits) expanded column subtraction with decomposition, modelled with place value counters, progressing to calculations with 4-digit numbers.



$$\begin{array}{r} \overset{}{200}\ \overset{20}{\cancel{30}}\ \overset{1}{2} \\ -\ 100\ \ 10\ \ 4 \\ \hline 100\ \ 10\ \ 8 \end{array}$$

If understanding of the expanded method is secure, children will move on to the formal method of decomposition, which again can be initially modelled with place value counters.



$$\begin{array}{r} \overset{}{2}\ \overset{2}{\cancel{3}}\ \overset{1}{2} \\ -\ 1\ \ 1\ \ 4 \\ \hline 1\ \ 1\ \ 8 \end{array}$$

Multiplication - Year 3

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

Multiplication - Year 3

Missing number problems
Continue with a range of equations as in Year 2 but with appropriate numbers,
Continue using the number line

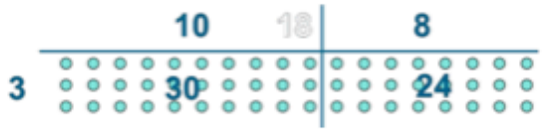
Mental methods
Doubling 2-digit numbers using partitioning

Demonstrating multiplication on a number line - jumping in larger groups of amounts

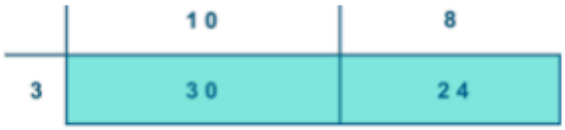
13 x 4 = 10 groups 4 + 3 groups of 4

Written methods (progressing to 2-digits x 1-digit)

Developing written methods using understanding of visual images



Develop onto the grid method



Give children opportunities for children to explore this and deepen understanding using Dienes apparatus and place value counters

Multiplication - Year 3

2 x 4 = 8

Ones
2
x 4
8

Move onto 20 x 4 =

Tens	Ones
2	0
x	4
8	0

23 x 2 = 46

Tens	Ones
2	3
x	2
	6

Tens	Ones
2	3
x	2
	6
4	0

Tens	Ones
2	3
x	2
	6
+ 4	0
4	6

Multiplication - Year 4

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

Multiplication - Year 4

Continue with a range of equations as in Year 2 but with appropriate numbers. Also include equations with missing digits

2 x 5 = 160

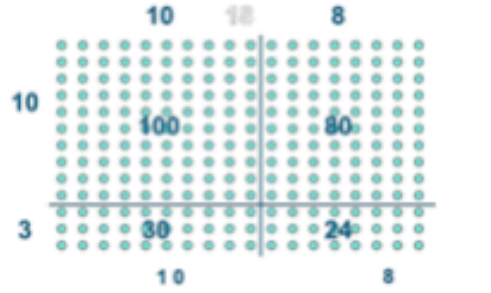
Mental methods

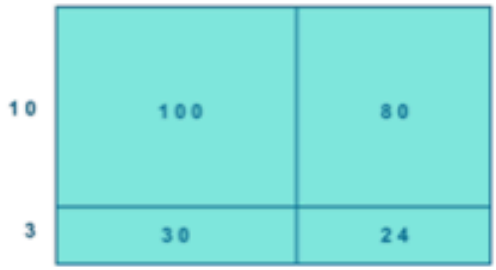
Counting in multiples of 6, 7, 9, 25 and 1000, and in steps of 1/100

Solving practical problems where children need to scale up. Relate to known number facts (e.g. how tall would a 25cm sunflower be if it grew 6 times taller?)

Written methods (progressing to 3-digit x 2-digit)

Children to embed and deepen their understanding of the grid method to multiply up 2-digit x 2-digit. Ensure this is still linked back to their understanding of arrays and place value counters.





$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 18 \\ +\ 120 \\ \hline 138 \end{array}$$

23 x 6 =

	20	3
6	120	18

20 x 6 3 x 6

23 x 6 = 120 +18

= 138

Division and fractions - Year 3

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

Division - Year 3

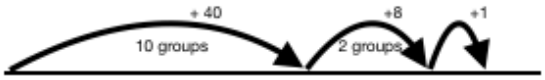
÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.

Grouping
How many 6's are in 30?
30 ÷ 6 can be modelled as:

Becoming more efficient using a number line

Children need to be able to partition the dividend in different ways.
48 ÷ 4 = 12

Remainders
49 ÷ 4 = 12r1

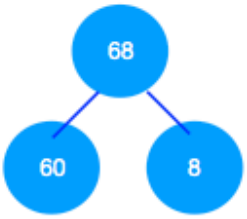


Sharing - 49 shared between 4. How many left over?
Grouping - how many 4s make 49? How many are left over?

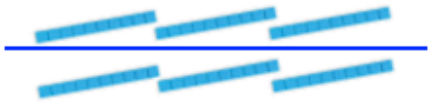
Place value counters can be used to support children apply their knowledge of grouping.
For example:
60 ÷ 10 = How many groups of 10 in 60?
600 ÷ 100 = How many groups of 100 in 600?

Division - Year 3

68 ÷ 2 =



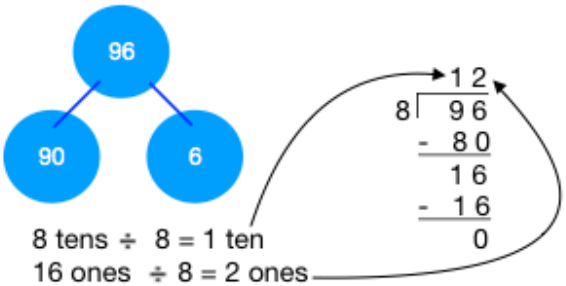
6 tens ÷ 2 = 30



8 ones ÷ 2 = 4

68 ÷ 2 = 30 + 4 = 34

96 ÷ 8 = 12



Division and fractions - Year 4

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Division - Year 4

= signs and missing numbers
Continue tusing a range of equations as in year 3 but with appropriate numbers.

Sharing, grouping and using a number line
Children will continue to explore division as sharing and grouping, and to represent calculations on a number line until they have a secure understanding. Children should progress in their use of written division calculations:

- using tables facts with which they are fluent
- experiencing a logical progression in the numbers they use, for example:

1. Dividend just over 10x the divisor, e.g. 84 ÷ 7
2. Dividend just over 10x the divisor when the divisor is a teen number, e.g. 173 ÷ 15 (learning sensible strategies for calculations such as 102 ÷ 17
3. Dividend over x100 the divisor, e.g. 840 ÷ 7
4. Dividend over x20 the divisor, e.g. 168 ÷ 7

All of the above stages should include calculations with remainders as well as without.

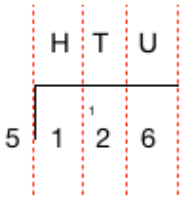
Remainders should be interpreted according to the context (i.e. rounded up or down to relate to the answer of the problem).

e.g. 840 ÷ 7 = 120

Jottings
7 x 100 = 700
7 x 10 = 70
7 x 20 = 140

Formal written methods
Formal short division should only be introduced once children have a good understanding of division, its links with multiplication and the idea of 'chunking up' to find a target number (see use of number lines above)

Short division to be modelled for understanding using place value counters as shown below. Calculations with 2 and 3-digit dividends, e.g. fig 1




```
  3 4
2 6 8      6 tens ÷ 2
- 6
    8      8 ones ÷ 2
  - 8
    0
```

68 ÷ 2 = 34

75 ÷ 6 =

```
  1 2
6 7 5      6 tens ÷ 6
- 6
  1 5      12 ones ÷ 6
- 1 2
    3 remainder
```

75 ÷ 6 = 12 r 3