



Meopham Community Academy



Enjoy, Learn, Aspire

Written Calculations Policy

This policy was reviewed by: Sarah Dean, Mathematics Subject Leader
Date: November 2017
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Next Review Date: November 2019

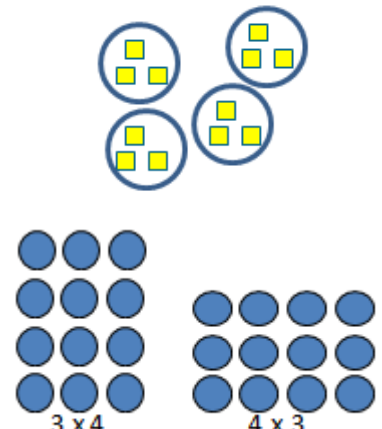
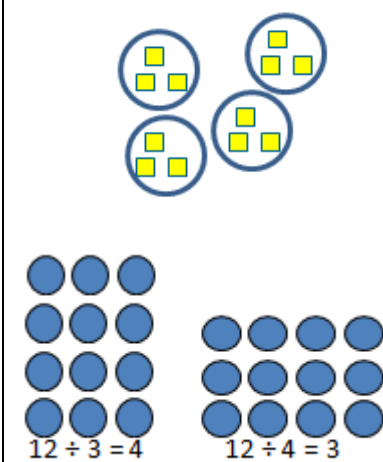
At Meopham Community Academy we believe children should be introduced to the process of calculation through practical, oral and mental activities.

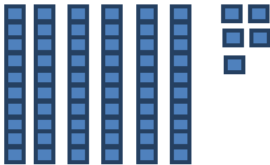
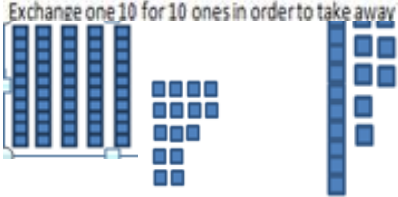


By using manipulatives, models and images, children will begin to understand the underlying principles behind formal written calculation methods. Over time, these methods will become more efficient and sufficient and lead to efficient written methods. By the end of year 6, children will be able to use mental and written methods which they understand and can use correctly.

Aims of this policy:

- To provide a consistent and logical approach to the teaching of calculations across the school
- To ensure that children are able to select the most efficient method for a calculation
- To ensure that children develop an efficient, reliable, compact written method of calculation for each operation.

	Addition	Subtraction	Multiplication	Division
EYFS	Use counters, bead strings, objects and progress to Numicon to encourage counting on from one number to find the sum of quantities to 10 and, if appropriate, to 20.	Use counters, bead strings and objects to develop the concept of subtraction as 'take away' and to find the differences between quantities to 10 and, if appropriate, to 20.	Use counters, bead strings and objects to group quantities to 10 and, if appropriate, to 20. For example, putting resources into egg boxes or ice trays which are arrays.	Use counters, bead strings and objects to make quantities to 10, then 20, into groups of 2s, 5s and 10s. For example, sharing objects into egg boxes which are in arrays.

	Addition	Subtraction	Multiplication	Division
Year 1	<p>Continue using manipulatives (for example Numicon) to add to 20 and, if appropriate, to 50 without counting everything</p> <p>Combine tens and ones using Dienes or bundles of straws and write number statements/draw pictures to show what they have done.</p>	<p>Continue using manipulatives from Year R and also Numicon to subtract and find the difference between quantities to 20 and, if appropriate, to 50.</p> <p>Make a number using Dienes or bundles of straws and subtract a smaller number. Write number statements/draw pictures to show what they have done.</p>	<p>Continue using the manipulatives from Year R and also Numicon to find groups of quantities, e.g. 2, 5, 10 to 20 and, if appropriate, 50.</p> 	<p>Continue using the manipulatives from Year R and also Numicon to find how many groups they can make out of quantities to 20 and, if appropriate, 50.</p> <p>E.g. $12 \div 3 = 4$</p> 

	Addition	Subtraction	Multiplication	Division
Year 2	<p>Continue combining Dienes to make sums up to 100, including bridging 10 and carrying. Write number statements/draw picture to show what they have done.</p> <p>Toward the end of the year, introduce vertical partitioning to prepare children for Year 3. This should be done alongside practical resources (such as Diene Blocks) and children drawing visual representations.</p> $\begin{array}{r} 43 \\ + 33 \\ \hline 76 \end{array}$	<p>Continue using Dienes to subtract and calculate differences between quantities to 100, including exchanging.</p> <p>Write number statements/draw pictures to show what they have done.</p> <p>65 - 47</p>  <p>Exchange one 10 for 10 ones in order to take away</p> 	<p>Continue as in year 1, focusing on arrays (including multiplying by 3) and writing commutative number statements.</p> <p>3 6 9 12</p> 	<p>Continue as in year 1, focusing on arrays and working out division calculations by counting in steps on fingers.</p> <p>3 6 9 12</p> 

	Addition	Subtraction	Multiplication	Division
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Use of manipulatives (e.g. Dienes of Place Value counters) and visual representations to lead to the written method

Expanded column method up to HTO + HTO

$$245 + 352$$

$$\begin{array}{r} 245 \\ + 352 \\ \hline 7 \\ 90 \\ \hline 500 \\ \hline 597 \end{array}$$

Column addition with up to 3 digits

$$\begin{array}{r} 262 + 691 \\ 262 \\ + 691 \\ \hline 953 \end{array}$$

Be careful to choose numbers which cannot be answered using a mental method

Use of manipulatives (e.g. Dienes of Place Value counters) and visual representations to lead to the written method

Expanded column subtraction for 3 digit numbers

$$363 - 127 = 236$$

$$\begin{array}{r} 50 \ 13 \\ 300 \ 60 \ 3 \\ - 100 \ 20 \ 7 \\ \hline 200 \ 30 \ 6 \end{array}$$

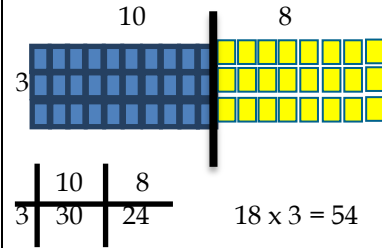
Some children may begin to use column subtraction with 3 digits

$$\begin{array}{r} 6 \ 8 \ 1 \\ - 3 \ 1 \ 6 \\ \hline 3 \ 7 \ 9 \end{array}$$

Be careful to choose numbers which cannot be answered using a mental method

Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method

Arrays to support the grid method (always calculate the ones first):

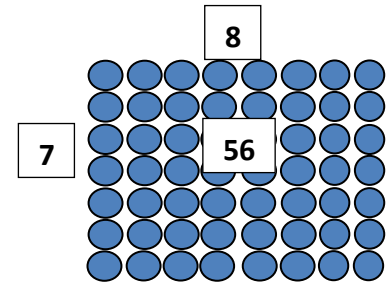


Leading to:

$$\begin{array}{r} 18 \\ \times 3 \\ \hline 54 \end{array}$$

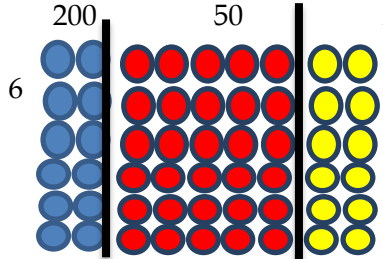
Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method

Arrays:



Leading to presenting calculations as short division

$$\begin{array}{r} 9 \\ 4 \overline{) 36} \end{array}$$

	Addition	Subtraction	Multiplication	Division
Year 4	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column addition with up to 4 digits</p> <p>1462 + 6791</p> $\begin{array}{r} 1462 \\ + 6791 \\ \hline 8253 \\ 11 \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column subtraction for 4 digit numbers</p> $\begin{array}{r} 61 \\ 5675 \\ - 1356 \\ \hline 4319 \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Arrays to support the grid method:</p>  <p>Leading to expanded multiplication</p> $\begin{array}{r} \text{HTU} \times \text{U} \\ 252 \\ \times 6 \\ \hline 12 \\ 300 \\ 1200 \\ \hline 1512 \end{array}$ <p>Moving onto HTU x U using formal method</p> $\begin{array}{r} 252 \\ \times 6 \\ \hline 1512 \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Short division for 3 digit numbers divided by a single digit. Including remainders.</p> <p>E.G.</p> $\begin{array}{r} 22r1 \\ 6 \overline{) 11313} \end{array}$

	Addition	Subtraction	Multiplication	Division
Year 5	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column addition including decimals with difference number of decimal places</p> $\begin{array}{r} 414.46 \\ + 367.99 \\ \hline 782.45 \\ \hline 1 \end{array}$	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column subtraction including decimals with difference number of decimal places</p> $\begin{array}{r} 415.24 \\ 6\cancel{0}\cancel{0}\cancel{0}5 \\ - 419.56 \\ \hline 236.79 \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Long multiplication HTO x TO and ThHTO x TO</p> $\begin{array}{r} 332 \\ \times 17 \\ \hline 2324 \\ 3320 \\ \hline 5644 \end{array}$	<p>Short division ThHTO ÷ O</p> $5156 \div 4$ $\begin{array}{r} 1289 \\ 4 \overline{) 5156} \\ \underline{4} \\ 11 \\ \underline{8} \\ 36 \\ \underline{32} \\ 40 \\ \underline{36} \\ 400 \\ \underline{360} \\ 400 \\ \underline{360} \\ 400 \\ \underline{360} \\ 400 \end{array}$

	Addition	Subtraction	Multiplication	Division
Year 6	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column addition with more than 4 digits and decimals</p> $\begin{array}{r} 14.468 \\ + 67.997 \\ \hline 82.465 \\ \hline \end{array}$ <p style="text-align: center;">1 1 1 1</p> <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Use of manipulatives (e.g. Dienes of Place Value counters) to lead to the written method</p> <p>Column subtraction with more than 4 digits and decimals</p> $\begin{array}{r} 4 \quad 15 \quad 12 \quad 1 \\ 656.75 \\ - 419.56 \\ \hline 236.79 \\ \hline \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Long multiplication for 4 digit by 2 digit whole numbers and one digit number with up to two decimal places by a whole number</p> $\begin{array}{r} 2332 \\ \times 18 \\ \hline 18656 \\ \underline{23320} \\ 41976 \end{array}$ <p>Be careful to choose numbers which cannot be answered using a mental method</p>	<p>Long division for 4 digit by 2 digit whole numbers</p> $3428 \div 16$ $\begin{array}{r} 214 \text{ r } 4 \\ 16 \overline{) 3428} \\ \underline{32} \\ 22 \\ \underline{16} \\ 68 \\ \underline{64} \\ 4 \end{array}$ <p>Divide a decimal number by one digit whole number using short division</p>