Henleaze Infant School

Henleaze Junior School

Calculation Policy

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Combining two parts to make a whole: part whole model Counting all to count on	Combining two parts to make a whole: part whole model Starting at the bigger numbers and counting on - using cubes Regrouping to make 10 using tens frame Using base 10	Combining two parts to make a whole: part whole model Adding three single digits Use of base 10 to combine two numbers Using place value counters/base 10 (up to 2 digits)	Column method - exchanging Using place value counters/base 10 (up to 3 digits)	Column method - exchanging (up to 4 digits)	Column method - exchanging up to 5 digit numbers and 3dp	Column method - exchanging including larger numbers and up to 3dp

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Subtraction	Taking away ones Counting back	Taking away ones Counting back Find the difference Part whole model Make 10 using tens frame	Counting back Find the difference Part whole model Make 10 Use of base 10	Column method with exchanging (up to 3 digits using place value counters/base 10)	Column method with exchanging. (up to 4 digits)	Column method with exchanging for up to 5 digits and up to 3dp	Column method with exchanging including different numbers of decimal places

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Multiplication	Recognising and making equal groups Repeated grouping Doubling Use cubes, Numicon and other objects in the classroom	Recognising and making equal groups Repeated grouping and addition Doubling Counting in multiples Arrays Use cubes, Numicon and other objects in the classroom	Recognising and making equal groups Repeated grouping and addition Arrays - showing commutative representation	Arrays 2d x 1d using base 10/place value counters Use of grid for 2digit x 1 digit	Column multiplication - introduced with place value counters (2 and 3 digit multiplied by 1 digit)	Column multiplication 4 digit multiplied by 1 or 2 digits	Column multiplication of any numbers by up to 4 digit numbers

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Division	Sharing objects into groups	Sharing objects into groups Division as grouping e.g. I have 12 sweets and put them into groups of 3, how many groups?	Division as grouping Division within arrays - linking to multiplication Repeated subtraction	Division with a remainder - times table facts and repeated subtraction 2d divided by 1d using base 10 or place value counters and number lines	Division with a remainder Short division (up to 3 digits by 1 digit - concrete and pictorial)	Short division with place value counters (up to 4 digits by a 1 digits by 1 digit including remainders)	Short division Long division Children should exchange into the tenths and hundredths column too Children should perform division using factors

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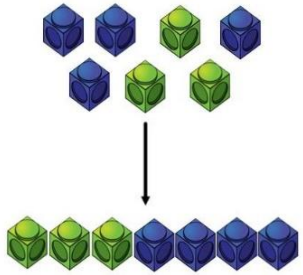
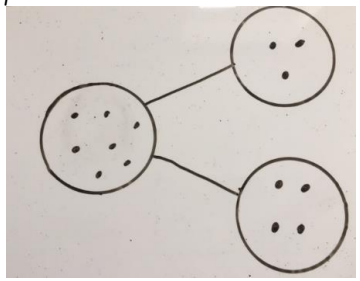
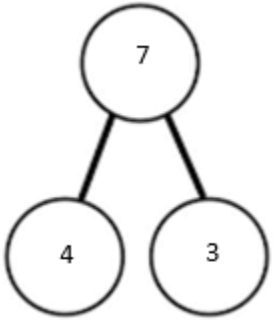
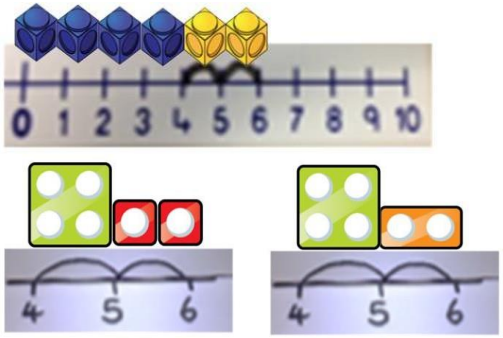
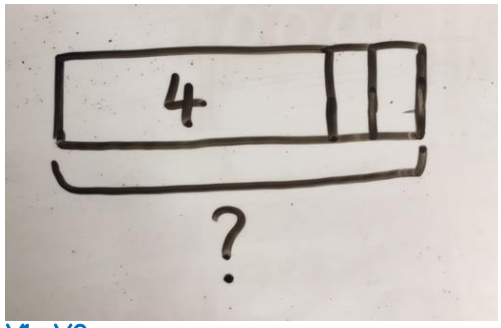
Calculation Policy: Guidance

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)  EYFS, Y1, Y2	Children to represent the cubes using dots or crosses. They could put each part on a part-whole model too.  EYFS, Y1, Y2	4 + 3 = 7 4 is a part, 3 is a part and the whole is 7.  EYFS, Y1, Y2, Y3
Counting on using number lines using cubes or Numicon.  EYFS, Y1, Y2	A bar model which encourages the children to count on, rather than count all.  Y1, Y2	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  Y1, Y2, Y3

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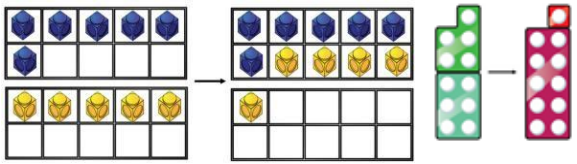
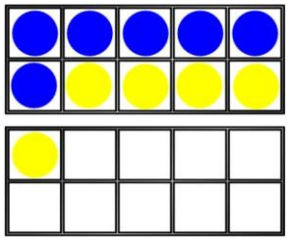
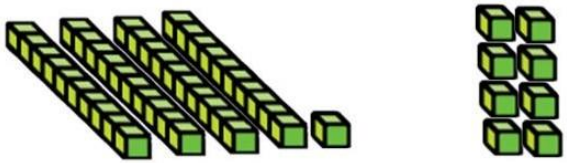
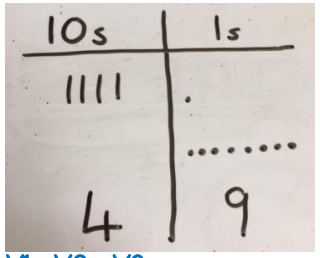
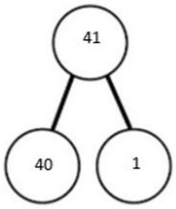
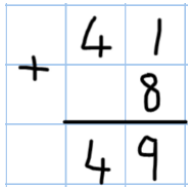
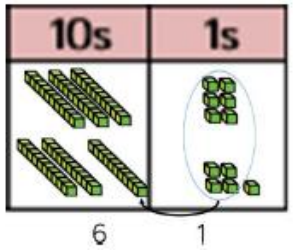
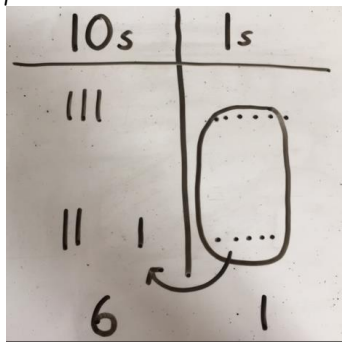
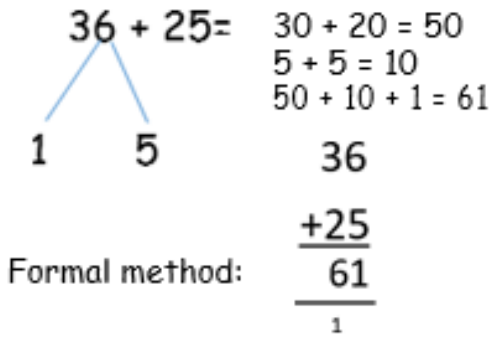
Regrouping to make 10; using ten frames and counters/cubes or using Numicon 6 + 5  Y1, Y2	Children to draw the ten frame and counters/cubes.  Y2, Y3	Children to develop an understanding of equality. For example: 6 + □ = 11 6 + 5 = 5 + □ 6 + 5 = □ + 4 Y2, Y3
TO + O using base 10. Continue to develop understanding of partitioning and place value. 41 + 8  Y1, Y2, Y3	Children to represent the base 10 e.g. lines for tens and dots/crosses for ones.  Y1, Y2, Y3	41 + 8   1 + 8 = 9 40 + 9 = 49 Y3
TO + TO using base 10 and exchanging. Continue to develop understanding of partitioning and place value. 36 + 25  Y2, Y3	Children to represent the base 10 in a place value chart.  Y2, Y3	Looking for ways to make 10.  Y3

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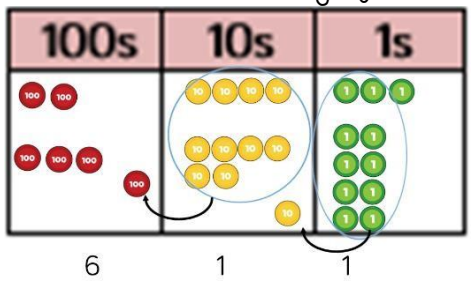
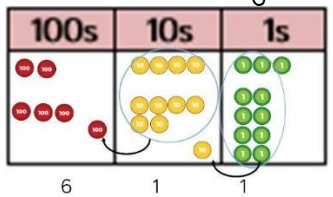
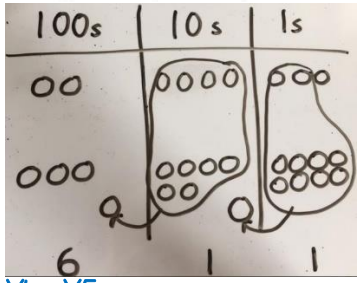
Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column - we exchange for 1 ten, when there are 10 tens in the 10s column – we exchange for 1 hundred.



Y3

Children to represent the counters in a place value chart, crossing out when they make an exchange.



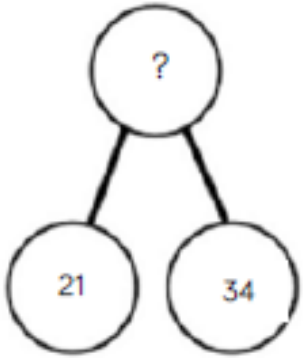


Y4, Y5

$$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ \hline {\scriptstyle 1\ 1} \end{array}$$

Y4, Y5, Y6

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



?	
21	34

Y4, Y5, Y6

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.

Y4, Y5, Y6

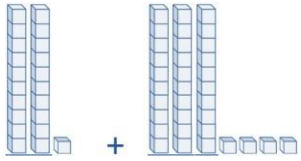
$$\begin{array}{r} 21 \\ +34 \\ \hline \\ \hline \end{array}$$

21 + 34 =

□ = 21 + 34

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

Y4, Y5, Y6



Missing digit problems:

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

Y4, Y5, Y6

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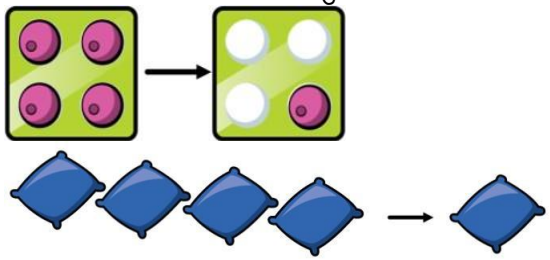
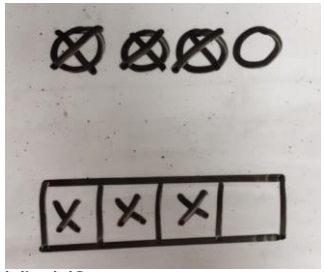
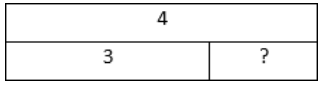
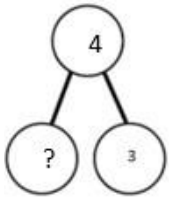
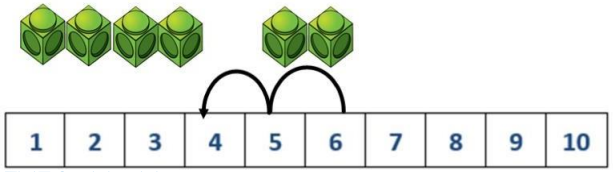
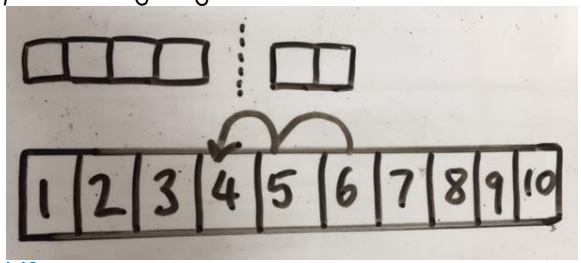
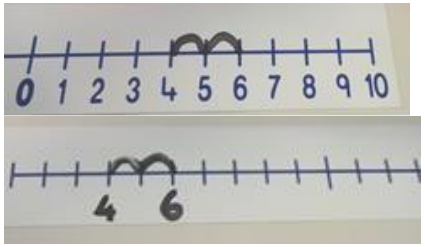
Calculation Policy: Subtraction

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).  EYFS, Y1, Y2	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.  Y1, Y2	4 - 3 = □ = 4 - 3   Y1, Y2, Y3, Y4
Counting back (using number lines or number tracks). Children start with 6 and count back 2. 6 - 2 = 4  EYFS, Y1, Y2	Children to represent what they see pictorially e.g.  Y2	Children to represent the calculation on a number line or a number track and show their jumps. Encourage children to use an empty number line.  Y2, Y3, Y4

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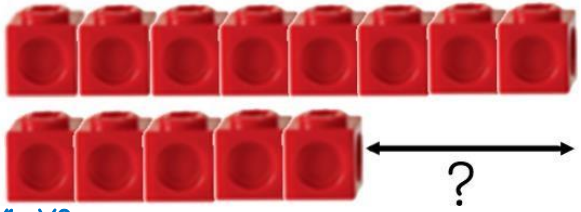
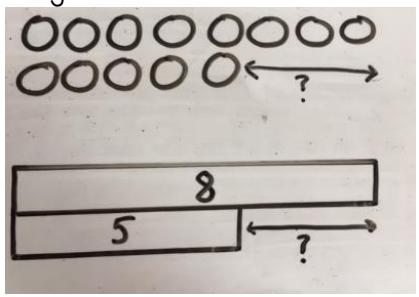
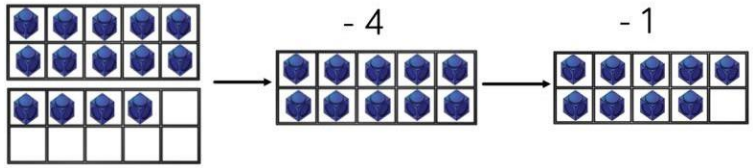
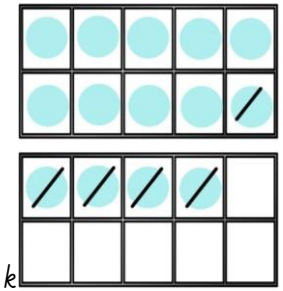
Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used). Calculate the difference between 8 and 5.  Y1, Y2	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.  Y2	Find the difference between 8 and 5. 8 - 5, the difference is ☐ Children to explore why 9 - 6 = 8 - 5 = 7 - 4 have the same difference. Y2
Making 10 using ten frames. 14 - 5  Y2	Children to present the ten frame pictorially and discuss what they did to make 10.  Y2	Children to show how they can make 10 by partitioning the subtrahend. 14 - 5 = 9 4 1 14 - 4 = 10 10 - 1 = 9 Y3

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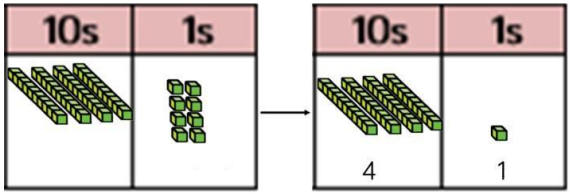
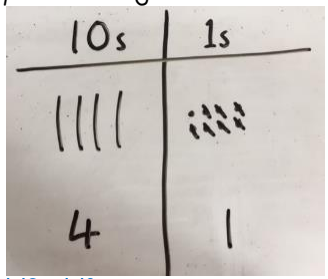
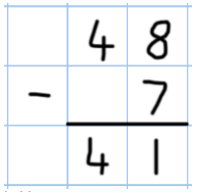
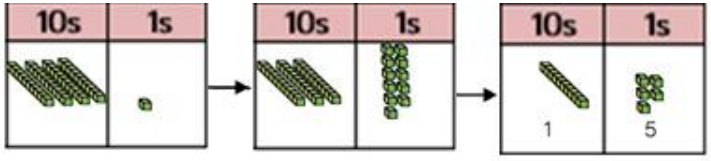
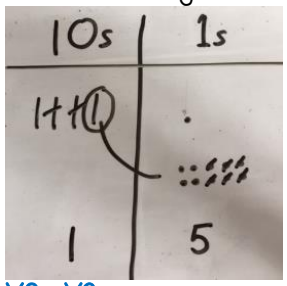
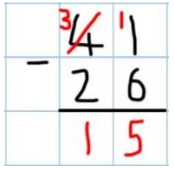
Column method using base 10. 48 - 7  Y2, Y3	Children to represent the base 10 pictorially.  Y2, Y3	Column method or children could count back.  Y3
Column method using base 10 and having to exchange. 41 - 26  Y2, Y3	Represent the base 10 pictorially, remembering to show the exchange.  Y2, Y3	Formal column method. Children must understand that when they have exchanged the 10, they still have 41 because 41 = 30 + 11.  Y3

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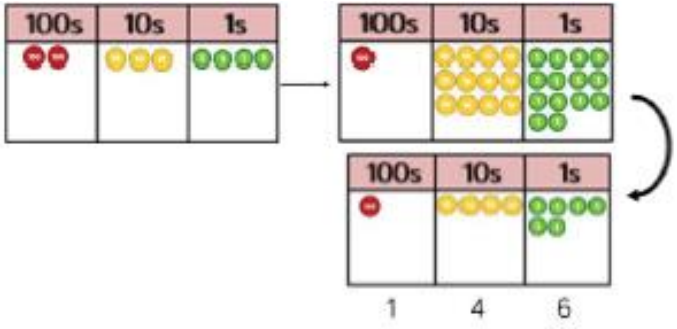
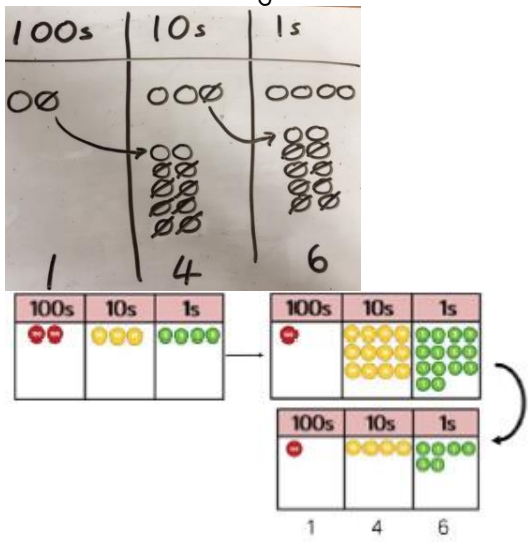
Column method using place value counters.

234 - 88



Y3

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



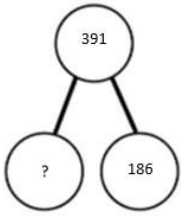
Y4, Y5

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

$$\begin{array}{r} {}^{2}\not{2}\,{}^{1}\not{3}4 \\ -\ 88 \\ \hline 6 \end{array}$$

Y4, Y5, Y6

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



391	
186	?

Y4, Y5, Y6

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

Calculate the difference between 391 and 186.

Y4, Y5, Y6

□ = 391 - 186

$$\begin{array}{r} 391 \\ -186 \\ \hline \quad \end{array}$$

What is 186 less than 391?

Y4, Y5, Y6

Missing digit calculations.

$$\begin{array}{r} 3\ 9\ \square \\ -\ \square\ \square\ 6 \\ \hline \square\ 0\ 5 \end{array}$$

Y4, Y5, Y6

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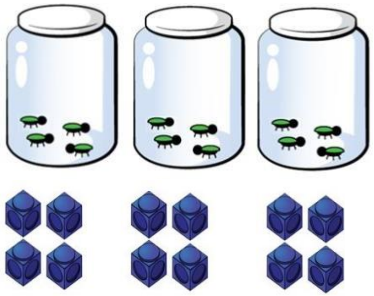
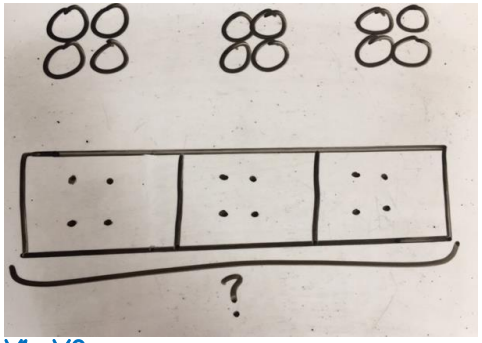
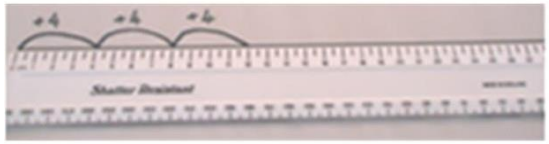
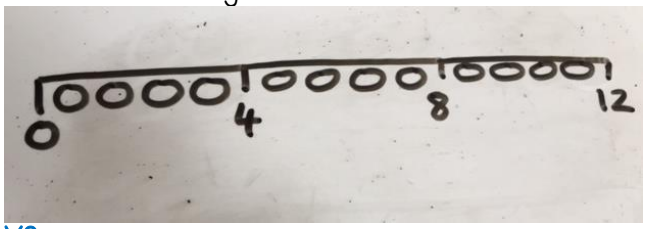
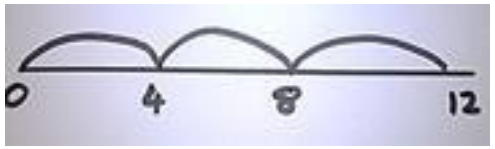
Calculation Policy: Multiplication

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

Concrete	Pictorial	Abstract
Repeated grouping/repeated addition 3 x 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group  EYFS, Y1, Y2	Children to represent the practical resources in a picture and use a bar model.  Y1, Y2	3 x 4 = 12 4 + 4 + 4 = 12 Y1, Y2
Number lines to show repeated groups. 3 x 4   Y2	Represent this pictorially alongside a number line e.g.  Y2	Abstract number line showing three jumps of four. 3 x 4 = 12  Y3

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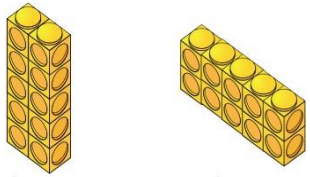
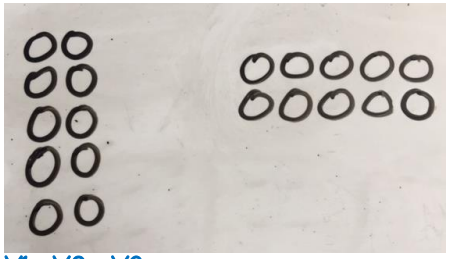
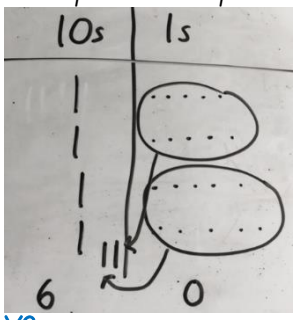
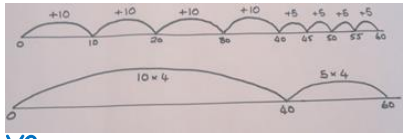
Use arrays to illustrate commutativity counters and other objects can also be used. 2 x 5 = 5 x 2  2 lots of 5 5 lots of 2 Y1, Y2	Children to represent the arrays pictorially.  Y1, Y2, Y3	Children to be able to use an array to write a range of calculations e.g. 10 = 2 x 5 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5 Y1, Y2, Y3
	Children represent the concrete manipulatives pictorially.  Y3	Children to be encouraged to show the steps they have taken. 4 x 15 10 5 10 x 4 = 40 5 x 4 = 20 40 + 20 = 60 A number line can also be used.  Y3

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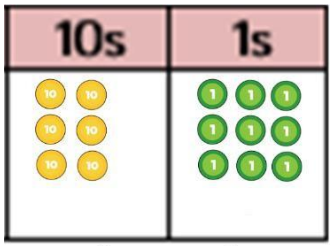
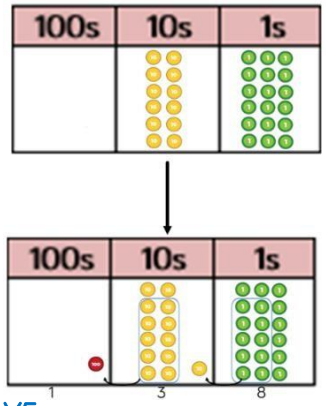
	Formal column method *with place value counters (base 10 can also be used).* *3 x 23*  Y4	*Children to record what it is they are doing to show understanding.* 3 × 23 20 3 3 × 20 = 60 3 × 3 = 9 60 + 9 = 69 23 × 3 69 Y4
	Formal column method *with place value counters.* *6 x 23*  Y5	*Formal written method.* 6 x 23 = 23 × 6 138 1 1 Y4, Y5, Y6

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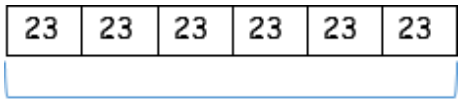
		1 2 4 × 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1 Answer: 3224 Y5, Y6

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

 Y5, Y6	Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week? Y4, Y5, Y6	Find the product of 6 and 23. 6 x 23 = ☐ = 6 x 23 6 × 23 23 × 6 Y4, Y5, Y6	

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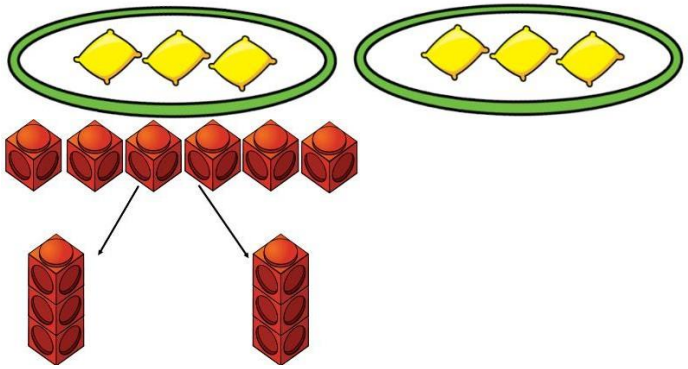
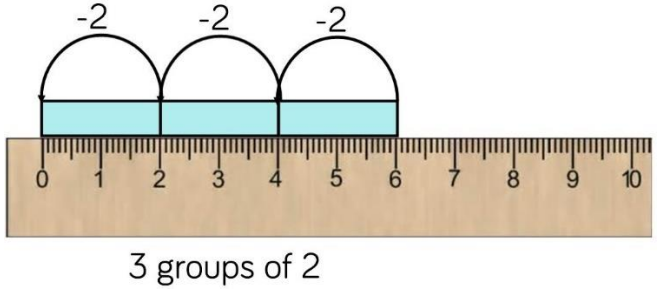
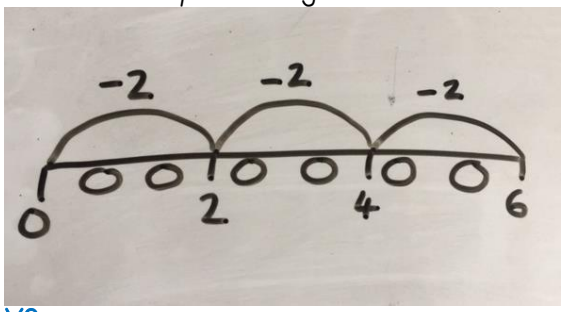
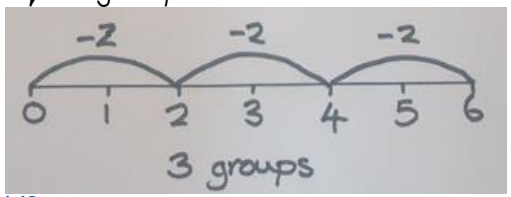
Calculation Policy: Division

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

Concrete	Pictorial	Abstract
Sharing using a range of objects. 6 ÷ 2  EYFS, Y1, Y2, Y3	Represent the sharing pictorially. Y1, Y2, Y3	6 ÷ 2 = 3 3 | 3 Children should also be encouraged to use their 2 times tables facts. Y2, Y3
Repeated subtraction using Cuisenaire rods above a ruler. 6 ÷ 2  3 groups of 2 Y2	Children to represent repeated subtraction pictorally.  Y2	Abstract number lune to represent the equal groups that have been subtracted.  Y2

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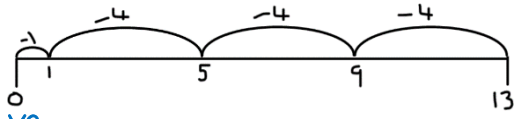
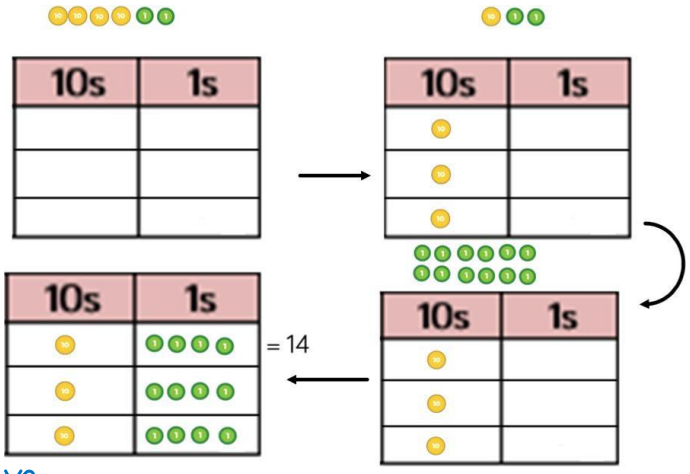
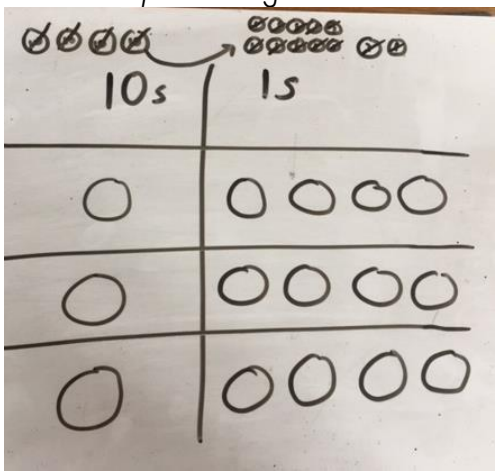
		13 ÷ 4 = 3 remainder 1 Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over'  Y3
Sharing using place value counters. 42 ÷ 3 = 14  Y3	Children to represent the place value counters pictorally.  Y3	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14 Y3, Y4

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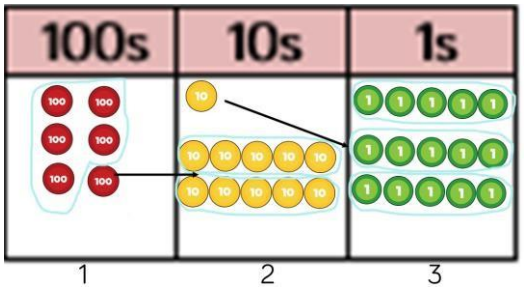
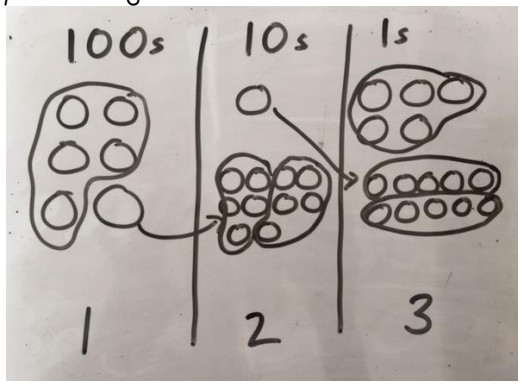
Short division using place value counters to group. 615 ÷ 5  1. Make 615 with place value counters 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? Y4, Y5	Represent the place value counters pictorally.  Y5 Use of dienes to demonstrate short division. Y6	Children to use the short division scaffold to complete the calculation. 123 5 ⟌ 6¹1¹5 Y4, Y5, Y6

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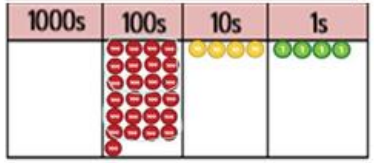
Long division using place value counters

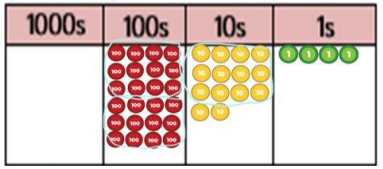
2544 ÷ 12

We can't group 2 thousands into groups of 12 so will exchange them.



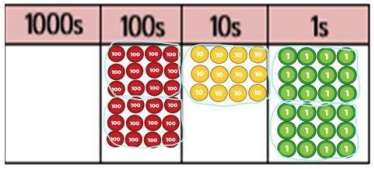
We can group 24 hundreds into groups of 12 which leaves with 1 hundred.

$$\begin{array}{r} 02 \\ 12\overline{)2544} \\ 24 \\ \hline 1 \end{array}$$



After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.

$$\begin{array}{r} 021 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 2 \end{array}$$



After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder.

$$\begin{array}{r} 0212 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$$

Y6

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

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?

Y5, Y6

$$5\overline{)615}$$

$615 \div 5 =$

$\square = 615 \div 5$

Y5, Y6

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