

Year 4 - Addition



Objective

Add numbers with up to 4 digits *and decimals with one decimal place* using the formal written method of columnar addition where appropriate.

Understanding

In developing a written method for addition, it is important that children understand the concept of addition, in that it is:

- Combining two or more groups to give a total or sum
- Increasing an amount

They also need to understand and work with certain principles, i.e. that it is:

- the inverse of subtraction
- commutative i.e. $5 + 3 = 3 + 5$
- associative i.e. $5 + 3 + 7 = 5 + (3 + 7)$

The fact that it is commutative and associative means that calculations can be rearranged, e.g. $4 + 13 = 17$ is the same as $13 + 4 = 17$.

Methods – Concrete Objects

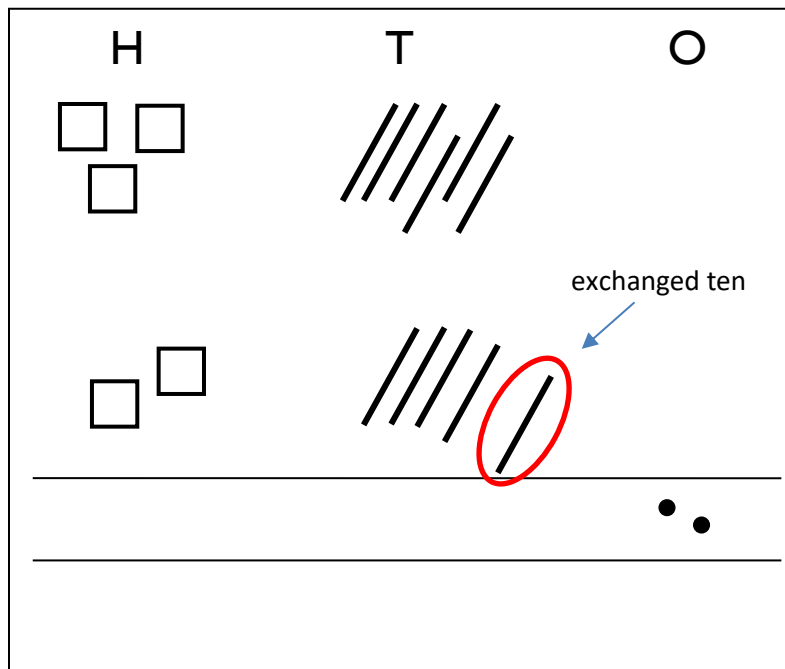
Base 10 method

Children will continue building on their knowledge of using Base 10 equipment. Children should add the **least significant digits** first. They can use a place value grid to begin to set the calculation out vertically and to support their knowledge of exchange between columns.

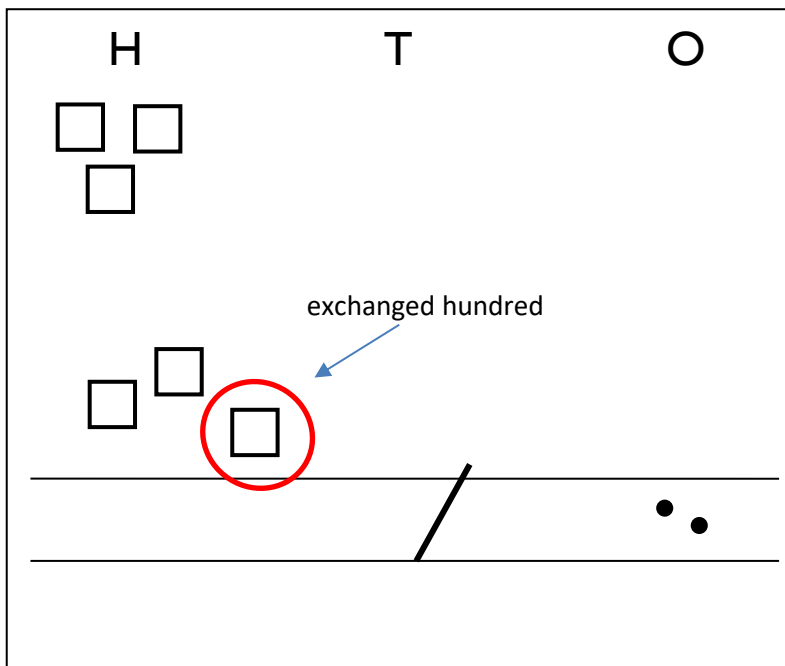
Step 1

H	T	O

Step 2



Step 3



Step 4

H	T	O
	/	• •

Methods – Recording

By the end of year 4, children should be using the written method confidently and with understanding. They will also be adding:

- several numbers with different numbers of digits including 4 digit numbers, understanding the place value;
- decimals with one decimal place, knowing that the decimal points line up under one another.

Column Method (without exchanging)

Children must be able to set out the calculation in the column method. It is important that this is done alongside the Base 10 jottings. It is also essential that columns are labelled with the place values. This should progress to, when they are ready, children utilising just the written method.

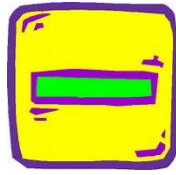
	H	T	O			H	T	O	
	4	6	1			□□		•	
						□□			
+	1	2	3		+	□	"	:'	
	5	8	4			5	8	4	

Column Method (with exchanging)

Children must be able to set out the calculation in the column method. It is important that this is done alongside the Base 10 jottings. It is also essential that columns are labelled with the place values. This should progress to, when they are ready, children utilising just the written method.

	H	T	O			H	T	O
	4	6	9					
+	1	2	5		+			
	5	9	4			5	9	4

Year 4 - Subtraction



Objective

Subtract numbers with up to 4 digits *and decimals with one decimal place* using the formal written method of columnar subtraction where appropriate.

Understanding

In developing a written method for subtraction, it is important that children understand the concept of subtraction, in that it is:

- Removal of an amount from a larger group (take away)
- Comparison of two amounts (difference)

They also need to understand and work with certain principles, i.e. that it is:

- the inverse of addition
- not commutative i.e. $5 - 3$ is not the same as $3 - 5$
- not associative i.e. $10 - 3 - 2$ is not the same as $10 - (3 - 2)$

Methods – Concrete Objects

Base 10 Method

Children will continue using the Base 10 equipment to support their calculations, still using a take away, or removal, method. Children should subtract the **least significant digits** first (i.e. start with the ones). They need to understand that the number being subtracted does not appear as an amount on its own, but rather as part of the larger amount. The example below shows this for a two-digit number, however in Y4 children will handle numbers including 4 digit numbers.

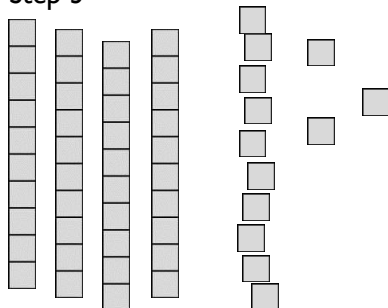
To calculate $54 - 23$, children would count out 54 using the Base 10 equipment (5 tens and 4 ones). They need to test whether there are enough ones to remove 3, in this case there are, so they would remove 3 ones and then two tens, counting up the answer of 3 tens and 1 one to give 31. Circling the tens and units that remain will help children to identify how many remain.

When the amount of ones to be subtracted is greater than the ones in the original number, an exchange method is required. This relies on children's understanding of ten ones being an equivalent amount to one ten. To calculate $53 - 26$, by using practical equipment, they would count out 53 using the tens and ones, as in Step 1. They need to consider whether there are enough ones to remove 6. In this case there are not so they need to exchange a ten into ten ones to make sure that there are enough, as in step 2.

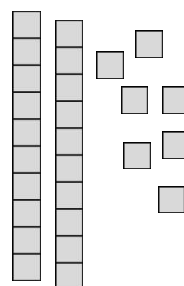


The children can now see the 53 represented as 40 and 13, still the same total, but partitioned in a different way, as in step 3 and can go on to take away the 6 ones and 2 tens from the calculation to leave 27 remaining, as in Step 4.

Step 3



Step 4



Methods – Recording

By the end of Y4, children should be using the written method confidently and with understanding. They will also be subtracting:

- numbers with different numbers of digits including 4 digit numbers, understanding the place value;
- decimals with one decimal place, knowing that the decimal points line up under one another.

Column Method (without exchanging)

	H	T	O			H	T	O
	4	7	6					
-	1	2	3					
	3	5	3			3	5	3

Column Method (with exchanging)

	H	T	O			H	T	O
	4	6	5					
-	1	2	4					
	3	4	1			3	4	1

Year 4 - Multiplication



Objective

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

Understanding

In developing a written method for multiplication, it is important that children understand the concept of multiplication, in that it is:

- repeated addition

They should also be familiar with the fact that it can be represented as an array

They also need to understand and work with certain principles, i.e. that it is:

- the inverse of division
- commutative i.e. 5×3 is the same as 3×5
- associative i.e. $2 \times 3 \times 5$ is the same as $2 \times (3 \times 5)$

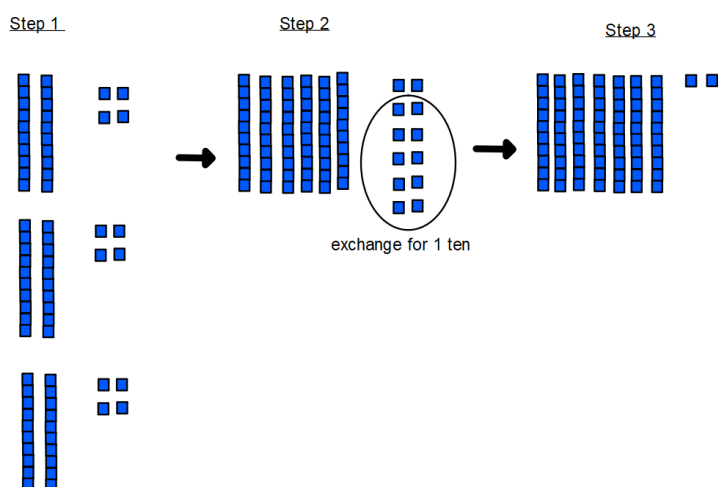
Methods – Concrete Objects

Base 10

In Y4 children will be introduced to the column method for multiplication. When introducing the column method, it is essential it is done alongside the use of practical equipment.

Below demonstrates for 2 digit numbers, however in Y4 children must be able to multiply 3 digit numbers by 1 digit numbers.

24×3 . Use base 10 to make the two-digit number the given number of times. Then group ones and tens and exchange where necessary.



Methods – Recording

Base 10

Below are the stages that the children need to work through in order to progress to the formal written method. In Year 3, stages 1 and 2 are to be taught. In Year 4, stages 1 and 2 must be recapped however the focus of the learning is on stage 3 – The Formal Written Method.

By the end of Y4, children should be using the written method confidently and with understanding. Whilst children are mastering the formal written method, they must draw the jottings alongside the column method. Below demonstrates for 2 digit numbers, however in Y4 children must be able to multiply 3 digit numbers by 1 digit numbers.

Stage 1 – Pictorial Representations

2	4	x	3	=	7	2	7	0
							11	::
							11	::
							11	::
							1	
							7	2

Stage 2 – Jottings: Partitioning/ Decomposing and Recombining

2	4	x	3	=	7	2		7	0	
								1	2	
								+	6	0
									7	2

partition/ decompose

multiply the ones

multiply the tens

recombine

Stage 3 – The Formal Written Method

	T	0			T	0
	2	4			11	::
x		3			11	::
	<u>7</u>	<u>2</u>			11	::

Year 4 - Division



Objective

Divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

Understanding

In developing a written method for division, it is important that children understand the concept of division, in that it is:

- repeated subtraction
- sharing into equal amounts
- grouping into equal amounts

They also need to understand and work with certain principles, i.e. that it is:

- the inverse of multiplication
- not commutative i.e. $15 \div 3$ is not the same as $3 \div 15$
- not associative i.e. $30 \div (5 \div 2)$ is not the same as $(30 \div 5) \div 2$

Methods – Concrete Objects

Inverse

Children must understand division as the inverse of multiplication and recall multiplication facts to solve division problems.

Remainders

They should also continue to develop their knowledge of division with remainders, e.g.

$$13 \div 4 =$$



$$13 \div 4 = 3 \text{ remainder } 1$$

Children need to be able to make decisions about what to do with remainders after division and round up or down accordingly. In the calculation $13 \div 4$, the answer is 3 remainder 1, but whether the answer should be rounded up to 4 or rounded down to 3 depends on the context, as in the examples below:

Q: I have £13. Books are £4 each. How many can I buy?

Answer: 3 (the remaining £1 is not enough to buy another book)

Q: Apples are packed into boxes of 4. There are 13 apples. How many boxes are needed?

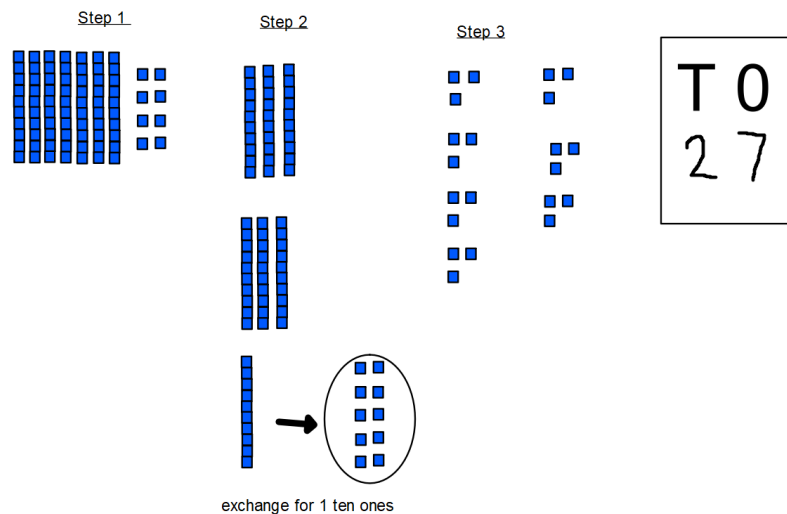
Answer: 4 (the remaining 1 apple still needs to be placed into a box)

Base 10

In Y4 children must continue using base 10 to divide three digit numbers by one digit numbers in preparation. This is the first time the compact method will be introduced. Therefore base 10 must be used alongside the understanding of the formal written method. The example below shows division of a 2 digit number, the expectations in Y4 is up to and including 3 digit numbers.

$$78 \div 3 =$$

Children must make the number being divided. In division, the calculation must begin with the most significant digit. In this case 7 tens will be put into groups of 3. There will then be 1 ten remaining which must then be exchanged for 10 ones. The 18 ones will then be put into groups of 3. Children must write answer into a place value grid to ensure the understanding of grouping into tens and ones.



Methods – Recording

Base 10

