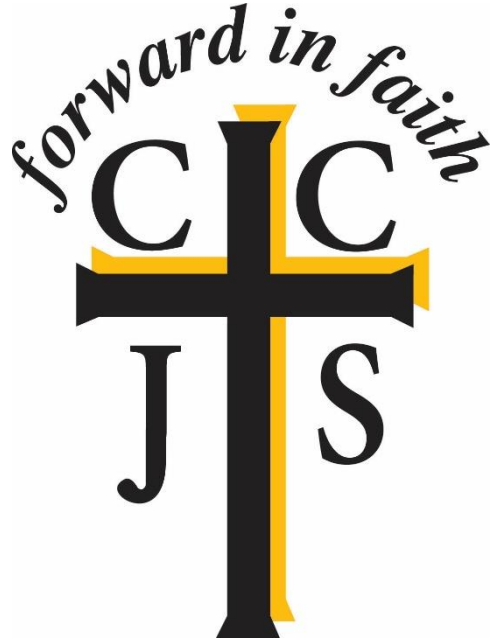
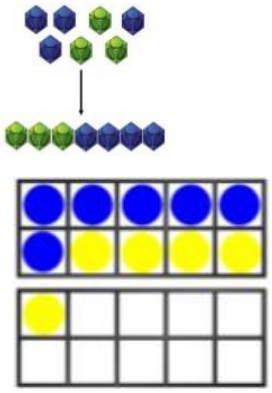
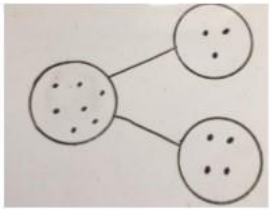
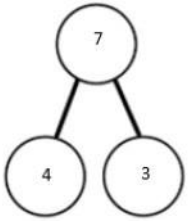
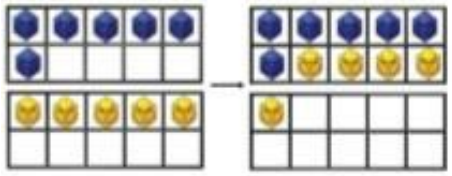
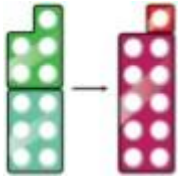
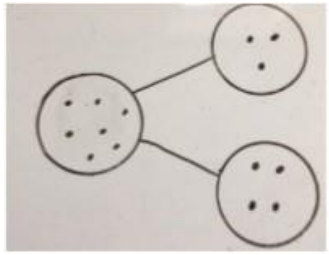
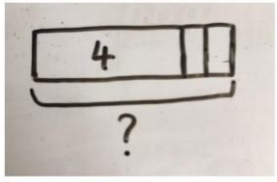
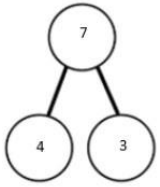
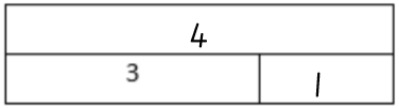
Cheadle Catholic Junior School
Calculation Policy

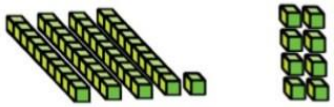
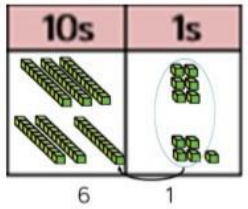
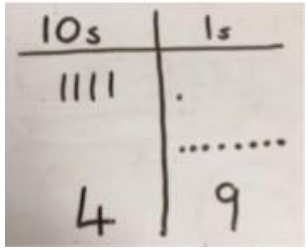
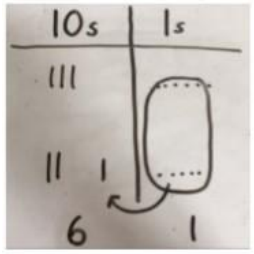
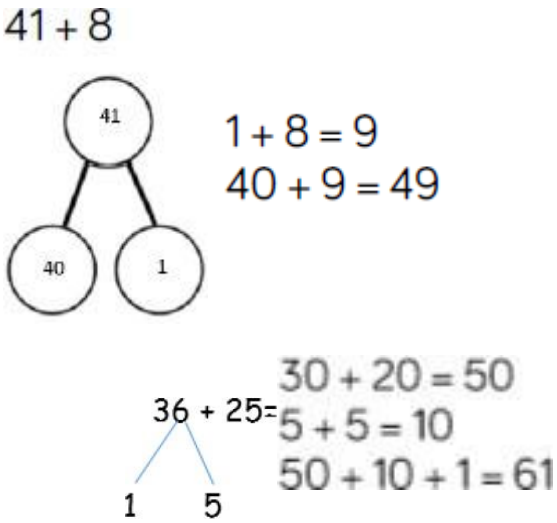
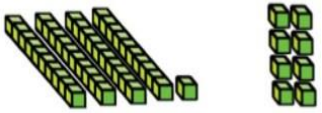
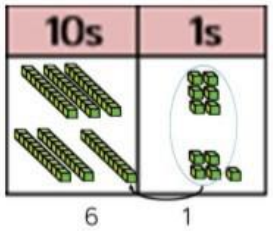
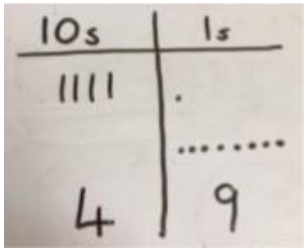
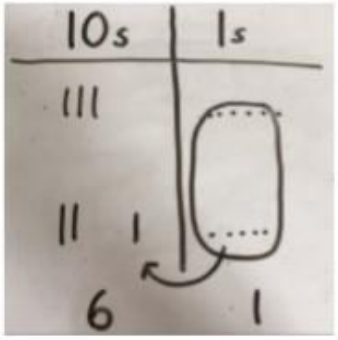
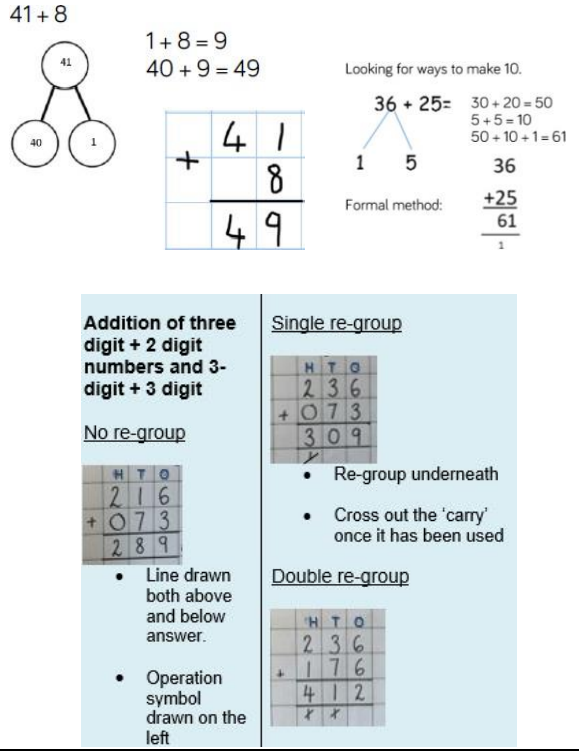
Adapted from White Rose



Calculation Policy- Addition

Key Language: sum, total, parts and whole, plus, add, altogether, more, is equal to, is the same as. (Addends)

Objectives	*Concrete*	*Pictorial*	*Abstract*
EYFS Adds and subtracts, using quantities and objects, 2 single-digit numbers, and counts on or back to find the answer (ELG) Finds the total number of items in two groups by counting all of them	**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. 
Year 1 Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs Write mathematical statements involving addition (+), subtraction (-) and equals (=) signs Represent and use number bonds within 20 Add one-digit and two-digit numbers to 20, including zero	Use tens frames , counters and numicon.  	Part whole models and bar models.  	Part whole models 4 + 3 = 7 Four is a part, 3 is a part and the whole is seven.  Bar models 3 + 1 = 4 

Year 2 I can solve problems with addition and subtraction including those involving numbers, quantities and measures by using objects or pictures I can answer simple addition and subtraction questions in my head as well as by writing them down I can add and subtract 2 two digit numbers mentally and when using objects, number lines and pictures	Use base 10   	Draw tens and ones - lines and dots.   	Part whole models and partitioning 
Year 3 I can add numbers with up to three digits using formal column methods I can solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction **Year 4** I can add numbers with up to four digits using formal column methods I can solve two step addition and subtraction problems using different methods and explain why I used them	Use base 10   	Draw tens and ones—lines and dots   	Column method 

Year 5

I can add and subtract numbers with more than 4 digits using written methods

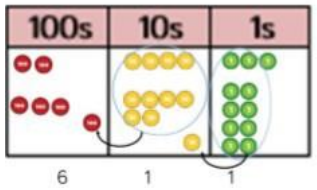
I can solve addition and subtraction problems needing more than one step and can work out which operation and method is the most suitable.

Year 6

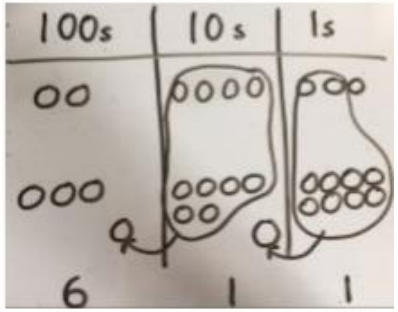
I can mentally calculate using a mix of the four operations

Use of place value counter to add HTO + TO, HTO + HTO

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.



Chn to represent the counters in a place value chart, circling when they make an exchange.



Addition of three digit + 3-digit and four digit + four digit

Regrouping Twice

Regrouping Thrice

- Line drawn both above and below answer.
- Operation symbol drawn on the left
- Regroup underneath
- Cross out the 'carry' once it has been used

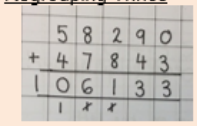
Adding decimals with the same number of decim places

e.g. 3.592 + 1.487

- Place the decimal po

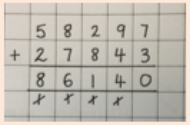
Column addition- progressing to more than four digits

Regrouping Thrice



- Line drawn both above and below answer.
- Operation symbol drawn on the left
- Regroup underneath
- Cross out the 'carry' once it has been used

Regrouping Four Times



- Fill in any blank columns with a zero before calculating.

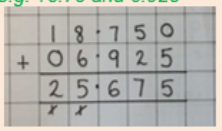
Adding decimals with the same number of decimal places

e.g. 3.592 + 1.487

- Place the decimal point in the answer box before solving

Adding decimals with different number of decimal places

e.g. 18.75 and 6.925



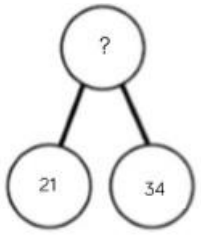
- Place the decimal point in the answer box before solving
- Remember to put in place holders.

Using mental calculation by counting on

45678 + 3500 = 49178
45678 + 3000 = 48678
42678 +500 = 49178

5.78 + 2.45 = 8.23
5.78 + 2 = 7.78
5.73 + 0.4 = 8.18
5.33 + 0.05 = 8.23

Conceptual variation; different ways to ask children to solve 391- 186



?	
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

21
+34
___

21 + 34 =

☐ = 21 + 34

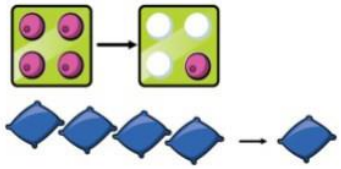
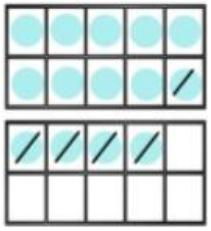
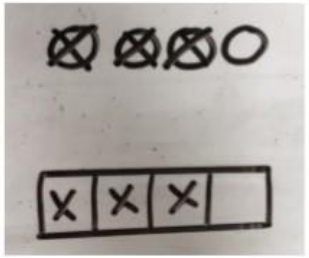
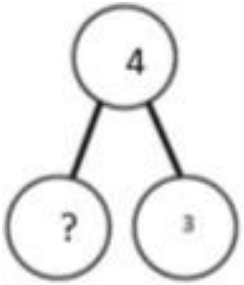
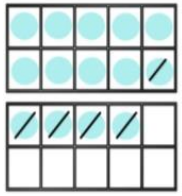
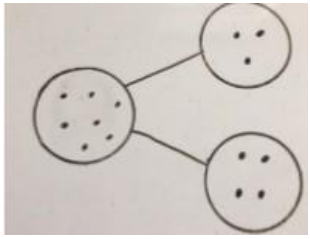
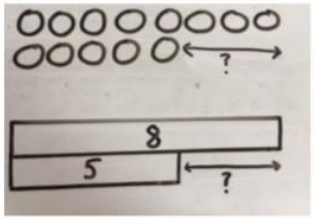
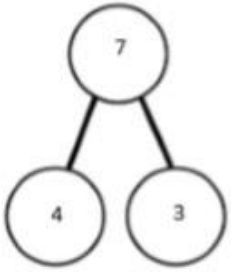
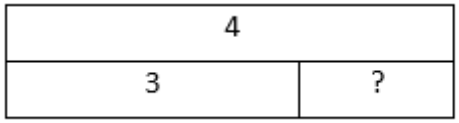
Calculate the sum of twenty-one and thirty-four.

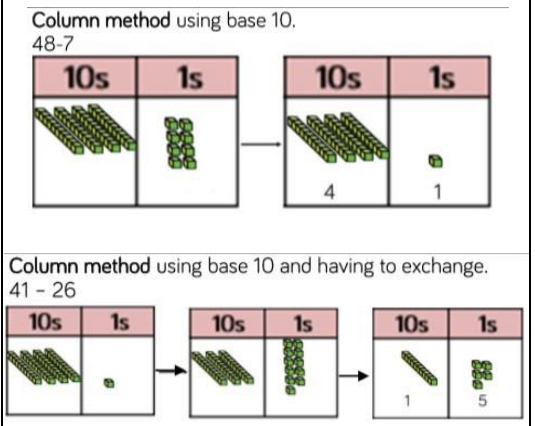
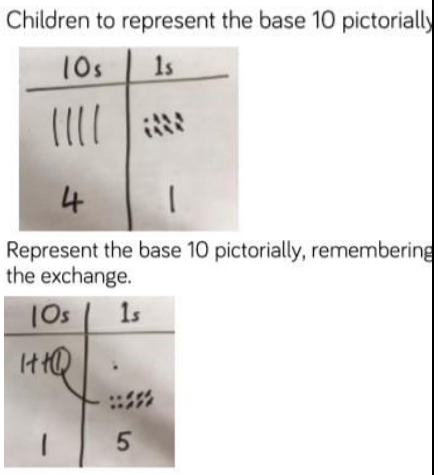
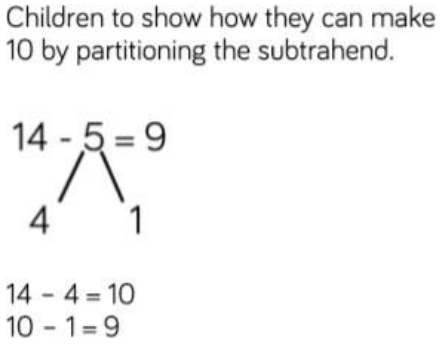
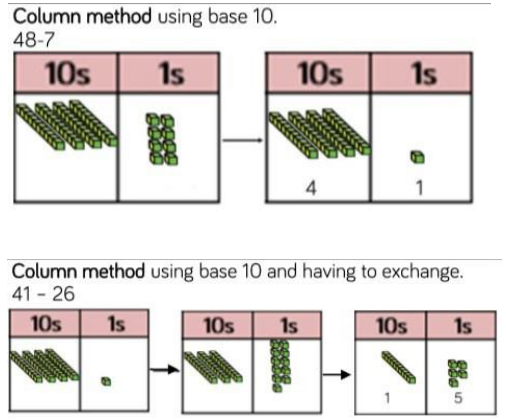
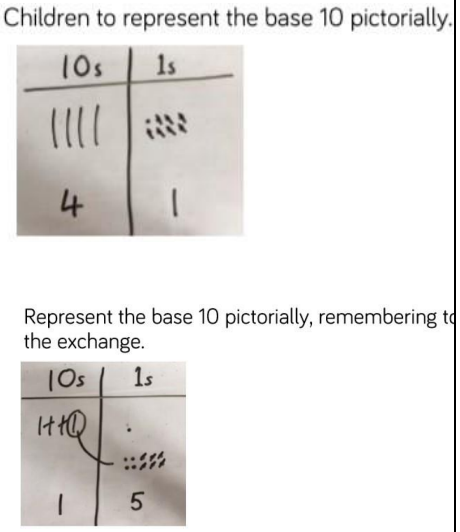
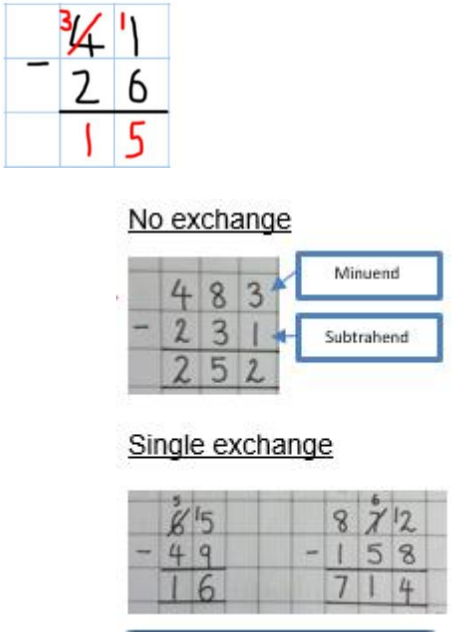
Missing digit problems:

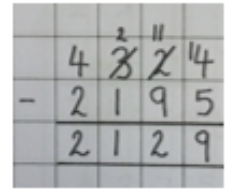
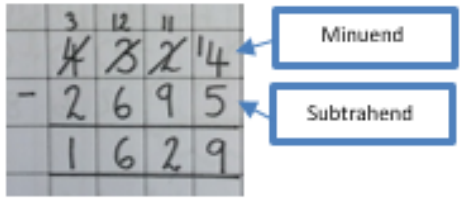
10s	1s
	
	?
?	5

Calculation Policy- Subtraction

Key Language: take away, less than, the difference, subtract, minus, fewer, decrease (Regrouping)

Objectives	*Concrete*	*Pictorial*	*Abstract*
EYFS Adds and subtracts, using quantities and objects, 2 single-digit numbers, and counts on or back to find the answer (ELG)	Physically take away objects. 4 – 3 = 1  Use tens frames and counters 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 	Part whole models 
Year 1 Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs Write mathematical statements involving addition (+), subtraction (-) and equals (=) signs I can use subtraction facts up to 20 I can subtract one digit and two digit numbers to 20	Use tens frames and counters. Children to present the ten frame pictorially and discuss what they did to make 10. 	Part whole models 7—3 = 4  	Part whole models and bar models 7—3 = 4  

Year 2 I can solve problems with addition and subtraction including those involving numbers, quantities and measures by using objects or pictures I can answer simple addition and subtraction questions in my head as well as by writing them down I can add and subtract 2 two digit numbers mentally and when using objects, number lines and pictures	Use base 10 	Draw tens and ones - lines and dots. 	Part whole models and partitioning 
Year 3 I can add numbers with up to three digits using formal column methods I can solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction **Year 4** I can add numbers with up to four digits using formal column methods I can solve two step addition and subtraction problems using different methods and explain why I used them	Use base 10 	Draw tens and ones—lines and dots 	Column method Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11. 

			Written Method for column subtraction Double exchange  Treble exchange  • Always place the larger number on the top (minuend) • Line drawn both above and below answer. • Operation symbol drawn on the left

Year 5

I can add and subtract numbers with more than 4 digits using written methods

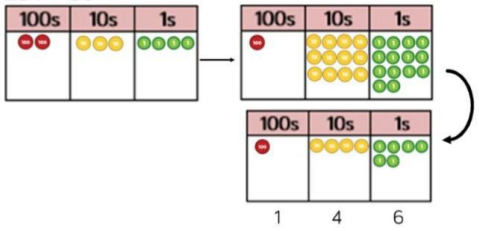
I can solve addition and subtraction problems needing more than one step and can work out which operation and method is the most suitable.

Year 6

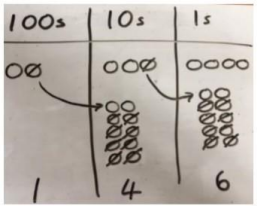
I can mentally calculate using a mix of the four operations

Column method using place value counters.

234 – 88



Represent the place value counters pictorially; remembering to show what has been exchanged.

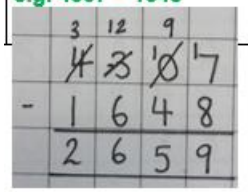


Formal colum method. Children must understand what has happened when they have crossed out digits.

Written Method for column subtraction

Exchanging when there is a 0 in the next column

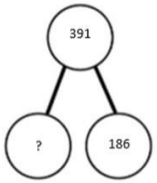
e.g. 4307 – 1648



Written Method for column subtraction (5 digits)

- Always place the larger number on the top (minuend)
- Line drawn both above and below answer.
- Operation symbol drawn on the left

Conceptual variation; different ways to ask children to solve 391– 186



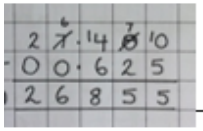
391	
186	?

Raj spent £391, Timmy spent £186.
How much more did Raj spend?

Calculate the difference between 391 and 186.

Subtracting decimals

e.g. Subtract 0.625 from 27.4



- Place the decimal point in the answer box before solving
- Put in your placeholders before calculating.

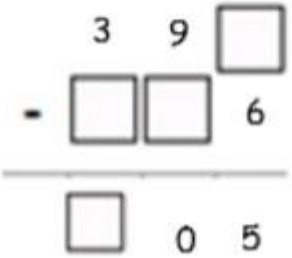
□ = 391 - 186

391

-186

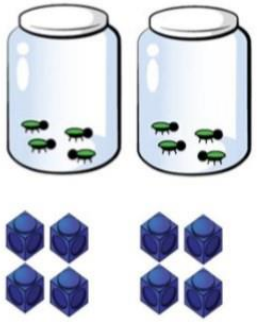
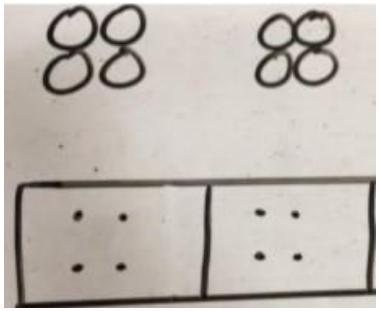
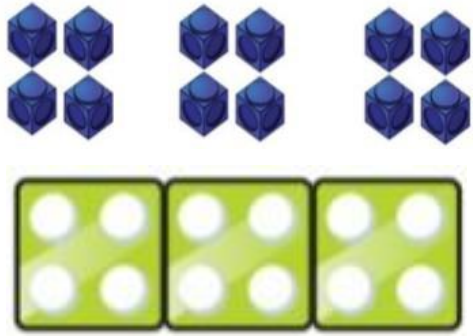
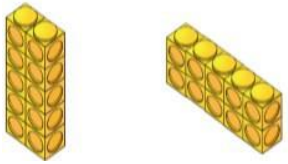
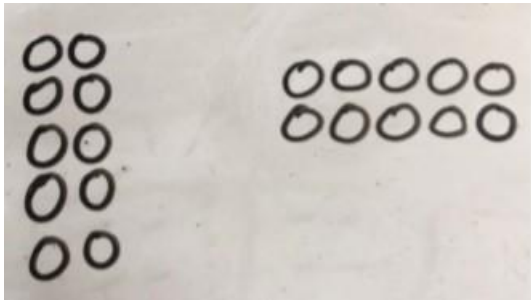
What is 186 less than 391?

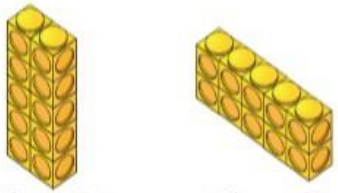
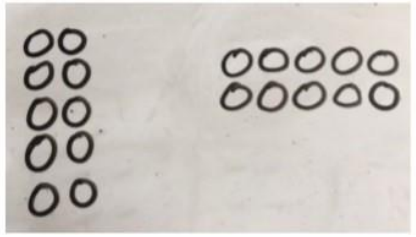
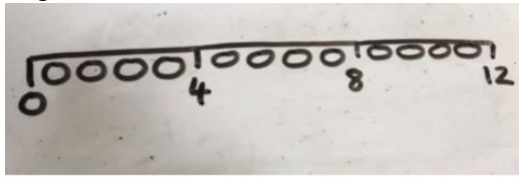
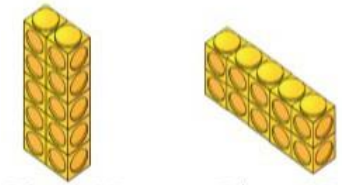
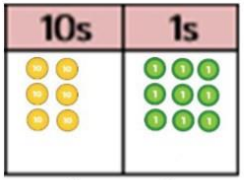
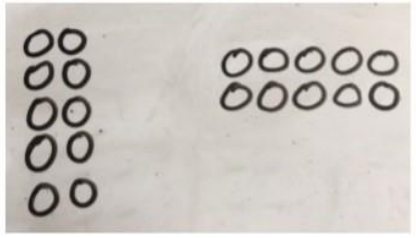
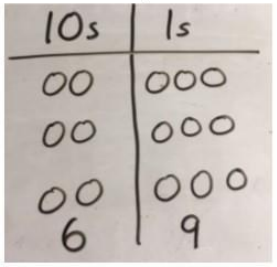
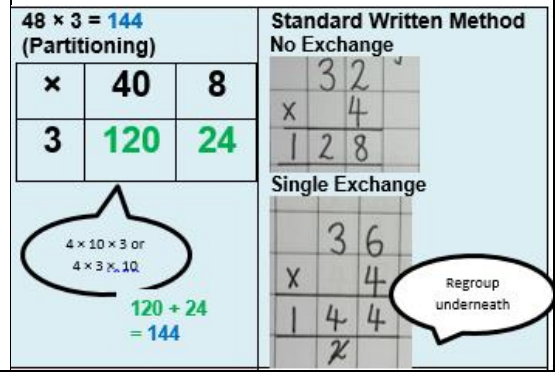
Missing digit calculations



Calculation Policy- Multiplication

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

Objectives	*Concrete*	*Pictorial*	*Abstract*
EYFS Solve problems, including doubling, halving and sharing Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups (ELG Exc)	Doubling using objects 	Doubling using pictures 	Double 2 2 + 2 = 4
Year 1 Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Repeated groups  Create arrays 	Draw arrays 	Write repeated additions 2 + 2 + 2 + 2 + 2 = 10

Year 2 Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Solve problems involving multiplication and division, using arrays, repeated addition and multiplication and division facts, including problems in contexts e.g. knowing that 2 × 7 = 14 and 2 × 8 = 16, explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left	Create arrays $2 \times 5 = 5 \times 2$  2 lots of 5 5 lots of 2	Children to represent the arrays pictorially.  Using a numberline 	Children to be able to use an array to write a range of calculations e.g. $10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$
Year 3 Write and calculate mathematical statements for multiplication and division using the multiplication tables that he/she knows, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods **Year 4** Multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Create arrays $2 \times 5 = 5 \times 2$  2 lots of 5 5 lots of 2 **Formal column method** with place value counters (base 10 can also be used.) 3 × 23 	Children to represent the arrays pictorially.  Children to represent the counters pictorially. 	Children to record what it is they are doing to show understanding. 3×23 20 3 $3 \times 20 = 60$ $3 \times 3 = 9$ $60 + 9 = 69$ 23 × 3 69 

67 × 9

×	60	7
9	540	63

540 + 63 = 603

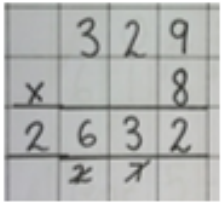
437 × 6

×	400	30	7
6	2400	180	42

2400 + 180 + 42 = 2622

Standard Written Method

Double Exchange



- Regroup underneath
- Cross out the 'carry' once it has been used

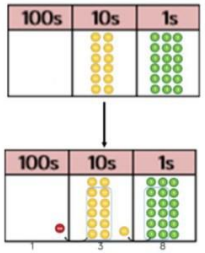
Year 5

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

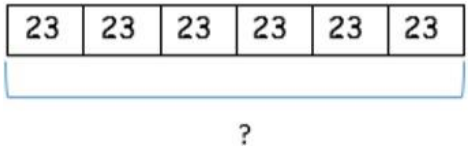
Year 6

I can mentally calculate using a mix of the four operations

Formal column method with place value counters.
6 x 23



Draw bar model



Formal written method

$$6 \times 23 =$$

$$\begin{array}{r} 23 \\ \times\ 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$$

To get 744 children have solved 6 × 124.
To get 2480 they have solved 20 × 124.

$$\begin{array}{r} 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 7\ 4\ 4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ \hline 1\ 1 \end{array}$$

Answer: 3224

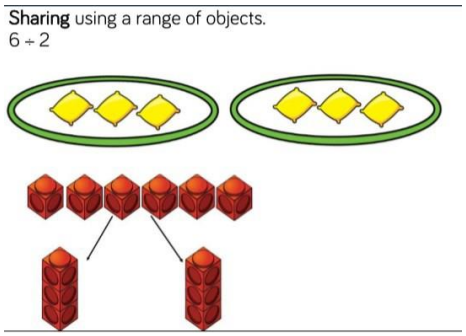
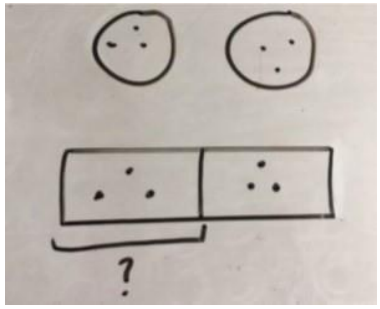
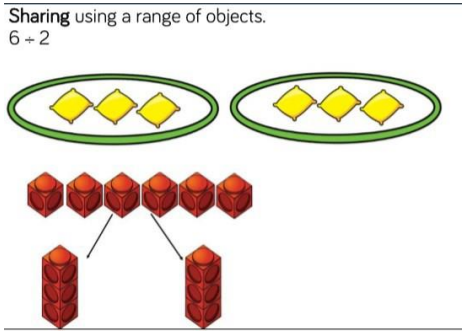
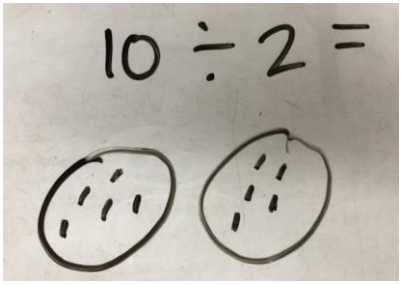
- Place larger number on the top
- When multiplying by the units, place the regroup on the top.
- When multiplying by the tens, place the exchange underneath answer smaller in size.
- When adding the values together, exchange underneath.
- Remember to cross out the carry once it has been used.

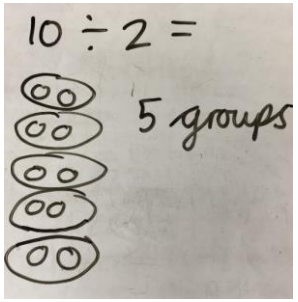
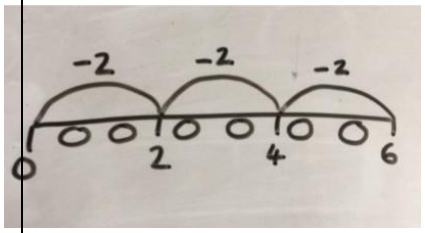
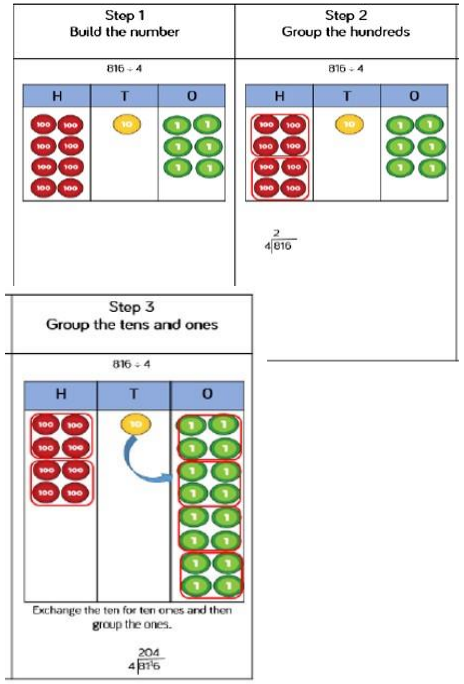
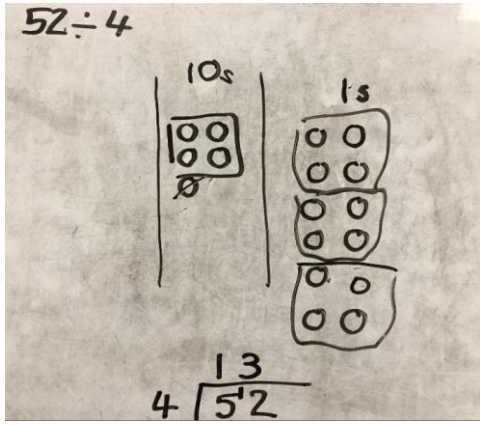
Conceptual variation; different ways to ask children to solve 6 x 23

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?  	

Calculation Policy- Division

Key Language: share, group, divide, divided by, half, dividend, divisor, quotient

Objectives	*Concrete*	*Pictorial*	*Abstract*
EYFS Solve problems, including doubling, halving and sharing Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups (ELG Exc)	Halving using objects  	Halving using pictures  	Half of 6 
Year 1 Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Sharing and grouping  	Sharing  Grouping	2 groups of 5 5 5 5 groups of 2 2 2 2 2 2

Year 2 Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs Solve problems involving multiplication and division, using arrays, repeated addition and multiplication and division facts, including problems in contexts e.g. knowing that 2 × 7 = 14 and 2 × 8 = 16, explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left	Grouping using equipment 	Grouping  Number lines 	Division number sentences 10 ÷ 2 = 5 10 ÷ 5 = 2
Year 3 Write and calculate mathematical statements for multiplication and division using the multiplication tables that he/she knows, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods **Year 4** Multiply two-digit and three-digit numbers by a one-digit number using formal written layout			Children to the calculation using the short division scaffold. 123 5 615

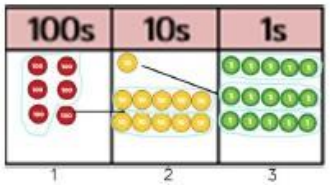
Year 5

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

Year 6

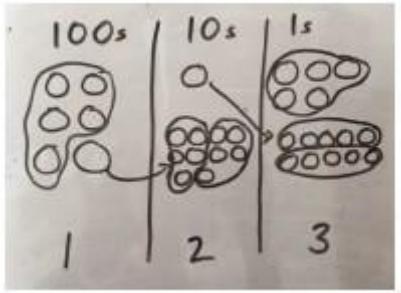
I can mentally calculate using a mix of the four operations

Short division using place value counters to group.
615 ÷ 5

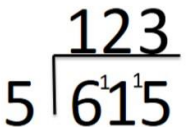


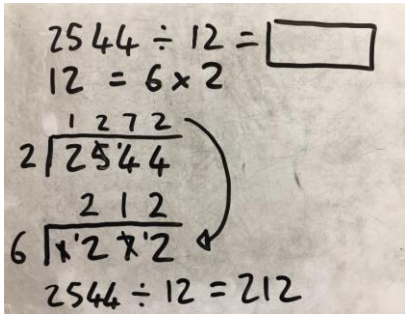
1. Make 615 with place value counters.
2. How many groups of 5 hundreds can you make with 6 hundred counters?
3. Exchange 1 hundred for 10 tens.
4. How many groups of 5 tens can you make with 11 ten counters?
5. Exchange 1 ten for 10 ones.
6. How many groups of 5 ones can you make with 15 ones?

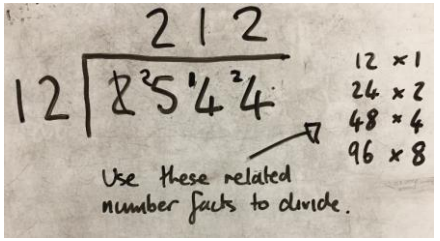
Represent the place value counters pictorially.



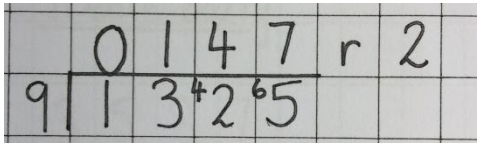
Children to the calculation using the short division scaffold.





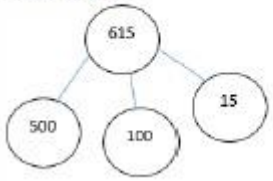


With remainder



or 147 2/9

Conceptual variation; different ways to ask children to solve 615 ÷ 5

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?