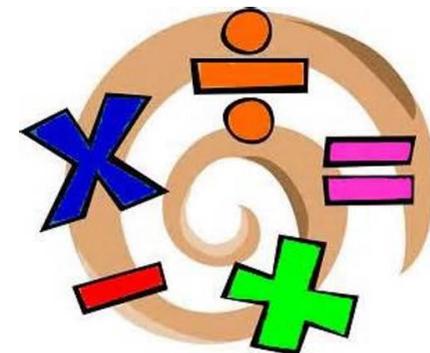# Culworth and Boddington CE Primary Academies

Calculation handbook for parents with children in Year 4

Progression towards standard written methods of calculation

INTRODUCTION

This calculation handbook has been written in line with the school calculation policy and the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression for each year group. The content is set out in yearly blocks under the following headings: addition, subtraction, multiplication and division.

Statements taken directly from the programme of study are listed in italics at the top of each section.

The Federation of Culworth and Boddington C of E Primary Academies uses the Big Maths resources to teach mental calculation strategies, including the key number facts that children will need to know called 'learnits.'

Children will use mental methods as their first port of call, when appropriate, but for calculations they cannot do in their heads, they will need to use an efficient method accurately and with confidence.

Within school, children will be given opportunities to deepen their understanding of concepts through a range of problems and real life situations, rather than moving on to the content of the next year group.

"Decision about when to progress should always be based on the security of pupils understanding and their readiness to progress to the next stage."

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AIMS OF THE HANDBOOK

- To enable parents to have a secure knowledge and understanding of the informal (mental) and formal written methods of calculations for all four operations taught in school.

Year 4

Addition – Year 4

- *Add numbers with up to 4 digits using formal written method of columnar addition **where appropriate.***

NB Ensure that children are confident with the methods outlined in the previous years' guidance before moving on.

Continue to teach the use of empty number lines with three and four digit numbers, ass appropriate.

Further develop the formal written method of addition, with three-digit numbers. Revise the expanded method first, if necessary:

$$176 + 147 =$$

```
      176
  +   147
  _____
       13    (7 + 6)
      110    (70 + 40)
      200    (100 + 100)
  _____
      323
  _____
```

This will lead into the formal written method….

176 + 147   =

Use the language of place value to ensure understanding:

147

'Seven add six equals 13. Write three in the units column and 'carry' one across into the tens column (10). '40 add 70 and the ten we carried equals 120.' Write 2 in the tens column (20) and carry 1 across into the hundreds column (100). '100 and 100 and 100 that has been carried equals 300.' Write 3 in the hundreds column (300).

+   176
_____
    323
_____
   1 1

The digits that have been 'carried' should be recorded under the line in the correct place value column.

If children are confident, introduce the addition of a four-digit number and a 3-digit number:

1845 + 526 =

1845

+526
_____
2371
_____
  1 1

Continue to develop with addition of two four-digit numbers.

NB If, at any time, children are making significant errors, return to the previous stage in calculation.

Subtraction – Year Four

- *Subtract numbers with up to 4 digits using the formal written method of columnar subtraction <u>where appropriate.</u>*

NB Ensure that children are confident with the methods outlined in the previous year's guidance before moving on.

Continue to teacher the use of empty number lines with three and four digit numbers, as appropriate.

Continue to develop the formal written method of subtraction by revisiting the expanded method first, if necessary. Continue to use base ten materials to support understanding.

258 – 72 =

$$200 + 50 + 8$$

$$- \qquad \underline{70 + 3}$$

becomes

$$100 + 150 + 8$$

$$- \qquad \underline{70 + 3}$$

$$100 + 80 + 5 = 185$$

You might replace the + sign with the word 'and' or omit it altogether to avoid confusion. Children will need to practise partition in a variety of ways.

This leads to the formal written method, involving decomposition…

```
  1 15
  2̶ 5 8            Use the language of place value to ensure understanding.

-   7 3            In this example it has been necessary to exchange from
                   the hundred column.
  1 7 5
```

The children's understanding is developed further using these methods to subtract a 3- digit number from a three-digit number. When children are confident, develop with four-digit numbers.

NB If, at any time, children are making significant errors, return to the previous stage in calculation.

Multiplication – Year 4

- *Recall multiplication facts for multiplication tables up to 12 x 12*
- *Multiplication two-digit and three-digit numbers by a one-digit number using formal written layout*
-

NB Ensure that the children are confident with the methods outline in the previous year's guidance before moving on.

Continue to use empty number lines, as appropriate (see year 3 guidance).

Further develop the grid method for two-digit numbers multiplied by a one- digit number.

36 x 4 = 144

X	30	6
4	120	24

120 + 24 = 144 (add the partial products)

Expanded short multiplication (two – digit number by a one-digit number):

36 x = 144

   30 + 6

    x   4
         ————

       24 (4 x 6 = 24)   Include an addition symbol when adding partial

    + 120 (4 x 30 = 120)   products.
        ————

     144

Refine recording in preparation for formal short multiplication:

36 x 4 = 144

    36

    x 4
    ————

  +   24 (4 x 6)

    120   (4 x 30)
    ————

    144

This leads to short multiplication (formal method) of a two-digit number multipled by a one – digit number:

$$
\begin{array}{r}
3\,6 \\
\times\ 4 \\
\hline
1\,4\,4 \\
\hline
2
\end{array}
$$

Use the language of place value to ensure understanding.

Ensure that the digit 'carried over' is written under the line in the correct column.

Continue to practise the formal method of short multiplication of a two- digit number by a one-digit number throughout Y4.

If children are confidence, continue to develop short multiplication with three – digit numbers multiplied by a one-digit number.

If necessary, return to the grid method and/or expanded method first:

127 x 6 = 762

X	100	20	7
6	600	120	42

600 + 120 + 42 = 762 (add the partial products)

This leads to expanded short multiplication:

127 x 6 = 762

127

x 6

___

 42 (6 x 7)

120 (6 x 20)

+ 600 (6 x 100)

___

 762

This will lead into short multiplication (formal method):

1 2 7

x 6

___

7 6 2

___

1 4

Use the language of place value to ensure understanding.

Ensure that the digits 'carried over' are written under the in the correct column.

NB If, at any time, children are making significant errors, return to the previous stage in calculation.

Division – Year 4

- *Recall multiplication and division facts for multiplication tables up to 12 x 12*
- *Use place value, know and derived facts to divide mentally*
- *Divide two –digit and three-digit numbers by a one-digit number using formal written layout (not explicitly stage in the programs of study but implied in the non-statutory guidance)*

NB Ensure that children are confident with the methods outline in the previous year's guidance before moving on.

Continue to write and calculate mathematical statements for division using the multiplication tables that the children know e.g.

32 ÷ 8 = 4

Continue using the formal written layout for division using multiplication tables that they know:

$$8 \overline{\smash{)}32} 4$$

'How many eights are there in thirty two?'

Continue using the formal written layout, introducing remainders:

25 ÷ 3 = 8 r 1

```
       8 r 1
     _____
 3 ) 25
```

NB Remainders are not specifically referred to until Y5 in the national Curriculum. However, this may be an appropriate point to introduce them using familiar multiplication facts.

This could be modelled using an empty number line, if necessary. Alternatively you could jump forwards in multiples of 3 from 0 to twenty four ('and one more makes 25')

Division using partitioning (two digits divided by one digit):

65 ÷ 5 = 13

65 = 50 + 15 (Partition 65 into 50 and 15)

50 ÷ 5 = 10

15 ÷ 5 = 3

10 + 3 = 13

NB Children will need to practice partition in a variety of ways.

Written method leading to formal method:

98 ÷ 7 = 14

$$7 \overline{)\, 70 + 28} \quad \begin{array}{c} 10 + 4 = 14 \end{array}$$

'We have partitioned 98 into 70 and 28 (90 = 70 + 28)'.

Seven 'goes into' 70 ten times and seven 'goes into' 28 four times. Ten add four equals 14

This will lead to the formal written method of short division:

$98 \div 7 = 14$

$$7 \overline{)\ 9^2\ 8}$$

with $1\ 4$ as the answer above.

Use the vocabulary of place value to ensure understanding and make the link to partitioning.

Continue to practise the formal method of short division throughout Y4.

When children are confident develop further to 3 and 4 digit numbers divided by a one-digit number using the formal method of short division with whole number answers (no remainders)

NB If, at any time, children are making significant errors, return to the previous stage in calculation.