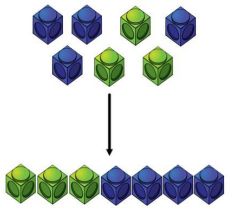
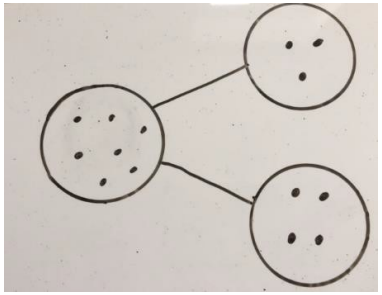
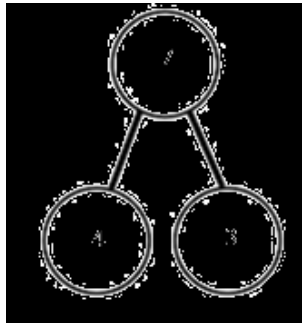
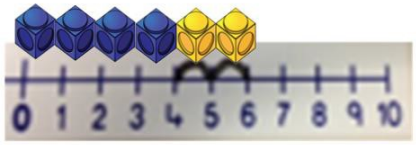
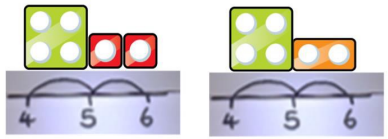
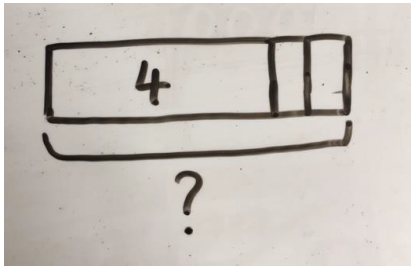
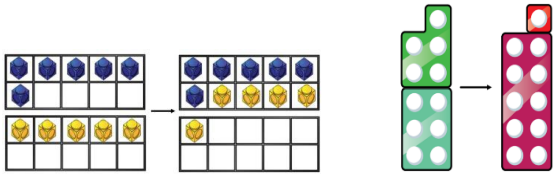
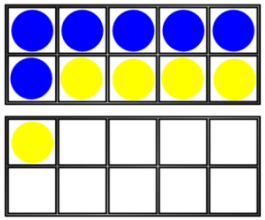
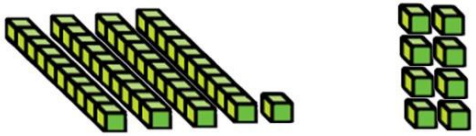
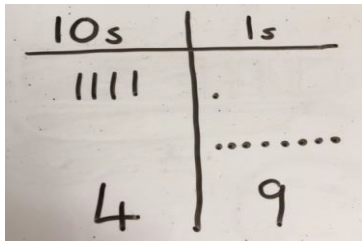
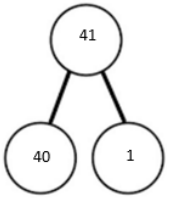
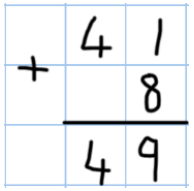
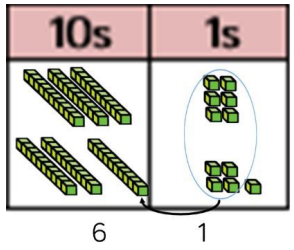
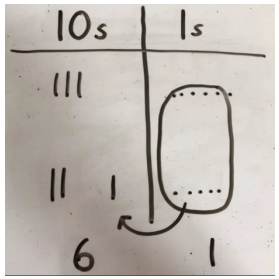
East Stanley School

Calculation Policy

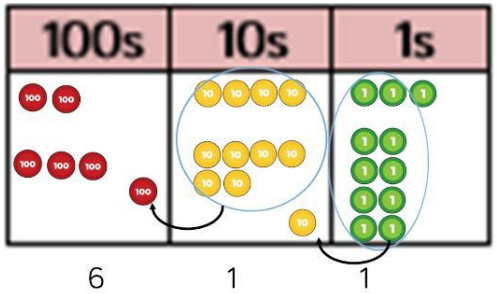
Addition

Key Vocabulary: *sum, total, altogether, plus, add, more, part, whole, is equal to, is the same as.*

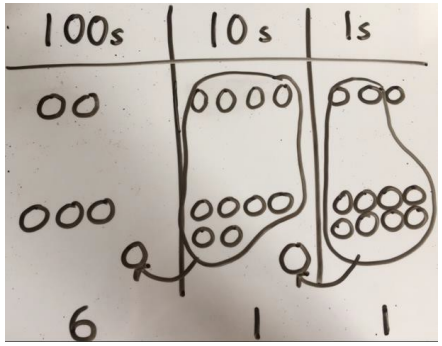
Concrete	Pictorial	Abstract
Combining two parts to make a whole using a variety of concrete resources: 	Children to represent the objects using dots or crosses on a part-whole model: 	4+3=7 Four is a part, 3 is a part and the whole is 7: 
Counting on using number lines using cubes or Numicon:   	Use of a bar model to encourage children to count on: 	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=6 

Regrouping to make 10 using 10s frames and counters or using Numicon: 6+5 	Children draw 10s frame and counters: 	Children to develop an understanding of equality: 6+ * = 11 6+5 = 5+6 6+5 = * +4
TO+O using base 10. Develop understanding of partitioning and place value: 	Represent the base 10 pictorially e.g. 	41+8  
TO+TO using base 10. Continue to develop understanding of partitioning and place value. 36+25 	Represent the base 10 pictorially: 	Looking for ways to make 10: 36 + 25= 30+20=50 5+5=10 50+10+1=61 1 5 Leading to formal method: 36 +25 61 1

Use of place value counters to add. When there are 10 1s we exchange for 1 10. When there are 10 10s we exchange for 1 100.



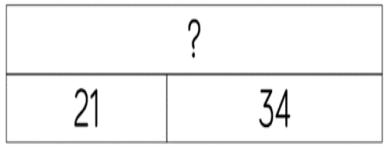
Children to represent the counters in a place value chart, circling when they make an exchange.



Standard written method

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

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



Word Problems:
In Y3 there are 21 children and in Y4 there are 34 children.

How many children in total?

21+ 34=55

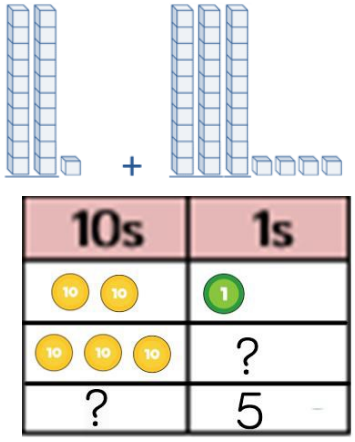
Prove it.

21+34= 55

□ = 21+34

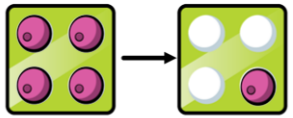
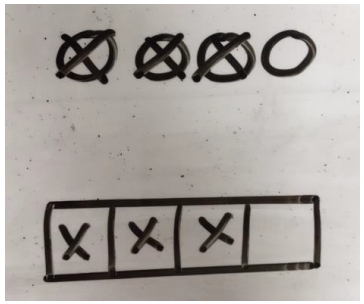
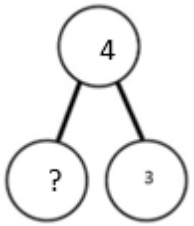
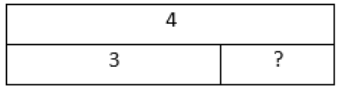
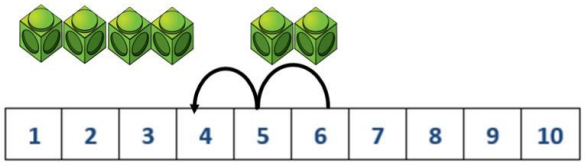
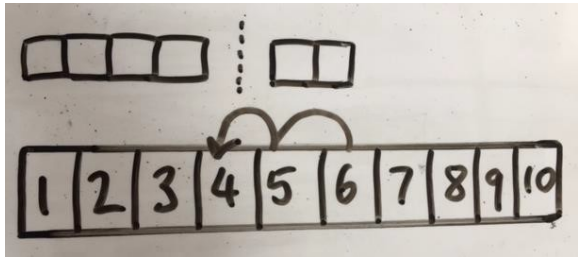
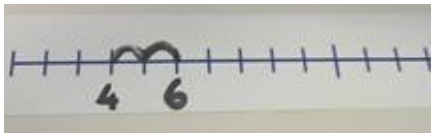
Calculate the sum of 21 and 34.

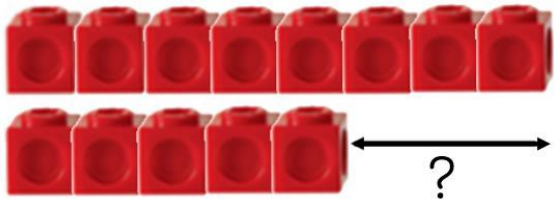
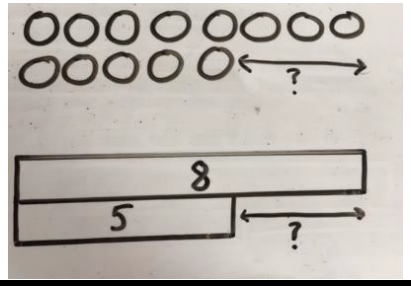
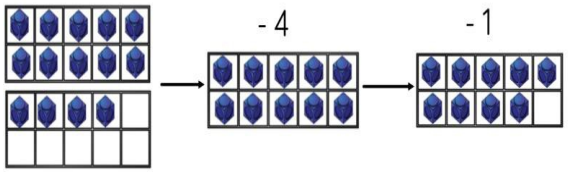
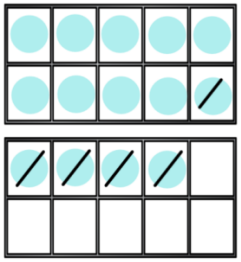
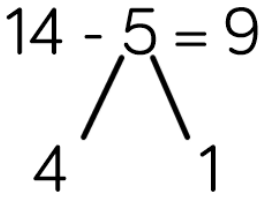
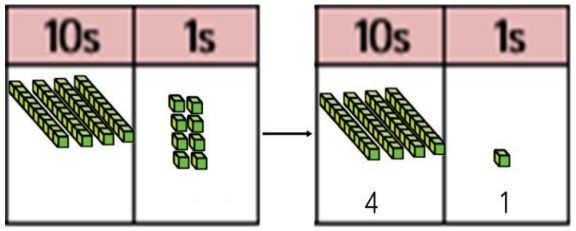
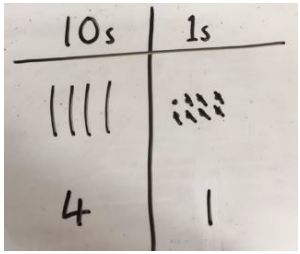
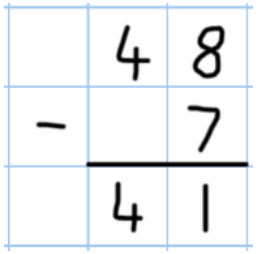
$$\begin{array}{r} 21 \\ +34 \\ \hline \\ \hline \end{array}$$

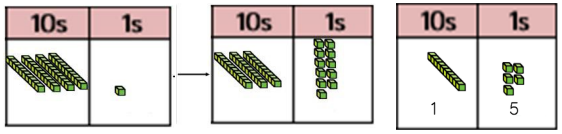
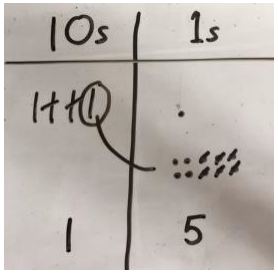
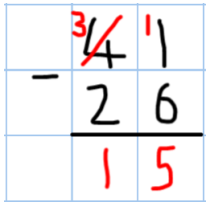
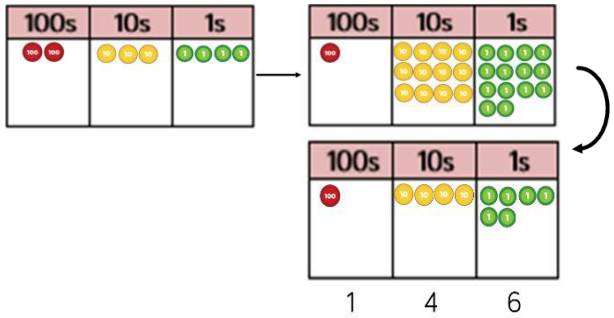
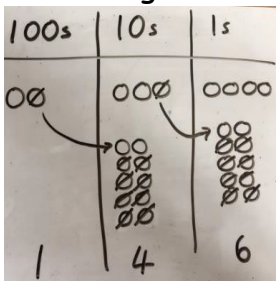
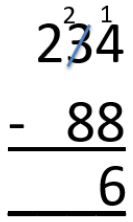


Subtraction

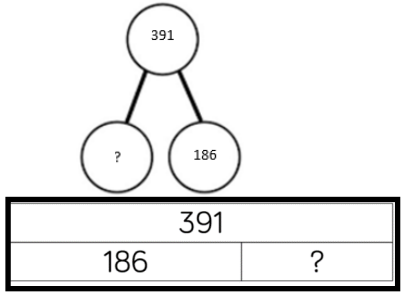
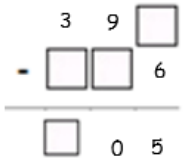
Key Vocabulary: take away, less than, the difference, subtract, minus, fewer, decrease.

Concrete	Pictorial	Abstract
Physically taking and removing objects from a whole. 4-3=1 	Children to draw the resources they are using and cross them out. The bar model can also be used. 	4-3 = □ = 4-3  
Counting back using number lines. Children start at 6 and count back 2. 6-2=4  	Children to represent what they see pictorially.  	Children to represent the calculation on a number line and show their jumps. Use an empty number line. 

Finding the difference using cubes, Numicon or other objects. Find the difference between 8 and 5.  	Children to draw what they have used or use the bar model to illustrate the calculation.  	Find the difference between 8 and 5. 8-5, the difference is □ Children to explore why: 8-5 9-6 7-4 have the same answer.
Using 10 frames; 14-5  	Children to represent the 10s frame pictorially. 	Children partition the subtrahend.  14-4=10 10-1=9
Column method using base 10. 48-7  	Children to represent the base 10 Pictorially.  	Column method or count back 7. 

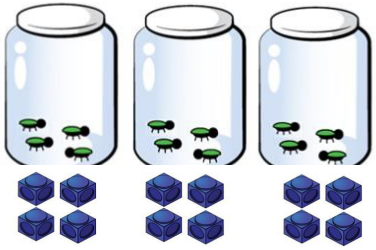
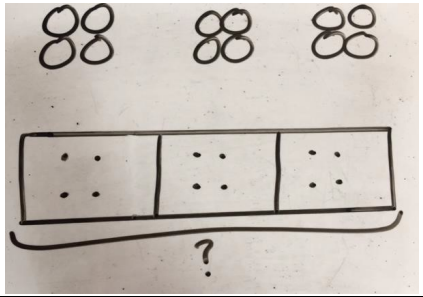
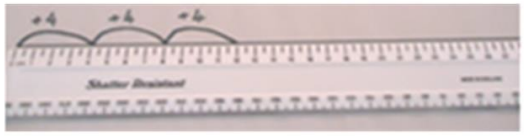
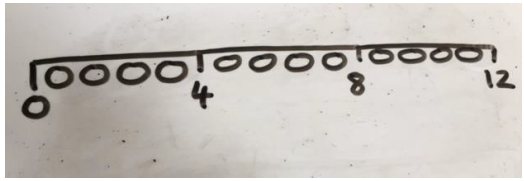
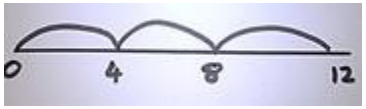
Column method using base 10 and having to exchange. 41-26 	Represent the base 10 pictorially, remembering to show the exchange. 	Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41=31+11. 
Column method using place value Counters.234-88 	Represent the place value counters pictorially, remembering to show what has been exchanged. 	Formal column method. Children must understand when they have crossed out the digits. 

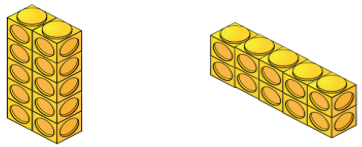
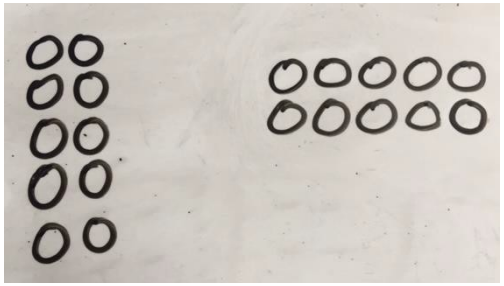
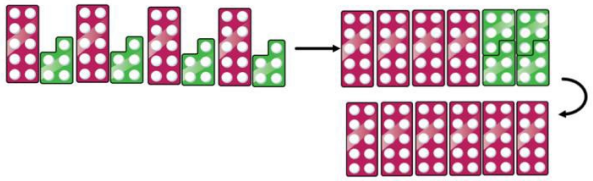
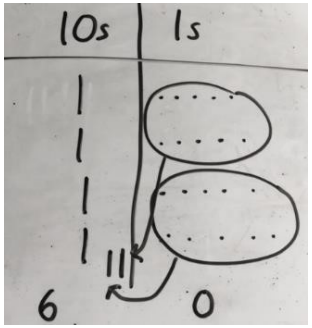
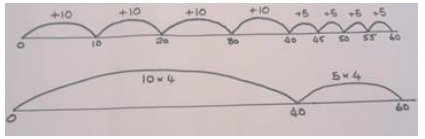
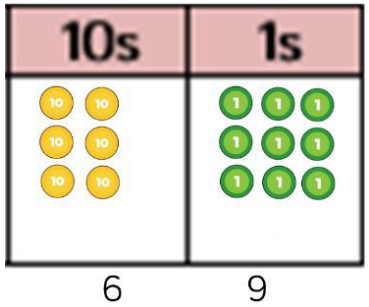
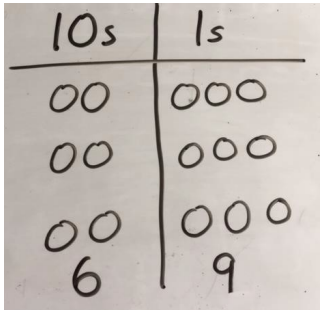
Conceptual variation; different ways to ask children to solve 391-186.

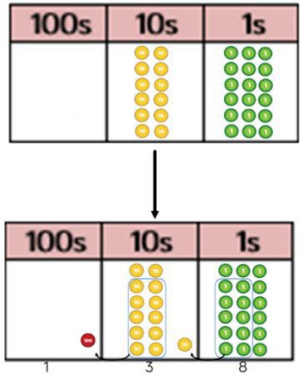
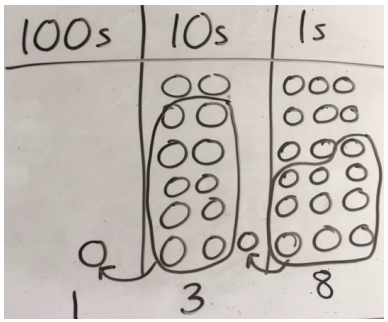
	Raj spent £391 Tim spent £186. How much more did Raj spend? Calculate the difference between £391 and £186.	□ = 391-186 391 -186 ——— What is 186 less than 391?	Missing digit calculations. 

Multiplication

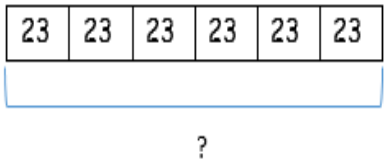
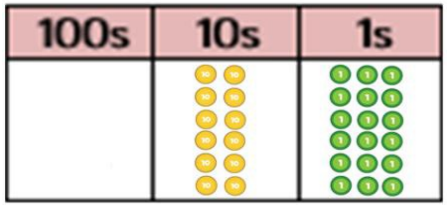
Key Vocabulary: *double, times, multiplied by, the product of, groups of, lots of, equal groups.*

Concrete	Pictorial	Abstract
Repeated grouping/repeated addition 3 x 4 4+4+4 There are 3 equal groups with 4 in each group. 	Children to represent the concrete resources pictorially 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 demonstrate commutativity. Counters and other Objects can be used. 2 x 5 = 5 x 2  2 lots of 5 5 lots of 2	Children to represent arrays Pictorially. 	Children 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
Partition to multiply using Numicon, Base 10 or Cuisenaire rods: 4 x 15 	Children to represent the concrete manipulatives pictorially.  	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.
Formal column method with place value Counters (base 10 can also be used). 3 x 23  	Children to represent the counters pictorially.  	Children to demonstrate what it is they are doing to show understanding. 3 x 20 = 60 3 x 3 = 9 60 + 9 = 69 23 x 3 69

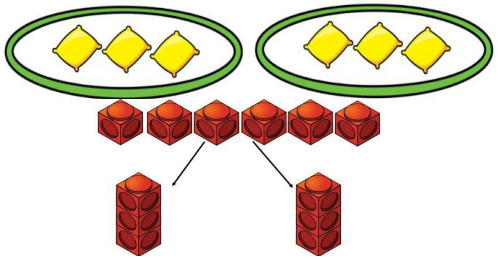
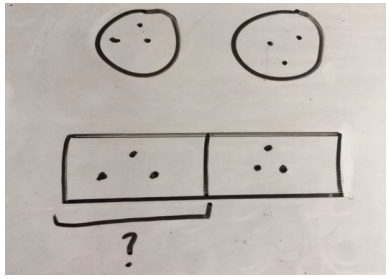
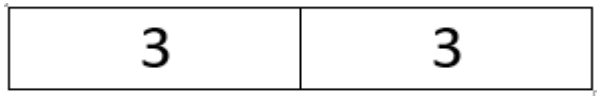
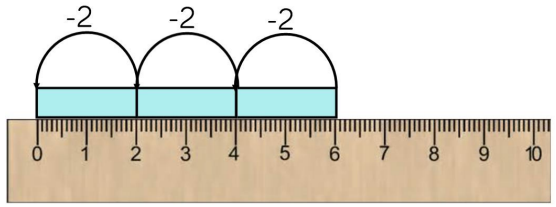
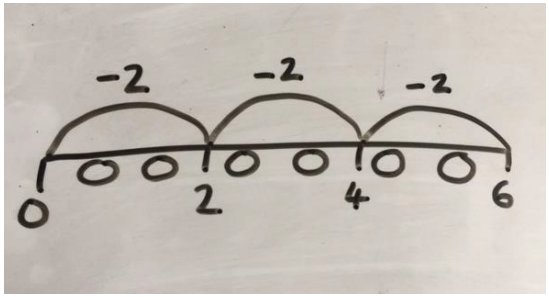
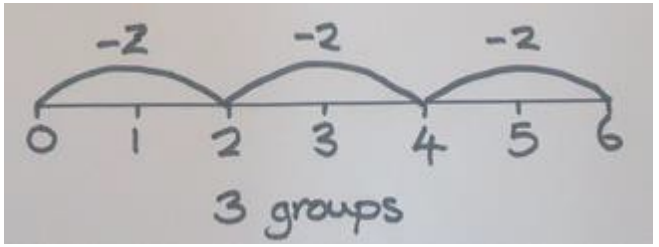
Formal column method with place value counters. 	Represent the place value counters/ base ten pictorially. 	Formal written method. 6 x 23 = 23 × 6 138 1 1
When children start to multiply 3 digit numbers by 3 digit numbers and 4 digit numbers by 2 digit numbers they should be confident with the abstract.		1 2 4 × 2 6 7 4 4 1 2 2 4 8 0 3 2 2 4 1 1 Answer: 3224

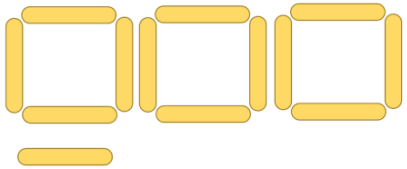
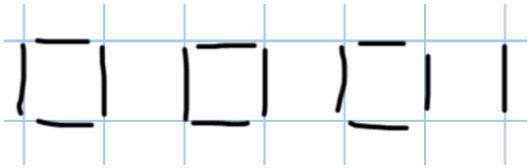
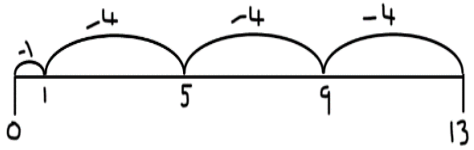
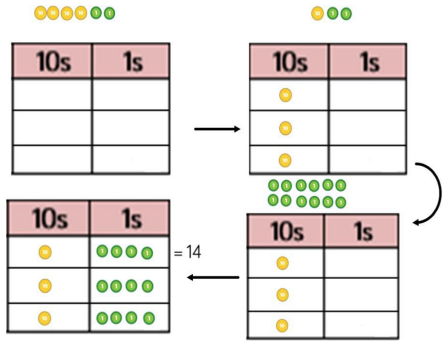
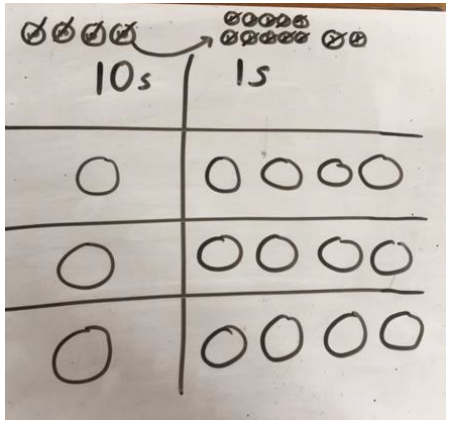
Conceptual variation; different ways to ask children to solve 6x23

	Maia had to swim 23 lengths 6 times a week. How many lengths did she swim in 1 week? With counters, prove 6x23=138	Find the product of 6 and 23 6x23= □=6x23	What is the calculation? What is the product? 

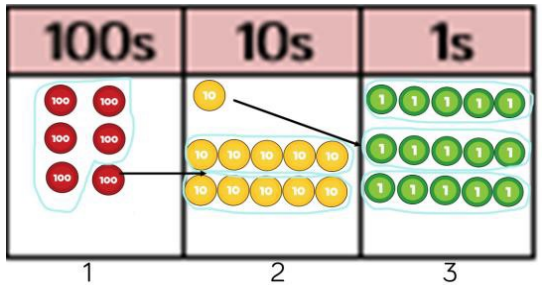
Division

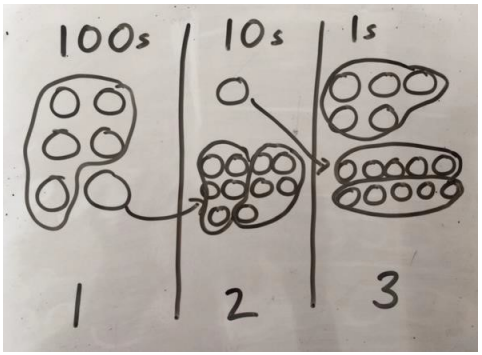
Key Vocabulary: *share, group, divide, divided by, half.*

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

2 digit number divided by 1 digit number 13÷4 Use of lollipop sticks to form wholes—squares because we are Dividing by 4.  There are 3 whole squares, with 1 left over.	Children to represent lollipop sticks pictorially.  There are 3 whole squares, with 1 left over.	13÷4=3 remainder 1 Children should be encouraged to use times table facts; they could also represent repeated subtraction on a number line: 3 groups of 4 with 1 left over 
Sharing using place value counters: 42÷3=14  	Children to represent the place value counters pictorially.  	Children 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

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



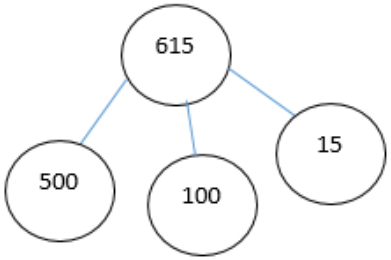


$$5\overline{)615}$$
$$123$$

Division by a two digit divisor using the above method.

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 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?

615 ÷ 5 =

□ = 615 ÷ 5

What is the calculation?

What is the answer?

Calculation Policy: Guidance

	EYFS/Y1	Y2	Y3	Y4	Y5	Y6
Addition	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on - using cubes. Regrouping to make 10 using ten frame.	Adding three single digits. Use of base 10 to combine two Numbers (up to two 2-digit numbers).	Column method - regrouping. Using place value counters (up to 3 digits).	Column method - regrouping. (up to 4 digits—to include up to two decimal places in context of money).	Column method - regrouping. Use of place value counters for adding decimals.	Column method- regrouping. Abstract methods. Place value counters to be used for adding decimal numbers.
Subtraction	Taking away ones Counting back Find the difference Part whole model Make 10 using the ten frame .	Counting back Find the difference Part whole model Make 10 Use of base 10	Column method with regrouping. (up to 3 digits using place value counters)	Column method with regrouping. (up to 4 digits)	Column method with regrouping. Abstract for whole numbers. Start with place value counters for decimals- with the same amount of decimal places.	Column method with regrouping. Abstract methods. Place value counters for decimals- with different amounts of decimal places.

	EYFS/Y1	Y2	Y3	Y4	Y5	Y6
Multiplication	Recognising and making equal groups. Doubling Counting in multiples Use cubes, Numicon and other objects in the classroom .	Arrays- showing commutative multiplication.	Arrays- 2digit × 1digit using base 10	Column multiplication- introduced with place value counters. (2 and 3 digit multiplied by 1 digit)	Column multiplication Abstract only but might need a repeat of year 4 first (up to 4 digit numbers multiplied by 1 or 2 digits)	Column multiplication Abstract methods (multi-digit up to 4 digits by a 2 digit number)
Division	Sharing objects into groups Division as grouping e.g. I have 12 sweets and put them in groups of 3, how many groups? Use cubes and draw round 3 cubes at a time.	Division as grouping Division within arrays- linking to multiplication Repeated subtraction	Division with a remainder- using lollipop sticks, times tables facts and repeated subtraction. 2digit divided by 1digit using base 10 or place value counters leading to Standard written method.	Division with a remainder Short division (up to 3 digits by 1 digit)- standard written method. (concrete and pictorial if required).	Short division (up to 4 digits by a 1 digit number including remainders)	Short division Long division with place value counters (up to 4 digits by a 2 digit number) Children should exchange into the tenths and hundredths column too