

Netherfield Primary School Calculation Policy

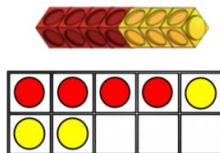
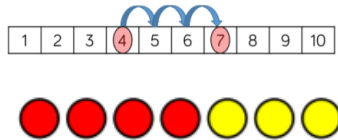
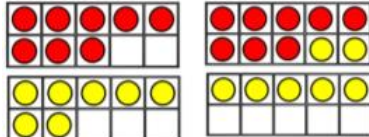
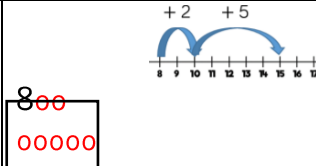
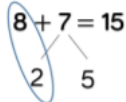
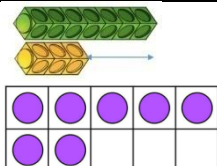
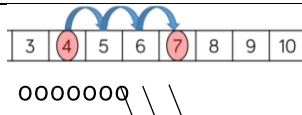

At Netherfield Primary School, we follow the White Rose scheme of work, which meets the aims of the National curriculum. This calculation policy has been written to support our scheme of work and ensure that children are exposed to a progressive, variety of methods for solving the different calculations that they will encounter in their maths learning. It has been written collaboratively by the teaching staff at Netherfield Primary School, using our professional experiences to tailor the policy to best meet the needs of the children we teach.

This calculation policy has been written to show progression within each of the four areas of calculation: addition, subtraction, multiplication and division. These areas of calculation have been grouped together as addition & subtraction, and multiplication & division. This is because we recognise the benefit to children of teaching these strands alongside each other to highlight the inverse properties of these operations.

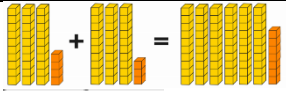

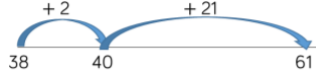
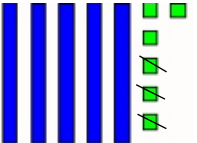
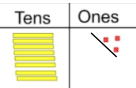

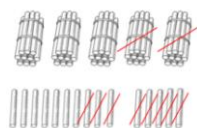
At its core, this calculation policy has been designed to teach children through the use of concrete, pictorial and abstract representations. Reinforcement and fluency are achieved by going back and forth between these representations. We understand the benefit of teaching through this approach as a way of developing and embedding a deep understanding of number and calculation for our pupils.

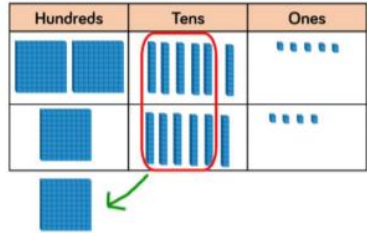
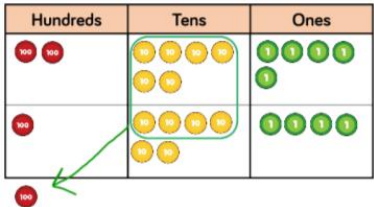
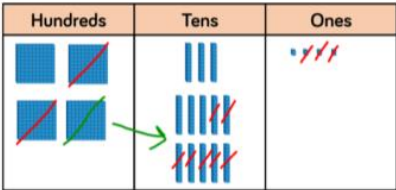
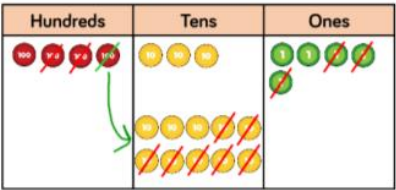
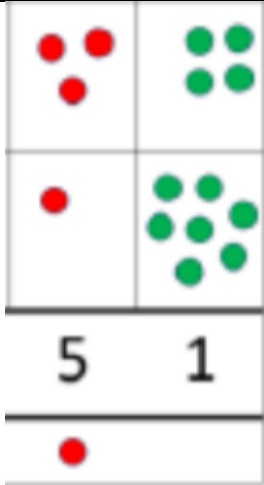
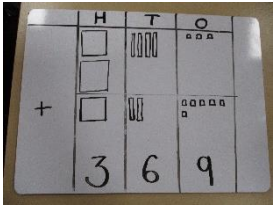
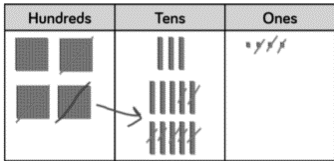
The 2014 National curriculum highlights the importance of children using the correct mathematical language as a central part of their learning (reasoning). It is essential that alongside teaching the methods in this policy, we must also ensure that children are able to verbalise their learning through the use of correct and specific mathematical vocabulary. This is achieved by introducing children to the vocabulary in the correct context, explicit modelling by adults and by giving children the opportunity to practice using the vocabulary to verbalise their learning.

Addition and Subtraction

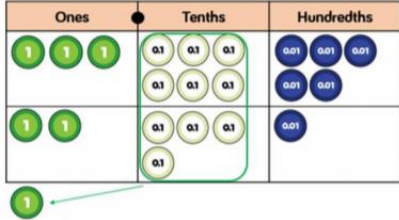
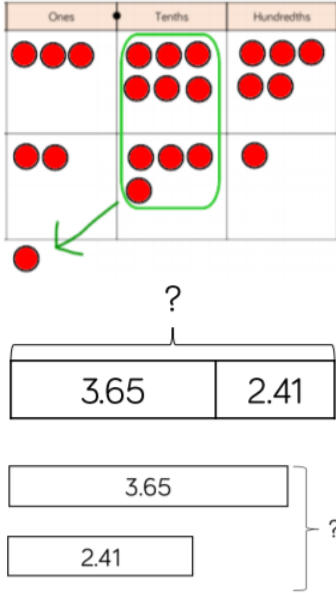
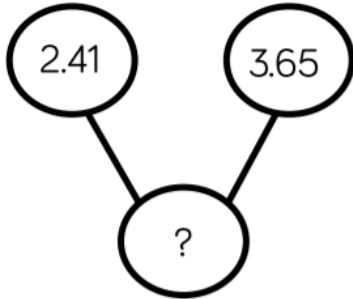
Learning	Concrete	Pictorial	Abstract	Notes <i>(including layout)</i>	Vocabulary	
Year 1 Add two 1 digit numbers to 10			$4 + 3 = 7$ $7 = 4 + 3$ 4 add 3 = 7		digit add, addition, more, equal to, altogether, doubles, number bonds	
Year 1 Add two 1 and 2 digit numbers to 20			$8 + 7 = 15$ $15 = 8 + 7$		It is important to highlight the importance of ten ones equalling one ten. Counting on can be used.	digit add, addition, more, equal to, altogether, doubles, number bonds
Year 1 Subtract 1 digit number from 10			$7 - 3 = 4$ 7 subtract 3 = 4		Find the difference	digit subtract subtraction less, take away equal to, find the difference

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 1 Subtract 1 or 2 digit number from 20			$14 - 6 = 8$ 14 subtract 6 = 8	Do we need to teach find the difference at an another time and not within subtraction?	digit subtract subtraction less, take away equal to,
Year 2 Add three 1 digit numbers			$7 + 6 + 3 = 16$	Children need to look for number bonds to 10 or doubles	digit add, addition, more, equal to, altogether,
Year 2 Add 1 and 2 digit numbers to 100			$38 + 5 = 43$ $5 + 38 = 43$ 38 $\underline{5} +$	Encouraged to count from the larger number. Use of number bonds to ten to be used Counting on can be used.	digit add, addition, more, equal to, altogether, tens, ones,


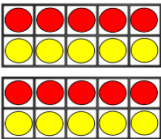
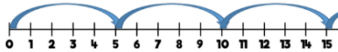
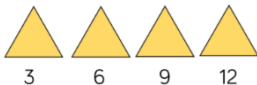

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 2 Add two 2 digit numbers	 		$\begin{array}{r} 33 \\ 22 \\ + \\ \hline \end{array}$	Hundred squares and blank number lines to count on in multiples of tens and ones Exchange to be taught.	digit add, addition, more, equal to, altogether, tens, ones, column, exchange
Year 2 Subtract 1 digit number from 100	 		$\begin{array}{r} 65 \\ 7 \\ - \\ \hline \end{array}$		digit subtract subtraction less, take away equal to, tens, ones,
Year 2 Subtract 2 digit numbers from 100			$\begin{array}{r} 65 \\ 32 \\ - \\ \hline \end{array}$	Exchange can be taught – this is usually a Greater Depth Skill.	digit subtract subtraction less, take away equal to, tens, ones, columns

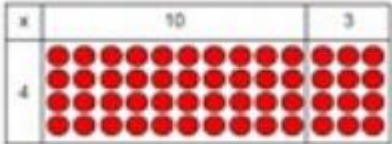

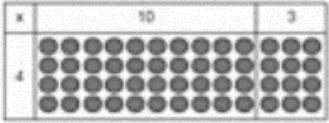
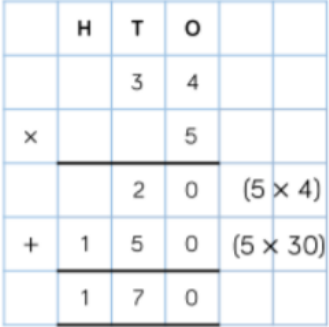
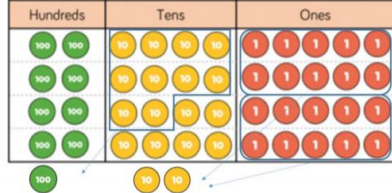
Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 3 Add/ subtract up to 3-digits	   	  <p>Subtraction:</p> 	$ \begin{array}{r} 265 \\ + 164 \\ \hline 429 \\ 1 \end{array} $	Layout: <ul style="list-style-type: none"> Longest number on top Addition/ subtraction symbol to the left hand side on the second line Exchanges made on a new row underneath the calculation Exchanges crossed out once used One line used to separate the question and the answer Subtraction written in the 	Exchange Columns Subtraction – always question children, even when we know there isn't an exchange to encourage the habit. "Can we take x away from y , or do we need to exchange?"

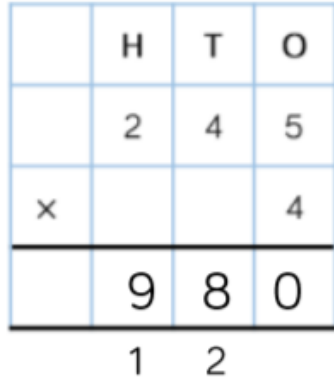
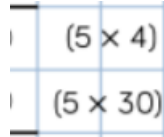
Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 4 Add/ subtract up to 4-digits				order they appear in the question (not “biggest number first” as this doesn’t support learning about negative numbers later on in school)	
Year 5/6 Add/ subtract 4+ digits				1 digit per box to support pv. Grid whiteboards used in Y3/4 and	

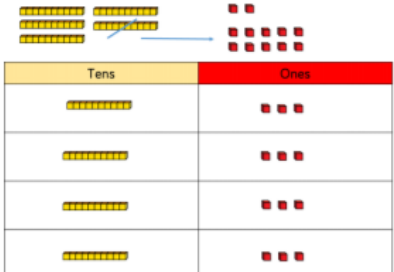
Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 5/6 Add/ subtract up to 3-dps			$\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \end{array}$ 	if necessary in YEAR 5/6.	

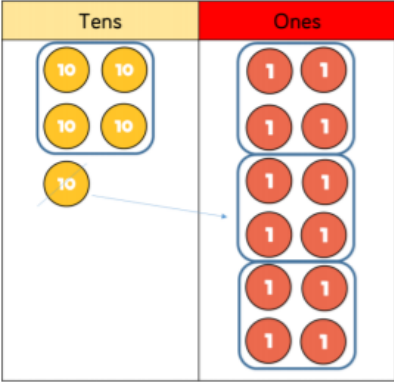
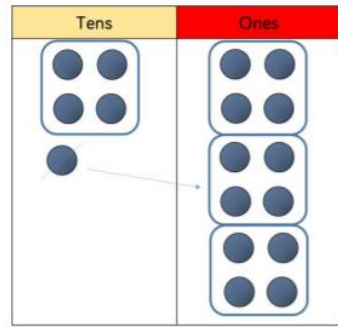

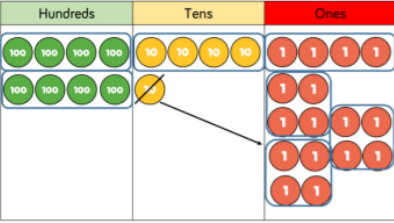
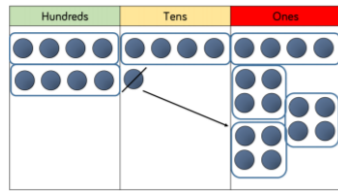

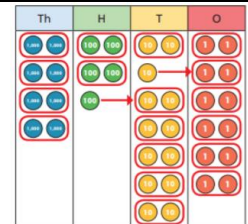

Multiplication and Division

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 1 Count in multiples of 2s, forwards and backwards			2, 4, 6, 8 to 24	To x 12	groups of 2s counting in 2s doubles
Year 1 Count in multiples of 5s, forwards and backwards			5, 10, 15, 20 to 60	To x 12	groups of 5s counting in 5s
Year 1 Count in multiples of 10s, forwards and backwards			10, 20, 30 to 120	To x 12	groups of 10s counting in 10s
Year 2 Count in multiples of 3s, forwards and backwards		 	3, 6, 9 to 36	To x 12	groups of 3s counting in 3s multiples
Year 2 Recall and use multiplication facts for 2, 5, 10, 3 times tables			6 x		

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 2 Recall and use division facts for 2, 5, 10, 3 times tables					
Year 3 2-digit x 1-digit	 	 <p>Drawing pv counters on a pv grid</p>		<ul style="list-style-type: none"> • Multiplication symbol to the left hand side on the second line • Exchanges made on a new row underneath the calculation • Exchanges crossed out once used • One line used to separate the question and the answer 	Y4 onwards to use the word “product” when discussing the answer to a multiplication Y5/6 “make 10x bigger” not “add 0”
Year 4 3-digit x 1-digit		<p>Drawing pv counters on a pv grid</p>			

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
				<ul style="list-style-type: none"> Expanded column method to also show the multiplication being answered. 	
Year 5 4-digit x 1-digit	Place value counters	Drawing pv counters on a pv grid	Written column multiplication	<ul style="list-style-type: none"> Chn to record ThHTO if necessary. 	
Year 5 2-digit x 2-digit grid method	base 10 place value counters	grid method to draw base 10 or pv counters	numerical grid method column multiplication		
Year 5 2/3-digit x 2-digit column multiplication			numerical grid method Written column multiplication		

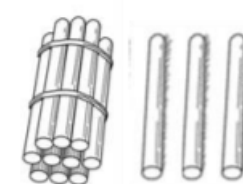
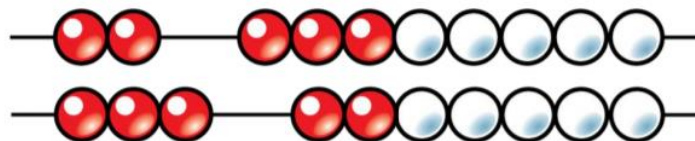
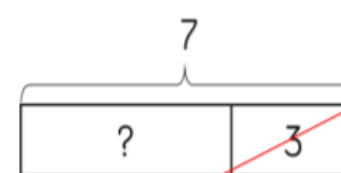
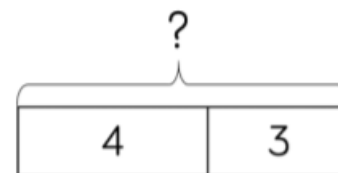
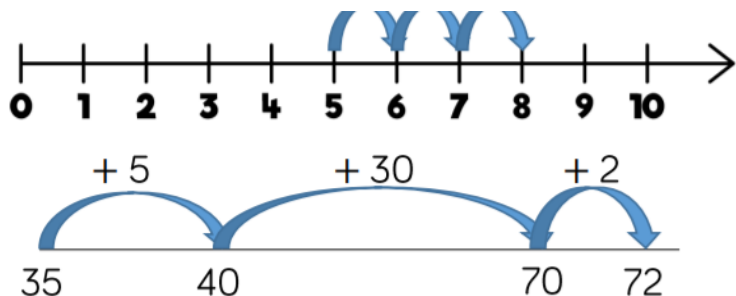
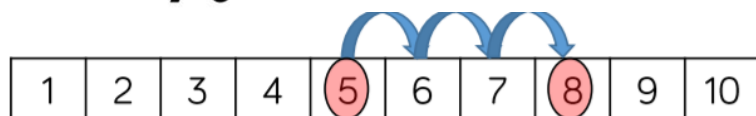
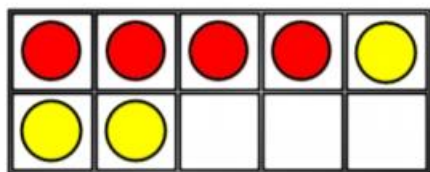
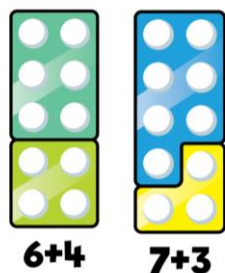
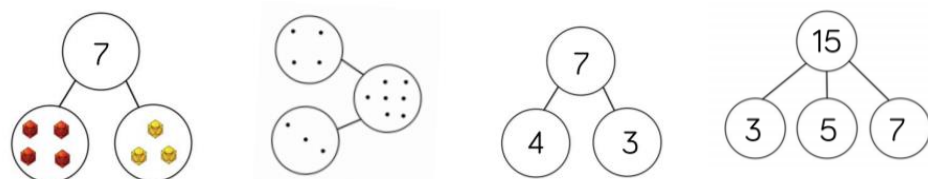
Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 6 4-digit x 2-digit			Written column multiplication		
Year 3 2-digit ÷ 1-digit (sharing with exchange and with remainders)		Sharing on PV grids	<p><i>Y3 consolidate conceptual understanding of sharing for division</i></p> <p>Abstract expression written alongside other methods</p>	<p>Y3 division questions should be beyond x12 (times table knowledge)</p> <p>Remainders "r1"</p> <p>Y4 to focus on conceptual understanding of short division (concrete, pictorial)</p> <p>Y5 to investigate layout of short-division (abstract)</p>	

Learning	Concrete	Pictorial	Abstract	Notes (including layout)	Vocabulary
Year 3 2-digit ÷ 1-digit (grouping)					
Year 4 3/2-digit ÷ 1-digit (grouping)					
Year 5 4-digit ÷ 1-digit (grouping)		A drawing of the concrete method			
Year 6 ÷ 2-digits (factors)	Counters Cubes	Pictures that can be cut/drawn on	Short-division/ bus-stop alongside concrete and pictorial		Y6 - divisor, dividend, quotient

Updated May 2022

Fluency in maths works through intelligent practice (rather than just mechanical repetition). This intelligent practice is called **varied fluency**. Once a child has grasped a mathematical concept, the idea is that they are exposed to varied fluency activities which develop their understanding. Below are some examples of varied fluency through different representations.

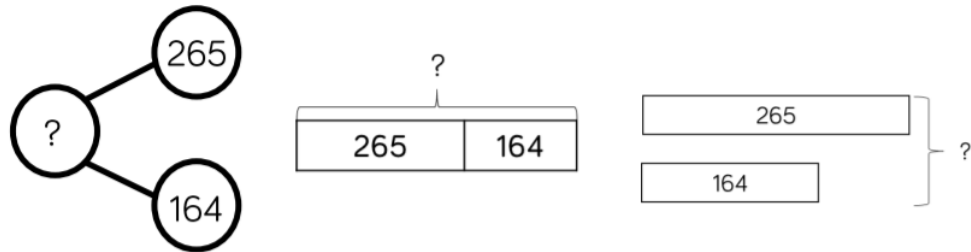
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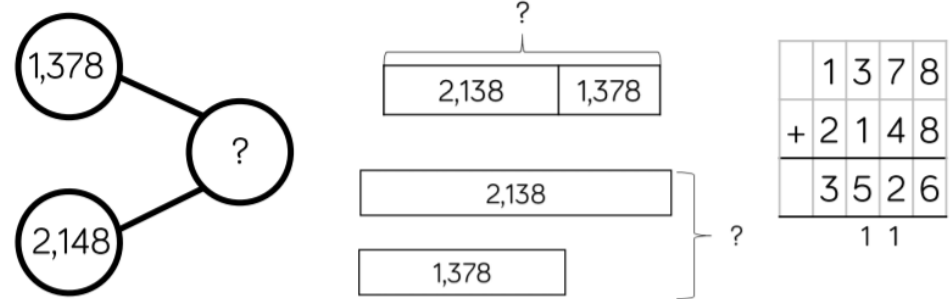
Tens	Ones

Tens	Ones

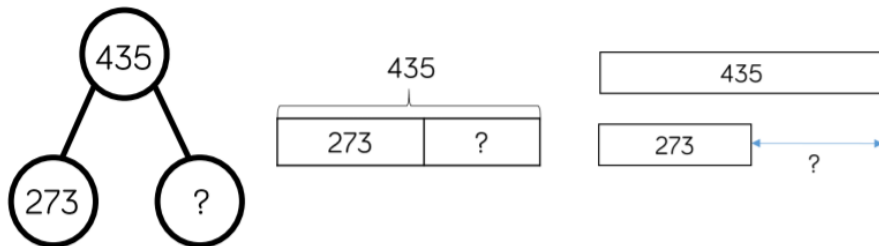
Key Stage 2:



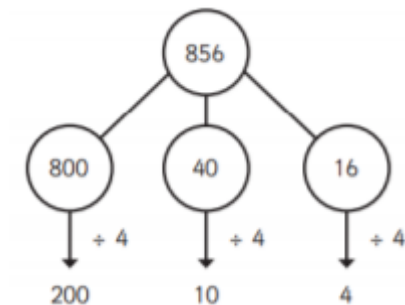
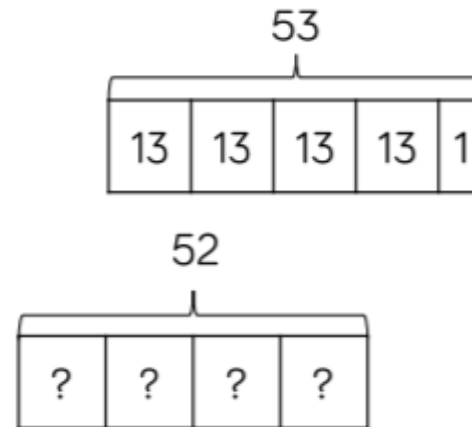
$$265 + 164 = 429$$



$$1,378 + 2,148 = 3,526$$



$$435 - 273 = 162$$



		0	3	6
	12	4	43	72