



Calculation Policy

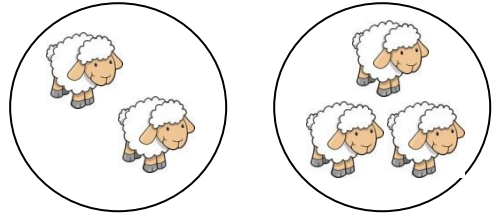
Updated 2021

Addition

Stage 1

Children understand the concept of addition as combining two amounts. They count orally and practically using objects. Nursery Rhymes and the verbal language of addition are used.

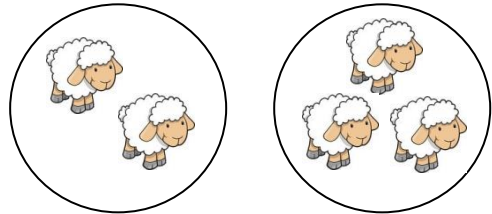
One to one correspondence is used to count and find a total.



Two sheep add three sheep equals five sheep.

Stage 2

Children are introduced to the + and = signs as they begin to record more formal written calculations. Practical apparatus is used to reinforce one to one correspondence.

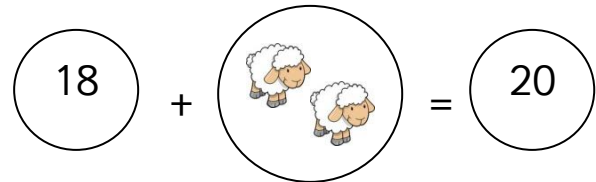


$$2 + 3 = 5$$

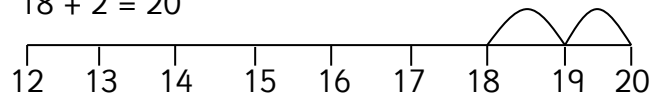
Stage 3

Children begin to 'count on' by putting the biggest number in their head, and use practical resources to find the answer.

By the end of year 1 children are able to use a number line to count on.



$$18 + 2 = 20$$

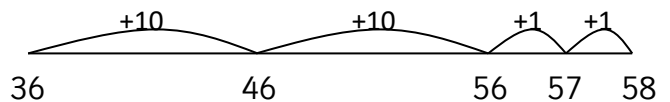


Stage 4

Children use an empty number line to add 2-digit numbers. They use a hundred square alongside the number line to support addition of tens and ones.

$$36 + 22 = 58$$

35	36	37	38	39
45	46	47	48	49
55	56	57	58	59
65	66	67	68	69



Stage 5

Children are introduced to expanded, then compact column methods. Dienes are used alongside written methods to support addition of tens and ones.

By the end of year 2 children will be able to use column method for addition.

$$34 + 23 =$$

T	O

Expanded

$$\begin{array}{r} 30 + 4 \\ + 20 + 3 \\ \hline 50 + 7 \end{array}$$

Compact

$$\begin{array}{r} 34 \\ + 23 \\ \hline 57 \end{array}$$

Stage 6

Children continue to use dienes or place value counters alongside column method, to understand and show exchanging.

Expanded column method is used to support children's understanding of place value and to develop the concept of exchanging ones for tens.

$$34 + 29 =$$

T	O

Children exchange 10 ones counters for a single tens counter, when the total amount of ones exceeds 9.

Expanded

$$\begin{array}{r} 30 + 4 \\ + 20 + 9 \\ \hline 50 + 13 \end{array}$$

Compact

$$\begin{array}{r} 34 \\ + 29 \\ \hline 63 \end{array}$$

Stage 7

Children have a secure understanding of column method. They are introduced to addition of decimals, using units such as cm/m and £/p to build fluency and mastery.

It is recommended that all children are using compact column method in year 4.

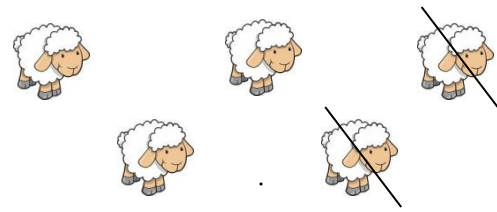
$$\begin{array}{r} 7893 \\ + 513185 \\ \hline 13278 \end{array}$$

$$\begin{array}{r} 31.76 \\ + 18.017 \\ \hline 49.83 \end{array}$$

Subtraction

Stage 1

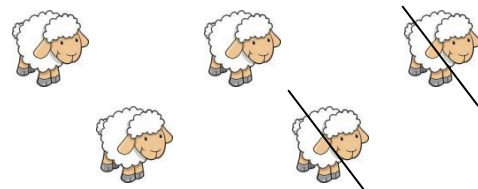
Children understand the concept of subtraction as taking away one amount from another. Children do this orally and practically. Nursery rhymes and the verbal language of subtraction are used.



Five sheep take away two sheep equals three sheep.

Stage 2

Children are introduced to the $-$ and $=$ signs as they begin to write more formal calculations. Practical resources to support one to one correspondence are still used at this stage.



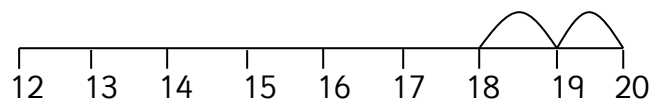
$$5 - 2 = 3$$

Children begin to count back using visual aids.

Stage 3

Children continue to use practical resources as well as a number line to count back from the largest number.

$$20 - 2 = 18$$



By the end of year 1 children are introduced to the hundred square in preparation for stage 4.

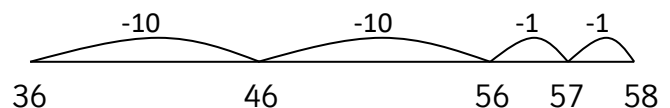
Stage 4

Children count back in steps of ten and one on an empty number line. The hundred square is used to support subtraction.

$$58 - 22 = 36$$

35	36	37	38	39
45	46	47	48	49
55	56	57	58	59
65	66	67	68	69

** When learning to 'find the difference' children count up on a number line, starting at the smallest number and arriving at the largest.*



Stage 5

Children are introduced to expanded column method, followed by compact column method for subtraction. Dienes are used alongside written methods to support subtraction of tens and ones.

$$43 - 22 =$$

T	O

Children practically take away dienes.

Expanded

$$\begin{array}{r} 40 + 3 \\ - 20 + 2 \\ \hline 20 + 1 \end{array}$$

Compact

$$\begin{array}{r} 43 \\ - 22 \\ \hline 21 \end{array}$$

Stage 6

Children continue to use practical apparatus, such as place value counters, alongside column methods when 'exchanging'.

$$43 - 26 =$$

T	O

Children exchange a 10 for ten 1s, to subtract larger 1s digits.

Expanded

$$\begin{array}{r} 30 \quad 13 \\ 40 + 3 \\ - 20 + 6 \\ \hline 10 + 7 \end{array}$$

Compact

$$\begin{array}{r} 3 \quad 13 \\ 43 \\ - 26 \\ \hline 17 \end{array}$$

Stage 7

Children use compact column subtraction to solve mathematical problems, building fluency and mastery. Children subtract decimal numbers in context.

$$\begin{array}{r} 5^3 \cancel{4}^1 3 \\ - 326 \\ \hline 217 \end{array}$$

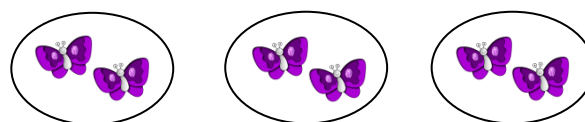
$$\begin{array}{r} 2^4 \cancel{8}^1 . \cancel{4}^1 6 \\ - 12.65 \\ \hline 12.81 \end{array}$$

It is recommended, that by the end of year 4 children use compact column method for subtraction.

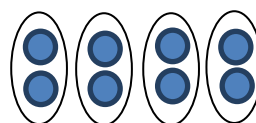
Multiplication

Stage 1

Children begin to understand the concept of multiplication as grouping. Children use visual representations and objects to visualise amounts. The language of multiplication is used.



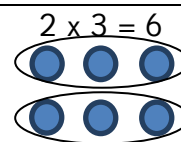
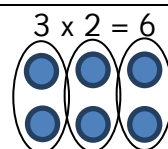
Three groups of two equal six.



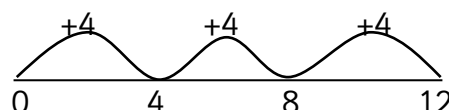
Children can pair objects to count up in twos.

Stage 2

Children use an array for multiplication. They begin to recognise that multiplication can be done in any order e.g. $2 \times 3 = 6$ and $3 \times 2 = 6$. They use the $\times$ and $=$ signs to record calculations.



$$3 \times 4 = 12$$



Children recognise multiplication as repeated addition, and can show this on a number line.

Stage 3

Children begin to develop mental calculation, relying on partitioning.

$$\begin{array}{l} 23 \times 3 = \\ \swarrow \quad \searrow \\ 20 \times 3 = 60 \quad 3 \times 3 = 9 \\ 60 + 9 = 69 \end{array}$$

Stage 4

Children use the grid method to multiply a 2-digit number by a 1-digit number, gradually progressing to multiplying two, 2-digit numbers.

(TO $\times$ O) leading to (TO $\times$ TO)

$$\begin{array}{r|rr} 25 & 20 & 5 \\ \times 4 & 80 & 20 \\ \hline & 80 & 20 \end{array} = 100$$

$$\begin{array}{r|rr} 32 & 30 & 2 \\ \times 21 & 600 & 40 \\ \hline 1 & 30 & 2 \end{array} = 672$$

*Column addition can be used alongside the multiplication grid to total large amounts.

Stage 5

By the end of year 4 children use formal written methods to multiply 2 and 3-digit numbers by 1-digit.

Expanded

$$\begin{array}{r} 23 \\ \times 7 \\ \hline 21 \\ 140 \\ \hline 161 \end{array}$$

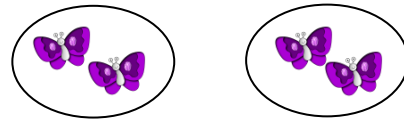
Compact

$$\begin{array}{r} 23 \\ \times 7 \\ \hline 161 \end{array}$$

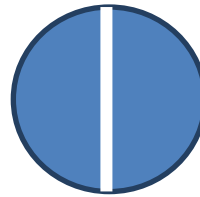
Division

Stage 1

Children begin to understand the concept of division as 'sharing'. They use a range of models, images and objects to demonstrate sharing a given amount equally.



4 shared by 2 equals 2.



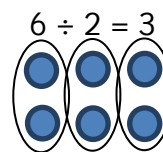
One cake shared equally between two people.

Stage 2

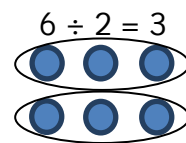
Children are introduced to the $\div$ sign. They begin to understand both structures of division; 'grouping' and 'sharing', and recognise that the answer will be the same.

**Always use the term divide when reading the $\div$ sign. Ask 'What's the same and different?' between both structures.*

Grouping



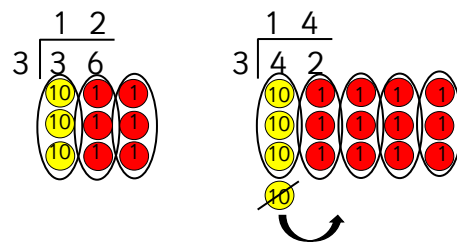
Sharing



Stage 3

Children begin to use short division methods. Place value counters are used practically or can be drawn pictorially to help children 'group' tens then ones in order to divide.

How many groups of 3 can we make with the tens counters? How many groups of 3 can we make with the ones counters?



In calculations where there are remaining tens, children should exchange for ones; before grouping the ones to find answers.

Stage 4

Children use the formal written method for short division confidently, dividing 2 and 3-digit numbers by a 1-digit number.

$$127 \div 4 =$$

$$\begin{array}{r} 31 \text{ r } 3 \\ 4 \overline{) 127} \end{array}$$

Although it is not statutory, it is recommended that children should be using the formal written method for short division **by the end of year 4**.