



How we teach it.

Written and mental calculations in Year 4.

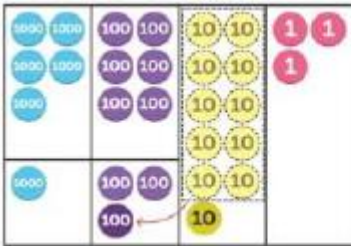


Written Addition in Year 4

Method:

Column Addition

In Year 4, Column Addition is taught referencing place value counters and mats. Children are encouraged to see how the two relate and why carrying takes place.



$$\begin{array}{r} 5678 \\ + 1235 \\ \hline 13 \end{array}$$

Column Addition with carrying

Leading to:

Column Addition

Children will be expected to become familiar with using formal methods of addition with and without carrying. This is supported with place value counters.

500 + 400 + 100 = 1000.
Carry the 1000 into the thousands column.

As 80 + 70 + 10 = 160, carry the 100 into the hundreds column.

As 7 + 5 = 12, carry the ten into the next column.

line up the H, T & U

Start adding at the units!

$$\begin{array}{r} \text{Th H T U} \\ 587 \\ + 475 \\ \hline 1062 \end{array}$$

Strategies for Support:

Column Addition will be taught referencing the Expanded Method. This understanding is supported with place value counters.

$$\begin{array}{r} 123 = 100 + 20 + 3 \\ + 45 = \quad \quad 40 + 5 \\ \hline 168 = 100 + 60 + 8 \end{array}$$

Is the same as: +

$$\begin{array}{r} 123 \\ + 45 \\ \hline 168 \end{array}$$

Next Steps:

Children will begin to add more than one number using column methods of addition. This understanding is supported with place value counters.

Ensure that the digits are lined up correctly.

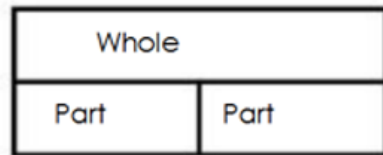
Carry below the line.

$$\begin{array}{r} \text{Th H T U} \\ 5678 \\ 468 \\ + \quad 72 \\ \hline 6218 \\ \hline 121 \end{array}$$

A Deeper Look:

Bar Model Strategy to support:

Children will use a bar model to find missing digits. It is important for them to use the bar model in this way to encourage the use of it when problem solving.

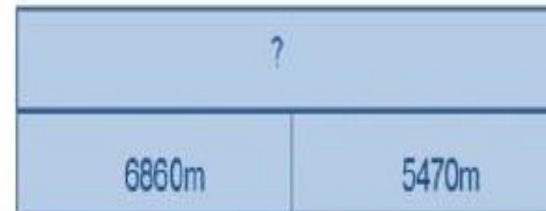


Alison jogs 6,860 metres and Calvin jogs 5,470 metres. How far do they jog altogether?

Children understand that addition and subtraction are a whole part relationship. They look for wholes and parts in the question and use the information they have to determine what operation to use.

Ex) $\text{Whole} - \text{Part} = \text{Part}$

$\text{Part} + \text{Part} = \text{Whole}$





Mental Addition in Year 4

Children should be able to recall:

- Sums of pairs of multiples of 10, 100 or 1000.
- Pairs of fractions that total one.

- Addition doubles of numbers 1 to 100.
E.g. $38 + 38$

- What must be added to any three digit number to make the next multiple of 100.
E.g. $521 + n = 600$

Working mentally, children should be able to:

- Add any pair of two-digit numbers including crossing the 10 and 100 boundary.
E.g. $47 + 58$

- Add a near multiple of 10.
E.g. $56 + 29 = 56 + 30 - 1$
- Add near doubles of two-digit numbers.
E.g. $38 + 37$

- Add two-digit or three-digit multiples of 10
E.g. $120 + 140$

Children should know when to:

- Count on in hundreds tens or ones.
- Partition: add tens and units separately then recombine.

- Partition: Add a multiple of 10 and adjust.
E.g. $56 + 29 = 56 + 30 - 1$
- Partition: Double and adjust.
E.g. $38 + 37 = 38 + 38 - 1$

- Use knowledge of place value and related calculations.
E.g. Work out $140 + 150$ using $14 + 15 = 29$
- Partition: Count on in minutes and house, bridging through 60.

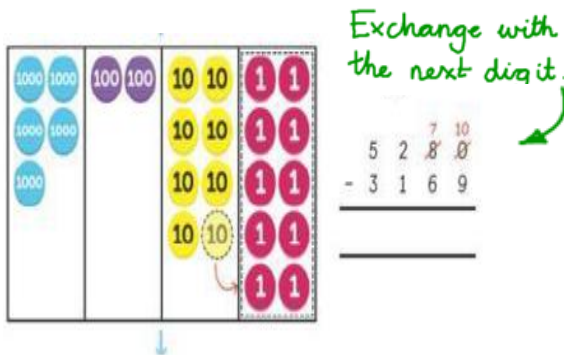


Written Subtraction in Year 4

Method

Column Subtraction with Dienes

In Year 4, Column Subtractions will be taught using place value counters to encourage children to see what happens when borrowing occurs.



Exchange with the next digit.

$$\begin{array}{r} 5 \ 2 \ 7 \ 10 \\ - 3 \ 1 \ 6 \ 9 \\ \hline \end{array}$$

Leading to:

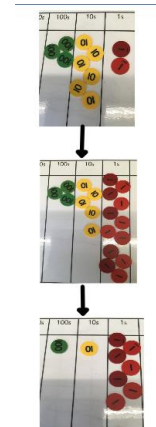
Column Subtraction

Children will be expected to become familiar with using formal methods of subtraction with and without borrowing (supported with place value counters where necessary).

Exchange with the next digit.

$$\begin{array}{r} 5 \ 12 \\ 362 \\ - 245 \\ \hline 117 \end{array}$$

$$50 - 40 \quad 12 - 5$$



Strategies to support:

Column Subtractions will be taught referencing the Expanded Method and dienes to encourage children to see how they relate.

Because you can't 'do' 2-5, exchange a ten for ten units.

$$\begin{array}{l} 362 = 300 + 50 + 12 \\ 245 = 200 + 40 + 5 \\ \hline 117 = 100 + 10 + 7 \end{array}$$

Recombine to get the answer.

Exchange with the next digit.

$$\begin{array}{r} 5 \ 12 \\ 362 \\ - 245 \\ \hline 117 \end{array}$$

$$50 - 40 \quad 12 - 5$$

Next Steps:

Children will move on to using Column Subtraction on its own and with decimals (supported with place value counters where necessary).

$$\begin{array}{r} 4 \ 15 \\ 362 \\ - 245 \\ \hline 117 \end{array}$$

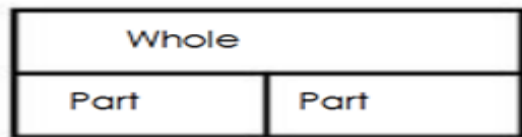
$$150 - 60 = 90$$

Start subtracting from the units

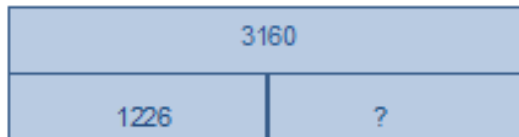
A Deeper Look:

Bar Model Strategy to support:

Using the bar to find missing digits. It is important for children to use the bar to aid with problem solving.



There are 3,160 books in a shop. 1,226 are in English and the rest are in French. How many French books are there?



Children understand that addition and subtraction are a whole part relationship. They look for wholes and parts in the question and use the information they have to determine what operation to use.

Ex) $\text{Whole} - \text{Part} = \text{Part}$

$\text{Part} + \text{Part} = \text{Whole}$

Year 4: solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.



e.g. one-step problem

Sally has 40 football cards. She gives 25 of them away. How many does she give away?



Mental Subtraction in Year 4

Children should be able to recall:

- Differences of pairs of multiples of 10, 100 or 1000.

- Halves of numbers 1 to 100.
E.g. Halve 56

- What must be added to any three digit number to make the next multiple of 100.
E.g. $521 + n = 600$

Working mentally, children should be able to:

- Subtract any pair of two-digit numbers including crossing the 10 and 100 boundary.
E.g. $91 - 35$

- Subtract a near multiple of 10.
E.g. $36 - 19 = 36 - 20 + 1$

- Subtract two-digit or three-digit multiples of 10
E.g. $370 - 180$

Children should know when to:

- Count back in hundreds tens or ones.
- Subtract by counting up from the smaller number.

- Partition: subtract tens and units.
E.g. Subtracting 27 by subtracting 20 then 7.
- Partition: Subtract a multiple of ten then adjust.

- Use knowledge of place value and related calculations.
E.g. $290 - 150$ using $29 - 15 = 14$
- Partition: Count back in minutes and hours, bridging through 60.

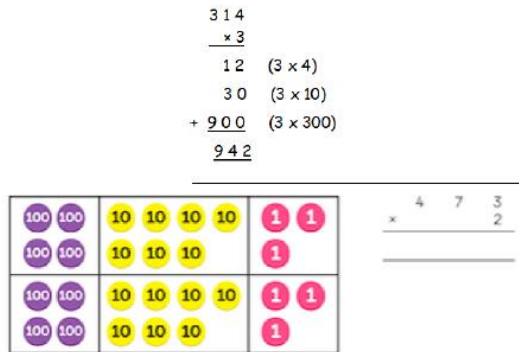


Written Multiplication in Year 4

Method:

The Ladder Method of Multiplication supported by place value counters.

The Ladder method is used when children multiplying both two and three digit numbers by a one digit number. Place value counters are used alongside to promote understanding of what is occurring.



Leading to:

The Compact Method of Multiplication.

Children use the compact method of multiplication and carry tens to the next column (supported with place value counters where necessary).

$$\begin{array}{r} 242 \\ \times 5 \\ \hline 1210 \end{array}$$

Strategies to support:

Grid Method

The Grid Method is set up vertically to resemble column multiplication as closely as possible (supported with place value counters where necessary).

$$\begin{array}{r|l} \times & 4 \\ 100 & 400 \\ 20 & 80 \\ 3 & 12 \\ \hline & 492 \end{array}$$

Next Steps:

Children will be comfortable using compact multiplication and will be able to explain the method using appropriate vocabulary (supported with place value counters where necessary).

$$\begin{array}{r} 242 \\ \times 5 \\ \hline 1210 \end{array}$$

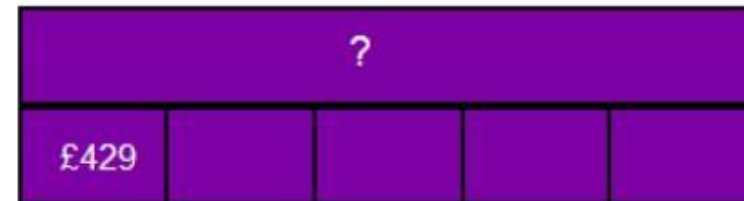
A Deeper Look:

Bar Model Strategy to support:

Multiply using a bar to support in problem solving.

A computer costs 5 times as much as a television. The television costs £429.

Cost of the computer



How much does the computer cost?

Children will 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.

A bar model with 8 blocks, each labeled '59'. Below the bar model is a dashed line. Below the dashed line, the following calculations are written:

$$\begin{aligned} &8 \times 59 \\ &= 8 \times 60 - 8 \\ &8 \times 6 = 48 \\ &8 \times 60 = 480 \\ &480 - 8 = 472 \end{aligned}$$

e.g. 8 children each download 59 songs to play on their iPod. How many songs do they have altogether?



Mental Multiplication in Year 4

Children should be able to recall:

- Multiplication facts to 10×10 .
- Doubles of numbers 1 to 100.
E.g. Double 58.

- Doubles of multiples of 10 and 100.
E.g. Double 50, Double 200.

- Factor pairs for known multiplication facts.

Working mentally, children should be able to:

- Double any two-digit number.
E.g. Double 39
- Double any multiple of 10 or 100.
E.g. Double 340, Double 800.

- Multiply numbers to 1000 by 10 and then 100.
- Multiply a multiple of 10 by a single-digit number.
E.g. 40×3

- Multiply numbers to 20 by a single-digit number.
E.g. 17×3
- Give the factor pair associated with a multiplication fact.
E.g. 6 has the factor pair 2 and 3

Children should know when to:

- Partition: Double the tens and ones separately then recombine.

- Use understanding that when a number is multiplied by 10 or 100, its digits move one or two places to the left.
- Use knowledge of multiplication facts and place value.
E.g. $7 \times 8 = 56$, $70 \times 8 = 560$

- Use partitioning and the distributive law to multiply.
E.g. $13 \times 4 = (10 \times 4) + (3 \times 4)$
 $= 40 + 12$



Written Division in Year 4

Method:

Short division with the support of place value counters

Dividing up to three digit numbers by a one digit number using short division. Only when the children are secure with dividing a two-digit number should they move onto a 3-digit number.

	H	T	O	
	0	2	5	r1
5	1	2	6	
				



Leading to:

Short Division

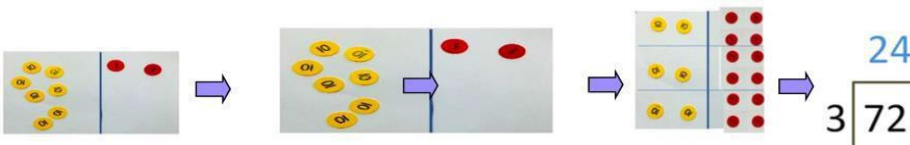
Dividing up to three digit numbers by a one digit number using short division. Only when the children are secure with dividing a two-digit number should they move onto a 3-digit number (supported with place value counters where necessary).

$$\begin{array}{r} 025 \\ 5 \overline{) 125} \\ \underline{10} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

Combine
 $1 \div 5 = 0$
 $12 \div 5 = 2 \text{ r} 2$
 $25 \div 5 = 5$
 Carry the remainder

Strategy to Support: Division with partitioning and manipulatives

Children look at short division with the support of dienes and manipulatives. Children are taught how to use the method when remainders occur within the calculation (e.g. $72 \div 3$), and be taught to 'carry' the remainder onto the next digit.



Next Steps:

Children will be comfortable using short division and will be able to explain the method using appropriate vocabulary (supported with place value counters where necessary).

$$\begin{array}{r} 025 \\ 5 \overline{) 125} \\ \underline{10} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

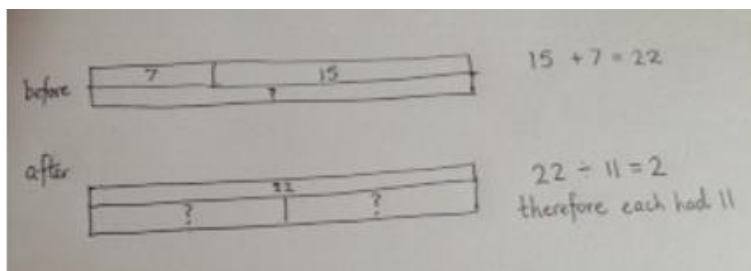
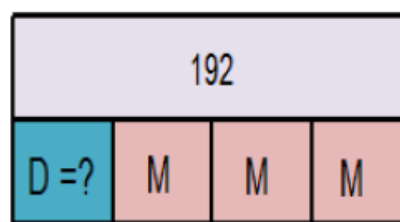
Combine
 $1 \div 5 = 0$
 $12 \div 5 = 2 \text{ r} 2$
 $25 \div 5 = 5$
 Carry the remainder

A Deeper Look:

Bar Model Strategy to support:

Children solve division problems using a bar model.

Desmond and Melissa collect cards. They have 192 cards in all. Melissa has three times as many cards as Desmond. How many cards does Desmond have?



e.g.
Aiden has seven marbles and Harvey has fifteen.
They decide to share them equally between
them. How many do they get each?



Mental Division in Year 4

Children should be able to recall:

- Corresponding division facts of times tables up to 10 x 10.
- Halves of numbers to 100.

- Halves of multiples of 10 and 100.

- Fraction and decimal equivalents of one-half, quarters, tenths and hundredths.
E.g. $\frac{3}{10}$ is 0.3 and $\frac{3}{100}$ is 0.03

Working mentally, children should be able to:

- Halve multiples of 10 and 100.
- Halve any even number to 200.

- Find unit fractions and simple non-unit fractions of numbers and quantities.
E.g. $\frac{3}{8}$ of 24

- Divide numbers to 1000 by 10 and then 100.
E.g. $600 \div 100$, $850 \div 10$
- Identify the remainder when dividing by 2, 5 or 10.

Children should know when to:

- Partition: halve the tens and units separately then recombine.

- Use understanding that when a number is divided by 10 or 100, its digits move one or two places to the right.

- Use knowledge of multiplication facts and place value.
E.g. $56 \div 7 = 8$, $560 \div 70 = 8$

Year 4 Problems

- 1. Martin has saved £6.78 and spends £4.69. How much does he have left?
- 2. Sally has 40 football cards. She gives $\frac{2}{5}$ of them away. How many does she give away?
- 3. Sally has 30 football cards. She gives $\frac{2}{5}$ of them to her friend. How many does she have left?
- 4. 8 children each download 59 songs to play on their iPod. How many songs do they have altogether?
- 5. Calculate how many fives there are in 85?
- 6. At the dressmakers, Debbie buys buttons weighing 3 grams each. If she has 81 grams of buttons, how many buttons does she buy?
- 7. Kelly buys $\frac{4}{5}$ of the shop's oranges. If the shop had 20 oranges, how many does she have?