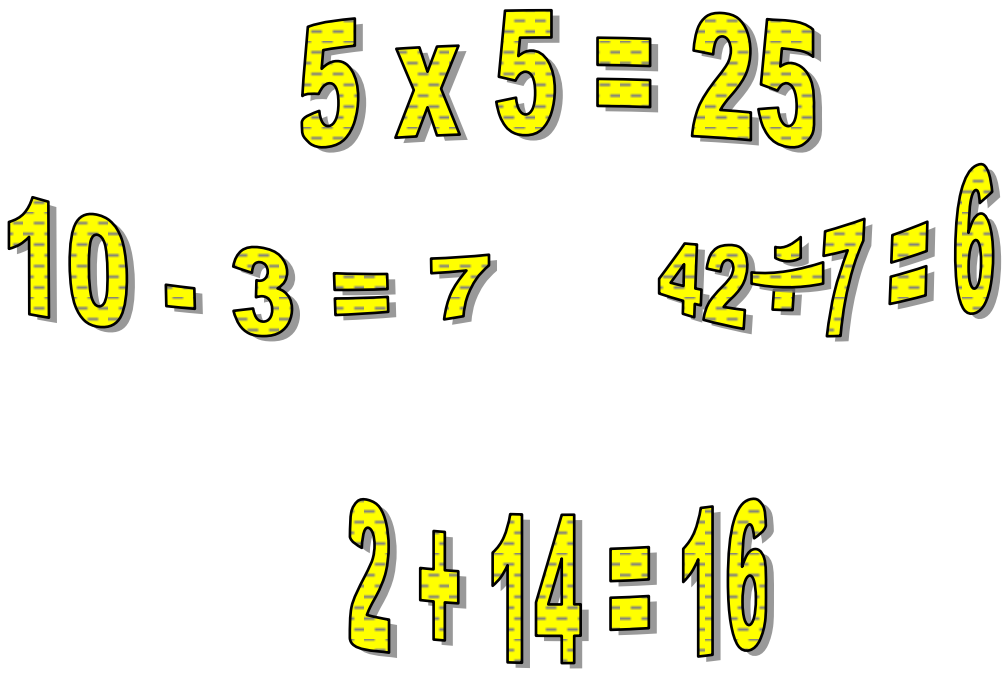
Teaching Written Calculations



2014 Curriculum

Why do we teach written methods of calculations?

With the new National Curriculum that was introduced to schools in September has come changes to the way in which we teach written mathematical calculations at Hawthorn Tree School. The aims of the new curriculum are to enable your child to become creative in maths and identify how essential it is in everyday life. The teaching we provide will strive to enable your child to become fluent with number and be able to use varied strategies to calculations with increasing speed and accuracy.

Children will work on solving problems by applying their mathematics to a variety of routine and non-routine problems and understanding and use of the different methods of calculations is essential for their success.

Due to the national raise in expectations some of you will notice that methods that were previously taught in Years 5 and 6 are now taught in Year 4.

At Hawthorn Tree School we teach maths to an age appropriate level. That is, if your child is in year 4, they will be introduced to the year 4 methods of calculation that the strategies suggests for that year group. Only in special circumstances will your child be taught the method of calculation for the year above. Methods from the year below will also be reinforced with your child if required. In this way teachers can make sure that children are secure on each of the methods, which are built on in the following year.

Written Methods of Calculation for Year 3

Addition

Compact column addition with two or more 2/3-digit numbers or towers of 2-digit numbers

e.g. *267 + 85*

```
  267
+  85
   12  ( 7 + 5)
  140  (60 + 80)
  200
  352
```

Subtraction

Expanded column subtraction with 3- and 4-digit numbers e.g. *754 - 286*

This would be recorded by the children as

```
  600      140
  ~~700~~ + ~~50~~ + 14
- 200  +  80  +  6
  400  +  60  +  8  =  468
```

Multiplication

Children will approximate first
23 x 8 is approximately 25 x 8 = 200

x	20	3
8	160	24

```
  160
+  24
  184
```

Division

Relate division to multiplications 'with holes in'

e.g. _ × 5 = 30 *is the same calculation as* 30 ÷ 5 = _ *thus we can count in 5s to find the answer*

KNOWLEDGE OF TIMES TABLES IS,THEREFORE, ESSENTIAL

Written Methods of Calculation for Year 4

Addition

Compact column addition with larger numbers, up to 4 digits

$$\begin{array}{r} 7648 \\ +\ 1486 \\ \hline 9134 \\ \hline 111 \end{array} \qquad \begin{array}{r} 6584 \\ +\ 5848 \\ \hline 12432 \\ \hline 111 \end{array}$$

Subtraction

Expanded column subtraction with 3- and 4-digit numbers e.g. *754 - 286*

This would be recorded by the children as

$$\begin{array}{rrcrcrcl} & {\scriptstyle 600} & & {\scriptstyle 140} & & & & \\ & \cancel{700} & + & \cancel{50} & + & {}^{1}4 & & \\ - & 200 & + & 80 & + & 6 & & \\ \hline & 400 & + & 60 & + & 8 & = & 468 \end{array}$$

Begin to develop compact column subtraction up to 4 digits

e.g. *6467 - 2684*

$$\begin{array}{r} {\scriptstyle 5\,13\,1} \\ \cancel{6}467 \\ -\ 2684 \\ \hline 3783 \end{array}$$

Multiplication

Use grid multiplication to multiply 3-digit numbers by 1-digit numbers

e.g. *253 × 6*

×	200	50	3	
6	1200	300	18	= 1518

```
  1 2 7
x   6
  4 2   (6x7)
+ 1 2 0   (6x20)
  6 0 0   (6x100)
  7 6 2
```

Use a vertical written algorithm (ladder) to multiply 3-digit numbers by 1-digit numbers alongside grid method.

e.g. *127 × 6* . Then leading to short multiplication.

```
1 2 7
x   6
7 6 2
1   4
```

Division

Use a written version of a mental method to divide 2- and 3-digit numbers by 1-digit numbers

e.g. 86 ÷ 3 as 20 × 3 (60) and 8 × 3 (24), remainder 2

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

98 ÷ 7 = 14

```
    1 4
  ┌────
7 ) 9 2 8
```

All times tables up to 12 x 12 should be known by the end of Year 4

Written Methods of Calculation for Year 5

Addition

Use compact addition to add decimal numbers with up to 2 decimal places

e.g. *15·68 + 27·86*

```
  15·68
+ 27·86
----------
  43.54
----------
  11 1
```

Subtraction

Compact column subtraction, as in Year 4, for numbers with up to 5 digits e.g. *16 324 – 8516*

Multiplication

Short multiplication of 2-, 3- and 4-digit numbers by 1-digit numbers

e.g. *435 × 8*

```
  435
×   8
-----
3480
  24
```

Long multiplication of 2-, 3-and 4-digit numbers by 2 digit numbers. In this case beginning with 24 x 6. Then 24 x 10

e.g. *24 × 16*

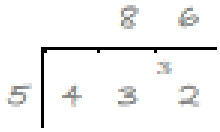
```
   24
×  16
-----
  144
 240
-----
  384
-----
```

Division

Use a written version of a mental strategy to divide 3-digit numbers by 1-digit numbers

e.g.

432 ÷ 5 becomes



Answer: 86 remainder 2

Your child will have to be confident in understanding that the remainder of division calculation can be expressed in 3 ways

a) As a simple remainder - r2 Answer 86 r 2
b) As a fraction - 2/5 (2 divided by 5) Answer 86 2/5
c) As a decimal - the fraction 2/5 is equivalent to 0.4 Answer 86.4

Written Methods of Calculation for Year 6

Addition

Compact column addition for adding several large numbers and decimal numbers with up to 2 decimal places

Compact column addition with money e.g. *£14·64 + £28·78 + £12·26*

```
  £14.64
  £28.78
+£12.26
----------
  £55.68
----------
   11 1
```

Subtraction

Compact column subtraction, as in Year 4 and 5, for even larger numbers e.g. *34 685 – 16 458*

Multiplication

Short multiplication of decimal numbers using × 100 and ÷ 100
e.g. *13·72 × 6 as (1372 × 6) ÷ 100 = 82·32*

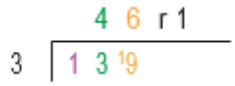
Short multiplication of money
e.g. *£13·72 × 6*

```
   £ 1 3.7 2
×          6
-------------
  £ 8 2.3 2
-------------
    2 4  1
```

Division

Short division of 3- and 4-digit numbers by 1-digit numbers

e.g. *139 ÷ 3*



Long division of 3- and 4-digit numbers by 2-digit numbers

e.g. 496 ÷ 11