

Addition

Year 4

Pupils should be taught to:

- Add and subtract numbers with up to 4 digits using the formal written methods of column addition and subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Move from expanded addition to the compact column method, adding units first, and 'carrying' numbers underneath the calculation.

Also include money and measures contexts.

e.g. $3517 + 396 = 3913$

Introduce the compact column addition method by asking children to add the two given numbers together using the method that they are familiar with (expanded column addition—see Y3). Teacher models the compact method with carrying, asking children to discuss similarities and differences and establish how it is carried out. Make sure that pupils draw a line underneath the final calculation.

Reinforce correct place value by reminding

them the actual value is 5 hundreds add

3 hundreds, not 5 add 3, for example.

'Carry' numbers underneath the bottom line.

Use and apply this method to money and measurement

Add ones first.

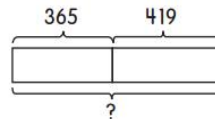
$$\begin{array}{r} 3517 \\ + 396 \\ \hline 3913 \end{array}$$

Bar modelling

Rani collects 365 beads in January.

She collects 419 beads in April.

How many beads does she collect in January and April?



Mastery in addition - see

NCETM website for more examples

Fill in the empty boxes to make the equations correct.

$$7 \square 1 + \square 3 \square = 999$$

$$7 \square 1 + \square 3 \square = 1000$$

Key vocabulary: add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line, Sum, tens, units, partition, addition, column tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse.

Subtraction

Pupils should be taught to:

- Subtract numbers with up to 4 digits using the formal written methods of column subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why

Partitioned column subtraction
with exchanging (decomposition)

As introduced in Y3, but moving towards more complex numbers and values. Use place value counters to reinforce 'exchanging'.

$$2754 - 1562 = 1192$$

2	0	0	0	+	7	0	0	+	5	0	+	4	
-	1	0	0	0	+	5	0	0	+	6	0	+	2
1	0	0	0	+	1	0	0	+	9	0	+	2	

To introduce the compact method, ask children to perform a subtraction calculation with the familiar partitioned column subtraction then display the compact version for the calculation they have done. Ask pupils to consider how it relates to the method they know, what is similar and what is different, to develop an understanding of it.

$$\begin{array}{r} 2754 \\ - 1562 \\ \hline 1192 \end{array}$$

Always encourage children to consider the best method for the numbers involved—mental, counting on, counting back or written.

Give plenty of opportunities to apply this to money and

Mastery in subtraction - see

NCETM website for more examples

Identify the missing numbers in these bar models. They are not drawn to scale.

1000		
	353	354

2000		
493		754

Select your own numbers to make this bar model correct.

5000		

Key vocabulary: equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, countback, how many left, how much less is? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, **inverse**

Multiplication

Year 4

Pupils should be taught to:

- Recall multiplication facts for multiplication tables up to 12×12
- Use place value, known derived facts to multiply mentally, including multiplying by 0 and 1; dividing by 1 and multiplying together three numbers
- Recognise and use factor pairs and commutativity in mental calculations
- Multiply 2-digit and 3-digit numbers by 1-digit numbers using formal written layout
- Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Multiply 2 and 3-digits by a single digit (Grid method)

$$\begin{array}{r} 500 \\ 150 \\ + 30 \\ \hline 680 \end{array}$$

Eg. $136 \times 5 = 680$

X	100	30	6
5	500	150	30

$$500 + 150 + 30 = 680$$

Expanded written method

The cook buys 463 packs of apples. How many apples are there altogether?

	H	T	O	
	4	6	3	
x			8	
		2	4	(3 x 8)
	4	8	0	(60 x 8)
				(400 x 8)

Formal written method

Example

$$283 \times 3 \rightarrow 300 \times 3 = 900$$

	H	T	O
	2	8	3
x	2		3
	8	4	9

Mastery in multiplication - see

NCETM website for more examples

Tom ate 9 grapes at the picnic. Sam ate 3 times as many grapes as Tom. How many grapes did they eat altogether?

The bar model is a useful scaffold to develop fluency in this type of question.

Key vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times... partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/ long multiplication, carry

Division

Year 4

Pupils should be taught to:

- Recall division facts for multiplication tables up to 12×12
- Use place value, known derived facts to divide mentally, including dividing by 0 and 1; dividing by 1 and multiplying together three numbers
- Divide 2-digit and 3-digit numbers by 1-digit numbers using formal written layout
- Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit; integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Continue to develop short division

STEP 1: Pupils must be secure with the process of short division for dividing 2-digit numbers by a single digit (those that do not result in a final remainder—see steps in Y3), but must understand how to calculate remainders, using this to 'carry' remainders within the calculation process (see example).

$$\begin{array}{r} 18 \\ 4 \overline{) 72} \end{array}$$

STEP 2: Pupils move onto dividing numbers with up to 3-digits by a single digit, however problems and calculations provided should **not result in a final answer with remainder** at this stage. Children who exceed this expectation may progress to Y5 level.

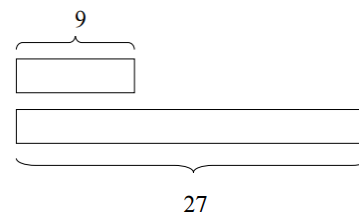
$$\begin{array}{r} 218 \\ 4 \overline{) 872} \end{array}$$

When the answer for the first column is zero (e.g. $1 \div 5$), children could initially write a zero above to acknowledge its place, and must always 'carry' the number (1) over to the next digit as a remainder.

$$\begin{array}{r} 037 \\ 5 \overline{) 185} \end{array}$$

Using bar model

There are 27 red flowers and 9 white flowers.
How many times as many red flowers as white flowers are there?
Two quantities are compared. One is a multiple of the other.
We know both quantities. To find the multiplier we divide $27 \div 9$.



Mastery in division - see

NCETM website for more examples

John has been thinking about some numbers. He divided a whole number by another whole number and got 3125. Now he has forgotten what the two whole numbers were in the first place. Can you help him work them out?

Key vocabulary: share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor