Talbot Primary School

Maths Calculation Policy

Reviewed: June 2025

Next review: June 2027

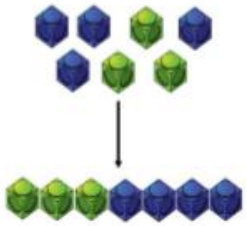
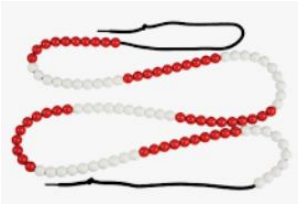
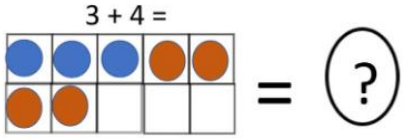
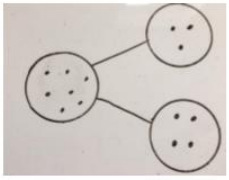
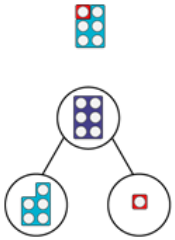
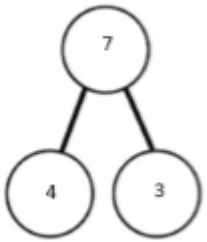
Introduction

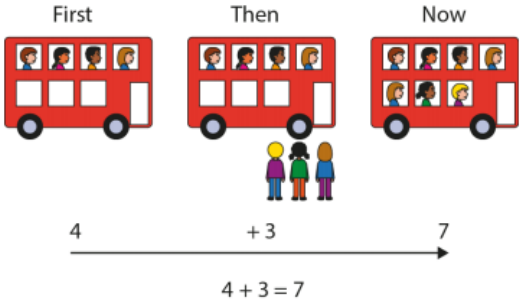
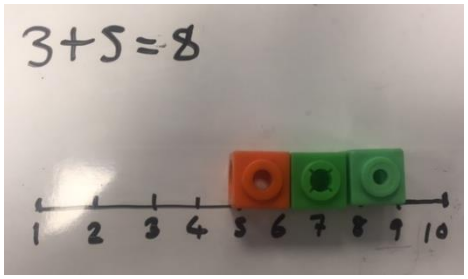
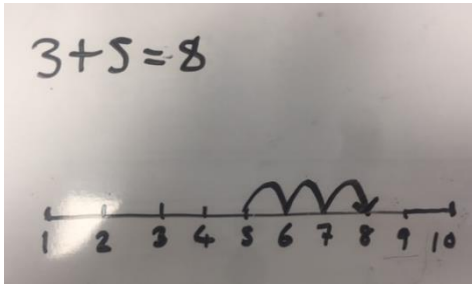
The purpose of this calculation policy is to demonstrate to teachers the preferred methods of calculation for our school. A range of models and structures should be used to help children to demonstrate their understanding of a subject using concrete, pictorial and abstract representations. We are dedicated to ensuring that this approach is consistent throughout school for all children as this will provide a deep and rich understanding of maths.

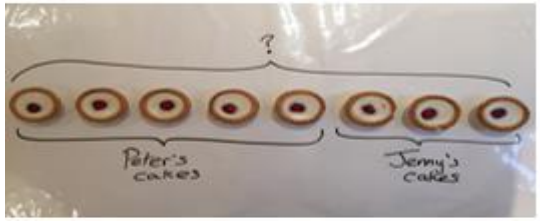
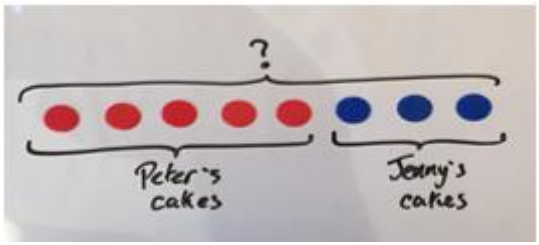
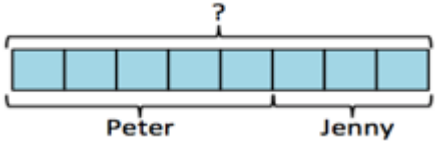
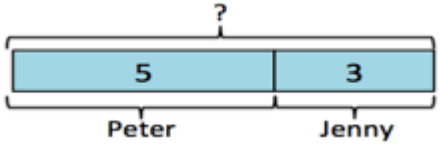
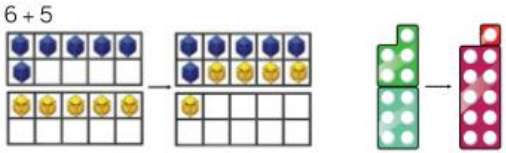
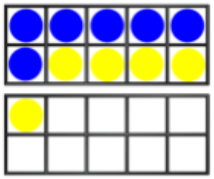
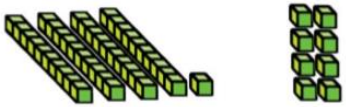
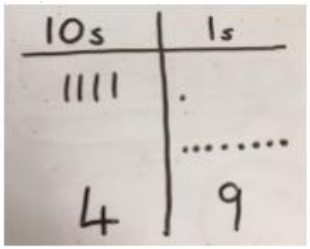
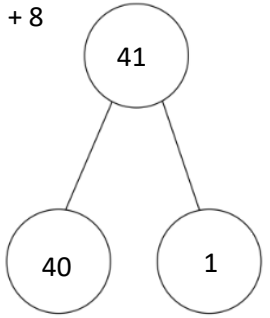
Why do we need this policy?

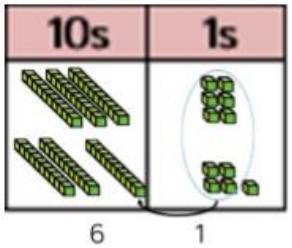
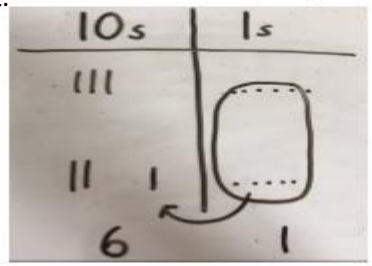
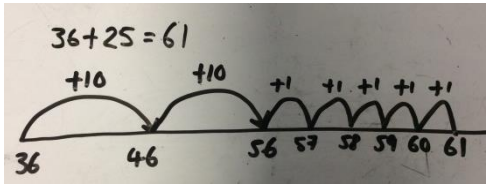
It is necessary to ensure consistency and progression of methods for calculation throughout the school. This guidance provides teachers with a clear path of progression, allowing them to help children progress and identify stages of progression for all children.

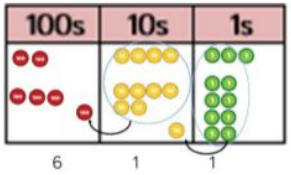
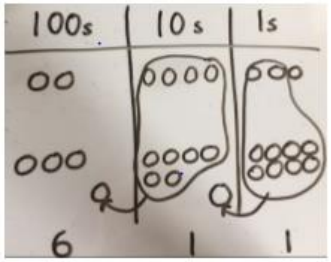
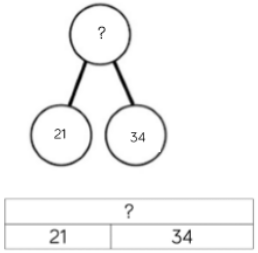
Although the policy is chronologically ordered from Early Years to Year 6, there are no specific year groups listed. This is reflective of our school approach which recognises that development may take place at different rates. It is crucial that children are not encouraged to progress too quickly before they have a solid understanding of a concept. The calculations listed in this policy should be used alongside the key models of our school: ten frames, number lines, part-whole models and bar models. In addition to this, concrete resources should be used to deepen pupil's understanding of a concept.

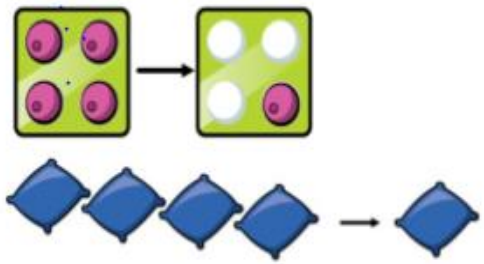
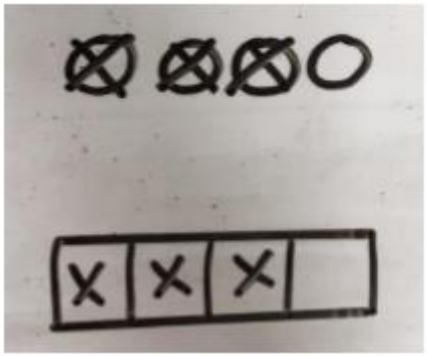
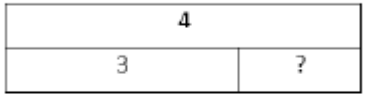
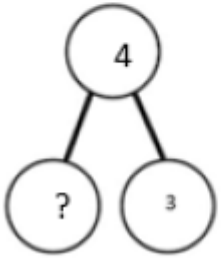
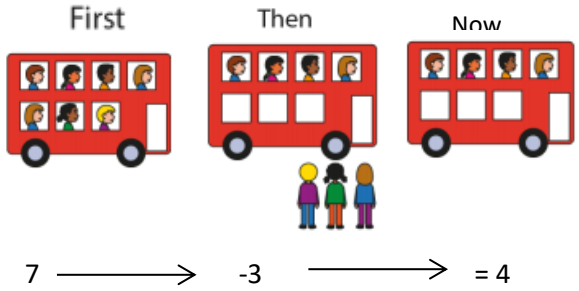
Addition	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part whole model Stem sentence: *This is a whole… because I have all of it.* *This is not a whole… because I don't have all of it.* *… is a part* *… is a part* *The whole is…*	Combining two parts to make a whole using objects and resources.  	Children to represent the cubes using dots or crosses. This could be shown using ten frames.  This could also be shown using part whole models.  	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven. 

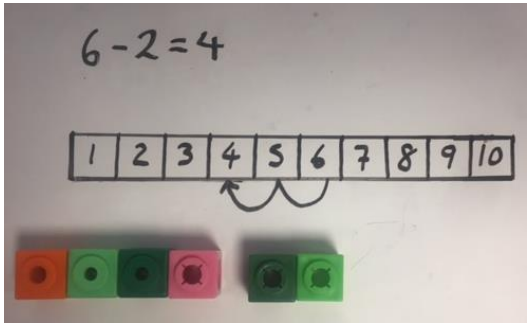
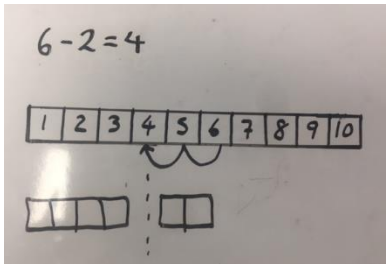
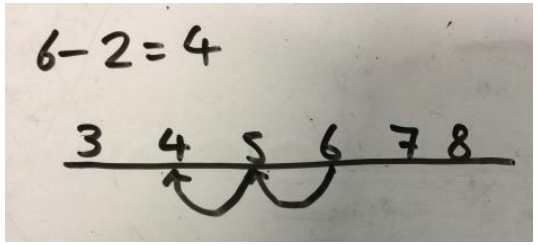
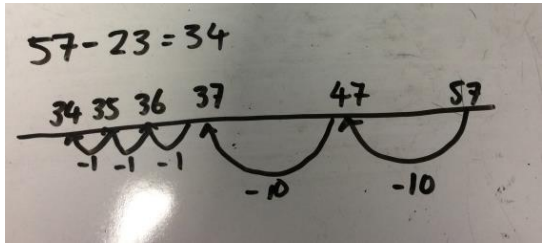
Addition stories Stem sentence: *First…then…now*	Chairs can be placed in rows of 2 to represent seats on a bus. Children can act out children getting on the bus. They should practise using the language 'First.. then…now' to explain the addition story.  	This can then be represented pictorially alongside the addition calculation.  	This can then be represented as the calculation alone, including missing number problems. 4 + 3 = 7 3 + _ = 7 7 = 3 + 4 7 = 4 + _
Adding on a number line	Using number lines or number tracks, children start with the larger number (5) and count on (3), This should be done using concrete objects such as cubes.  	Children to draw the steps onto the number line  .	3 + 5 = 8 8 = 5 + 3 8 = 3 + ? ? = 3 + 5 I have 3 sweets. I am given 5 more. How many do I have altogether?

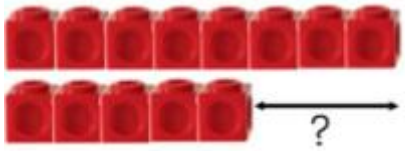
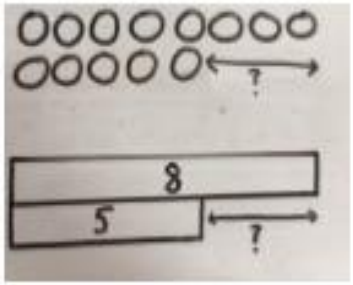
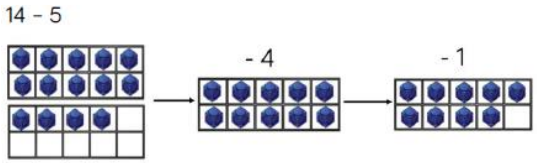
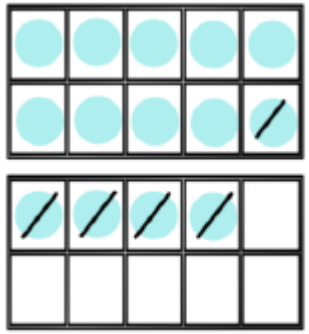
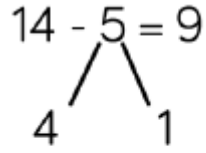
Combining parts to make a whole: bar model Stem sentences: *… is a part* *… is a part* *… is the whole*	Creating bar models using objects as part of a story.   	Children to represent the problem using a drawn bar model with each section representing one.  Once confident, children can represent each number as one bar.  	Children to complete an abstract calculation. **5 + 3 = 8** **3 + 5 = 8** **? – 5 + 3**
Regrouping to make 10.	Regrouping to make 10: using ten frames and counters/ cubes or using Numicon.  	Children to draw the ten frame and counters/cubes. 	Children to develop an understanding of equality e.g. 6 + □ = 11 6 + 5 = 5 + □ 6 + 5 = □ + 4
TO + 0 using base ten and other concrete apparatus	Children to develop understanding of partitioning and place value. TO + O using base ten, counters and moving onto place value counters. e.g. 41 + 8 	Children to represent the base 10 e.g. lines for tens and dots/crosses for one  	41 + 8  1 + 8 = 9 40 + 9 = 49

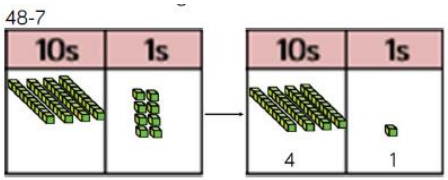
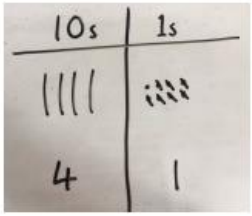
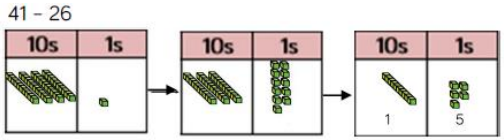
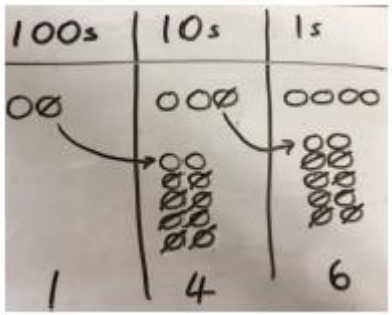
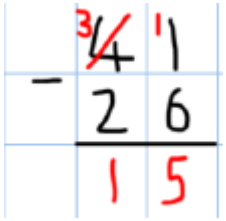
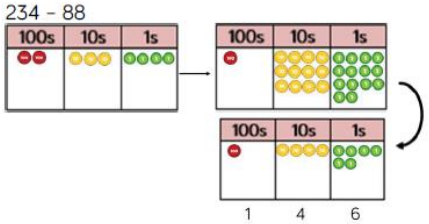
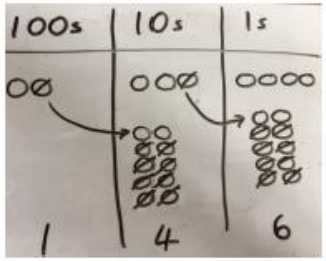
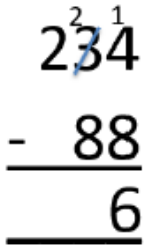
TO + TO using base ten, numicon and other equipment.	TO + TO using base 10 Continue to develop understanding of partitioning and place value. 36 + 25  	Children to represent the base 10 in a place value chart.  Jottings to be made alongside using the concrete apparatus. 3 6 + 2 5 50 + 11 50 + 11 = 61	Partitioning methods used to add. This does not always need to be recorded but can be used as a mental method. 36 = 30 + 6 25 = 20 + 5 50 + 11 = 61 Children should extend this by looking for ways to make 10. 36 + 25= 1 5 30 + 20 = 50 5 + 5 = 10 50 + 10 + 1 = 61 Formal method: 36 +25 61 1 Children can then use a number line. They should begin with the larger number. The smaller should then be partitioned and added on in steps. 

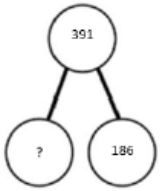
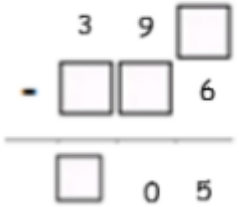
Column method – exchanging. Sentence stem: *If the column sum is equal to 10 or more, we must exchange.*	Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column – we exchange for 1 ten. When there are 10 tens in the 10s column, we exchange for 1 hundred.  This can also be done with Base 10 (dienes) to help children clearly see that 10 ones equal 1 ten and that 10 tens equal 100.	Children to represent the counters in a place value chart when they make an exchange.  	Once children have a secure understanding of exchanging, they can move onto formal methods of addition. They can begin by partitioning the numbers. 20 + 5 40 + 8 60 + 13 = 73 Children should then move on to showing the exchange below the calculation. Children should cross out the exchanged digit as they add it, to ensure that they do not forget. 243 +368 611 1 1 This will later be developed to adding decimals using column addition.
Conceptual variation; different ways to ask children to solve 21 + 34			
 	Raj spent £391. Timmy spent £186. How much more did Raj spend? Calculate the difference between 391 and 186.	21 +34 21 + 34 = ☐ = 21 + 34 Calculate the sum of twenty-one and thirty-four.	 Missing digit problems: 

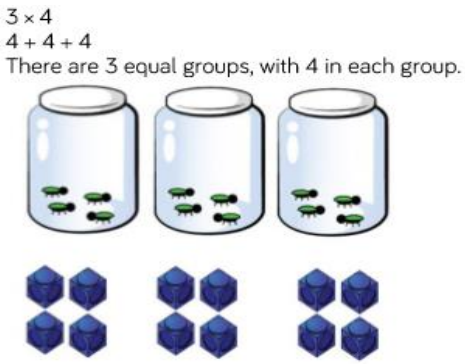
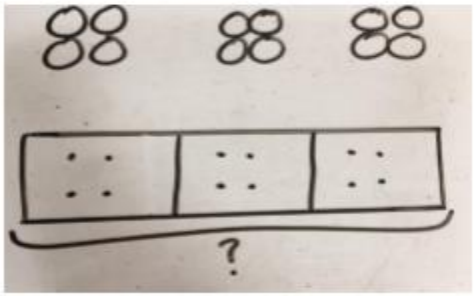
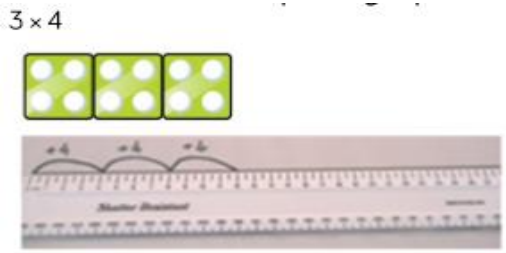
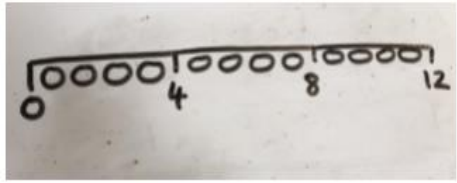
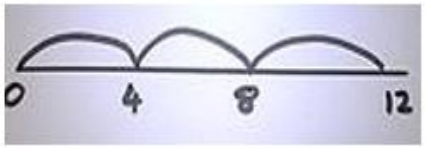
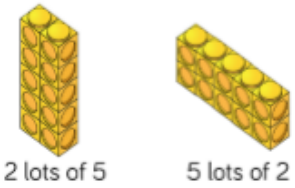
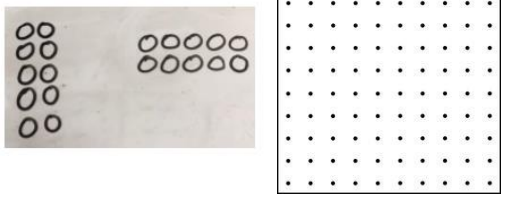
Subtraction	Concrete	Pictorial	Abstract
Physically taking away and removing objects from a whole. Stem sentence: *When we subtract… our number gets… smaller.*	4 – 3 = 1 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 	4- 3 = ☐ = 4 – 3  
Subtraction stories Stem sentence: *First…then…now*	Chairs can be placed in rows of 2 to represent seats on a bus. Children can act out children getting off the bus. They should practise using the language 'First.. then…now' to explain the subtraction story. 	This can then be represented pictorially alongside the subtraction calculation. 	This can then be represented as the calculation alone, including missing number problems 7 – 3 = 4 4 = 7 – 3 3 = 7 - _

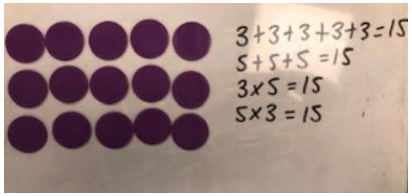
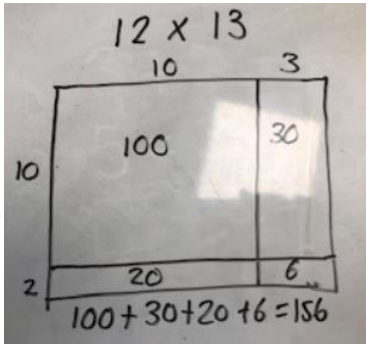
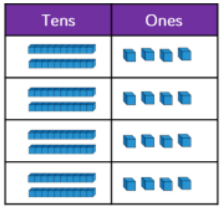
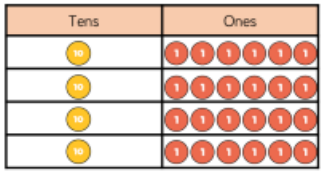
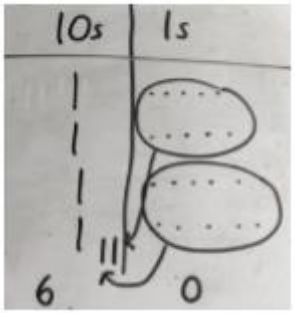
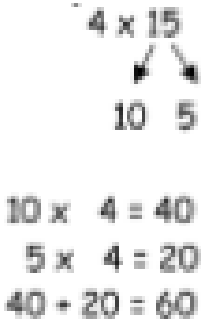
Counting back	Using number lines or number tracks, children start with 6 and count back 2. This should be done using concrete objects such as cubes. 	Childen to represent what they see pictorially.  Children to count back on a number line (arrows below the line for subtraction).  This should then progress to counting back using 2 digit numbers which have been partitioned into tens and ones. 	Put 13 in your head and count back 4. What number are you at?

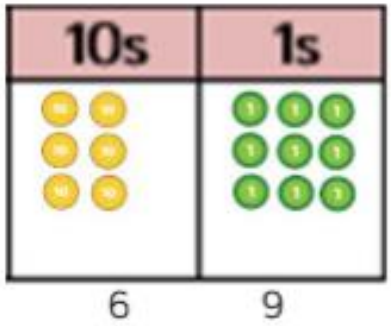
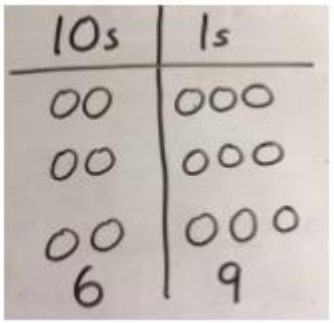
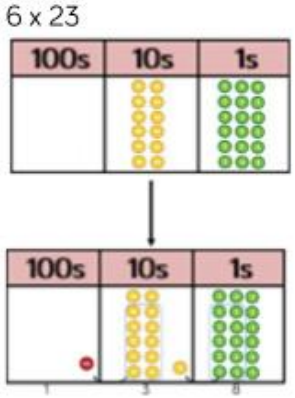
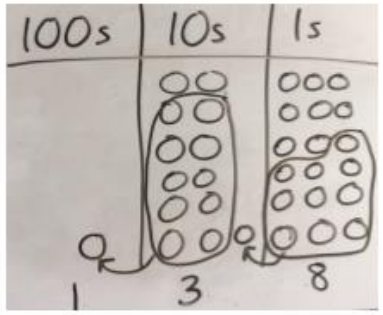
Finding the difference	Use cubes, numicon, Cuisenaire rods or other objects to calculate difference. Calculate the difference between 8 and 5. 	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. Finding the difference between 8 and 5. 	Find the difference between 8 and 5. Children to explore why 9-6 = 8 - 5 = 7 - 4 have the same difference.
Making 10 using ten frames.	Making 10 using ten frames 	Children to represent the ten frame pictorially and discuss what they did to make ten. 	Children to show how they can make 10 by partitioning the number which is being subtracted.  14 – 4 = 10 10 – 1 = 9

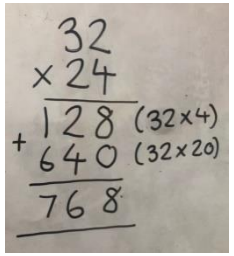
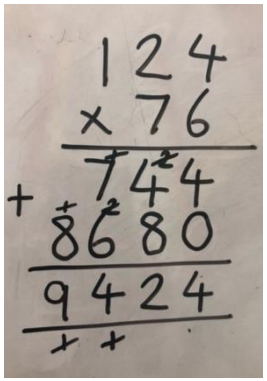
TO – O and TOP – TO without exchanging Stem sentence: *The ones column represents..one(s) minus ..one(s) is equal to … ones.* *The tens column represents…ten(s) minus…ten(s) is equal to … tens.*	Children to represent TO-O using base 10. Children can move onto using place value counters. 	Children to show the base 10 pictorially. 	Children to complete calculations mentally. 46 – 7 = 34 – 9 =
Subtraction with exchanging Stem sentence: *We must exchange …ten for…ones.*	Children to use base 10 to show subtraction calculations in which there is exchanging needed. 	Represent the base 10 pictorially- remember to show the exchange. 	Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11 
Column method	Children should use place value counters to show what happens when subtracting using the column method. 	Represent the place value counters pictorially remembering to show what has been exchanged. 	Formal column method. Children must understand what has happened when they have crossed out digits. 

Conceptual variation; different ways to ask children to solve 391-186			
 391 186 | ?	Raj spent £391, Timmy spent £186. How much more did Raj spend? Calculate the difference between 391 and 186.	□ = 391 – 186 391 -186 ___ What is 186 less than 391?	Missing digit calculations 

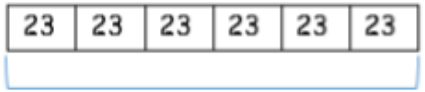
Multiplication	Concrete	Pictorial	Abstract
Repeated grouping/ repeated addition	Using objects to show repeated grouping and addition. 	Children to represent the practical resources in a picture and a bar model. 	3 x 4 = 12 4 + 4 + 4 = 12
Number lines	Children to use objects on a number line to show repeated groups. e.g. numicon on a number line  Cuisenaire rods can be used too.	Represent this pictorially alongside a number line. 	Abstract number line showing three jumps of four. 3 x 4 = 12 
Use arrays to show commutativity Stem sentence: *There are… rows of ….; altogether there are…* *We have… groups of…*	Children to use counters and other objects to show arrays. 2 x 5 = 5 x 2 	Children to represent the arrays pictorially or using dot paper. 	Children to be able to use an array to write a range of calculations e.g. $10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$

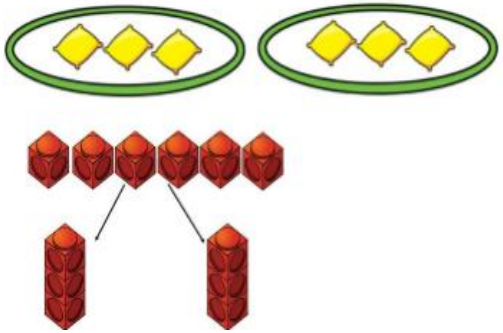
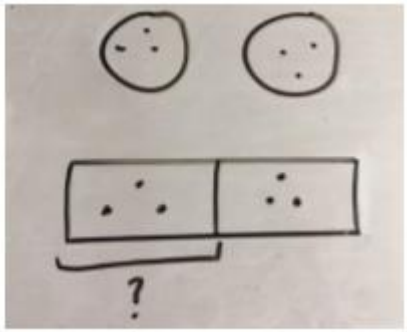
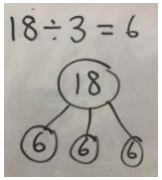
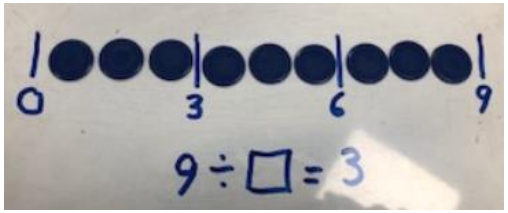
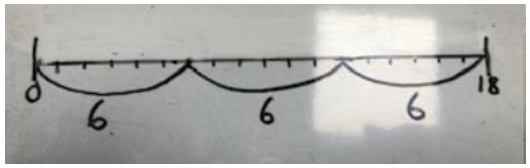
There are…columns of…; altogether there are…		Children to use blank arrays to show more complex multiplications. This supports mental methods of multiplication. 	
Partition to multiply using base 10 or place value counters.	Partition to multiply using base 10 or place value counters. e.g. 24 x 4  16 x 4 	Children to represent the concrete manipulatives pictorially. 	Children to be encouraged to show the steps they have taken. 

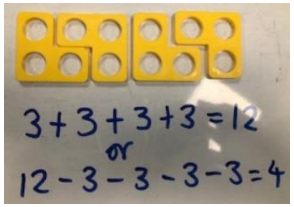
Multiplying TO X O Stem sentence: *The factors are … and …* *The product is…*	Representing the multiplication using place value counters (base 10 can also be used). 3 x 23  	Children to represent the counters pictorially.  	Children to record what it is they are doing to show understanding. 3 x 23 → 20 3 3 x 20 = 60 3 x 3 = 9 60 + 9 = 69 Children should begin to look at this as a formal method but should be aware that mental methods should be used when possible. 23 × 3 69
Formal column method Stem sentence: *The factors are … and …* *The product is…*	Children to represent a formal column method with place value counters.  	Children to represent the counters/ base 10 pictorially.  	Formal written method. Exchanged digits should be written beneath the calculation. These should be crossed out when they are added so they are not forgotten. 6 x 23 = 23 × 6 138 1 1

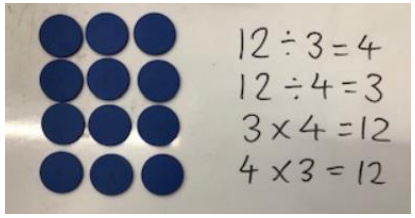
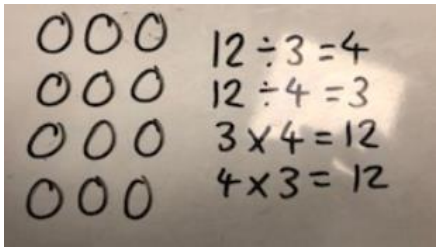
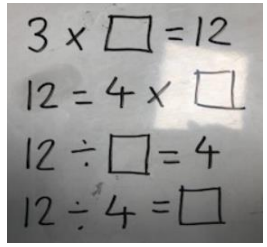
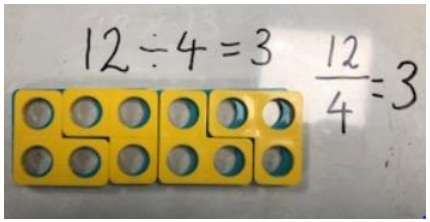
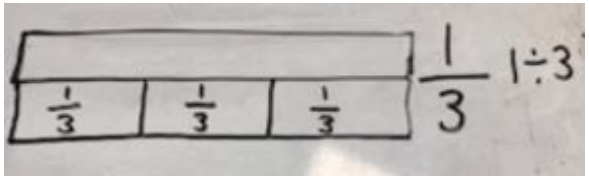
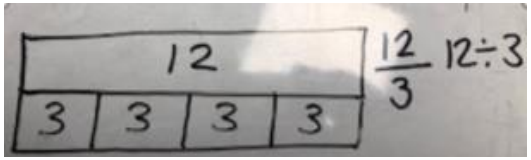
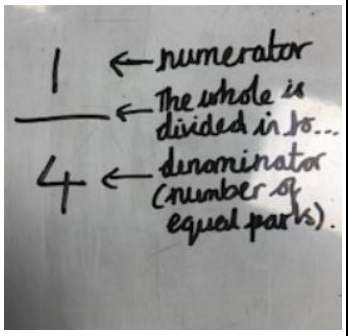
			Children then begin to learn long multiplication. First with notations alongside.  Once they are secure with this, they can multiply without writing the partitioned calculation alongside. Exchanged digits should be added to each row of the calculation as shown below. Exchanged digits should be crossed out once they have been added. 

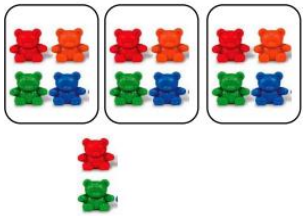
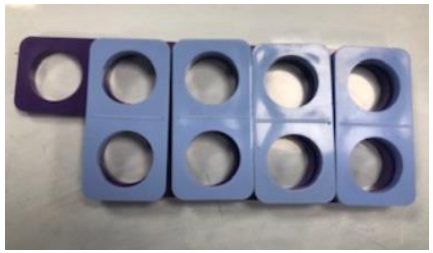
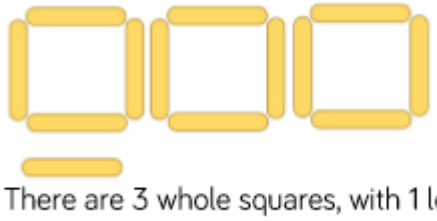
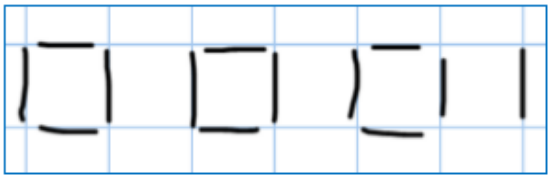
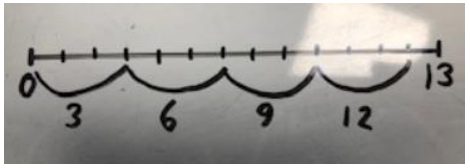
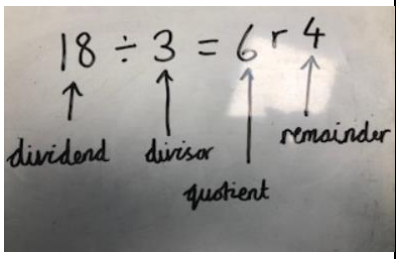
Conceptual variation; different ways to ask children to solve 6 x 23

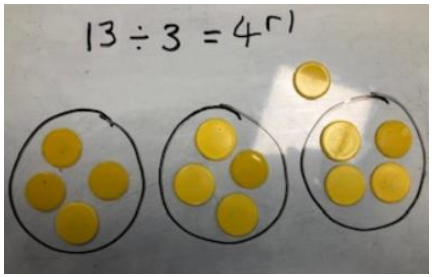
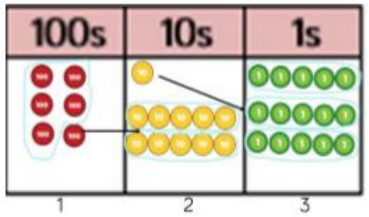
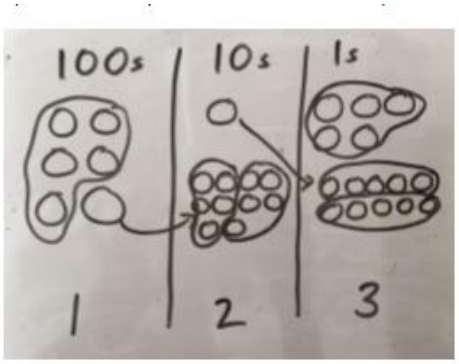
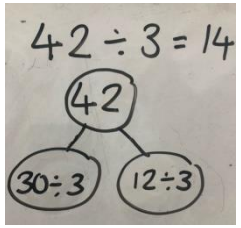
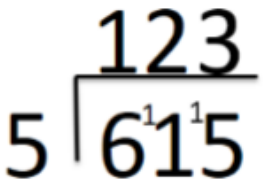
	Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week? With the counters, prove that 6 x 23 = 138	Find the product of 6 and 23 $6 \times 23 =$ $\square = 6 \times 23$ $\begin{array}{r} 6 \\ \times\ 23 \\ \hline \end{array}$ $\begin{array}{r} 23 \\ \times\ 6 \\ \hline \end{array}$	What is the calculation? What is the product? 

Division	Concrete	Pictorial	Abstract
Sharing objects into groups. 6 ÷ 2 Sentence stem: *divided into groups of…*	Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially. 	6 ÷ 2  Children should also be encouraged to use their 2 times table facts. Part whole models are also used to show division as sharing. 
Division as grouping. Sentence stem: *…is divided into groups of…There are … groups.*	Repeated addition or subtraction Counting up or down in groups of 3, to find how many in 9.  Using Numicon, to see division as repeated addition/subtraction.	Using a number line to work out the number of groups of 6 in 18. 	Application of grouping to word problems: A teacher needs 28 pens for a writing activity. Pens come in packs of 7. How many packs does she need to get?

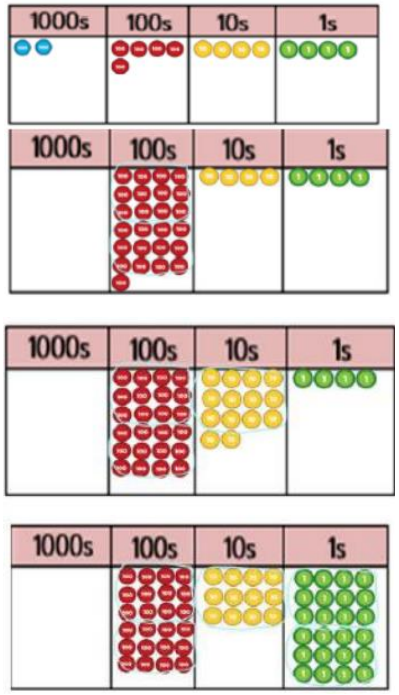
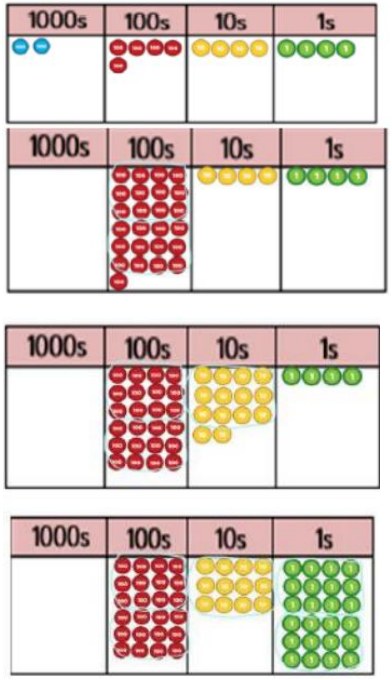
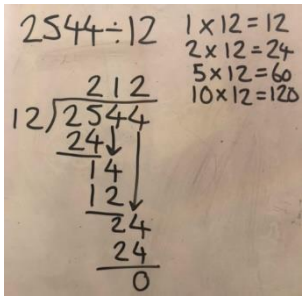
	 Using Cuisenaire rods alongside a ruler to show how many groups of 3 in 15.  Using Cuisenaire rods to show how many groups of 4 there are in 20. 		

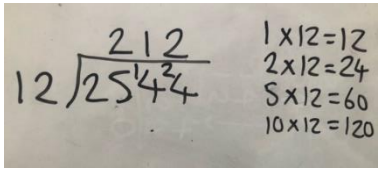
Division as arrays. Sentence stem: *… put into …rows, makes … columns.*	Using arrays to show a link between multiplication and division. 	Drawing arrays to show the connection between multiplication and division. 	Create linked multiplication and division statements using the inverse method. 
Division linked to fractions. Stem sentence: *The whole has been divided into…equal parts and we have…of them.*	Using Cuisenaire rods to show that a whole divided into 2 equal parts is $\frac{1}{2}$  Our whole is 12. It has been divided into 4 equal groups. Each of these groups is a quarter. 	Using bar models to highlight the connection between division and fractions. The whole has been divided into 3 equal parts. Each part is a third.  The whole is 12. It has been divided into 4 equal parts. Each of these groups is a quarter. 	Children can confidently discuss the connection between division and fractions. 

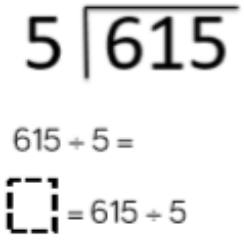
Division with a remainder. Sentence stem: *…is divided into groups of…. There are … groups and a remainder of…* *The dividend is…* *The divisor is…* *The quotient is…* *The remainder is…*	Dividing objects between different groups and see how much is left over. 14 ÷ 3 = 4 r 2  Dividing with remainders using Numicon.  Lollipops can also be used to show remainders.  There are 3 whole squares, with 1 left over.	This can then be represented pictorially by grouping the dots and showing the remainder.   This can also be shown using a number line.  	

	Dividing using counters. 		
Short division *The dividend is…* *The divisor is…* *The quotient is…* *The remainder is…*	Children to use place value counters alongside a bus stop method so the children can compare the formal method to the concrete manipulations.  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?	Represent the place value counters pictorially. 	Children can use partitioning to divide mentally.  Before moving onto a written method of short division. 

<table>
<tr>
<td>Long division

The dividend is…
The divisor is…
The quotient is…
The remainder is…</td>
<td>A teacher may demonstrate this process using place value counters to show long division.
e.g. 2544 ÷ 12
 
</td>
<td>The counters can be represented pictorially.
 
</td>
<td>When secure with short division, children can move onto long division.
They should write out a list of key multiples before completing the division.
 

Some children may prefer to use the method shown below.
 
</td>
</tr>
<tr>
<td colspan="4">Conceptual variation; different ways to ask children to solve 615 ÷ 5</td>
</tr>
<tr>
<td>Using the part whole model below, how can you divide 615 by 5 without using short division?
 
</td>
<td>I have £615 and share it equally between 5 bank accounts. How much will be in each account?

615 pupils need to be put into 5 groups. How many will be in each group?</td>
<td> 
</td>
<td>What is the calculation?
What is the answer?
 
</td>
</tr>
</table>