Year 6 Maths Calculations Policies

NC Programme of study

- Pupils practice addition for larger numbers using the formal written method of column addition
- Solve addition one-step and multi-step problems in context

Year 6 Addition

BY THE END OF YEAR 6…

By the end of Year 6, children will be able to show their understanding as:

	3	0	2	4	3	2
+	1	1	0	7	0	9
	4	1	3	1	4	1
			1		1	

	2	0	6	.	0	3	5
+	1	1	0	.	1	2	4
		2	3	.	3	8	0
			2	.	8	0	0
	3	4	2	.	3	3	9
		1	1		1		

Following on from Year 5…
Formal column addition for any number of values, with mixed decimal places

Children should continue to work in columns, for large numbers as well as those to several decimal places, in context where appropriate.

NC Programme of study

- Pupils practice subtraction for larger numbers using the formal written method of column addition
- Solve subtraction one-step and multi-step problems in context

Year 6 Subtraction

BY THE END OF YEAR 6...

By the end of Year 6, children will be able to show their understanding as:

$$\begin{array}{r} {}^{2}\cancel{3}\,0\,{}^{1}\cancel{2}\,4\,{}^{1}\cancel{3}\,2 \\ -\;1\;1\;0\;7\;0\;9 \\ \hline 1\;9\;1\;7\;2\;3 \end{array} \qquad \begin{array}{r} {}^{0}\cancel{1}\,2\,{}^{1}\cancel{5}\,.\,0\,{}^{1}3\,5 \\ -\;\;5\;2\;.\;8\;0\;3 \\ \hline 0\;7\;3\;.\;2\;3\;2 \end{array}$$

Following on from Year 5...
Formal column subtraction for any number of values, with mixed decimal places

Children should continue to work in columns, for large numbers as well as those to several decimal places, in context where appropriate. Children should be expected to make use of the inverse nature of addition and subtraction where appropriate.

E.g. Maximum crowd capacity at three American Football grounds are;

Stadium	Crowd capacity
Ohio	102329
Michigan	109901
Los Angeles Coliseum	93607

What is the difference between the numbers of seats available at each stadium?

E.g. Two numbers have a difference of 1.5803. One of the numbers is 4.7218. What is the other? Is this the only answer? How could you find another solution?

$$\begin{array}{r} 4\;.\;7\;2\;1\;8 \\ -\;?\;.\;?\;?\;?\;? \\ \hline 1\;.\;5\;8\;0\;3 \end{array} \qquad \begin{array}{r} 4\;.\;{}^{6}\cancel{7}\,{}^{1}2\;1\;8 \\ -\;1\;.\;5\;8\;0\;3 \\ \hline 3\;.\;1\;4\;1\;5 \end{array}$$

NC Programme of study

- Multiply multi-digit numbers up to 4x2 digits whole number, using formal written method
- Multiply 1d numbers with up to 2 decimal places by whole numbers

Year 6 Multiplication

BY THE END OF YEAR 6...

By the end of Year 6, children will be able to show their understanding as:

$$\begin{array}{r} 4276 \\ \times\ 34 \\ \hline 17104 \\ 12820 \\ \hline 145384 \\ \hline \end{array}$$

Following on from Year 5...
Column method for long multiplication

$$\begin{array}{r} 142 \\ \times\ 31 \\ \hline 142 \\ 4260 \\ \hline 4402 \end{array}$$

The introductory teaching of long multiplication, based on solid conceptual understanding of short multiplication, is developed in Years 4 and 5.

Children in Year 6 should be consolidating their understanding with the multiplication of increasingly large numbers, set in context wherever possible. (Emphasise use of punk '0').

Column method for long multiplication, involving decimals

The multiplication of decimal numbers was introduced in year 5, with single digit numbers with up to 2 decimal places being multiplied by a single digit whole number.
(See Year 5 for accompanying notes)

$$\begin{array}{r} 3.25 \\ \times\ 6 \\ \hline .30 \\ 1.20 \\ 18.00 \\ \hline 19.50 \\ \hline \end{array}$$

$$\begin{array}{r} 3.25 \\ \times\ 6 \\ \hline 19.50 \\ \hline \end{array}$$

	2	.	7	4
x			1	4
		.	1	6
	2	.	8	0
	8	.	0	0
		.	4	0
	7	.	0	0
2	0	.	0	0
3	8	.	3	6
1	1			

The expanded stage should be shown again, alongside the compact format when introducing the children to the multiplication of a decimal number by a **two-digit number**.
E.g. £2.74 x 14

It may be useful for children to annotate at the side of each line, which part of the calculation it refers to, e.g. (4 x 4p) or (10 x 70p)

	2	.	7	4
x			1	4
1	0		9	6
	2		1	
2	7		4	0
3	8	.	3	6
	1			

Punk '0'

NC Programme of study

- Divide numbers up to 4x2 digits whole number, using formal written method
- Interpret remainders as whole numbers, fractions or by rounding – appropriate to context
- Divide numbers up to 4 digit by 2 digit using short and long divsion

Year 5 Division

BY THE END OF YEAR 6...

By the end of Year 6, children will be able to show their understanding as:

Divide 4 digit by 2 digit using multiple of the divisor method.
Divide 4 digit by 2 digit using short division method.

Dividing by a two-digit number

Following on from Year 5, children will now be confident using a compact layout for short division of a four-digit number by a single digit number. Where appropriate, children can continue to use this method when dividing by a two-digit number.

E.g.

```
        0  4  5
      ----------
         4  5
1  1 |  4  9  5
```

More complex division

Often the numbers involved in a division calculation will determine an appropriate method.

```
       0  0  9
     ----------
          1  13
1  5 | 1  3  5
```

Provide children with a calculation such as 135 ÷ 15.

For this example, children will need to draw upon their mental calculation skills to estimate answers and explain their thinking. They will know that 15 x 10 = 150, and so should be expecting the answer to be less than 10. They may recognise that 135 is 15 less than 150, and so the answer is 9.

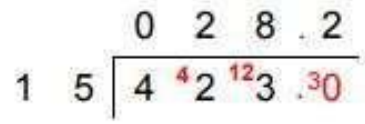
Children should be encouraged to draw upon known facts, and establish what they already know about the divisor. This can be recorded in a 'toolbox' to support, if necessary.

E.g. 420 ÷ 15
The chosen multiples of the divisor will depend on each child's known facts and their ability to manipulate these using doubling and halving skills. This needs to be carefully modelled.

15 x 10 = 150
15 x 5 = 75
15 x 2 = 30

A 'toolbox' is then used to complete the calculation.

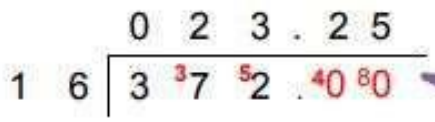
Expressing remainders as decimals



Children will use a toolbox, as above to solve the calculation:

1x15= 15
2x15= 30
4x15= 60
8x15= 120
10x15=150

In Year 6 remainders are recorded as decimals.



The same method can be used to show answers to 2 decimal places:

1x16= 16
2x16= 32
3x16= 48
4x16= 64
5x16= 80
10x16=160

When problem solving, children in Year 6 will need to select the appropriate way of representing remainders, according to the question being asked. They may need to round to the nearest whole number, round up to the next whole number or state how many of a given amount are 'left over'.