Year 6

Daisyfield Primary School Calculation Policy

Updated March 2025

Progression Toward Mental Calculation Strategies (Addition and Subtraction)

The ability to calculate mentally is an essential skill, but, as with written methods of calculation, children need to be taught. **It is important to ensure that when teaching particular strategies, children have the appropriate prerequisite skills and are guided as to how and when that strategy is appropriate.**

Children should be taught and encouraged to ask themselves the following questions when faced with a calculation:

- Do I know the answer?
- Can I work it out in my head?
- Do I need to do a jotting?
- Do I need to use a written method?

When using a jotting, there is no requirement to follow a particular method of recording.

A feature of mental calculation is that a type of calculation can often be worked out in several different ways. Which method is best will depend on the numbers involved, the age of the children and the range of methods that they are confident with.

In developing a progression through mental calculation strategies for addition and subtraction, it is important that children understand the relevant concepts, in that addition is:

- combining two or more groups to give a total or sum
- increasing an amount

and subtraction 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, that:

- addition and subtraction are inverses
- addition is commutative i.e. 5 + 3 = 3 + 5 but subtraction is not 5 - 3 is not the same as 3 - 5
- addition is associative i.e. 5 + 3 + 7 = 5 + (3 + 7) but subtraction is not 10 - 3 - 2 is not the same as 10 - (3 - 2)

Commutativity and associativity mean that calculations can be rearranged, e.g. 4 + 13 = 17 is the same as 13 + 4 = 17.

Y6

End of Year Objective:
Add and subtract numbers mentally, including: two three-digit numbers where one or both are multiples of 10 or 100; two or three-digit numbers to or from a four digit number; two four-digit numbers (where there is no carrying or exchange involved); pairs of decimals to one decimal place

Rapid Recall:

Children should be able to:

- Recall and use addition and subtraction facts for 1 (with decimal numbers to two decimal places)

Mental Strategies

Partition and combine multiples of thousands hundreds, tens and ones

Partitioning numbers is a core strategy for adding and subtracting pairs of numbers. Children can either partition both of the numbers in the calculation, or keep the first number the same and just partition the second. *(See Y2, Y3, Y4 and Y5 for more information).*

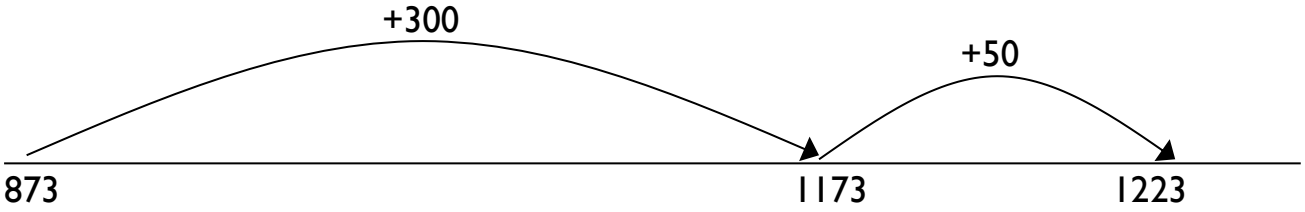
Examples of calculations:

5800 + 2400	5800 add 2000 and 400 = 5800 add 2000 add 400
873 + 350	873 add 300 and 50 = 873 add 300 add 50
4100 - 1600	4100 take away 1000 and 600 = 4100 take away 1000 take away 600
2132 - 440	2132 take away 400 and 40 = 2132 take away 400 take away 40
5124 + 1352	5124 add 1000 and 300 and 50 and 2 = 5124 add 1000 add 300 add 50 add 2 (crossing no boundaries)
7584 - 2351	7584 take away 2000 and 300 and 50 and 1 = 7584 take away 2000 take away 300 take away 50 take away1 (crossing no boundaries)

Prerequisite skills:

- Count forwards and backwards in ones, tens, hundreds and thousands
- Understand place value and understand which digit changes if one, ten or hundred is added or subtracted
- Partition numbers into hundreds, tens and ones

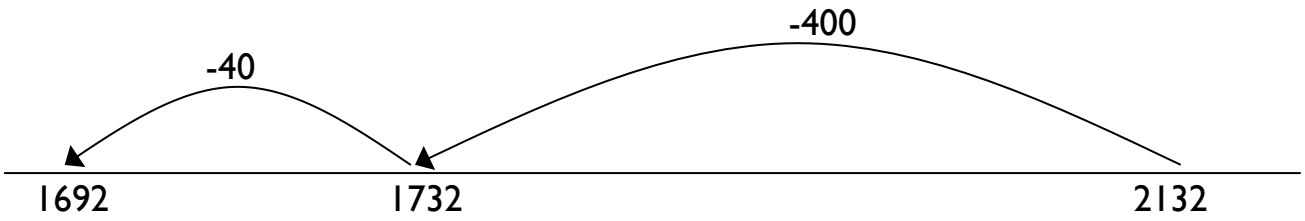
873 + 350 = 1223 (shown using a numberline)



873 + 350 = 1223 (shown using number sentences)

873 + 300 = 1173
1173 + 50 = 1223

2132 – 440 = 1692 (shown using a number line)



2132 – 440 = 1692 (shown using number sentences)

2132 – 400 = 1732
1732 – 40 = 1692

Partition and combine multiples of ones and tenths

Partitioning numbers is a core strategy for adding and subtracting pairs of numbers. Children can either partition both of the numbers in the calculation, or keep the first number the same and just partition the second. The calculations include crossing ones boundaries. *(See Year 5 for more information)*

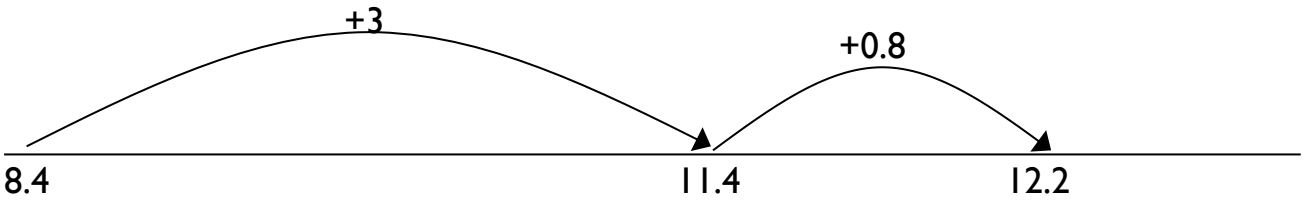
Examples of calculations:

8.4 + 3.8	8.4 add 3 and 0.8 = 8.4 add 3 add 0.8
13.2 – 4.5	13.2 take away 4 and 0.5 = 13.2 take away 4 take away 0.5

Prerequisite skills:

- Count forwards and backwards in tenths and ones
- Understand place value of decimal numbers

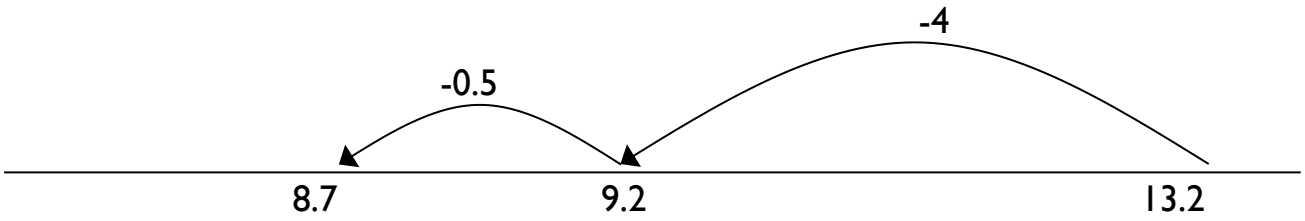
8.4 + 3.8 = 12.2 (shown using a number line)



8.4 + 3.8 = 12.2 (shown using number sentences)

8.4 + 3 = 11.4
11.4 + 0.8 = 12.2

13.2 – 4.5 = 8.7 (shown using a numberline)



13.2 – 4.5 = 8.7 (shown using number sentences)

13.2 – 4 = 9.2
9.2 – 0.5 = 8.7

Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 680 + 430, 6.8 + 4.3, 0.68 + 0.43 can all be worked out using the related calculation 68 + 43

In Y6, children need to build on their knowledge and understanding gained in Y5 *(See Y5 for more information)* Children should use their knowledge of the number system to help them use related facts to calculate, e.g. 0.68 is one hundred times smaller than 68, 0.43 is a hundred times smaller than 43, so the answer to 0.68 + 0.43 will be a hundred times smaller than 68 + 43.

Examples of calculations:

0.62 + 0.38	using knowledge of 62 + 38 = 100
0.75 + 0.56	using knowledge of 75 + 56 = 131
2.8 + 0.43	using knowledge of 280 + 43 = 323
1 – 0.41	using knowledge of 100 – 41 = 59
0.92 – 0.35	using knowledge of 92 – 35 = 57
8.3 – 0.52	using knowledge of 830 – 52 = 778

Prerequisite skills:

- Know, or quickly derive, number bonds to 1, 10, 100 1000
- Identify number bonds within other numbers, e.g. identifying
- 7 + 3 within the calculations 257 + 343 or 1.7 + 2.3

Find differences by counting up through the next multiple of 0.1, 1, 10, 100 or 1000

In Y6, children need to build on their knowledge and understanding gained in Y5 to find differences that cross 0.1, 10, 100 and 1000 boundaries. When deciding whether to use a mental or a written method for a calculation, children should be encouraged to select the method which is most efficient.

Examples of calculations:

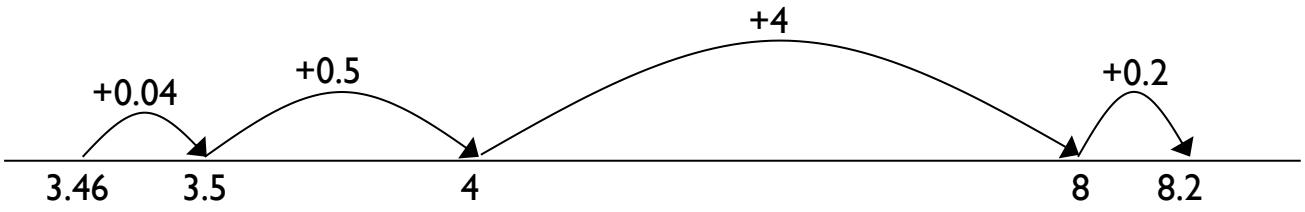
8.2 – 3.46
14.23 – 7.58

Prerequisite skills:

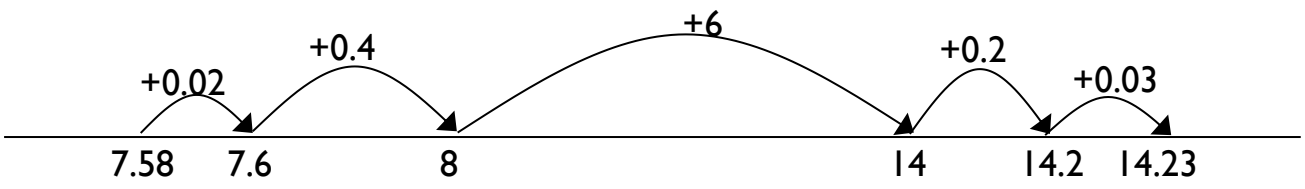
- Understand the place value of numbers to identify which number is the greater or lesser
- Establish whether numbers are close together or near to multiples of 10 or 100
- Place numbers appropriately on an unmarked numberline
- Count forwards and backwards in ones and tens

Children could use empty numberlines to record the calculation.

8.2 – 3.46 = 4.74



14.23 – 7.58 = 6.65



Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 - 2)

In Y6, children bridge using decimals to one place. To do this, it is essential that children can partition decimal numbers in different ways, e.g. 2.5 into 2 and 0.5, 2.5 into 1 and 1.5, 2.5 into 2.1 and 0.4, etc.

Examples of calculations:

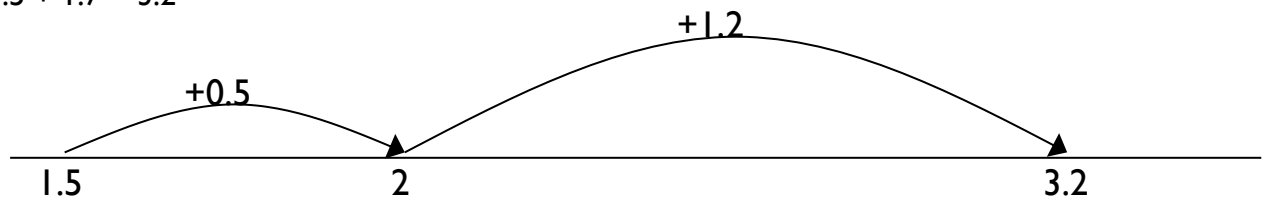
1.5 + 1.7 as 1.5 + 0.5 + 1.2
0.7 + 0.56 as 0.7 + 0.3 + 0.26
8.3 – 2.7 as 8.3 – 2.3 – 0.4

Prerequisite skills:

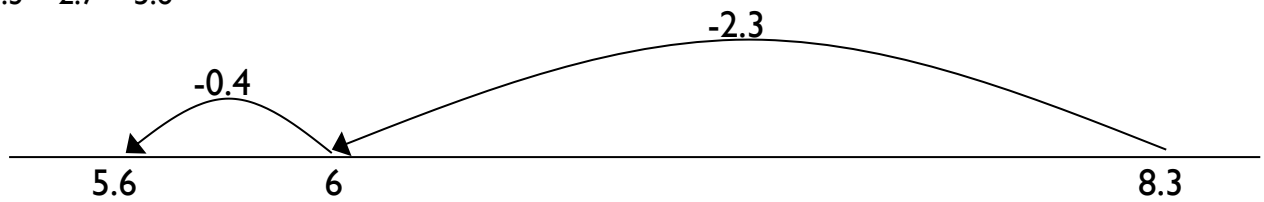
- Partition numbers in different ways, e.g. 5 as 2 + 3 to enable 58 + 5 as 58 + 2 + 3
- Know, or quickly derive, number bonds to 10

Children could use empty numberlines to record the calculation.

1.5 + 1.7 = 3.2



8.3 – 2.7 = 5.6



Add or subtract a multiple of 10 and adjust (for those numbers close to multiples of 10)

In Y6, children adjust calculations using decimals to one place.

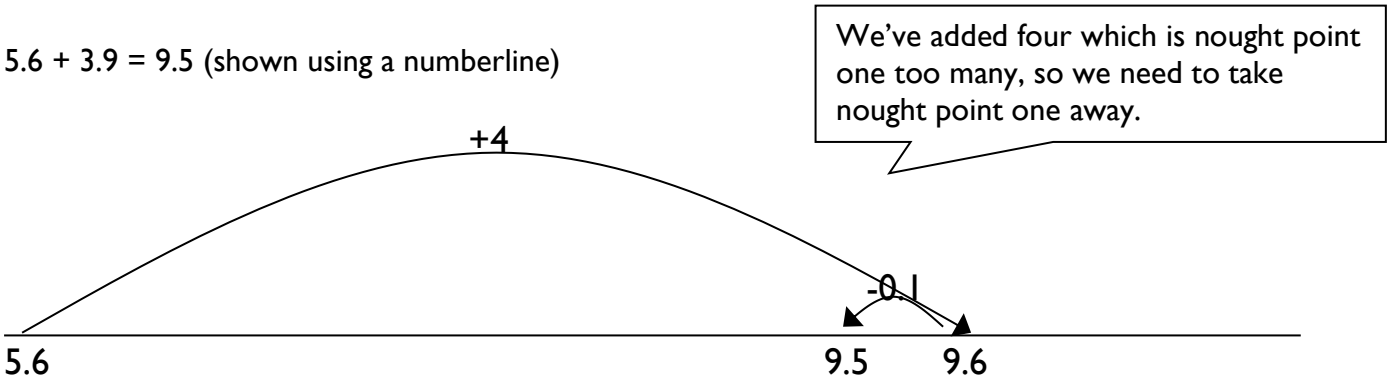
Examples of calculations:

5.6 + 3.9 - as 5.6 + 4 – 0.1
7.5 – 4.8 - as 7.5 – 5 + 0.2

Prerequisite skills:

- Identify the difference between the number being added and subtracted and the multiple of 10
- Understand that the adjustment needs to be the opposite of the operation carried out

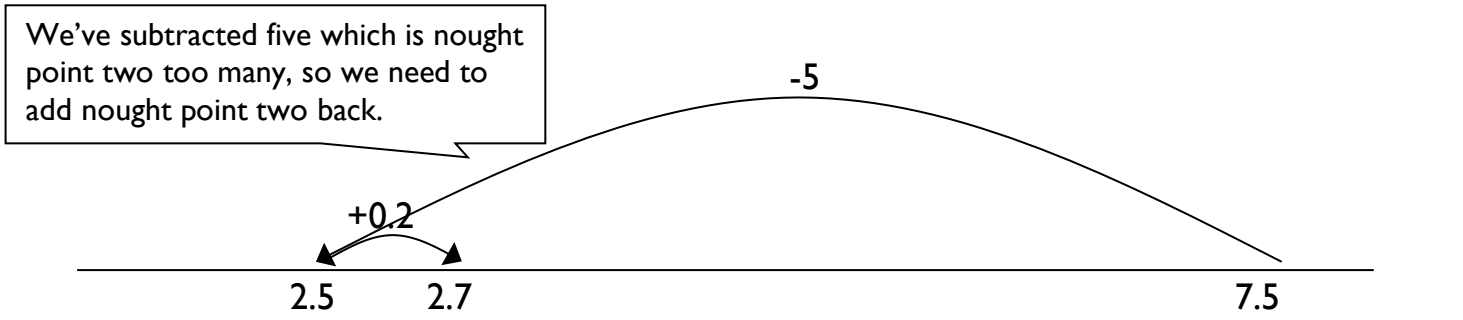
5.6 + 3.9 = 9.5 (shown using a numberline)



5.6 + 3.9 = 9.5 (shown using number sentences)

5.6 + 4 = 9.6
9.6 – 0.1 = 9.5

7.5 – 4.8 = 2.7 (shown using a numberline)



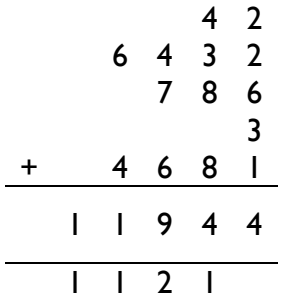
7.5 – 4.8 = 2.7 (shown using number sentences)

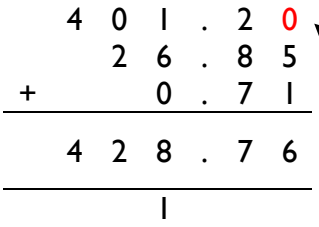
7.5 – 5 = 2.5
2.5 + 0.2 = 2.7

WRITTEN ADDITION

End of Year Objective:
Add whole numbers and decimals using formal written methods (columnar addition).

Children should extend the carrying method and use it to add whole numbers and decimals with any number of digits.





When adding decimals with different numbers of decimal places, children should be taught and encouraged to make them the same through identification that 2 tenths is the same as 20 hundredths, therefore, 0.2 is the same value as 0.20.

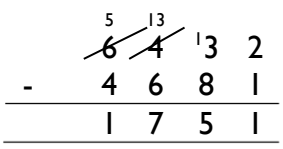
They will also be adding:

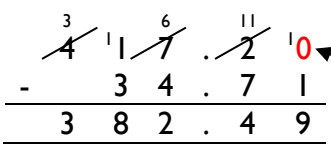
- several numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with mixed numbers of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another.

WRITTEN SUBTRACTION

End of Year Objective:
Subtract whole numbers and decimals using formal written methods (columnar subtraction).

Children should extend the decomposition method and use it to subtract whole numbers and decimals with any number of digits.





When subtracting decimals with different numbers of decimal places, children should be taught and encouraged to make them the same through identification that 2 tenths is the same as 20 hundredths, therefore, 0.2 is the same value as 0.20.

They will also be subtracting:

- numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with mixed numbers of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another.

Y6 PROGRESSION IN MENTAL CALCULATION – Multiplication and Division

End of Year Objective:
Perform mental calculations, including with mixed operations and large numbers

Rapid Recall

Children should be able to:

- Recall related tables facts decimal numbers (0.7 x 6 = 4.2 because 7 x 6 = 42)
- Use partitioning to double or halve any number
- Recall prime numbers up to 100
- Recall squares of the corresponding multiples of 10 (i.e. 40^2 is 1600)

Mental Strategies

In Year 6 children build on their skills and understanding from previous year groups to multiply and divide mentally with larger numbers and numbers to three decimal places. Children should be encouraged to choose the most appropriate strategy based on the numbers involved in the calculation.

Perform mental calculations – Multiplication

Multiply whole numbers and decimals to three decimal places by 10, 100 and 1000

Building on their knowledge of multiplying by 10, 100 and 1000 from Year 5, children use place value columns to multiply numbers to three decimal places by 10, 100 and 1000
e.g. 43.721 x 100 =

Th	H	T	U	•	t	h	th
		4	3	•	7	2	1
4	3	7	2	•	1		

Examples of calculations

4562 x 1000

9.682 x 10

25.784 x 100

Prerequisite skills:

- Understand and use place value columns when representing numbers

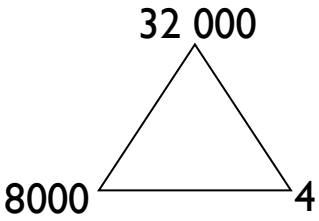
- Understand the effect of multiplying a number by 10, 100 or 1000

Identify and use all related facts that link to tables

Children should be encouraged to select the most appropriate strategy based on the numbers involved in the calculation.

e.g. 8000 x 4 =

Using related facts in a multiplication trio could help with this calculation:



Children should be able to explain that because 8000 is a thousand times greater than 8, the answer to 8000 x 4 will be a thousand times greater than 32.

e.g. 8000 x 40 =

Using factor pairs could help with this calculation:

	8000 x 40 =	
becomes	8000 x 4 x 10 =	(using knowledge of factor pairs)
which becomes	32 000 x 10 = 320 000	

Examples of calculations

7000 x 6

500 x 40

900 x 300

3000 x 80

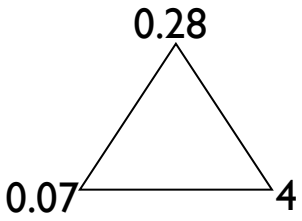
Prerequisite skills:

- Recall multiplication tables
- Understand the effect of multiplying a number by 10, 100 or 1000
- Recognise and use factor pairs

Use related facts to multiply 0.0t by a one-digit number

NB 0.0t represents a multiple of a hundredth

Children can use a multiplication trio to derive related facts, e.g. 0.07 x 4



Children should be able to explain that because 0.07 is a hundred times smaller than 7, the answer to 0.07 x 4 will be a hundred times smaller than 28. They can then use their understanding of dividing by 100 to calculate this.

Examples of calculations

0.03 x 7

0.06 x 9

0.05 x 4

Prerequisite skills:

- Recall multiplication tables
- Understand the effect of dividing a one- or two-digit number by 100

Use compensation to multiply U.9 and U.99 by a one-digit number

Building on their understanding from Year 5 of multiplying H99 by a one-digit number, children multiply by the nearest whole number and then compensate appropriately.

e.g. 6.9 x 4 =

6.9 x 4 = 7 x 4 subtract 0.1 x 4

7 x 4 = 28

So 6.9 x 4 = 28 – 0.4

6.9 x 4 = 27.6

e.g. 6.99 x 4 =

6.99 x 4 = 7 x 4 subtract 0.01 x 4

7 x 4 = 28

So 6.99 x 4 = 28 – 0.04

6.99 x 4 = 27.96

Examples of calculations

5.9 x 4

3.99 x 7

9.99 x 6

Prerequisite skills:

- Recall multiplication tables
- Understand how multiplying by 0.9 is related to multiplying by 1
- Understand how multiplying by 0.99 is related to multiplying by 1
- Subtract a 0.t or 0.0h from a whole number

Use partitioning to multiply 0.th by a one-digit number

Children should be encouraged to choose the most efficient method, which may be mental, rather than simply opting for a written method.

e.g. 0.67 x 4 =

0.6 x 4 = 2.4

0.07 x 4 = 0.28

0.67 x 4 = 2.68

Examples of calculations

0.76 x 3

0.28 x 7

0.54 x 6

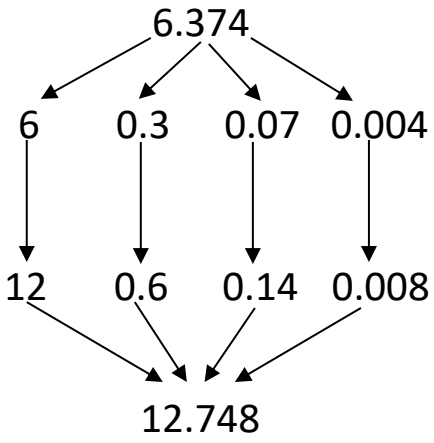
Prerequisite skills:

- Recall multiplication tables
- Partition 0.th into tenths and hundredths
- Use related facts
- Add numbers with different amounts of digits

Use partitioning to double numbers including those with three decimal places

Children should use related facts to double numbers. For example, double 9 is 18 so double 0.009 (a thousand times smaller than 9) is 0.018 (a thousand times smaller than 18).

e.g. double 6.374



The diagram above illustrates the way children should be thinking about doubling using partitioning, but it is not necessary for them to record in this way if it is not helpful to the child.

Examples of calculations

Double 3.421

Double 6.705

Double 12.594

Double 54 672

Double 674 960

Prerequisite skills:

- Count forwards in steps of powers of 10
- Partition a number appropriately
- Use related facts to double multiples of powers of 10
- Recombine multiples of powers of 10

Perform mental calculations – Division

Divide whole numbers and decimals to three decimal places by 10, 100 and 1000

Building on their knowledge of dividing by 10, 100 and 1000 from Year 5, children use place value columns to divide numbers by 10, 100 and 1000. Answers should include decimals up to three decimal places.
e.g. 356.7 ÷ 100 =

Th	H	T	U	•	t	h	th
	3	5	6	•	7		
			3	•	5	6	7

Examples of calculations

9.83 ÷ 10

7.04 ÷ 10

860.2 ÷ 100

56 789 ÷ 1000

Prerequisite skills:

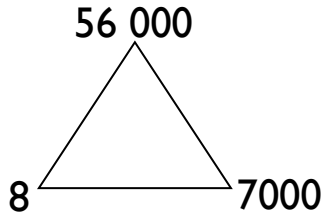
- Understand and use place value columns when representing numbers
- Understand the effect of dividing a number by 10, 100 or 1000

Identify and use all related facts that link to tables

Children should be encouraged to select the most appropriate strategy based on the numbers involved in the calculation.

e.g. 56 000 ÷ 8 =

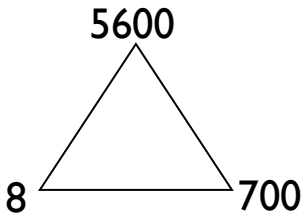
Using related facts in a division trio could help with this calculation:



Children should be able to explain that because 56 000 is a thousand times greater than 56, the answer to 56 000 ÷ 8 will be a thousand times greater than 7. They can then use their understanding of multiplying by 1000 to calculate this.

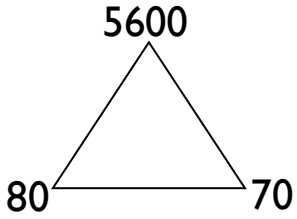
e.g. 5600 ÷ 80 =

The following division trio could be used as a starting point for this calculation:



Children should be able to explain that because 5600 is a hundred times greater than 56, the answer to 5600 ÷ 8 will be a hundred times greater than 7. They can then use their understanding of multiplying by 100 to calculate this.

The following division trio could then be derived:



Children should be able to explain that because 80 is ten times greater than 8, the answer to 5600 ÷ 80 will be ten times smaller than the answer to 5600 ÷ 8 because there will be ten times fewer groups.

Examples of calculations

81 000 ÷ 9

270 ÷ 30

3000 ÷ 50

9600 ÷ 800

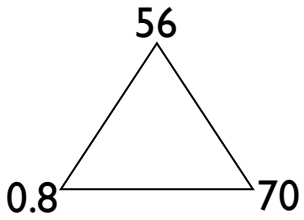
Prerequisite skills:

- Recall multiplication tables
- Understand division as repeated subtraction
- Understand the effect of multiplying or dividing by 10, 100 or 1000

Use related facts to divide TU by 0.t

e.g. 56 ÷ 0.8 =

Using related facts in a division trio could help with this calculation:



Children should be able to explain that because 0.8 is ten times smaller than 8, the answer to 56 ÷ 0.8 will be ten times greater than the answer to 56 ÷ 8 because there will be ten times more groups.

Examples of calculations

21 ÷ 0.7

36 ÷ 0.9

48 ÷ 0.4

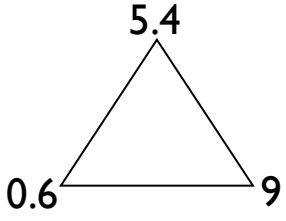
Prerequisite skills:

- Recall multiplication tables
- Understand division as repeated subtraction
- Understand the effect of multiplying or dividing by 10

Use related facts to divide 0.th by 0.t

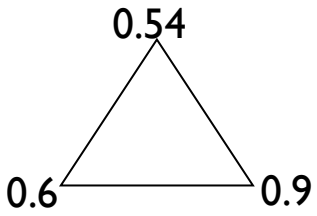
e.g. 0.54 ÷ 0.6 =

The following division trio from Year 5 could be used as a starting point for this calculation:



Children should be able to explain that 5.4 is ten times smaller than 54 and 0.6 is ten times smaller than 6. This means that both numbers have been scaled down by the same amount, so the relationship between the numbers stays the same. The answer to 5.4 ÷ 0.6 will therefore be 9 because there are 9 groups of 0.6 in 5.4

The following division trio could then be derived:



Children should be able to explain that because 0.54 is ten times smaller than 5.4, the answer to 0.54 ÷ 0.6 will be ten times smaller than 9. They can then use their understanding of dividing by 10 to calculate this.

Examples of calculations

0.32 ÷ 0.4

0.64 ÷ 0.8

0.45 ÷ 0.9

Prerequisite skills:

- Recall multiplication tables
- Understand division as repeated subtraction
- Understand the effect of multiplying and dividing by 10

Use related facts to divide by 50

Dividing by 50 is the same as dividing by 100 and then doubling because 50 is half of 100. Children can investigate this using simple calculations.

e.g. 200 ÷ 100 = 2

2 x 2 = 4

So 200 ÷ 50 = 4

Children can then use this in more complex calculations.

e.g. 3200 ÷ 50 =

3200 ÷100 = 32

32 x 2 = 64

So 3200 ÷ 50 = 64

Examples of calculations

4100 ÷ 50

7800 ÷ 50

530 ÷ 50

Prerequisite skills:

- Understand the effect of dividing by 100
- Double numbers including those with one decimal place

Use related facts to divide by 25

Dividing by 25 is the same as dividing by 100 and then multiplying by 4 because 25 is one quarter of 100. Children can investigate this using simple calculations.

e.g. 200 ÷ 100 = 2

2 x 4 = 8

So 200 ÷ 25 = 8

Children can then use this in more complex calculations.

e.g. 4800 ÷ 25 =

4800 ÷100 = 48

48 x 4 = 192

So 4800 ÷ 25 = 192

Examples of calculations

3200 ÷ 25

7600 ÷ 25

360 ÷ 25

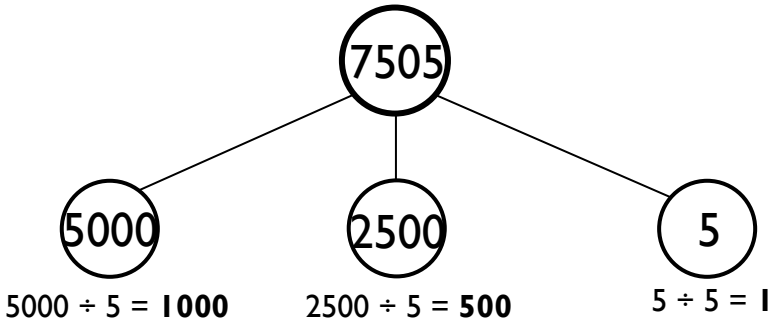
Prerequisite skills:

- Understand the effect of dividing by 100
- Multiply numbers up to one decimal place by 4

Use partitioning to divide ThHTU by a one-digit number

Building on their understanding of using partitioning to divide TU by a one-digit number from Year 4, children decide how to partition ThHTU to help them divide it by a one-digit number.

e.g. 7505 ÷ 5 = **1501**



The diagram above illustrates the way children should be thinking about dividing using partitioning, but it is not necessary for them to record in this way if it is not helpful to the child.

Examples of calculations

5035 ÷ 5 By partitioning into 5000 and 35

1236 ÷ 4 By partitioning into 1200 and 36

9240 ÷ 6 By partitioning into 6000 and 3000 and 240

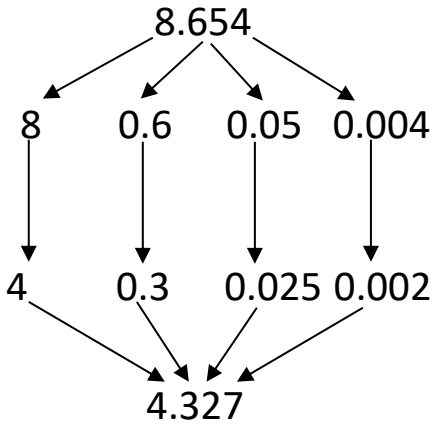
Prerequisite skills:

- Recall multiplication tables
- Understand division as repeated subtraction
- Partition four-digit numbers in different ways

Use partitioning to halve any number including to three decimal places

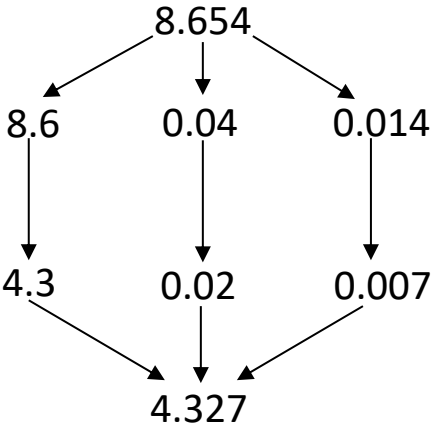
Children should be encouraged to decide the best way to partition a number to halve it.

e.g. Find half of 8.654



An alternative way of partitioning would be:

Find half of 8.654



The diagrams above illustrate the way children should be thinking about halving using partitioning, but it is not necessary for them to record in this way if it is not helpful to the child.

Examples of calculations

Find half of 4.684

Find half of 12.826

Find half of 6.942

Find half of 15.674

Find half of 478 612

Prerequisite skills:

- Partition numbers (including in different ways for efficiency)
- Use related facts to halve a multiple of a thousandth, hundredth, tenth, ten, hundred and thousand
- Recombine multiples of one, ten, hundred and thousand

Recombine multiples of a tenth, hundredth and thousandth

Y6 WRITTEN MULTIPLICATION

End of Year Objective:
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

Multiply one-digit numbers with up to two decimal places by whole numbers.

By the end of year 6, children should be able to use the grid method and the compact method to multiply any number by a two-digit number. They could also develop the method to be able to multiply decimal numbers with up to two decimal places, but having been introduced to expanded and compact vertical methods in Year 5, it may be appropriate to use the expanded vertical method when introducing multiplication involving decimals.

4.92 x 3

T U . t h			T U . t h
4 . 9 2			4 . 9 2
x 3		becomes	x 3
0 . 0 6	(0.02 x 3)		1 4 . 7 6
2 . 7	(0.9 x 3)		2
+ 1 2	(4 x 3)		
1 4 . 7 6			

Children should also be using this method to solve problems and multiply numbers, including those with decimals, in the context of money or measures, e.g. to calculate the cost of 7 items at £8.63 each, or the total length of six pieces of ribbon of 2.28m each.

Y6

End of Year Objective:
Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.

Use written division methods in cases where the answer has up to two decimal places.

To develop the chunking method further, it should be extended to include dividing a four-digit number by a two-digit number, e.g.

6367 ÷ 28

```
   227r11
28)6367
 - 5600   200x
    767
 -  560    20x
    207
 -  140     5x
     67
 -   56     2x
     11
```

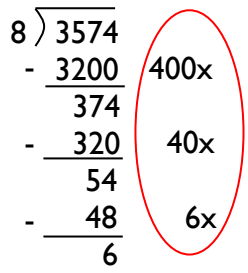
Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly.

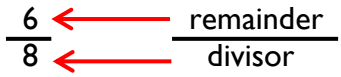
In addition, children should also be able to use the chunking method and solve calculations interpreting the remainder as a decimal up to two decimal places.

This should first be demonstrated using a simple calculation such as 13 ÷ 4 to show the remainder initially as a fraction.

Using practical equipment, children can see that for 13 ÷ 4, the answer is 3 remainder 1, or put another way, there are three whole groups and a remainder of 1. This remainder is one part towards a full group of 4, so is $\frac{1}{4}$. To show the remainder as a fraction, it becomes the numerator where the denominator is the divisor (the number that you are dividing by in the calculation).

3574 ÷ 8





So 3574 ÷ 8 is $446\frac{6}{8}$
(when the remainder is shown as a fraction)

To show the remainder as a decimal relies upon children's knowledge of decimal fraction equivalents. For decimals with no more than 2 decimal places, they should be able to identify:

Half: $\frac{1}{2} = 0.5$

Quarters: $\frac{1}{4} = 0.25$, $\frac{3}{4} = 0.75$

Fifths: $\frac{1}{5} = 0.2$, $\frac{2}{5} = 0.4$, $\frac{3}{5} = 0.6$, $\frac{4}{5} = 0.8$

Tenths: $\frac{1}{10} = 0.1$, $\frac{2}{10} = 0.2$, $\frac{3}{10} = 0.3$, $\frac{4}{10} = 0.4$, $\frac{5}{10} = 0.5$, $\frac{6}{10} = 0.6$, $\frac{7}{10} = 0.7$, $\frac{8}{10} = 0.8$, $\frac{9}{10} = 0.9$

and reduce other equivalent fractions to their lowest terms.

In the example above, 3574 ÷ 8, children should be able to identify that the remainder as a fraction of $\frac{6}{8}$ can be written as $\frac{3}{4}$ in its lowest terms. As $\frac{3}{4}$ is equivalent to 0.75, the answer can therefore be written as 446.75.