

Calculation at Ghyllside School

The ability to calculate is the cornerstone of mathematical understanding; a key skill which children will need in their adult lives to help them make sense of the world. The accompanying booklet outlines the main methods used by the children in each year group. Learning in the Early Years and Year 1 is very practical, often using objects and highly visual methods to build understanding. In Year 2 there is more pencil and paper recording, although visual and practical resources are still used to support learning. In Key Stage 2 children progress through a range of increasingly formal methods as they move towards Year 6 and secondary school.

In school we use a system called Big Maths and regular CLIC sessions (stands for **C**alculation, **L**earn Its, **I**t's **N**othing New and **C**alculation) as the basis for the teaching of Number and Calculation. These sessions are taught between 3 to 5 times a week and are fast paced and designed to build confidence and produce children who feel that maths is something they feel good about and can do. The methods they learn as part of CLIC sessions are 'high understanding' methods which begin as fully written but can eventually become fully mental without the need to record. It is likely that as a parent these are the methods that are unfamiliar to you. Hopefully the booklet will help you make sense of these 'modern' methods we use in school and more able to help support your child with maths at home.

The Brick Wall of Mathematical Understanding


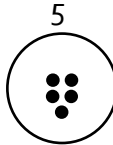
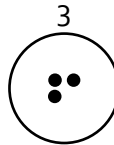
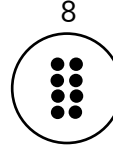

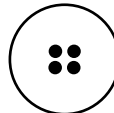
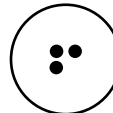
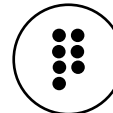
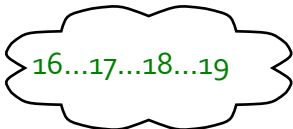
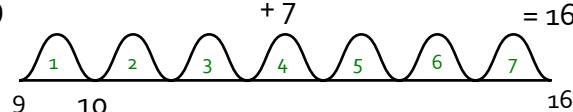
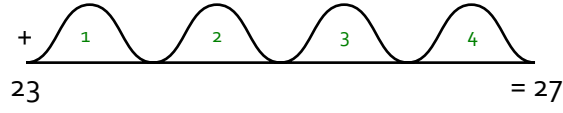
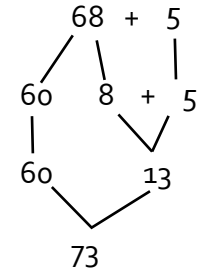


You can view understanding in maths as a little bit like a brick wall. In order to build on top of the wall, the lower bricks have to be in place. In the context of maths this is very true. Trying to pile on higher bricks in the form of more complex methods before the lower bricks (key skills and understanding) are secure can lead to confusion and frustration. If you are keen to support your child with maths at home we recommend focusing on helping with addition facts up to $9 + 9$ and multiplication facts (times tables). Your child should have a good idea of which facts or times table they are learning at any given time, or you can get that information from their teacher.



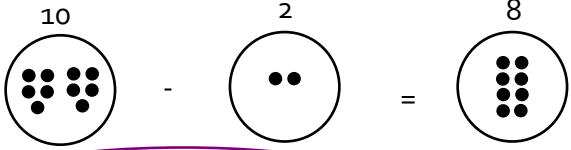

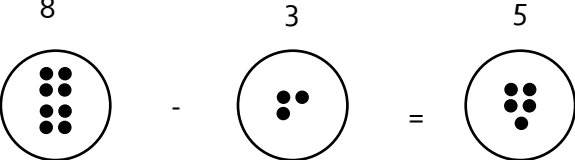
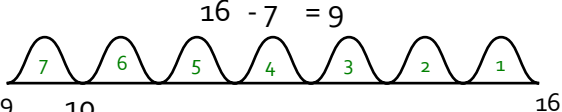
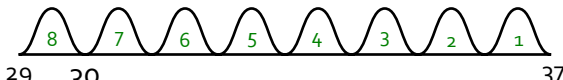
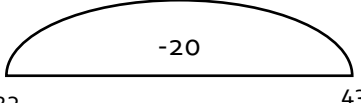
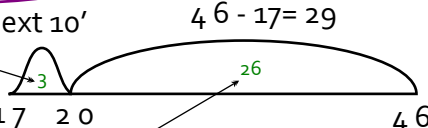
It is also worth noting that although your child will progress through the methods in this booklet in the prescribed order, even though they are organised in year groups, this is not a guarantee that your child will be taught that method at that point in their calculation 'journey'. They may move more slowly or indeed accelerate through the methods.

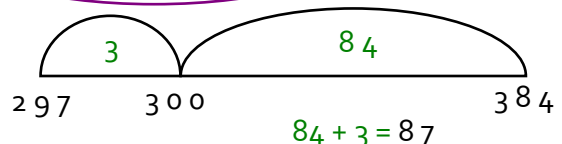
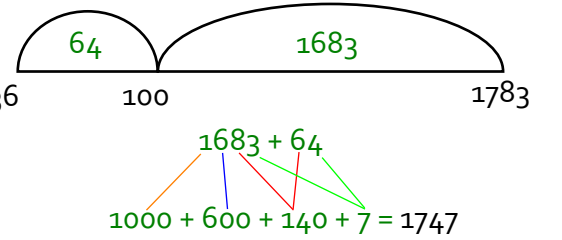
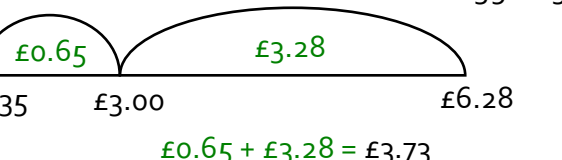
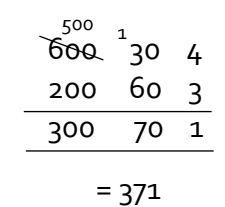
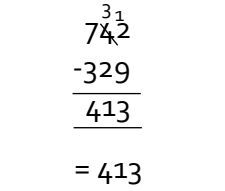
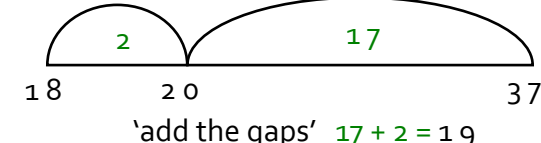
We hope that you find the booklet useful, and as ever if you have any questions please ask your child's class teacher.




NC = National Curriculum

Addition Foundation Stage	Year 1	Year 2									
<p>FSC Children can say which number is one more than a given number. Children will use quantities and objects to add two single digit numbers and count on to find the answer.</p>	<p>NC Add and subtract 1 and 2 digit numbers to 20 (e.g. $14 + 3 = 17$, $7 + 9 = 16$) Calculate pairs of numbers that add up to 20, recording formally (e.g. $14 + 6 = 20$, $12 + 8 = 20$)</p>	<p>NC Add 2 digit numbers and 1 digit numbers ($23 + 4$) Add 2 digit numbers and tens ($35 + 60$, $26 + 30$) Add 2 digit numbers and 2 digit numbers ($24 + 32$) Know pairs of numbers that add to 20 ($14 + 6 = 20$, $15 + 5 = 20$)</p>									
<p>To have a group of objects and ask for one more.</p> <p>"How many have I got here? If I add one more, how many will I have?" </p> <p>To ask for one more using a number line.</p> <p>'Put your object on number 5. Can you move it to one more?' 1 2 3 4 5 6 7 8 9 10</p> <p>To know one more when shown / told a numeral</p> <p>"Can you tell me a number one more than 7?"</p> <p>Use objects and physically count them.</p> <p> +  =  $5 + 3 = 8$</p> <p>To count on to find the answer </p>	<p>Use objects and physically count them</p> <p>$4 + 3 = 7$  +  = </p> <p>Record as a number sentence</p> <p>$4 + 3 = 7$</p> <p>'Count on in your head from the biggest number'</p> <p>$16 + 3 =$ </p> <p>Use a number line to count on $9 + 7 = 16$</p> <p></p>	<p>Use a number line to count on</p> <p>$23 + 4 = 27$ </p> <p>Use a 100 Square to add tens</p> <p>$38 + 20 = 58$</p> <table border="1" data-bbox="1814 821 2083 1077"> <tr> <td>37</td> <td>38</td> <td>39</td> </tr> <tr> <td>47</td> <td>48</td> <td>49</td> </tr> <tr> <td>57</td> <td>58</td> <td>59</td> </tr> </table> <p>Partition and Recombine</p> <p>$68 + 5 = 73$ </p>	37	38	39	47	48	49	57	58	59
37	38	39									
47	48	49									
57	58	59									

Addition Year 3	Year 4	Year 5 & 6
<p>NC: Add 3 digit numbers (e.g. 349 + 732) Add 3 digit numbers as money (e.g. £2.79 + £3.25)</p>	<p>NC: Add up to 4 digit numbers using the column method (e.g. 4362 + 9216)</p>	<p>NC: Add up to 2 digit numbers mentally (e.g. 24 + 19) Add 2 or more 4 digit numbers including decimals (e.g. 3922.6 + 9407.2)</p>
<p>Partition and Recombine</p> $\begin{array}{r} 349 + 632 \\ \hline 900 + 70 + 11 \\ \hline 981 \end{array}$ <p>Partition and Recombine</p> $\begin{array}{r} £2.59 + £3.25 \\ \hline £2.00 + £3.00 = £5.00 \\ £0.50 + £0.20 = £0.70 \\ £0.09 + £0.05 = £0.14 \\ \hline \underline{£5.84} \end{array}$	<p>Expanded column method</p> $\begin{array}{r} 3841 + 2914 \\ \hline 3000 + 800 + 40 + 1 \\ 2000 + 900 + 10 + 4 \\ \hline \underline{5000 + 1700 + 50 + 5} \end{array} = 6755$ <p>Compact column method</p> $\begin{array}{r} 3841 \\ + 2914 \\ \hline \underline{6755} \\ 1 \end{array}$	<p>Mentally - Brain only!</p> $\begin{array}{r} 38 + 46 \\ \hline 70 + 14 = 84 \end{array}$ <p>Compact column method</p> $\begin{array}{r} 3218.4 \\ + 4832.7 \\ \hline \underline{8051.1} \\ 1 \quad 1 \quad 1 \end{array}$

Subtraction Foundation	Year 1	Year 2									
<p>FSC: Children can say which number is one less than a given number. Children will use quantities and objects to subtract two single digit numbers and count on to find the answer.</p>	<p>NC: Subtract 1 and 2 digit numbers from numbers below 20 (e.g. $8 - 4$, $16 - 9$)</p>	<p>NC: Subtract 1 digit number from 2 digit number (e.g. $37 - 6$, $45 - 9$) Subtract 10 from 2 digit number (e.g. $59 - 20$, $73 - 40$) Subtract 2 digit number from 2 digit number (e.g. $36 - 12$, $45 - 18$) Begin to understand relationship between - and +</p>									
<p>To have a group of objects and ask for one less</p> <p>"How many have I got here? If I take one away, how many will I have?"</p>  <p>To ask for one less using a number line.</p> <p>'Put your object on number 5, can you move it to one less'</p>  <p>To know one less when shown / told a numeral</p> <p>"Can you tell me a number one less than 7?"</p> <p>Use objects and physically count them.</p>  <p>To count back to find the answer</p>  <p>$5 - 3 = 2$</p>	<p>Use objects and physically count</p>  <p>'We have 8 dots, we take away 3. What do we have left?'</p> <p>Record as a number sentence</p> <p>$8 - 3 = 5$</p> <p>Use a number line to count back</p>  <p>$16 - 7 = 9$</p>	<p>Use a number line to count back</p>  <p>$37 - 8 = 29$</p> <p>Use a number line to subtract tens</p>  <p>$43 - 20 = 23$</p> <p>Use a 100 Square for subtracting tens</p> <table border="1" data-bbox="1809 880 2065 1136"> <tr> <td>22</td> <td>23</td> <td>24</td> </tr> <tr> <td>33</td> <td>33</td> <td>34</td> </tr> <tr> <td>42</td> <td>43</td> <td>44</td> </tr> </table> <p>Use a number line to count forward to find the gap</p>  <p>'Hop to the next 10'</p> <p>$46 - 17 = 29$</p> <p>'Hop the rest of the way'</p> <p>'Add the hops together' $3 + 26 = 29$</p>	22	23	24	33	33	34	42	43	44
22	23	24									
33	33	34									
42	43	44									

Subtraction Year 3	Year 4	Year 5 & 6
<p>NC: Subtract 3 digit numbers from 3 digit numbers (e.g. 384 - 297) Subtract 2 digit numbers from 4 digit numbers (e.g. 4631- 92) Subtract 3 digit number as money (e.g. £9.75- £3.40)</p>	<p>NC: Subtract up to 4 digit numbers using the column method (e.g. 3924 - 1871)</p>	<p>NC: Subtract 2 digit numbers from a 2 digit number mentally (e.g. 46 - 19) Subtract up to 4 digit numbers (including decimals) using the column method (e.g. 762.9 - 38.42)</p>
<p>Use a number line to count forward to find the gap $384 - 297 = 87$</p>  <p>Use a number line to count forward to find the gap $1783 - 36 = 1747$</p>  <p>Use a number line to count forward to find the gap $£6.28 - £2.35 = £3.73$</p> 	<p>Expanded column method</p> $634 - 263 = 371$  <p>Compact column method</p> $742 - 329 = 413$ 	<p>Mental strategy 2 digit - 2 digit Brain only!</p> <p>'Count forwards to find the gap'</p> $37 - 18 = 19$  <p>Column method</p> $\begin{array}{r} 3 \ 11 \ 17 \ 1 \\ 4283 \\ - 1794 \\ \hline 2489 \end{array}$ <p>Column method (decimals)</p> $\begin{array}{r} 8 \ 1 \ 6 \ 1 \\ 493.70 \\ - 26.49 \\ \hline 467.21 \end{array}$

Multiplication Year 1	Year 2	Year 3						
<p>NC: Use objects and arrays to answer 'lots of' questions *An array is a rectangular arrangement of a multiplication fact*  e.g. $4 \times 4 = 16$</p>	<p>NC: Know 2x, 5x and 10x tables Use x symbol Solve multiplication as repeated addition (e.g. $4 \times 6 = 24$ $6+6+6+6=24$) Multiply single digit numbers by multiples of 10 (smile multiplication: e.g. 4×30, 6×40)</p>	<p>NC: Know 3x, 4x and 9x tables Multiply 1 digit numbers by 2 digit numbers using the grid method (e.g. 54×4)</p>						
<p>Use objects, arrange and count physically</p> <p>'Set out 4 lots of 4 dots and find the total'</p>  = 16 <p>'There are 3 lots of 5 How many altogether?'</p>  = 15	<p>Repeated addition 4×3</p> <p>'4 lots of 3' $3 + 3 + 3 + 3 = 12$</p> <p>Smile multiplication</p> <p>$30 \times 5 = 150$</p> <p>This is the 'smile!' ($3 \times 5 = 15$)</p> <p>'add the o'</p>	<p>Grid method $34 \times 3 = 102$</p> <table border="1" data-bbox="1702 542 1937 694"> <tr> <td>x</td> <td>30</td> <td>4</td> </tr> <tr> <td>3</td> <td>90</td> <td>12</td> </tr> </table> <p>$90 + 12 = 102$</p> <p>$100 + 2$</p>	x	30	4	3	90	12
x	30	4						
3	90	12						

Multiplication Year 4	Year 5	Year 6																																																																		
<p>NC: Know 6x, 7x and 8x tables Multiply 1 digit number by 3 digit numbers (4 x 362) Multiply 2 digit numbers by 2 digit numbers using the grid method including decimals (42 x 35, 3.6 x 8) Multiply by multiples of 10 and 100 (smile multiplication)</p>	<p>NC: Know 11x and 12x tables Multiply 3 and 4 digit numbers by 1 digit number using short multiplication (e.g. 4936 x 7, 361 x 4,)</p>	<p>NC: Multiply 3 & 4 digit numbers by 2 digit numbers using long multiplication (e.g. 3462 x 32)</p>																																																																		
<p>Grid method</p> <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">2400</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">180</td> </tr> <tr> <td style="text-align: right;">x</td> <td style="text-align: center;">400</td> <td style="text-align: center;">30</td> <td style="text-align: center;">5</td> <td style="text-align: right;">5</td> </tr> <tr> <td style="text-align: right;">6</td> <td style="text-align: center;">2400</td> <td style="text-align: center;">180</td> <td style="text-align: center;">5</td> <td style="text-align: right;"><u>2585</u></td> </tr> </table> <p>Smile multiplication</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> $40 \times 60 = 2400$ 'Do the x bit' (4 x 6 = 24) </div> <div style="text-align: center;"> $6 \times 300 = 1800$ 'add the zeros' </div> </div> <p>Grid multiplication</p> <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td style="text-align: center;">x</td> <td style="text-align: center;">60</td> <td style="text-align: center;">9</td> <td style="text-align: right;">1800</td> </tr> <tr> <td style="text-align: right;">30</td> <td></td> <td style="text-align: center;">1800</td> <td style="text-align: center;">270</td> <td style="text-align: right;">270</td> </tr> <tr> <td style="text-align: right;">9</td> <td></td> <td style="text-align: center;">540</td> <td style="text-align: center;">81</td> <td style="text-align: right;">540</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;"><u>81</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;"><u>2591</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: right;">11</td> </tr> </table> <p>Grid multiplication (decimals)</p> <table style="margin-left: 20px;"> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">27.</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;"><u>3.6</u></td> </tr> <tr> <td style="text-align: right;">x</td> <td style="text-align: center;">3</td> <td style="text-align: center;">0.4</td> <td></td> </tr> <tr> <td style="text-align: right;">9</td> <td style="text-align: center;">27</td> <td style="text-align: center;">3.6</td> <td style="text-align: right;"><u>30.6</u></td> </tr> </table>					2400					180	x	400	30	5	5	6	2400	180	5	<u>2585</u>		x	60	9	1800	30		1800	270	270	9		540	81	540					<u>81</u>					<u>2591</u>					11				27.				<u>3.6</u>	x	3	0.4		9	27	3.6	<u>30.6</u>	<p>Short multiplication - expanded method</p> <p>Estimate $4000 \times 4 = 16,000$</p> $ \begin{array}{r} 3612 \\ \times \quad 4 \\ \hline 8 \\ 40 \\ 2400 \\ 12000 \\ \hline 14448 \end{array} $ <p>Short multiplication - compact method</p> <p>Estimate $4000 \times 4 = 16,000$</p> $ \begin{array}{r} 3612 \\ \times \quad 4 \\ \hline 14448 \\ \quad 2 \end{array} $	<p>Long multiplication</p> <p>(Estimate: $4000 \times 20 = 80\,000$)</p> $ \begin{array}{r} 3948 \\ \times \quad 23 \\ \hline 11844 \quad (\times 3) \\ \quad 78960 \quad (\times 20) \\ \hline 90804 \\ \quad 111 \end{array} $
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Division	Year 4	Year 5	Year 6							
	<p>NC: Divide multiples of 10 using known facts (e.g. $140 \div 7 = 20$, $320 \div 4 = 80$) Calculate 2 digit numbers \div 1 digit numbers including those with remainders ($83 \div 3 = 27 \text{ r}2$)</p>	<p>NC: Divide 2, 3 and 4 digit numbers by 1 digit numbers using short division</p>	<p>NC: Divide 3 and 4 digit numbers by 2 digit numbers using long division</p>							
<p>Using known facts</p> <p><i>'I know $180 \div 6 = 30$ because $18 \div 6 = 3$'</i></p> <p>Big Maths Chunking with remainders</p> <p>$79 \div 6 = 13 \text{ r}1$</p> <table border="1" data-bbox="324 970 555 1214"> <tr> <td>$\times 6$</td> <td>79</td> </tr> <tr> <td>10</td> <td>60 \rightarrow 19</td> </tr> <tr> <td>3</td> <td>18 \rightarrow r 1</td> </tr> <tr> <td>13 r 1</td> <td></td> </tr> </table>	$\times 6$	79	10	60 \rightarrow 19	3	18 \rightarrow r 1	13 r 1		<p>Short Division</p> <p>$963 \div 3 = 321$</p> $\begin{array}{r} 321 \\ 3 \overline{) 963} \end{array}$ <p>$764 \div 4 = 191$</p> $\begin{array}{r} 191 \\ 4 \overline{) 764} \end{array}$ <p>$78 \div 5 = 15 \text{ r}3$</p> $\begin{array}{r} 15 \text{ r}3 \\ 5 \overline{) 78} \end{array}$ <p>with a remainder</p> <p>$49.3 \div 6 = 8.21999$ (recurring)</p> $\begin{array}{r} 08.21999 \\ 6 \overline{) 49.3000} \\ \underline{48} \\ 13 \\ \underline{12} \\ 10 \\ \underline{9} \\ 1 \end{array}$ <p>giving a decimal answer</p>	<p>Long Division</p> <p>$3009 \div 18 = 167 \text{ r}3$</p> $\begin{array}{r} 167 \text{ r}3 \\ 18 \overline{) 3009} \\ \underline{18} \\ 120 \\ \underline{108} \\ 129 \\ \underline{126} \\ 3 \end{array}$
$\times 6$	79									
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