Hampton Junior School

Written Calculations Policy

‘Be the best you can be!’

Written by SP – Sep 2015

Written Calculations Policy

This policy outlines the written methods of calculation that are taught throughout the school. Its purpose is to ensure consistency and progression in the use of these methods across each year group.

Our aim is to ensure that, by the end of Key Stage 2, all children:

- have a secure understanding of number facts, place value and the four operations: addition, subtraction, multiplication and division;
- make use of informal notes to record stages and part answers when using mental methods of calculation, in order to record essential information which cannot be kept in their heads;
- have an efficient, reliable, formal written method of calculation for each operation, which they can apply confidently when undertaking calculations they cannot complete mentally.

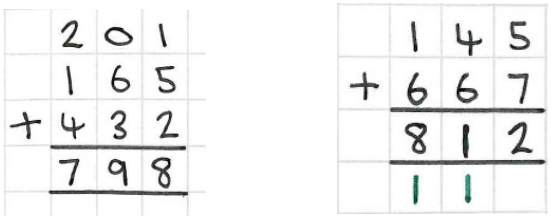
While emphasis is placed on securing knowledge of formal written methods, it is important to recognise that the ability to perform mental calculations accurately is also essential, as there is an element of mental processing within every written method.

Each of the written methods will be taught in the year groups specified below, however, children will be encouraged to use methods which they have been taught previously and are secure with, while the new methods are being embedded. Similarly, children will be taught the methods specified in the year group above if they are ready to progress on to them.

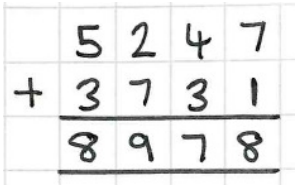
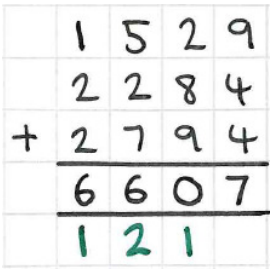
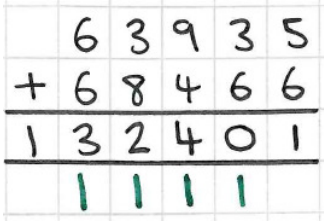
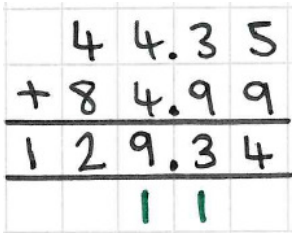
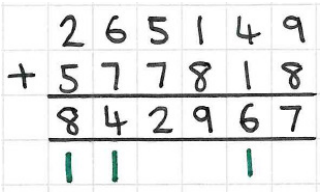
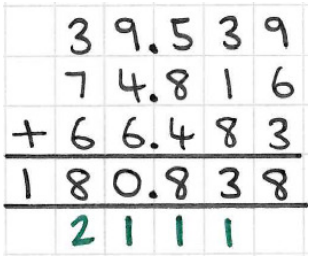
Multiplication Tables

Children are expected to know multiplication and division facts for the following multiplication tables:

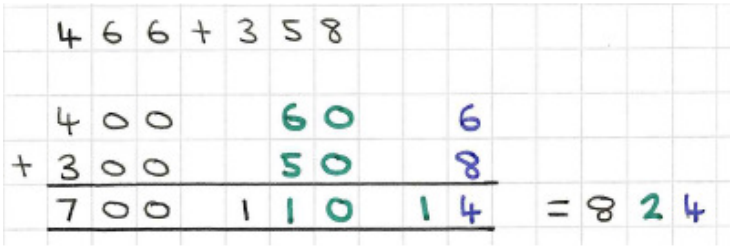
By the end of Year 2: Multiplication and division facts for the 2, 5 and 10 multiplication tables tables
By the end of Year 3: Multiplication and division facts for the 3, 4 and 8 multiplication tables
By the end of Year 4: Multiplication and division facts for all multiplication tables, up to 12 x 12

<table>
<tr><th colspan="2">Addition</th></tr>
<tr><td colspan="2">Pre-requisite methods: Using a number line; partitioning; expanded columnar addition</td></tr>
<tr><td colspan="2">Year 3: Columnar addition, including carrying numbers
*See below</td></tr>
<tr><td>Columnar addition:
  </td><td>National Curriculum statutory objectives:

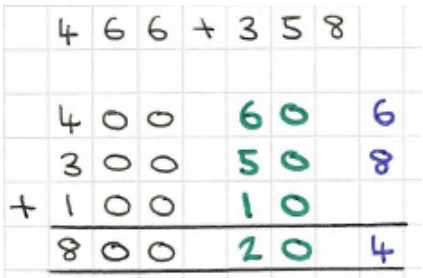
• Add numbers with up to three digits, using the formal written method of columnar addition
• Estimate the answer to a calculation and use inverse operations to check answers.
•</td></tr>
<tr><td colspan="2">Year 4: Columnar addition, including carrying numbers
*See below</td></tr>
</table>

Columnar addition:	National Curriculum statutory objectives:
 	• Add numbers **with up to four digits,** using the formal written method of columnar addition. • Estimate the answer to a calculation and use inverse operations to check answers.
Year 5: Columnar addition, including decimal numbers up to 2 decimal places (2dp)	
Columnar addition:	National Curriculum statutory objectives:
 	• Add numbers **with more than four digits,** using the formal written method of columnar addition • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
Year 6: Columnar addition, including decimal numbers up to 3 decimal places (3dp)	
Columnar addition:	National Curriculum statutory objectives:
 	• Add numbers **with more than four digits,** using the formal written method of columnar addition • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

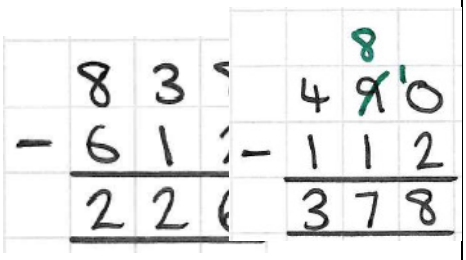
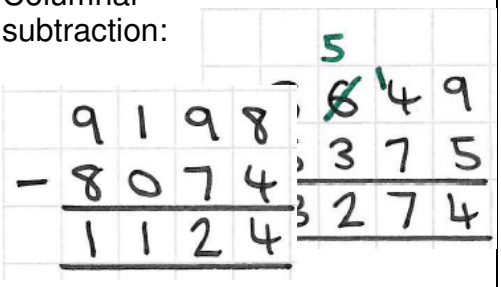
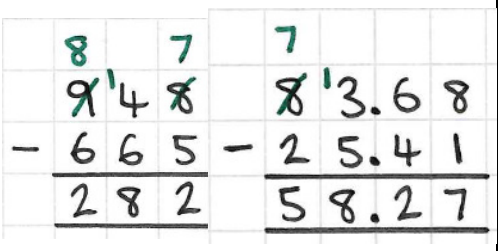
* Expanded columnar addition builds on partitioning to support knowledge of place value before progressing to columnar addition.

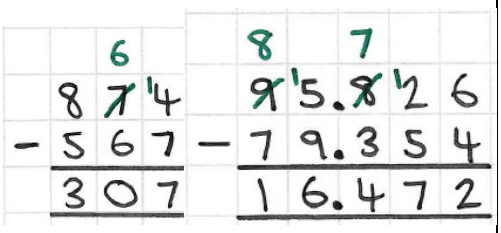


This next example shows where digits in a column add to more than the column value.

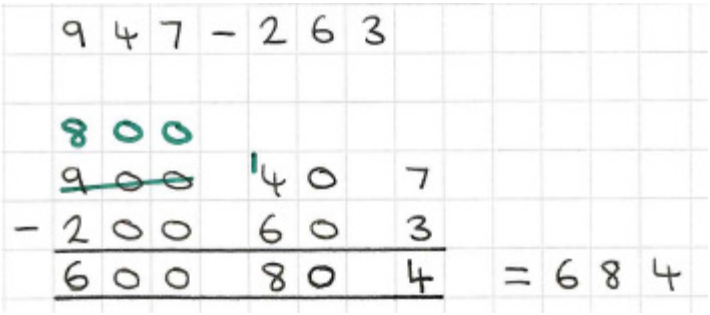


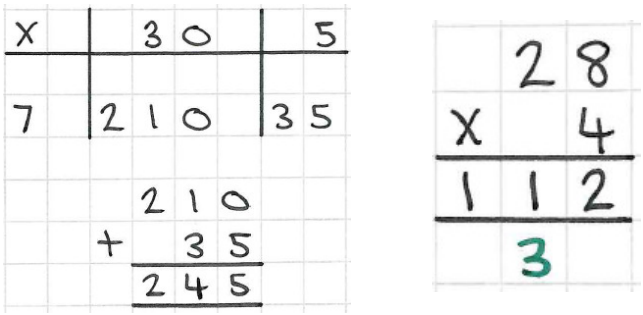
Subtraction
Pre-requisite methods: Using a number line; counting up; partitioning; expanded columnar subtraction
Year 3: Columnar subtraction, including exchanging numbers *See below

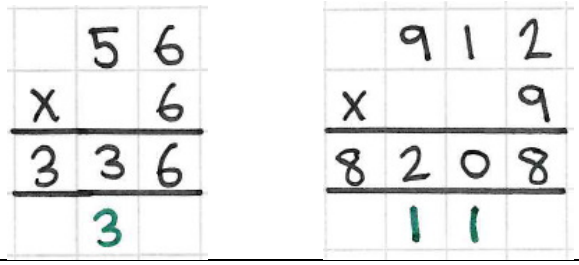
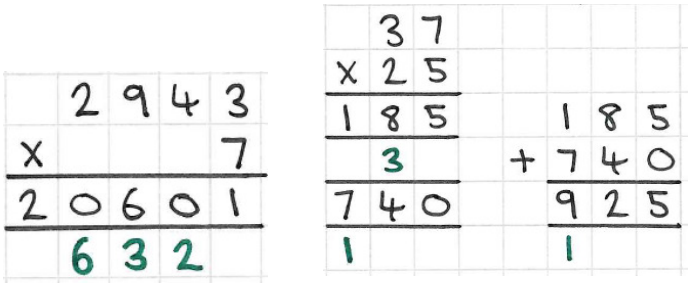
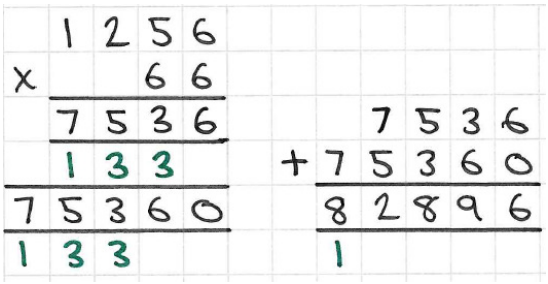
Columnar subtraction:	National Curriculum statutory objectives:
	• Subtract numbers **with up to three digits,** using the formal written method of columnar subtraction • Estimate the answer to a calculation and use inverse operations to check answers.
Year 4: Columnar subtraction, including exchanging numbers *See below	
Columnar subtraction:	National Curriculum statutory objectives:
	• Subtract numbers **with up to four digits,** using the formal written method of columnar subtraction • Estimate the answer to a calculation and use inverse operations to check answers.
Year 5: Columnar subtraction, including decimal numbers up to 2 decimal places (2dp)	
Columnar subtraction:	National Curriculum statutory objectives:
	• Subtract numbers **with more than four digits,** using the formal written method of columnar subtraction. • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
Year 6: Columnar subtraction, including decimal numbers up to 3 decimal places (3dp)	

Columnar subtraction:	National Curriculum statutory objectives:
	• Subtract numbers **with more than four digits,** using the formal written method of columnar subtraction. • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

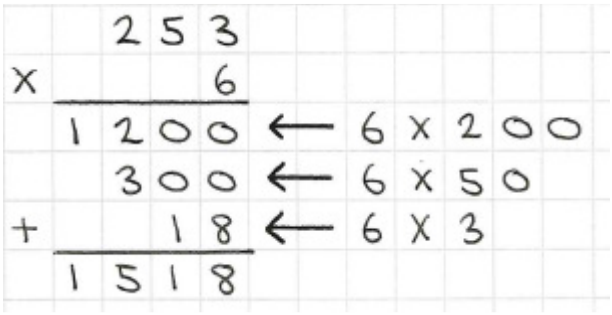
* Expanded columnar subtraction builds on partitioning to support knowledge of place value before progressing to columnar subtraction.



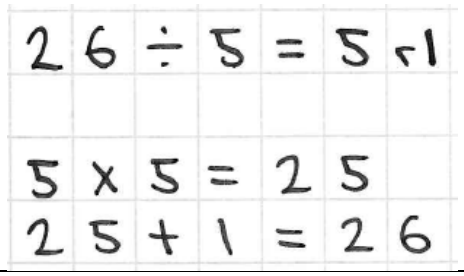
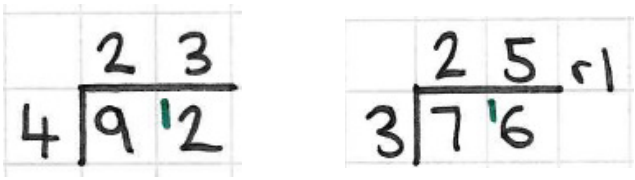
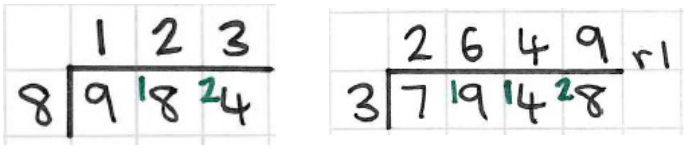
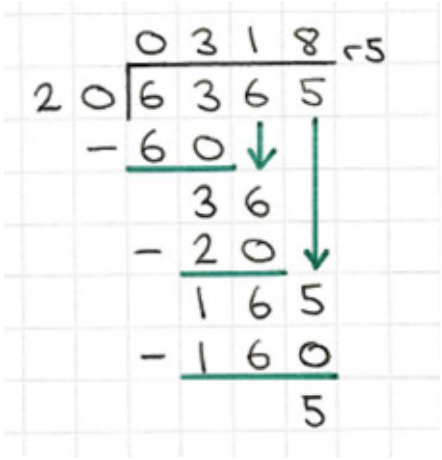
Multiplication	
Pre-requisite methods: Grouping; arrays; repeated addition **Multiplication tables:** 2, 5 and 10	
Year 3: Partitioning, leading to short multiplication *See below	
Partitioning and short multiplication: 	National Curriculum statutory objectives: • Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements using the multiplication tables that they know, including for **two-digit numbers times one-digit numbers.**
Year 4: Short multiplication *See below	
Short multiplication:	National Curriculum statutory objectives: • Recall and use multiplication and division facts for multiplication tables up to 12 x 12

	• Multiply **two-digit and three-digit numbers by a one-digit number**, using a formal written layout.
Year 5: Short multiplication and long multiplication (including decimals in a context)	
Short multiplication and long multiplication: 	National Curriculum statutory objectives: • Multiply numbers up to **four digits by a one-digit or two-digit number** using a formal written method, including long multiplication for two-digit numbers.
Year 6: Long multiplication (including decimals in a context)	
Long multiplication: 	National Curriculum statutory objectives: • Multiply **multi-digit numbers up to four digits by a two-digit whole number,** using the formal written method of long multiplication.

*Expanded short multiplication can be used if necessary to support progression towards short multiplication



Division	
Pre-requisite methods: Sharing; grouping; partitioning	**Multiplication tables:** 2, 5 and 10
Year 3: Using the inverse operation, including expressing remainders	
Using the inverse operation:	National Curriculum statutory objectives:

	• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements for division using the multiplication tables that they know
Year 4: Short division, including expressing remainders *See below	
Short division: 	National Curriculum statutory objectives: • Recall and use multiplication and division facts for multiplication tables up to 12 x 12 • Write and calculate mathematical statements for division, using the multiplication tables that they know
Year 5: Short division, including interpreting remainders *See below	
Short division: 	National Curriculum statutory objectives: • Divide **numbers up to four digits by a one-digit number**, interpreting remainders appropriately for the context
Year 6: Short division and long division, including interpreting remainders *See below	
Long division: 	National Curriculum statutory objectives: • Divide **numbers up to four digits by a two-digit whole number**, using the formal written method of short division, and interpret remainders according to the context. • Divide **numbers up to four digits by a two-digit whole number**, using the formal written method of long division, and interpret remainders as whole numbers, fractions or by rounding, as appropriate for the context

*Expanded division (chunking) can be used if necessary to support progression towards short and long division

$236 \div 17 = 13 \text{ r } 15$

$$
\begin{array}{r}
\cancel{2}^{1}\cancel{3}^{1}6 \\
-\ 170 \quad (10 \text{ lots}) \\
\hline
066 \\
-\ 34 \quad (2 \text{ lots}) \\
\hline
\cancel{3}^{2}\cancel{8}^{1}2 \\
-\ 17 \quad (1 \text{ lot}) \\
\hline
15
\end{array}
$$

$1 \times 17 = 17$
$2 \times 17 = 34$
$10 \times 17 = 170$
$20 \times 17 = 340$
$5 \times 17 = 85$