Joint Driffield Junior and Infants Schools Calculation Policy

Aims

This calculation policy has been derived through collaboration of staff at Northfield Infant, Driffield CE Infant and Driffield Junior School to ensure that children in Driffield of primary age learn consistent and appropriate methods to be able to use and apply effectively to all contexts. The methods follow a structure that builds on application of place value and leads towards quick and efficient formal written methods.

The principal focus of the calculation policy at the schools in Driffield is to ensure that pupils extend their understanding of the number system and place value. This should develop the connections that pupils make between addition and subtraction, and multiplication and division. Children are encouraged to identify and cope with variation and tackle problems in different ways. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division.

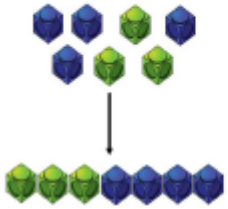
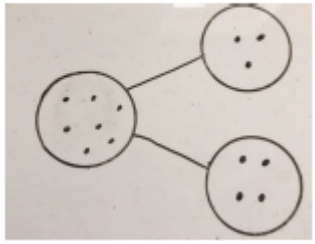
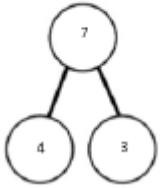
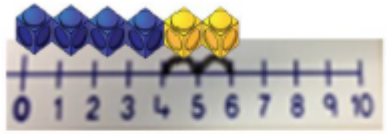
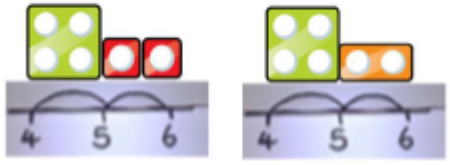
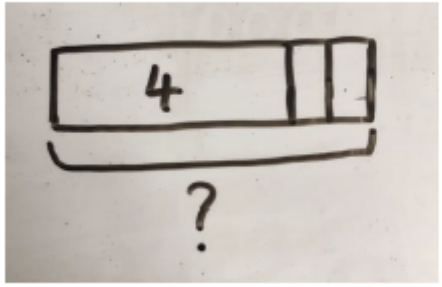
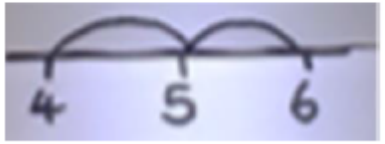
Access to the calculation policy This calculation policy is available to view on all three school websites.

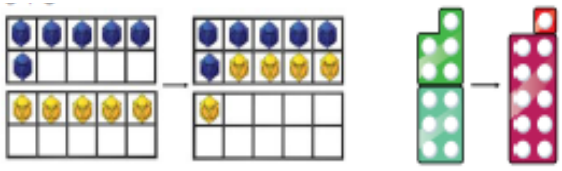
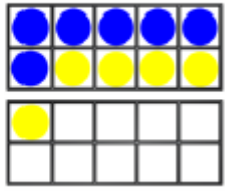
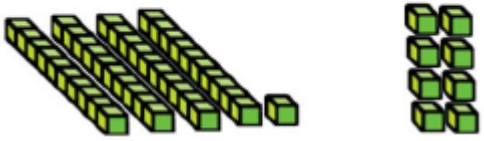
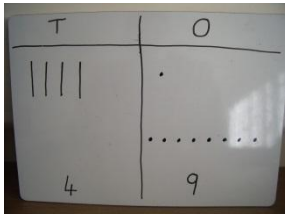
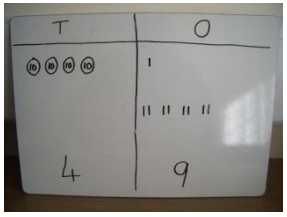
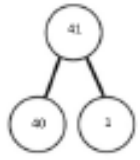
Application of the policy at KS1 (Infant Schools)

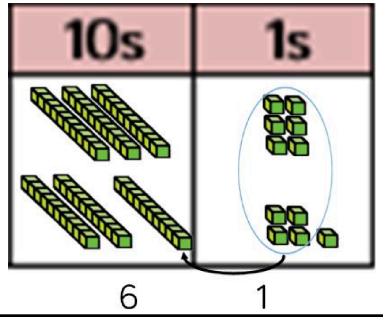
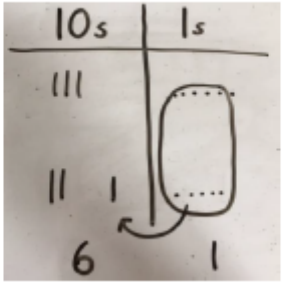
Children will be taught the various methods and then given the opportunity to apply them during daily maths lessons, morning maths sessions and maths challenge time.

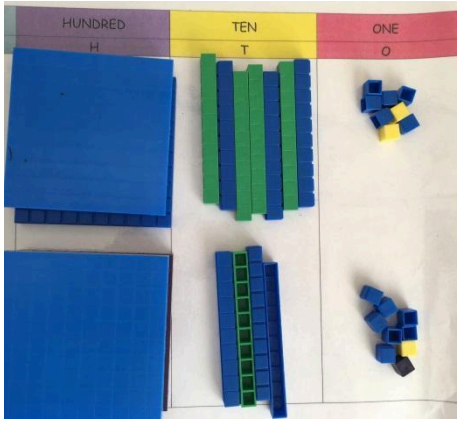
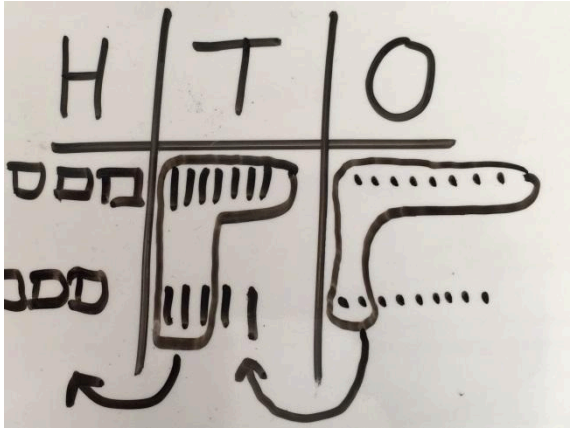
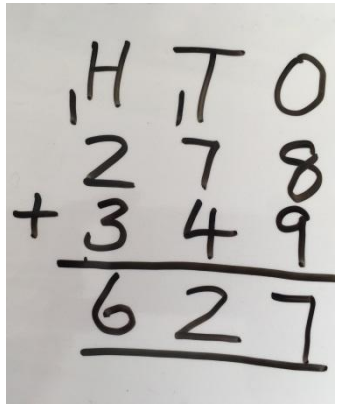
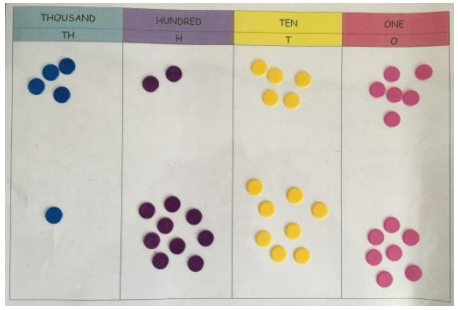
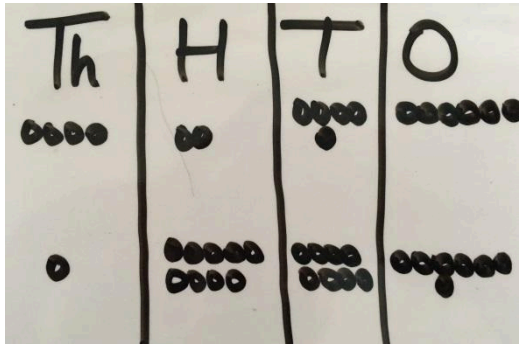
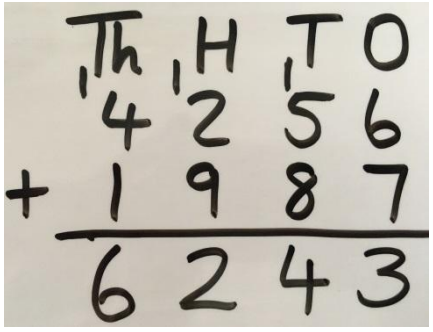
Application of the policy at KS2 (Driffield Juniors)

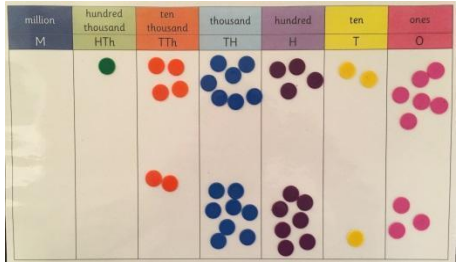
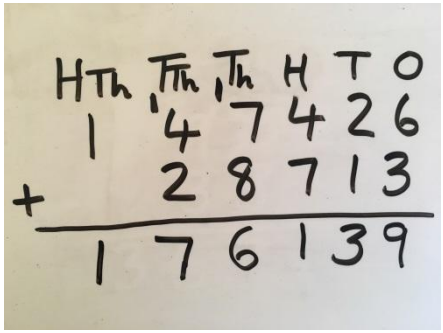
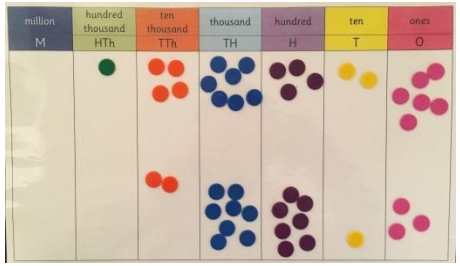
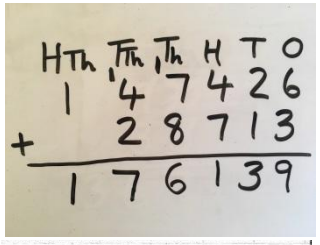
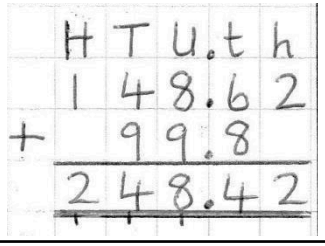
The key stage two calculation policy demonstration videos are available for parents, students and staff to view on Youtube and on the school website under the ‘Mathematics’ tab (these are reviewed and updated as necessary).
At Driffield Junior School, student planners have a QR code which takes children and parents directly to the videos. We believe that this has a positive impact on home-school engagement.

Addition	**Key Language**: Sum, total, parts and wholes, plus, add, altogether, more, is equal to, is the same as.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	**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 too. 	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven 
	Counting on 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 

Addition	**Key Language**: Sum, total, parts and wholes, plus, add, altogether, more, is equal to, is the same as.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	**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 and understanding of equality e.g. 6 + ☐ = 11 6 + 5 = 5 + ☐ 6 + 5 = ☐ + 4 11 = 6 + ☐
	2 digit + 1 digit 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 dots/crosses for ones or circles for tens and lines for ones.  	41 + 8  1 + 8 = 9 40 + 9 = 49

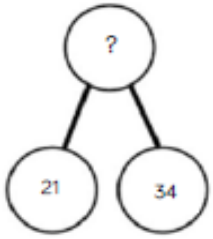
	2 digit + 2 digit using base 10. Continue to develop understanding of partitioning and place value. 36 + 25  	Children to represent the base 10 in a place value chart.  Exchange/ Swap 10 ones for 1 ten or Rename 10 ones as 1 ten	**36 + 25 =** 30 + 20 = 50 6 + 5 = 11 50 + 11 = 61

Addition	**Key Language**: Sum, total, parts and wholes, plus, add, altogether, more, is equal to, is the same as.		
	Concrete	**Pictorial**	**Abstract**
Year 3	To add two numbers (up to 3 digits) using partitioning. 		
Year 4	To add two numbers (up to 4 digits) using column addition. 		

Addition	**Key Language**: Sum, total, parts and wholes, plus, add, altogether, more, is equal to, is the same as.		
	Concrete	**Pictorial**	**Abstract**
Year 5	To add two numbers (with 4 or more digits) using column addition. 	N/A (If working below YG content, refer to previous year's method).	
Year 6	To add a range of numbers using column addition. 	N/A (If working below YG content, refer to previous year's method).	 

Addition	**Key Language**: Sum, total, parts and wholes, plus, add, altogether, more, is equal to, is the same as.

We ask the children to solve addition problems in different ways. Below are some examples.



?	
21	34

Word problems:
In year 3 there are 21 children and in year 4 there are 34 children. How many children in total?

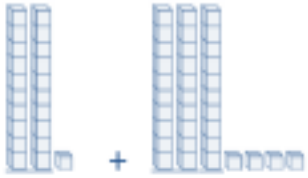
21 + 34 = 55. Prove it.

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

$21 + 34 =$

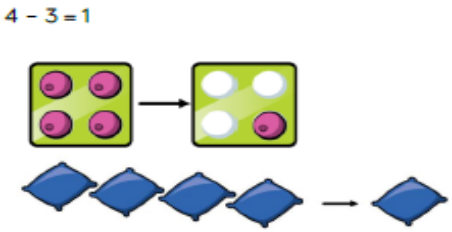
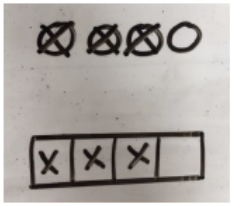
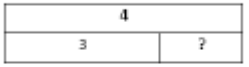
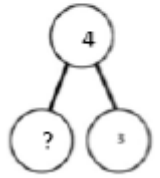
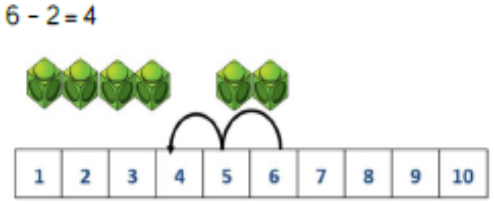
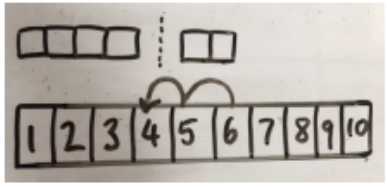
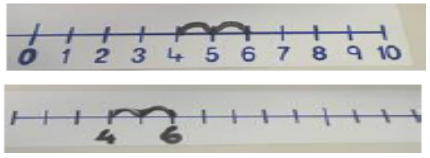
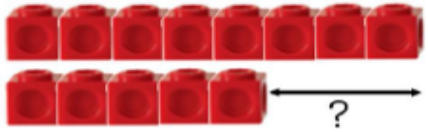
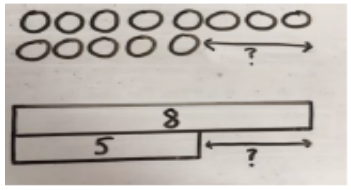
$\square = 21 + 34$

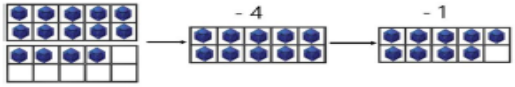
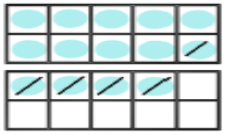
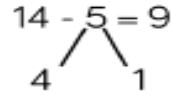
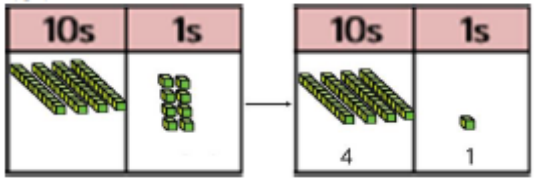
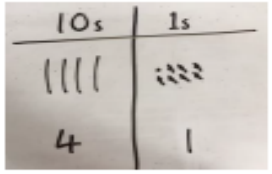
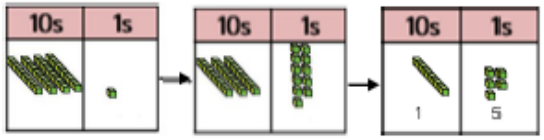
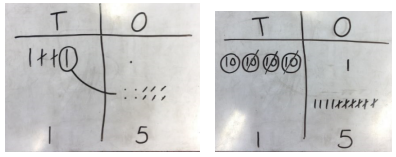
Calculate the sum of twenty-one and thirty four.

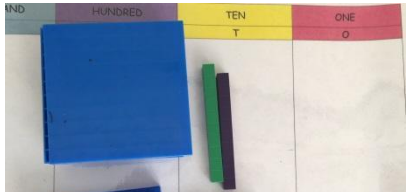
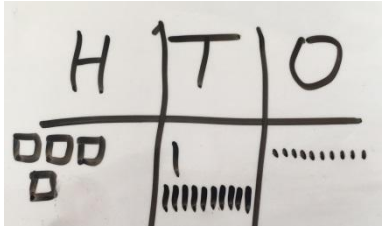
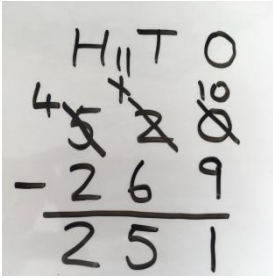
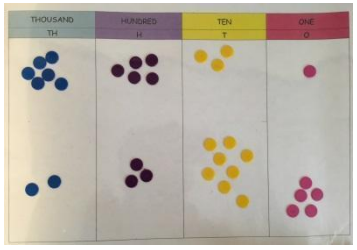
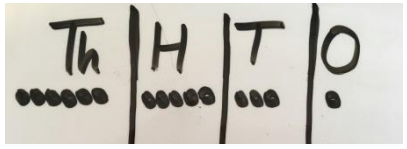
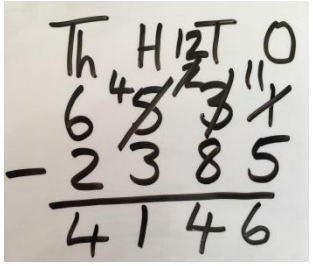


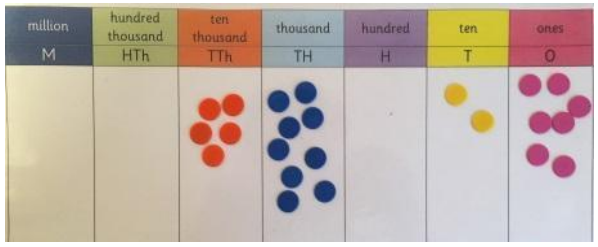
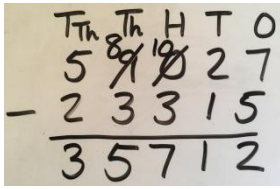
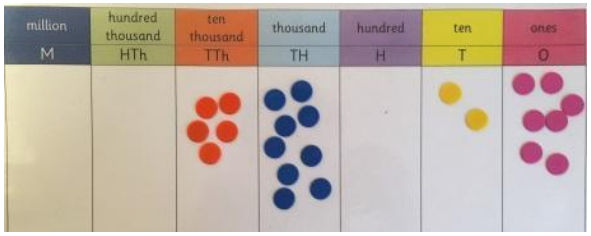
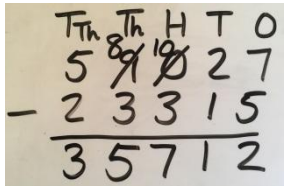
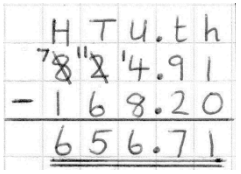
Missing digit problems:

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

Subtraction	**Key Language**: take away, less than, the difference, subtract, minus, fewer, decrease.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	Physically taking away and removing objects from a whole (tens frames, Numicon, cubes and other items such as beanbags could be used) 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can be used. 	4 - 3 = □ = 4 – 3  
	Counting back (using number lines or number tracks) children start with 6 and count back 2. 	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 9 – 6 = 8 – 5 = 7 – 4 have the same difference.

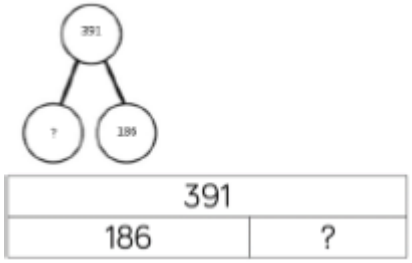
Subtraction	**Key Language**: take away, less than, the difference, subtract, minus, fewer, decrease.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	Making 10 using ten frames. 14 – 5 	Children to present the tens frame pictorially and discuss what they did to make 10. 	Children to show how they 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 using base 10 and having to exchange/rename. 41 – 26 	Represent the base 10 pictorially, remembering to show the exchange/rename. 	

Subtraction	**Key Language**: take away, less than, the difference, subtract, minus, fewer, decrease.		
	Concrete	**Pictorial**	**Abstract**
Year 3	To subtract numbers (up to 3 digits) using column subtraction.  Remove the number Base10 which represent the bottom number. Rename as required.	 	 Key language - rename
Year 4	To subtract numbers (up to 4 digits) using column subtraction.  Remove the number of counters which represent the bottom number. Rename as required.	 	 Key language - rename

Subtraction	**Key Language**: take away, less than, the difference, subtract, minus, fewer, decrease.		
	Concrete	**Pictorial**	**Abstract**
Year 5	To subtract numbers with 4 or more digits using column subtraction.  Remove the number of counters which represent the bottom number. Rename as required.	N/A (If working below YG content, refer to previous year's method).	 Key language - rename
Year 6	To subtract a number from another number using column subtraction.  Remove the number of counters which represent the bottom number. Rename as required.	N/A (If working below YG content, refer to previous year's method).	  Key language - rename

Subtraction	**Key Language**: take away, less than, the difference, subtract, minus, fewer, decrease.

We ask the children to solve addition problems in different ways. Below are some examples.



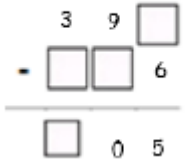
Raj spent £391, Timmy spent £186.
How much more did Raj spend?
Calculate the difference between 391 and 186.

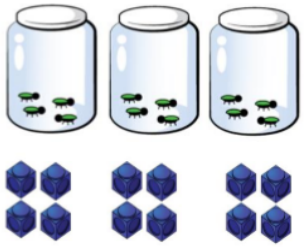
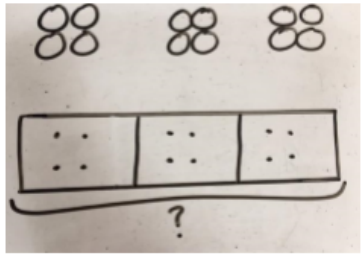
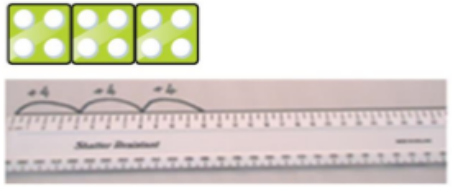
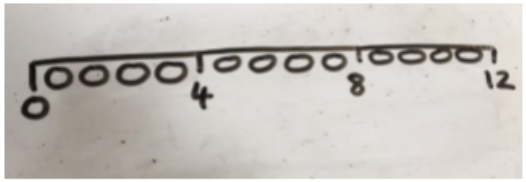
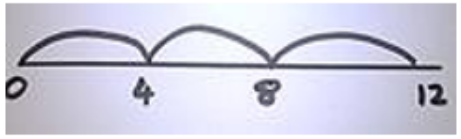
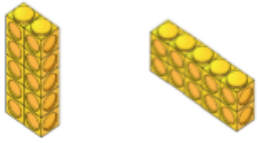
□ = 391 – 186

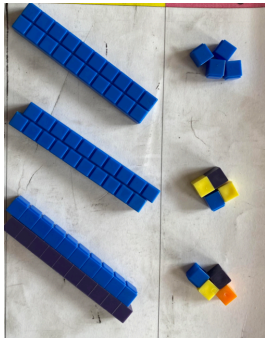
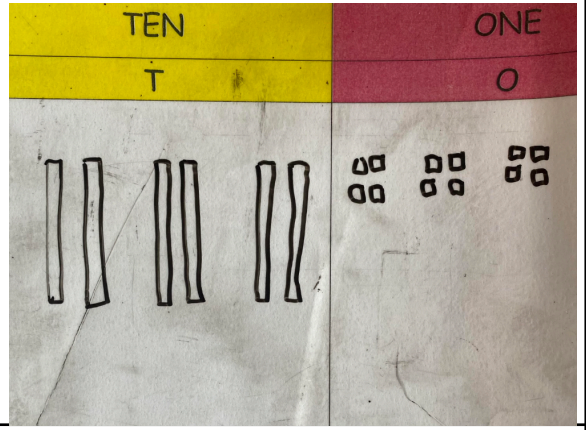
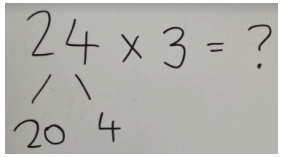
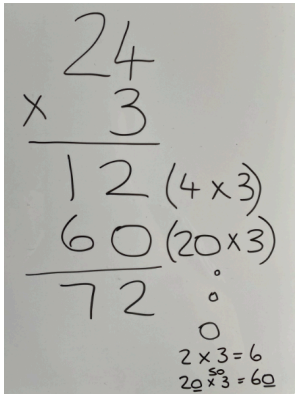
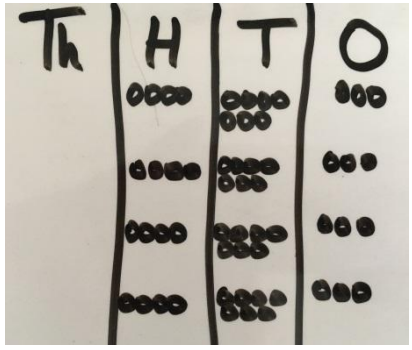
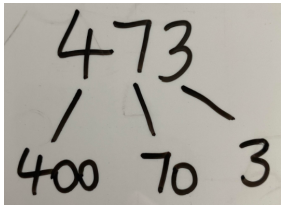
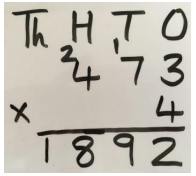
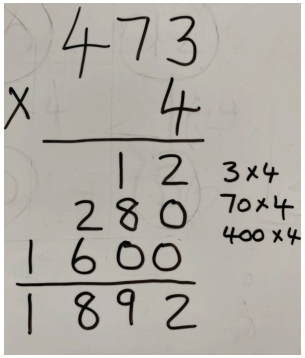
391
-186
———

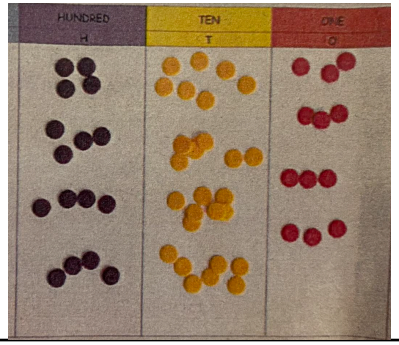
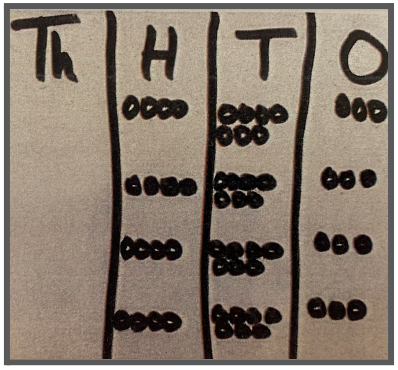
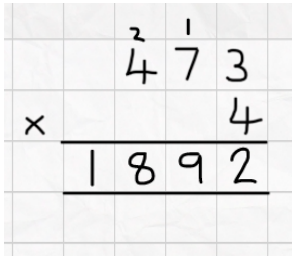
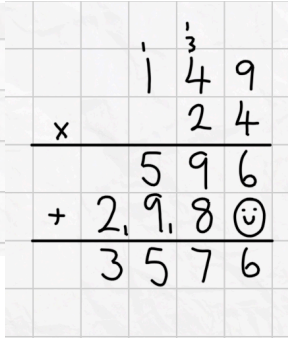
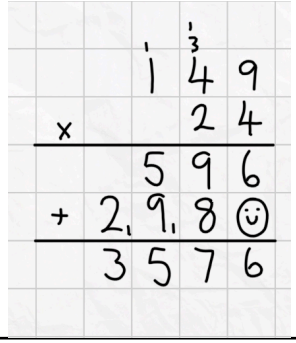
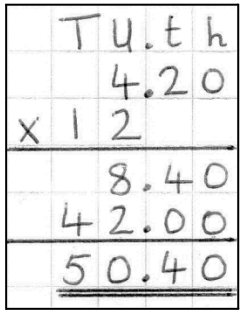
What is 186 less than 391?

Missing digit calculations.



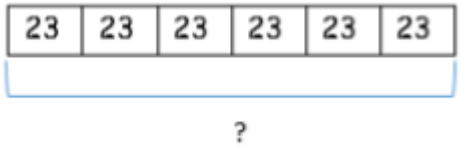
Multiplication	**Key Language:** double, times, multiplied by, the product of, groups of, lots of, equal groups, repeated addition, factors, multiples.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	Repeated grouping/repeated addition 3 x 4 = 4 + 4 + 4 There are 3 equal groups, with 4 in each group. 	Children to represent the practical resources in a picture and use a bar model. 	3 x 4 = 12 4 + 4 + 4 = 12
	Number lines to show repeated groups – 3 x 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 x 4 = 12 
	Use arrays to illustrate commutativity – counters and other objects can also be used. 2 x 5 = 5 x 2  2 lots of 5 5 lots of 2	x x x x x x x x x x x x x x x x x x x x	Children to be able to use an array to write a range of calculations e.g 10 = 2 x 5 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

Multiplication	**Key Language:** double, times, multiplied by, the product of, groups of, lots of, equal groups, repeated addition, factors, multiples.		
	Concrete	**Pictorial**	**Abstract**
Year 3	To multiply a two-digit number with a single-digit number using a formal multiplication method. 		 
Year 4	To multiply a three-digit number with a single-digit number using a formal multiplication method. 		  

Multiplication	**Key Language:** double, times, multiplied by, the product of, groups of, lots of, equal groups, repeated addition, factors, multiples.		
	Concrete	**Pictorial**	**Abstract**
Year 5	To multiply a four digit number with a two digit number using formal multiplication. 		 
Year 6	To multiply a four digit number with a two digit number using formal multiplication. N/A (If working below YG content, refer to previous year's method).	N/A (If working below YG content, refer to previous year's method).	 

Multiplication	**Key Language:** double, times, multiplied by, the product of, groups of, lots of, equal groups, repeated addition, factors, multiples.

We ask the children to solve multiplication problems in different ways. Below are some examples.



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

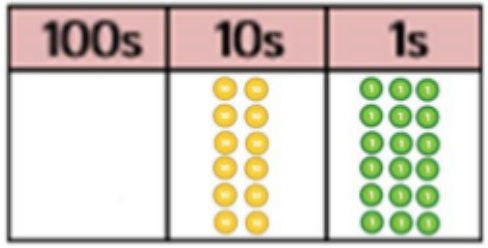
Find the product of 6 and 23

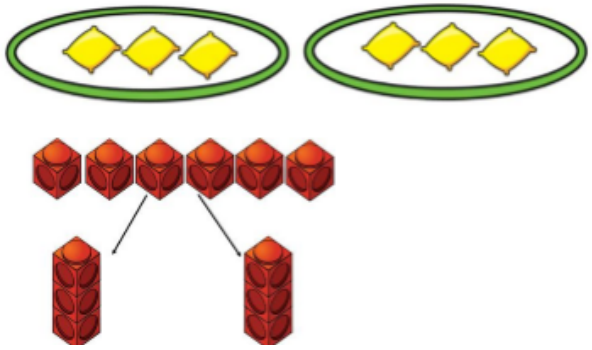
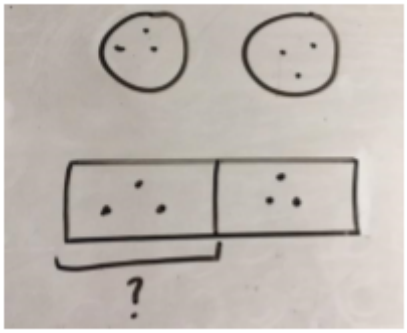
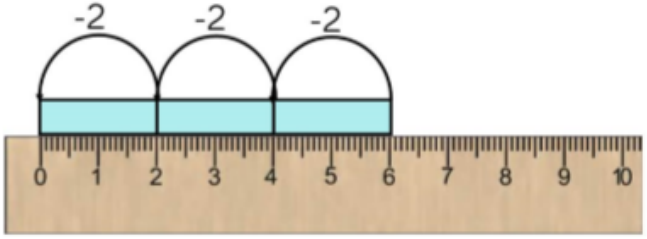
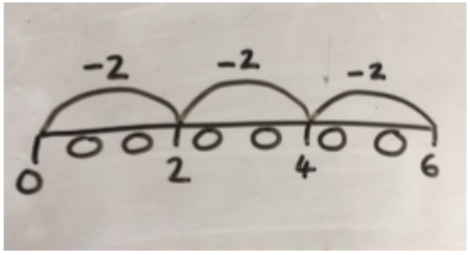
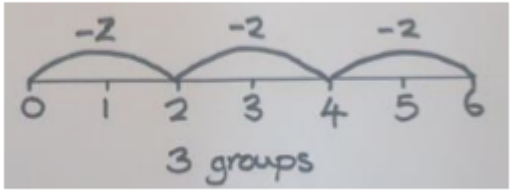
$6 \times 23 =$

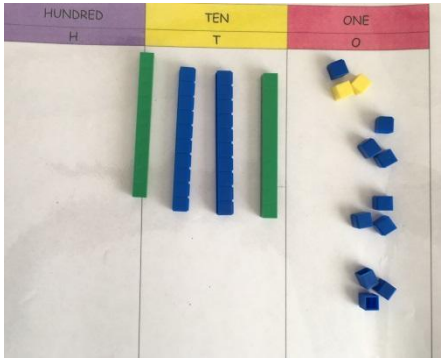
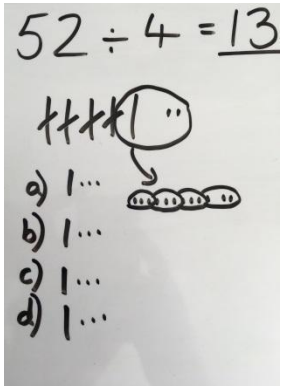
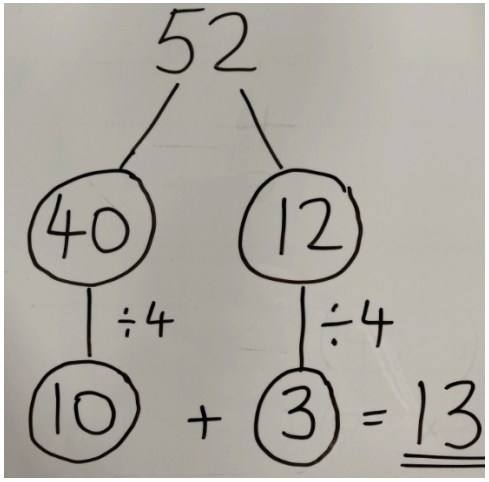
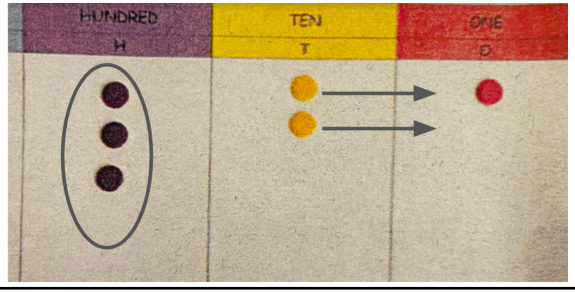
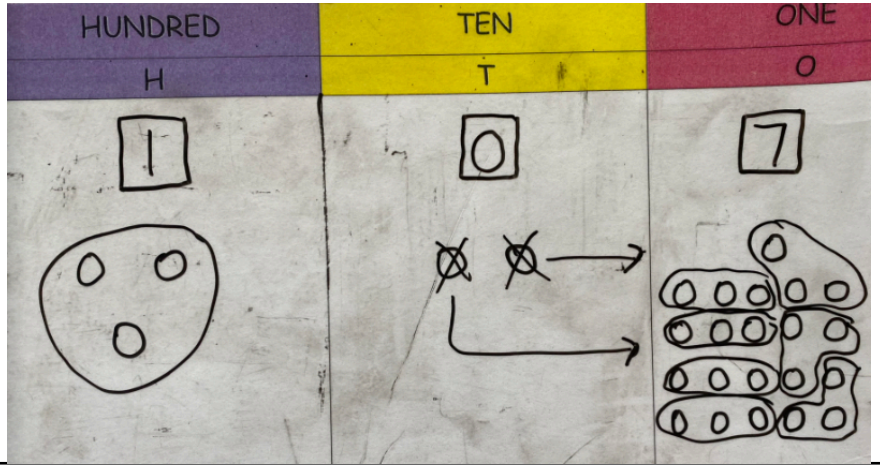
$\square = 6 \times 23$

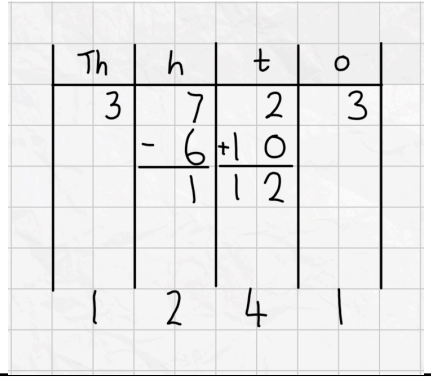
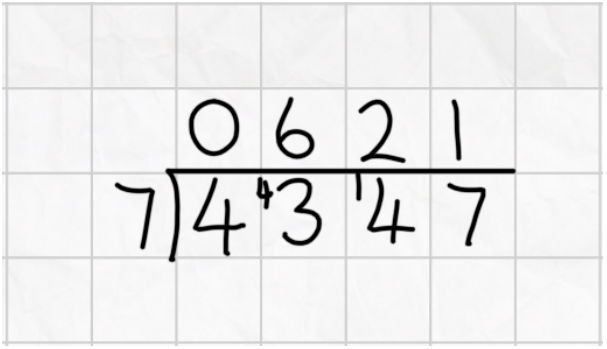
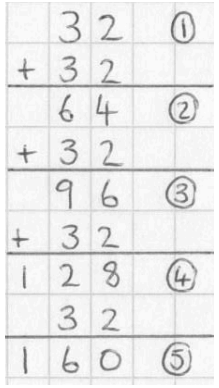
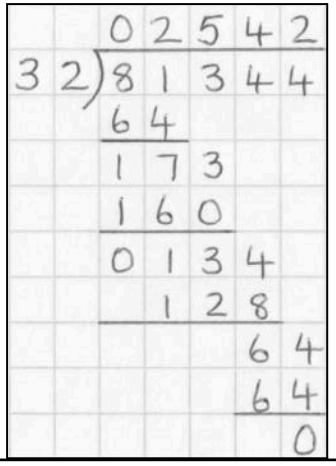
6	23
× 23	× 6
___	___

What is the calculation?
What is the product?



Division	**Key Language:** share, group, divide, divided by, half.		
	Concrete	**Pictorial**	**Abstract**
Key Stage One	Sharing using a range of objects. 6 ÷ 2 	Represent the sharing pictorially, including arrays.  x x x x x x	6 ÷ 2 = 3  Children should also be encouraged to use their 2 times tables facts.
	Repeated subtraction. 6 ÷ 2  3 groups of 2	Children to represent repeated subtraction pictorially.  	Abstract number line to represent the equal groups that have been subtracted. 

Division	**Key Language:** share, group, divide, divided by, half.		
	Concrete	**Pictorial**	**Abstract**
Year 3	To divide a 2 digit number by a single-digit number using grouping and knowledge of place value. 		
Year 4	To divide 2 and 3 digit numbers by a single-digit number using grouping and knowledge of place value. 		

Division	**Key Language:** share, group, divide, divided by, half.		
	Concrete	**Pictorial**	**Abstract**
Year 5	To divide numbers (up to 4 digits) by a single-digit number using bus stop division and give an appropriate remainder (decimal/fraction/remainder). (If working below YG content, refer to previous year's method).	A process moving from heavily scaffolded Y4 method to Y5 method: 	
Year 6	To divide numbers by a two-digit number using long division. (If working below YG content, refer to previous year's method).	(If working below YG content, refer to previous year's method).	 

Division	**Key Language:** share, group, divide, divided by, half.		
We ask the children to solve division problems in different ways. Below are some examples.			
Using the part whole model below, how can you divide 615 by 5 without using short division?	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?	$5 \overline{)615}$ $615 \div 5 =$ $\square = 615 \div 5$	What is the calculation? What is the answer?