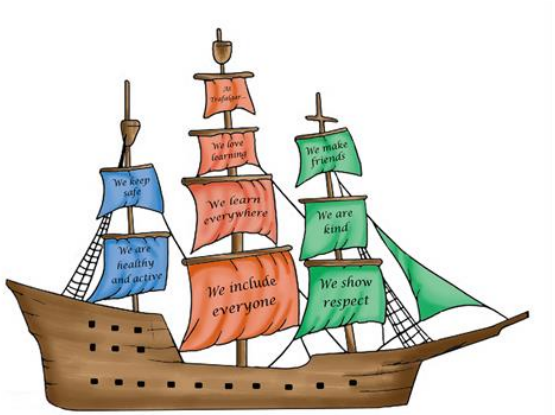
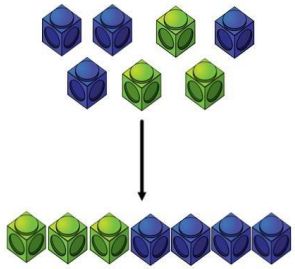
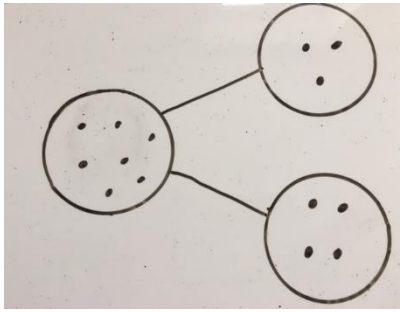
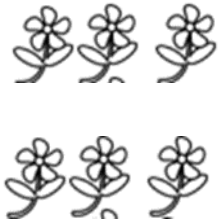
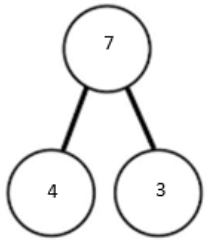
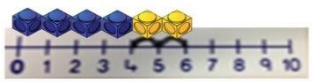
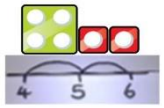
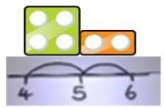
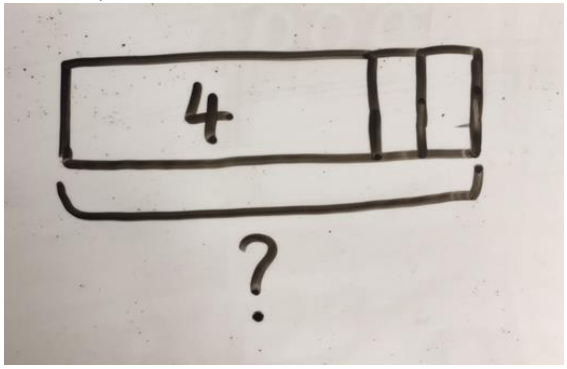


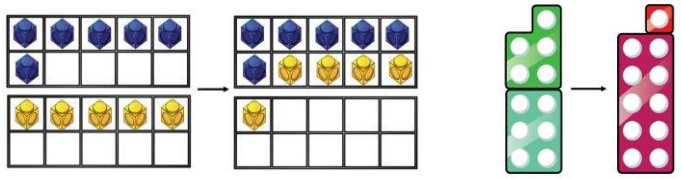
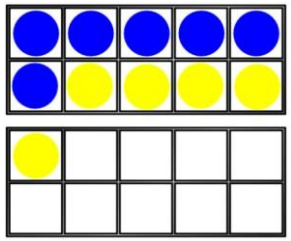
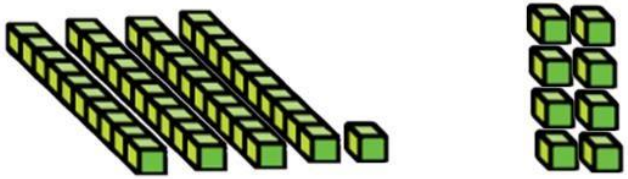
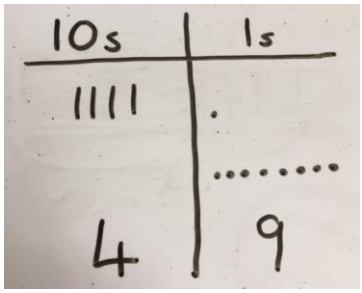
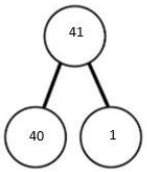
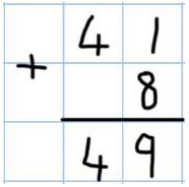
Trafalgar Infants Calculation Policy 2022

The following pages show the progression in calculation (addition, subtraction, multiplication and division) and how this works in line with the National Curriculum. The consistent use of the CPA (concrete, pictorial, abstract) approach helps children develop mastery across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods.

Calculation policy: Addition

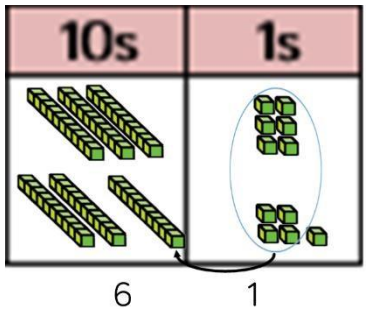
Key language: sum, total, parts and wholes, plus, add, altogether, more, 'is equal to' 'is the same as'.

Concrete	Pictorial	Abstract
Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cars).  	Children to represent the cubes using dots or crosses. They could put each part on a part whole model.  	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven. 
Counting on by adding one more to a group of objects.  Using number lines using cubes or Numicon.   	A bar model which encourages the children to count on, rather than count all. 	The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2 

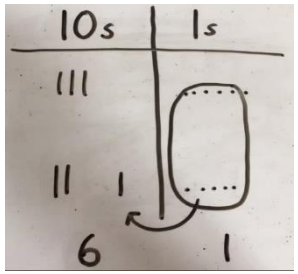
Regrouping to make 10; using ten frames and counters/cubes or using Numicon.  6 + 5	Children to draw the ten frame and counters/cubes. 	Children to develop an understanding of equality e.g. 6 + ☐ = 11 6 + 5 = 5 + ☐ 6 + 5 = ☐ + 4
TO + O using base 10. Continue to develop understanding of partitioning and place value. 41 + 8 	Children to represent the base 10 e.g. lines for tens and dot/crosses for ones. 	41 + 8  1 + 8 = 9 40 + 9 = 49 

TO + TO using base 10. Continue to develop understanding of partitioning and place value.

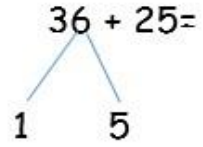
36 + 25



Children to represent the base 10 in a place value chart.



Looking for ways to make 10.

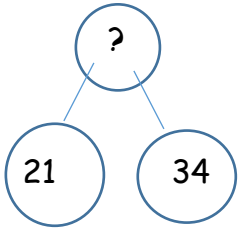


30 + 20 =50
5 + 5 =10
50 + 10 + 1 =61

Formal method:

$$\begin{array}{r} 36 \\ +25 \\ \hline 61 \\ \hline {\scriptstyle 1} \end{array}$$

Conceptual variation; different ways to ask children to solve 21 + 34



?	
21	34

Word problems:

In year R, there are 21 children and in year 1, there are 34 children.

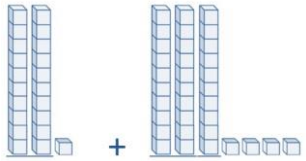
How many children in total?

21 + 34 = 55. Prove it

$$\begin{array}{r} 21 \\ +34 \\ \hline \\ \hline \end{array}$$

21 + 34 = ☐ = 21 + 34

Calculate the sum of twenty-one and thirty-four.

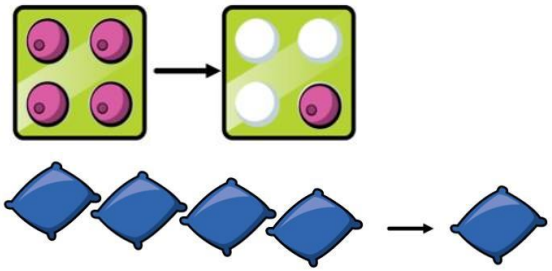
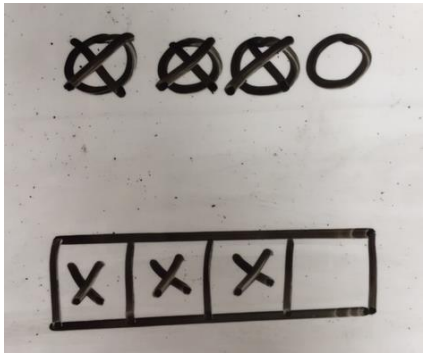
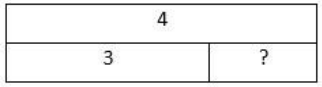
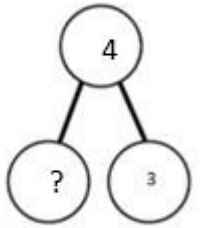
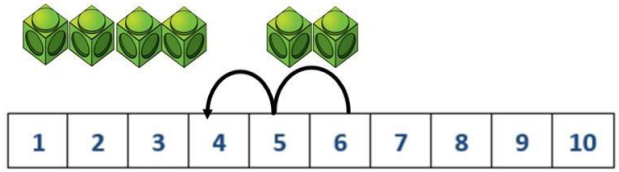
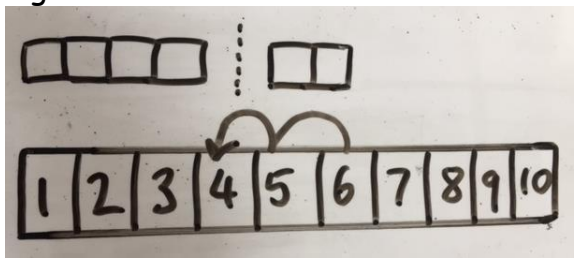
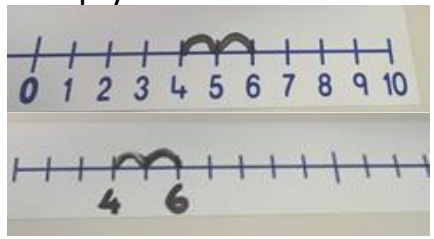


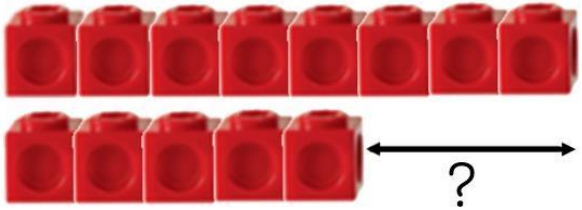
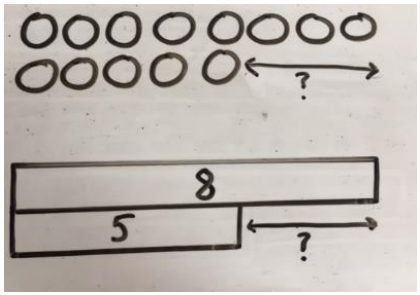
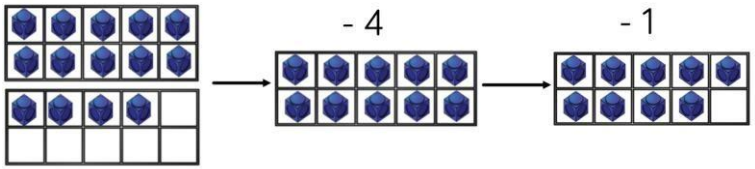
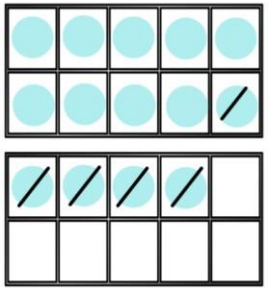
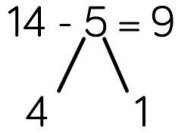
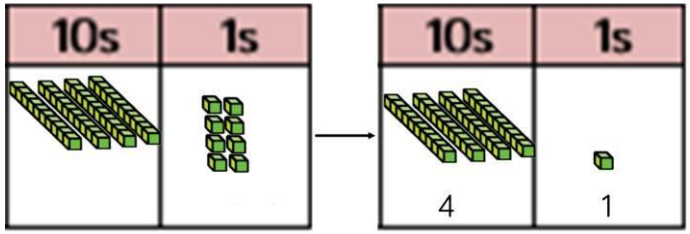
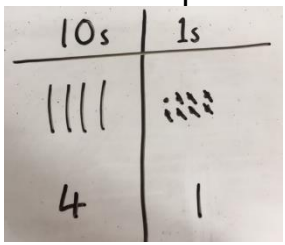
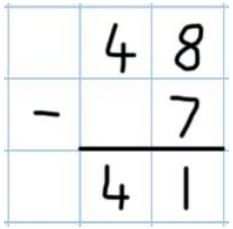
Missing digit problems:

10s	1s
10 10	1
10 10 10	?
?	5

Calculation policy: Subtraction

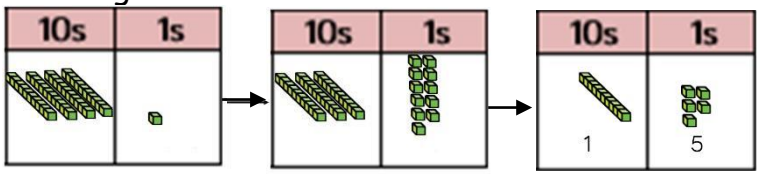
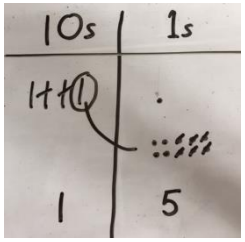
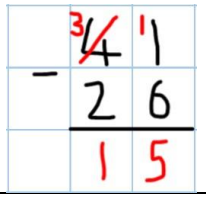
Key language: take away, less than, the difference, subtract, minus, fewer, decrease.

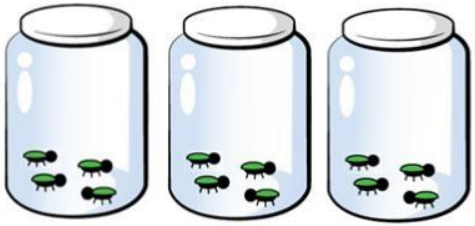
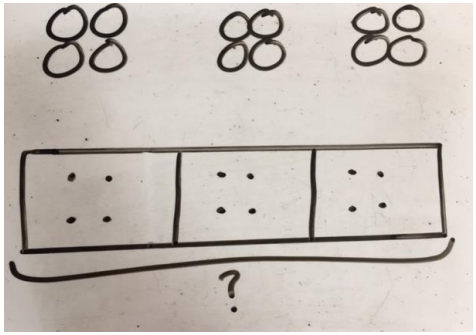
Concrete	Pictorial	Abstract
Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used). 4 – 3 = 1 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 	4- 3 = □ = 4 – 3  
Counting back (using number lines or number tracks) children start with 6 and count back 2. 6 – 2 = 4 	Children to represent what they see pictorially e.g. 	Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line 

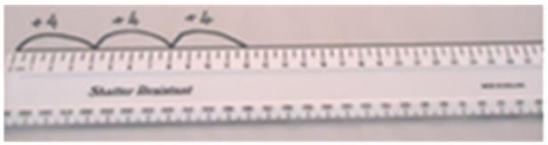
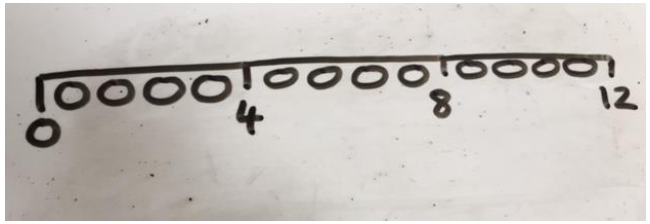
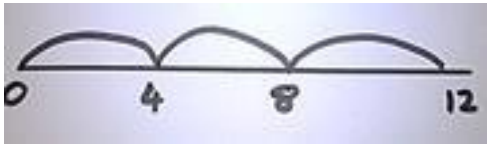
Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used). Calculate the difference between 8 and 5. 	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. 	Find the difference between 8 and 5. 8 – 5, the difference is □ Children to explore why 8- 6 = 8 – 5 = 7 – 4 all have the same difference.
Making 10 using ten frames.  14 – 5	Children to present the ten frame pictorially and discuss what they did to make 10. 	Children to show how they can make 10 by partitioning the subtrahend.  14 – 4 = 10 10 – 1 = 9
Column method using base 10.  48-7	Children to represent the base 10 pictorially. 	Column method or children could count back 7. 

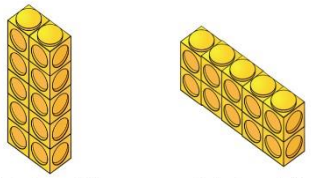
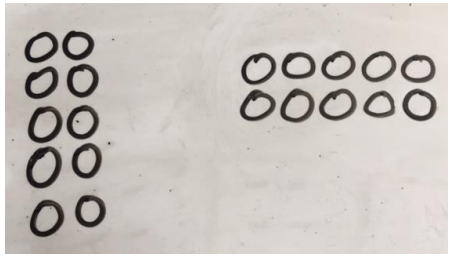
Calculation policy: Multiplication

Key language: double, times, multiplied by, the product of, groups of, lots of, equal groups.

Column method using base 10 and having to exchange. 41 – 26  	Represent the base 10 pictorially, remembering 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. 

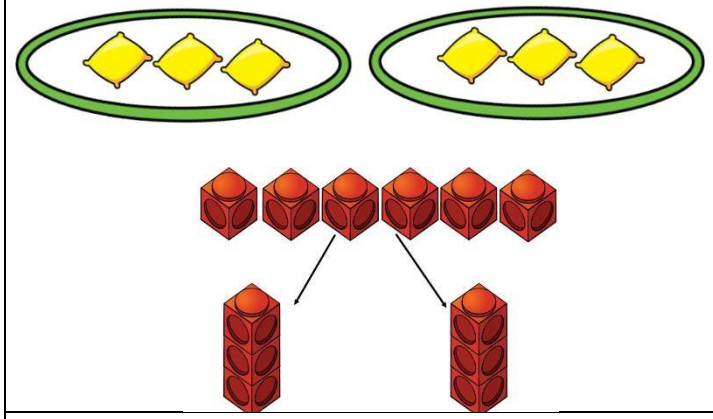
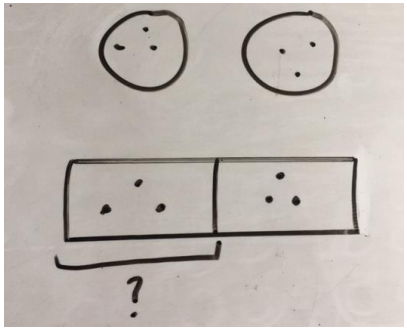
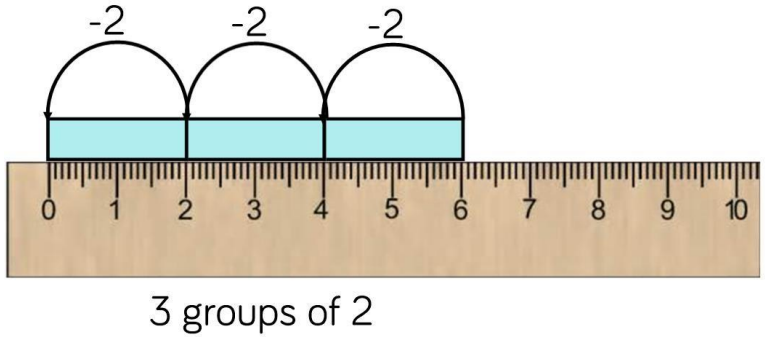
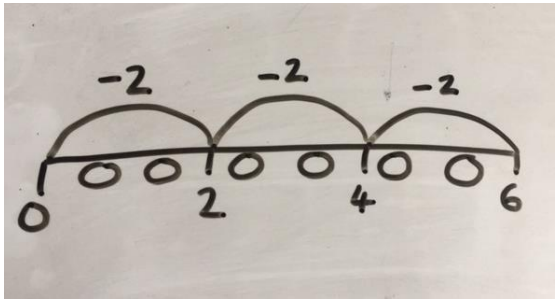
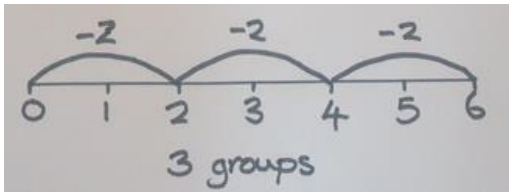
Concrete	Pictorial	Abstract
Repeated grouping/repeated addition 3 × 4 4 + 4 + 4  There are 3 equal groups, with 4 in each group. 	Children to represent the practical resources in a picture and use a bar model.  	3 × 4 = 12 4 + 4 + 4 = 12

Number lines to show repeated   groups- 3 × 4 Cuisenaire rods can be used too.	Represent this pictorially alongside a number line e.g.: 	Abstract number line showing three jumps of four. 3 × 4 = 12 

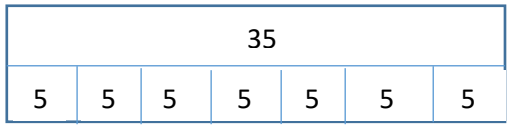
Use arrays to illustrate commutativity counters and other objects can also be used. 2 × 5 = 5 × 2 	Children to represent the arrays pictorially. 	Children to be able to use an array to write a range of calculations e.g. 10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

Calculation policy: Division

Key language: share, group, divide, divided by, half.

Concrete	Pictorial	Abstract
Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially. 	6 ÷ 2 = 3 3 | 3 Children should also be encouraged to use their 2 times tables facts.
Repeated subtraction using Cuisenaire rods above a ruler/ number line. 6 ÷ 2  3 groups of 2	Children to represent repeated subtraction pictorially. 	Abstract number line to represent the equal groups that have been subtracted. 

Conceptual variation; different ways to ask children to show 35 ÷ 5

Using the bar model below, how can you divide 35 by 5?  	I have £35 and share it equally between 5 people. How much will be in each person get? 35 pupils need to be put into 5 groups. How many will be in each group?	35 ÷ 5 = ☐ = 35 ÷ 5	What is the calculation? What is the answer?