Woodseaves C.E. Primary Academy

Calculations Policy

Together we will create a respectful, caring and safe learning community that inspires all to achieve and flourish.

'Start children on the way they should go, and even when they are old, they will not turn from it.'

Proverbs 22:6

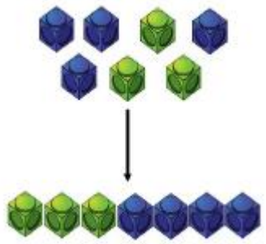
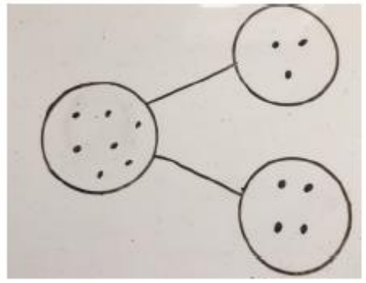
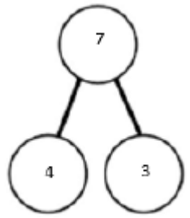
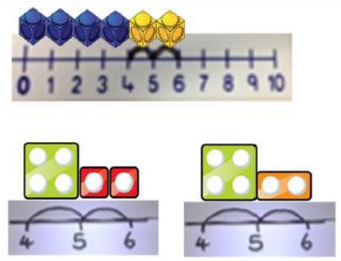
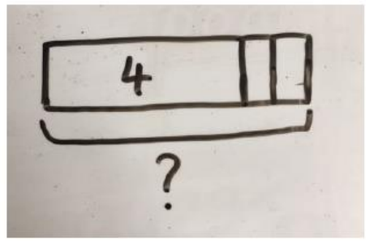
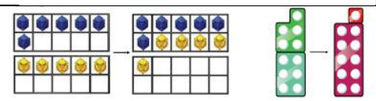
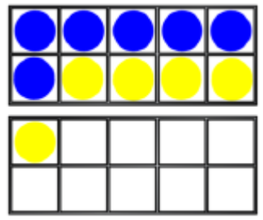
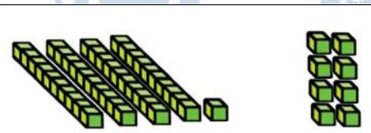
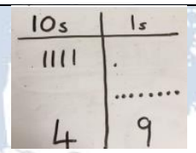
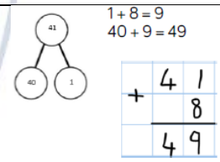
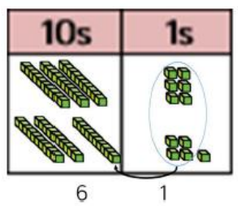
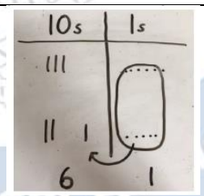
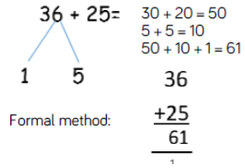
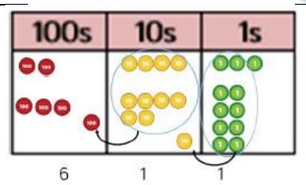
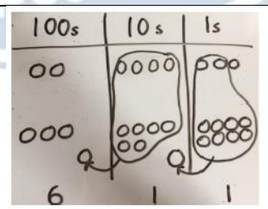
Ratified: Due to Covid -19 this policy will remain in draft format until approved by Governors

By*******

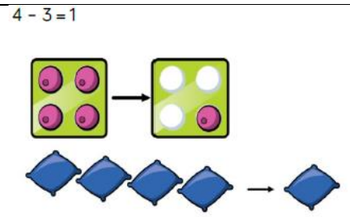
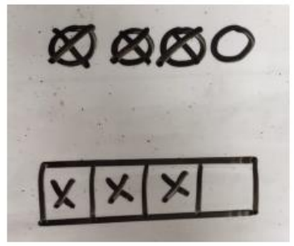
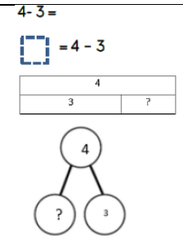
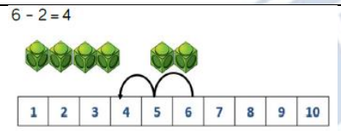
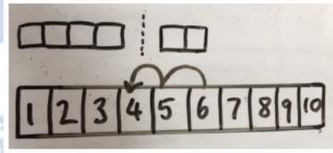
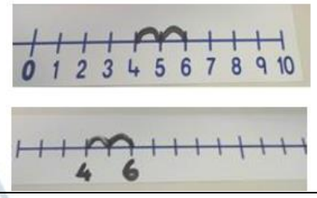
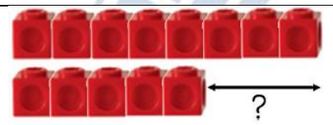
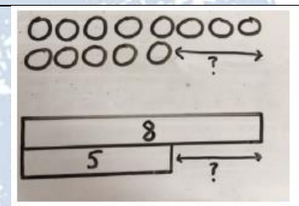
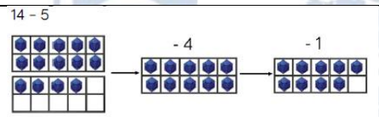
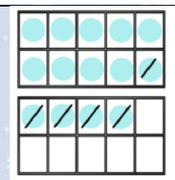
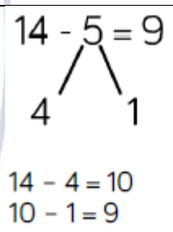
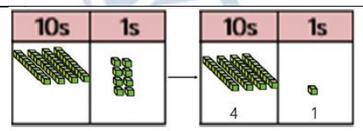
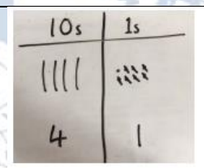
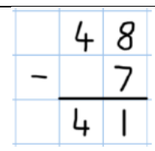
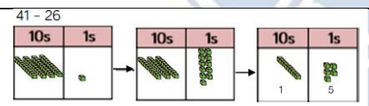
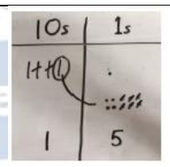
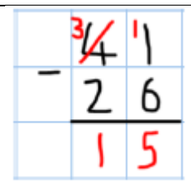
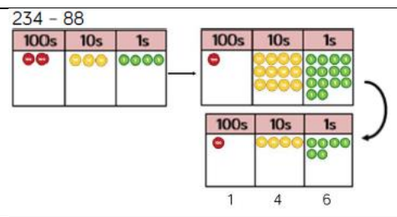
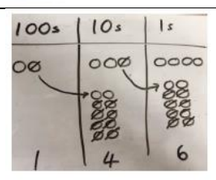
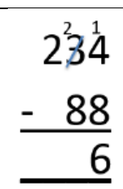
Review due ******

This policy has been largely adapted from the White Rose/Maths Hub materials, it is a working document which will be revised and amended as necessary.

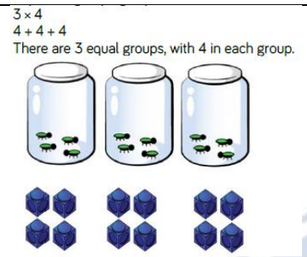
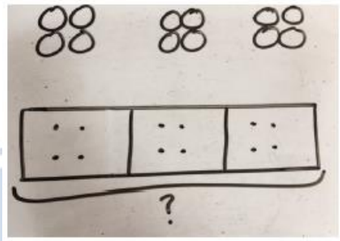
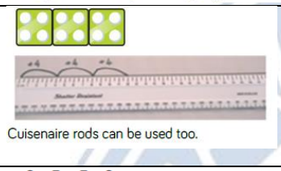
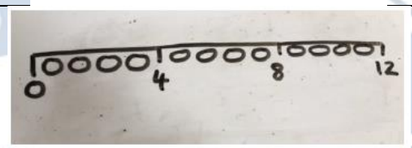
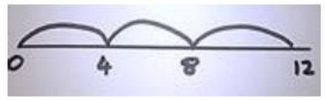
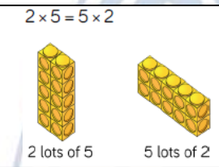
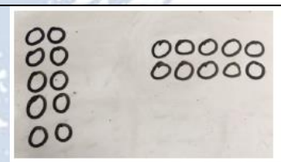
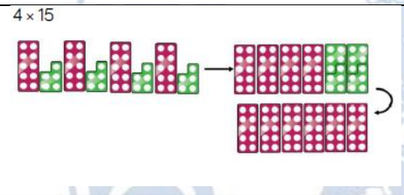
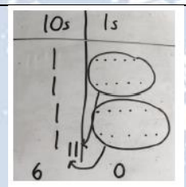
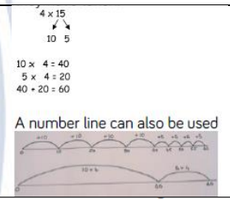
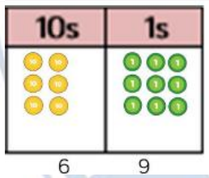
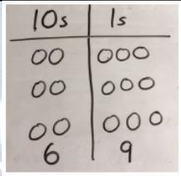
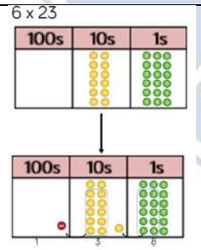
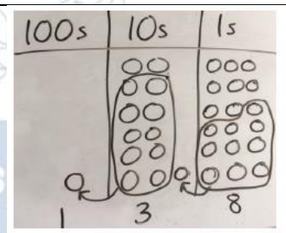
Addition

Objective/Strategy	Concrete	Pictorial	Abstract
Part whole model- Combining two parts to make a whole. Move from use of concrete objects, pictures of objects, to digits recorded.			
Counting on Move from use of numicon/blocks on a number line, to bar model, to an abstract number line.			
Regrouping to make 10 Move from concrete ten frame with blocks/counters, to children drawing own counters onto ten frame, to develop an understanding of equality.			$6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$
Adding 2 digit and 1 digit numbers Children move from using base 10/numicon resources, to lines and dots representation, to formal written methods.			
Adding 2 digit to 2 digit numbers Children move from using base 10/numicon resources, to using a place value chart with lines and dots, to formal written methods.			
Addition of 3 digit to 3 digit numbers Children move from using counters/base 10/numicon resources in a place value chart to drawing representations on a place value chart to formal written methods.			$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline 1\ 1 \end{array}$

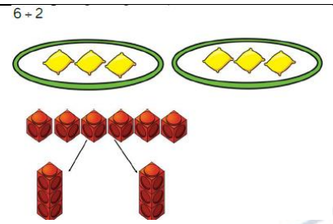
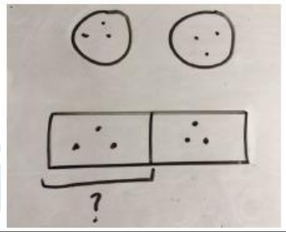
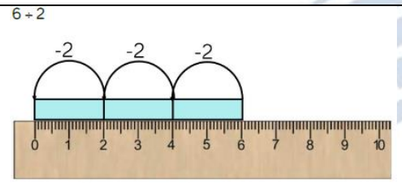
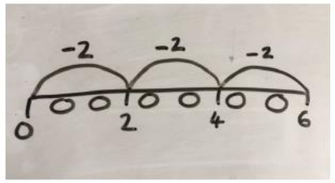
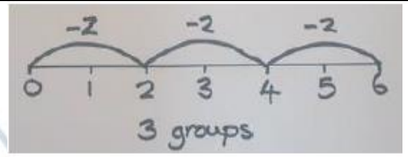
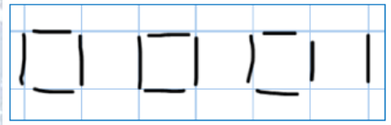
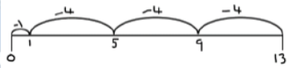
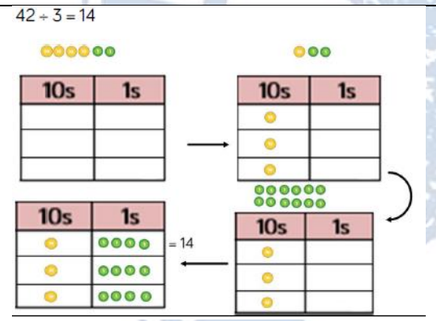
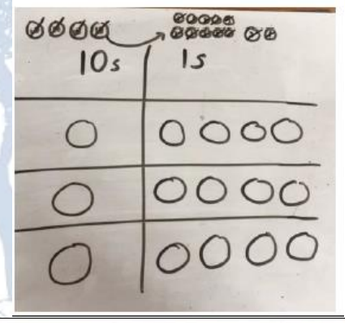
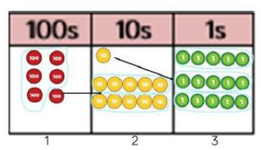
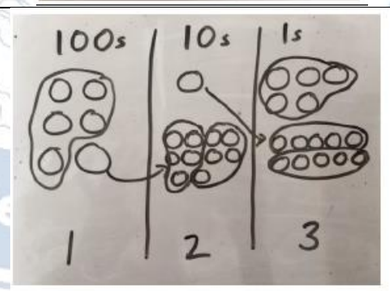
Subtraction

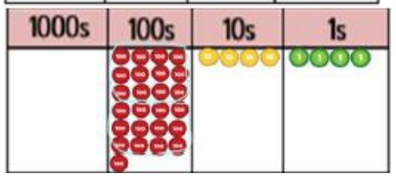
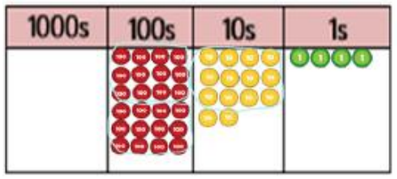
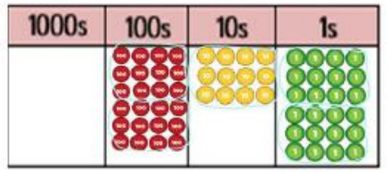
Objective/Strategy	Concrete	Pictorial	Abstract
Removing objects from a whole Children move from use of concrete resources including numicon, cubes, bean bags etc to drawing representations of the concrete resources and crossing out the required amount to bar modelling and partitioning.			
Counting back Children start with pre prepared number line, moving to children representing to what they see pictorially, to children representing on a blank number line.			
Finding the difference Children begin with using cubes and other concrete resources to moving to a drawing bar models/visual representations of cubes etc to representing mental process.			8 – 5, the difference is ☐ Children to explore why 9 - 6 = 8 – 5 = 7 – 4 have the same difference.
Making 10 Children use 10 frames and resources, then move to drawing their own ten frames, children then show how they can make 10 by partitioning the subtrahend.			
Column method – no exchange Children use base 10/numicon resources, then move to representing base 10 pictorially and then to the formal written method.			
Column method – with exchange Children use base 10/numicon to show the exchange, children then represent on a place value chart showing the exchange and then move to the formal written method.			
Column method – place value counters Children use place value counters and place value charts, then move to drawing the counters and representing the exchange process to a formal written method.			

Multiplication

Objective/Strategy	Concrete	Pictorial	Abstract
Repeated grouping/repeated addition Use of concrete resources e.g. cubes and pots to illustrate 3 groups of 4, children represent the concrete resources pictorially and/or use the bar model, then move to written representations.			3 × 4 = 12 4 + 4 + 4 = 12
Number lines to show repeated groups Children use numicon resources and prepopulated number lines, then children represent concrete resources alongside a number line, children use abstract number line.			3 × 4 = 12 
Use arrays to illustrate commutativity Children use cubes/counters or other objects, then move to drawing these resources and then use an array to write a range of calculations.			10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5
Partition to multiply Children begin with numicon resources and then move to representing these pictorially to performing partitioning abstractly and being able to annotate what they have done.			
Formal column method Children begin with using place value counters/base 10 then move to representing pictorially then representing their thinking through annotated calculations.			3 × 23 20 3 3 × 20 = 60 3 × 3 = 9 60 + 9 = 69 23 × 3 69
Formal column method			6 x 23 = 23 × 6 138 1 1

Division

Objective/Strategy	Concrete	Pictorial	Abstract
Sharing Children begin with using concrete resources and sharing, moving to using pictorial representations and/or bar modelling and then using annotations to illustrate working out.			6 ÷ 2 = 3 3 | 3 Children should also be encouraged to use their 2 times tables facts.
Repeated subtraction Children use Cuisenaire rods above a ruler, moving on to drawing a representation of the concrete resources and then abstract number line			
2 digit divided by 1 digit numbers Children use lollypop sticks to form wholes, then move to represent these pictorially and finally use multiplication facts and/or number lines.	Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over.		Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over' 
2 digit divided by 1 digit numbers Children use place value counters and place value grids to then representing this pictorially and finally writing calculations to show the process.	42 ÷ 3 = 14 		42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14
Short division	615 ÷ 5  1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones?		$\begin{array}{r} 123 \\ 5\overline{)\,6^{1}1^{1}5} \end{array}$

Long division	2544 ÷ 12  We can't group 2 thousands into groups of 12 so will exchange them.  We can group 24 hundreds into groups of 12 which leaves with 1 hundred. $\begin{array}{r} 02 \\ 12\overline{)2544} \\ \underline{24} \\ 1 \end{array}$  After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens. $\begin{array}{r} 021 \\ 12\overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2 \end{array}$  After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder. $\begin{array}{r} 0212 \\ 12\overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$