

Nursery Hill Primary School, Ansley Common, Nuneaton



Calculation Policy Year 3

Written September 2018

Adopted October 2018

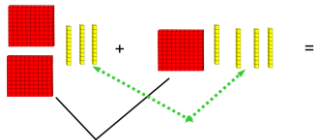




































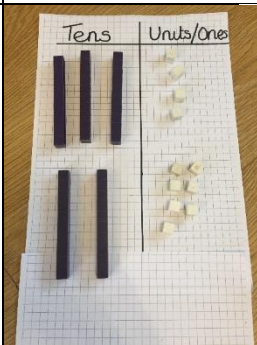


















Review September 2019

Children are introduced to the processes of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved. As children's mental methods are strengthened and refined, so too are their informal written methods. These methods become more efficient and succinct and lead to efficient written methods that can be used more generally. By the end of Year 6 children are equipped with mental, written and calculator methods that they understand and can use correctly. When faced with a calculation, children are able to decide which method is most appropriate and have strategies to check its accuracy. At whatever stage in their learning, and whatever method is being used, it must still be underpinned by a secure and appropriate knowledge of number facts, along with those mental skills that are needed to carry out the process and judge if it was successful. In summary, we are aiming for children who;

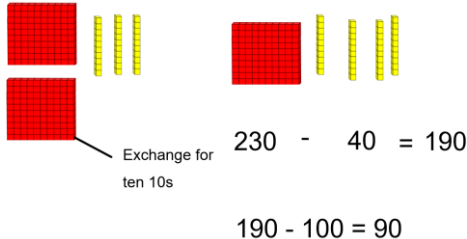
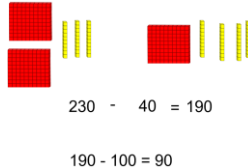

- ✓ have a secure knowledge of number facts and a good understanding of the four operations;
- ✓ have a secure understanding of place value to support with mental and written calculations;
- ✓ are able to use this knowledge and understanding to carry out calculations mentally and to apply general strategies when using one-digit and two digit numbers and particular strategies to special cases involving bigger numbers;
- ✓ make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads;
- ✓ have an efficient, reliable, method of calculation for each operation that children can apply with confidence when undertaking calculations, either written or mental;
- ✓ use a calculator effectively, using their mental skills to monitor the process, check the steps involved and decide if the numbers displayed make sense.

This policy outlines the routes through calculation within each year group to support the development of all 4 operations. Support and guidance for this policy has been taken from the White Rose Maths Calculation Policy as well as additional materials.

Addition - Year 3

Objective	Concrete	Pictorial	Abstract																		
Add mentally 3 digit – 3 digit 3 digit – 2 digit 3 digit – 1 digit	<div></div> <div>300 + 70 =</div> <p>Children to begin counting tens first. Progress to being over hundred boundary when adding tens.</p>	Use drawings to represent each digit. – PV chart may be used as below.	<div>$320 + 480 =$</div> <div>$700 + 100 = 800$</div>																		
Column addition – no regrouping 2 and 3 digits	<div><table><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></tbody></table></div> <div>Begin by using dienes to add using place value charts. Start with no exchanging such as 31 + 26 = 57. Begin adding the units. This could be done with place value counters too.</div>	H Hundreds	T Tens	U Units							<div><table><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></tbody></table></div> <div>Children move to drawing counters.</div>	H Hundreds	T Tens	U Units							<div><div>Children to complete the formal expanded method for addition. Showing their understanding of place value</div><div>$\begin{array}{r} 223 \\ + 114 \\ \hline 7 \\ 30 \\ 300 \\ \hline 337 \end{array}$</div><div>Note: If children are secure with their place value knowledge, they may progress onto the compact method for addition as shown in year 4-6.</div></div>
H Hundreds	T Tens	U Units																			
																					
																					
H Hundreds	T Tens	U Units																			
																					
																					
Column addition – with regrouping 2 and 3 digits	<div></div> <div>Progress to exchanging where there are more than 10 ones in the units column and they need to be exchanged for a ten. This could also be done with place value counters.</div>	<div><table><thead><tr><th>Th Thousands</th><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></tbody></table><div><div>771</div><div>771</div></div></div> <div>Children move to drawing counters.</div>	Th Thousands	H Hundreds	T Tens	U Units									<div><div>Children to complete the formal expanded method for addition. Showing their understanding of place value.</div><div>$\begin{array}{r} 568 \\ + 261 \\ \hline 9 \\ 120 \\ 700 \\ \hline 829 \end{array}$</div><div>Note: If children are secure with their place value knowledge, they may progress onto the compact method for addition as shown in year 4-6.</div></div>						
Th Thousands	H Hundreds	T Tens	U Units																		
																					
																					
Bar model to support problem solving	<div><div>Whole</div><div><div>?</div><div>628279</div></div><div>PartPart</div></div> <p>The bar model for addition needs to work alongside all problem solving to help children visualise what the problem is asking them to do.</p>																				


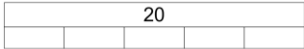

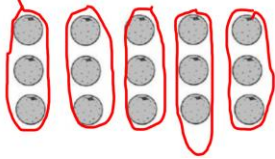
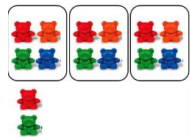

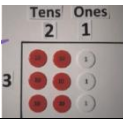
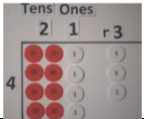
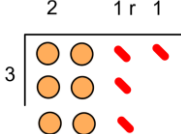
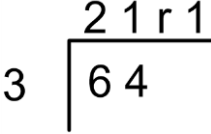
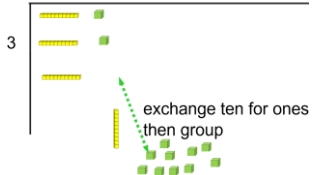
Subtraction - Year 3

Objective	Concrete	Pictorial	Abstract												
Subtract mentally 3 digit – 3 digit 3 digit – 2 digit 3 digit – 1 digit	 <p>230 - 40 = 190</p> <p>190 - 100 = 90</p>	 <p>230 - 40 = 190</p> <p>190 - 100 = 90</p>	$230 - 140 = 90$ $230 - 40 = 190$ $190 - 100 = 90$												
Column subtraction without regrouping 2 and 3 digit numbers	<table border="1" data-bbox="407 467 732 665"><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> <p>244 – 132 = 112</p>	H Hundreds	T Tens	U Units				<table border="1" data-bbox="1025 467 1514 601"><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> <p>244 – 132 = 112 Children represent numbers using drawings.</p>	H Hundreds	T Tens	U Units				<p>Children to complete the formal expanded method for subtraction. Showing their understanding of place value.</p> <div><div>-</div><div>244 132 2 10 100 112</div></div> <p>Note: If children are secure with their place value knowledge, they may progress onto the compact method for addition as shown in year 4-6</p>
H Hundreds	T Tens	U Units													
H Hundreds	T Tens	U Units													
Column subtraction with regrouping 2 and 3 digit numbers	 <p>153 – 37 = 116</p> <p>Use dienes to model how to exchange a ten for ten ones to enable the subtraction to happen.</p>	<table border="1" data-bbox="1160 873 1375 1005"><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> <table border="1" data-bbox="1160 1040 1379 1176"><thead><tr><th>H Hundreds</th><th>T Tens</th><th>U Units</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr></tbody></table> <p>254 – 138 =</p> <p>Children represent numbers using drawings.</p>	H Hundreds	T Tens	U Units				H Hundreds	T Tens	U Units				<p>Children to complete the formal expanded method for subtraction. Showing their understanding of place value.</p> <div><div>-</div><div>254 138 6 10 100 116</div></div> <p>Note: If children are secure with their place value knowledge, they may progress onto the compact method for addition as shown in year 4-6</p>
H Hundreds	T Tens	U Units													
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Bar model – supporting problem solving	<div><div>Whole</div><div>254</div><div>189 ?</div><div>Part Part</div></div> <p>The bar model for addition needs to work alongside all problem solving to help children visualise what the problem is asking them to do.</p>														

Multiplication - Year 3

Objective	Concrete	Pictorial	Abstract
Grid method	<p>Show the links with arrays first before starting the grid method.</p> <div><div><div><div>x</div><div>10</div><div>3</div></div><div><div>4</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></di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Division - Year 3

Objective	Concrete	Pictorial	Abstract
Division as grouping	$96 \div 3 = 32$  Use place value counters to group into the given amounts.	 $20 \div 5 = ?$ $5 \times ? = 20$ Continue to use bar modelling to show and support understanding. E.g $12 \div 4 = 3$	$28 \div 7 = 4$ Divide 28 into groups of 7. How many are in each group?
Division with arrays	 Link division to creating arrays and think about the number sentence that can be created. $15 \div 3 = 5$, $15 \div 5 = 3$, $3 \times 5 = 15$, $5 \times 3 = 15$	Draw representations and split into groups to make division sentences.  $15 \div 5 = 3$	$28 \div 7 = 4$ $28 \div 4 = 7$ $7 \times 4 = 28$ $4 \times 7 = 28$ Find the inverse of multiplication and division sentences
Division with remainders	$14 \div 3 = 4 \text{ r } 2$ 	 Jump in equal steps to see the remainder. Draw dots and circle the full groups.	$32 \div 7 = 4 \text{ r } 4$
Formal division – larger numbers. No exchanging	$63 \div 3 = 21$  $87 \div 4 = 21 \text{ r } 3$ 		
Formal division – larger numbers. Exchanging	$42 \text{ divided by } 3$ 	As above but using exchanging.	