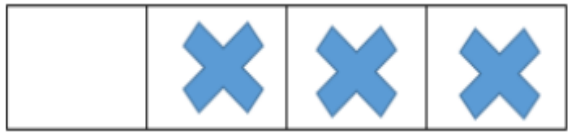
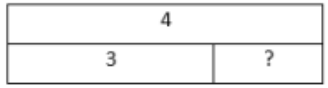
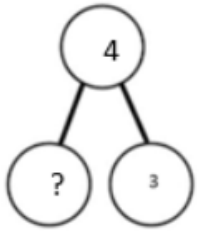
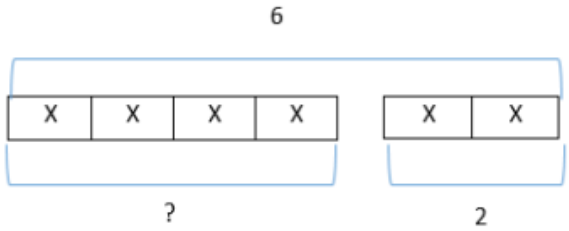
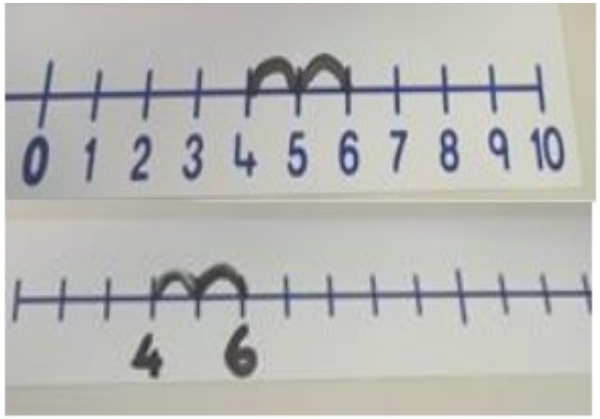
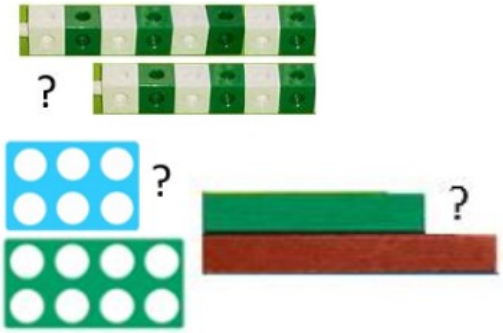
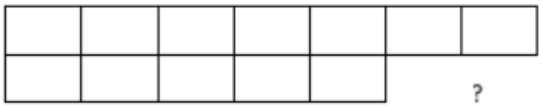
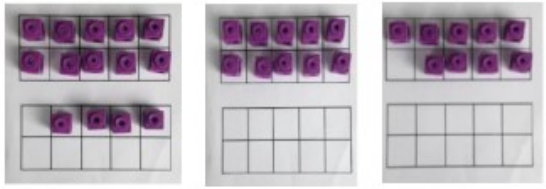
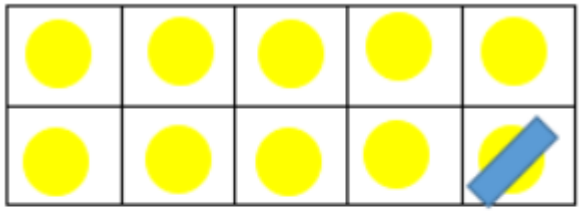
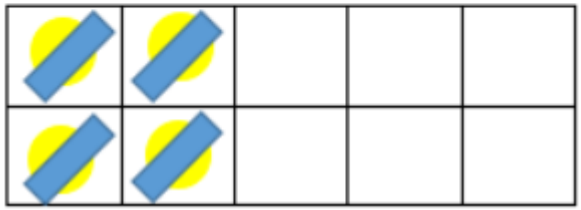
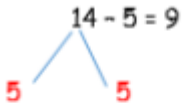
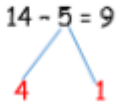
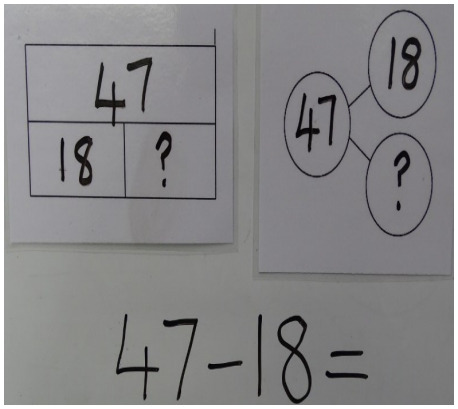
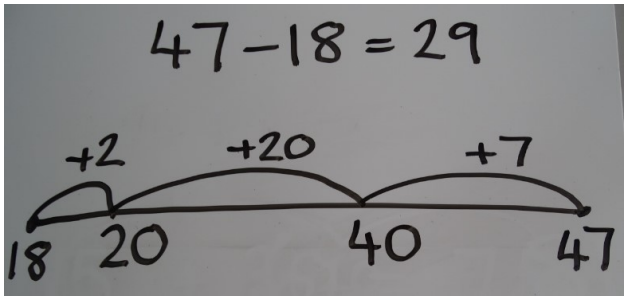
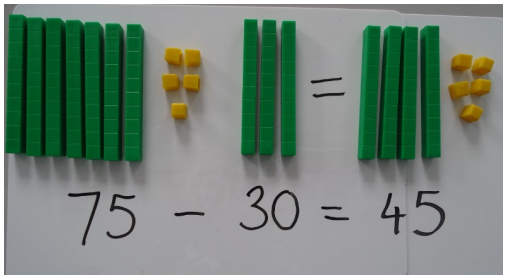
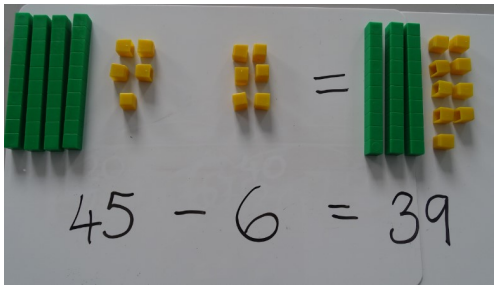
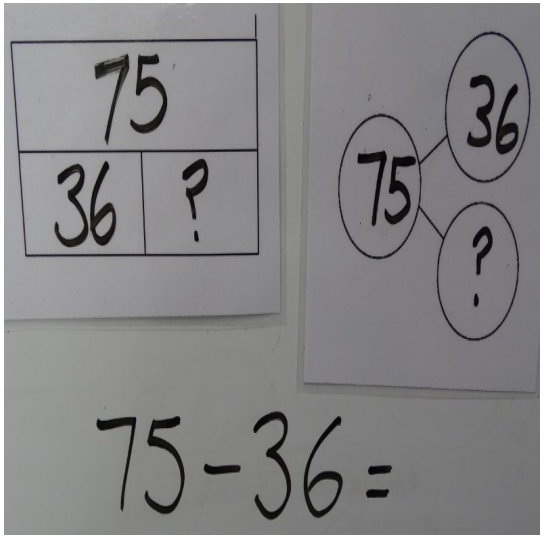
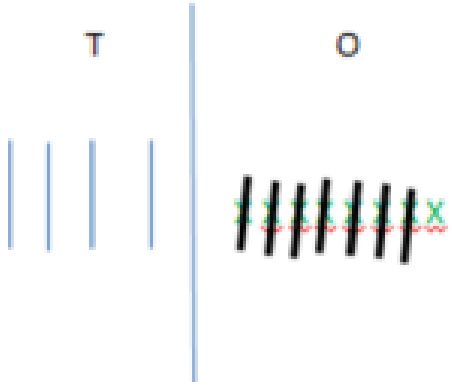
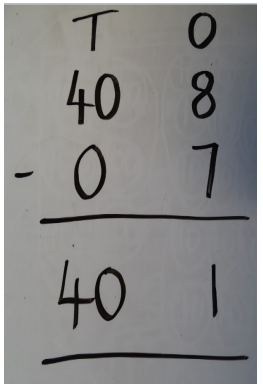
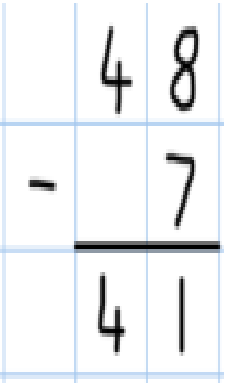
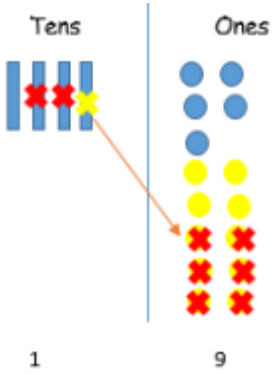
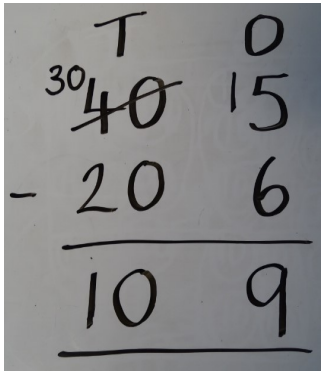
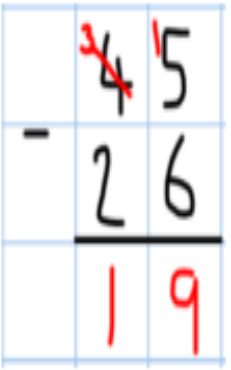
Subtraction

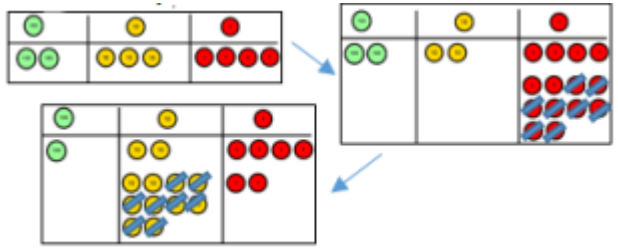
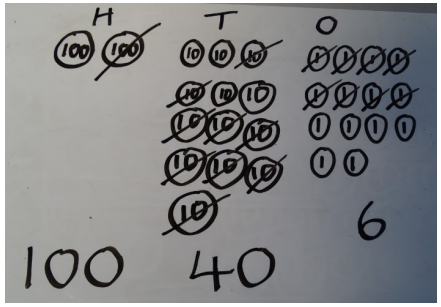
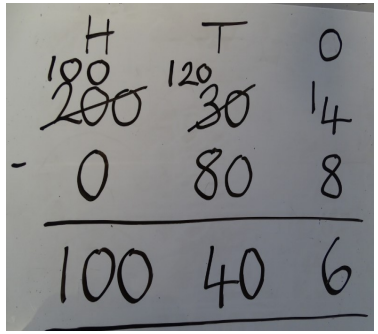
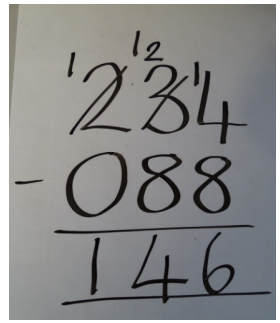
Key language which should be used: take away, less than, the difference, subtract, minus, fewer, decrease, '7 take away 3, the difference is four

Concrete	Pictorial	Abstract
Physically taking away and removing objects from a whole (use various objects too) rather than crossing out children will physically remove the objects 4 – 3 = 1 	Children to draw the concrete resources they are using and cross out.  Use of the bar model: 	4- 3 = □ = 4 - 3  
Counting back (using number lines or number tracks)  	Children to represent what they see pictorially e.g.  	

Concrete	Pictorial	Abstract
Finding the difference (using cubes, numicon or Cuisenaire rods, other objects can also be used) 	Children to draw the cubes/other concrete objects which they have used XXXXXXXX XXXXXX Use of the bar model 	Find the difference between 8 and 6. 8 – 6, the difference is ? Children to also explore why 9 - 7 = 8 – 6 (the difference, of each digit, has changed by 1 do the difference is the same- this will help when solving 10000-9987)
Making 10 (using numicon or ten frames) 14 – 5  Children could also do this by subtracting a 5 from the 10. 	Children to present the ten frame pictorially  	14 – 5 = 9 You also want children to see related facts e.g. 15 – 9 = 5 Children to represent how they have solved it e.g.  14 is made up of 5, 5 and 4 so I can subtract one 5 to be left with 4 and 5  5 is made up of 4 and 1 so I can subtract 4 to make 10 and then 1 to get to 9

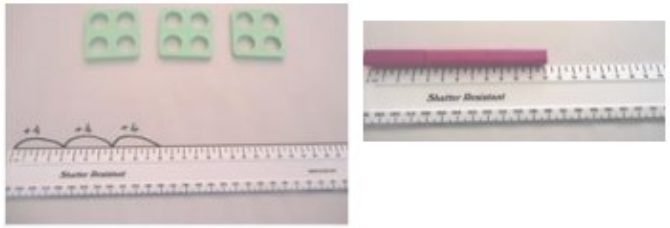
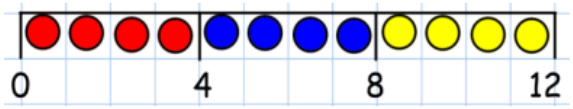
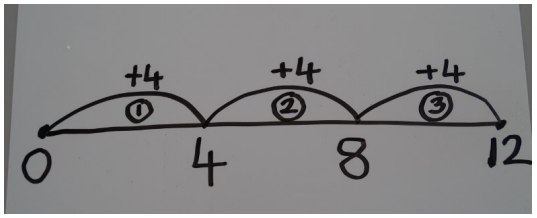
Concrete	Pictorial	Abstract
Counting on using a number line 	Bar model 	Abstract number line 
TO -TO using Dienes. Use partitioning and bridging 10. 75 - 36  	Bar model 	Children to start with the largest number and subtract the tens and then the ones. 75 -36 75 - 30 = 45 45 - 6 = 39

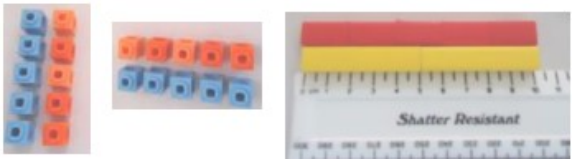
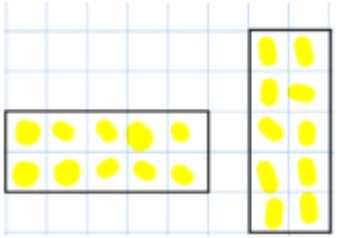
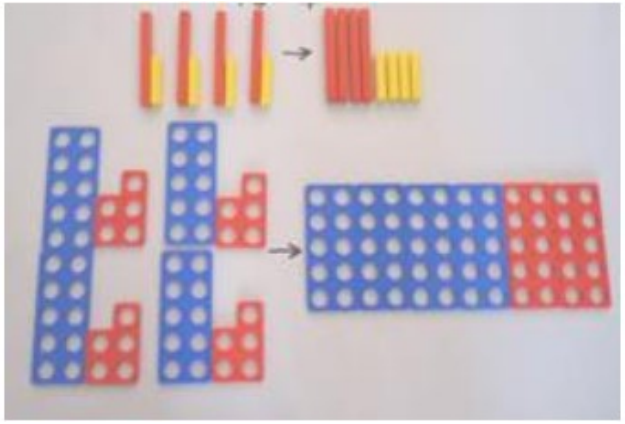
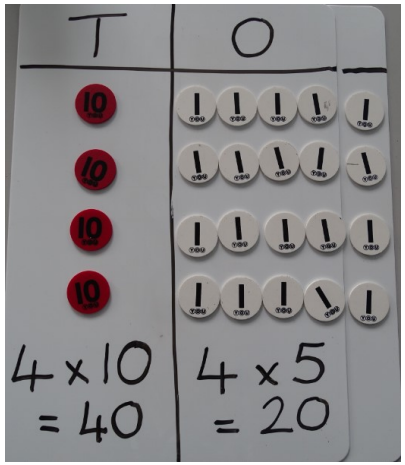
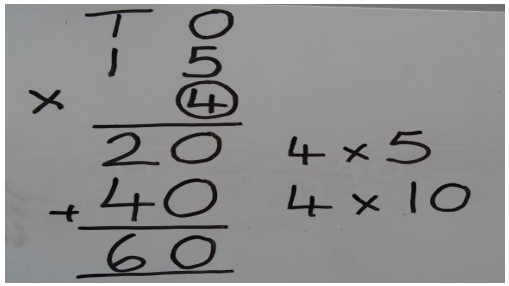
Concrete	Pictorial	Abstract
Column method (using Dienes and no exchanging) 48-7 		Expanded and formal written method  
Column method (using Dienes and having to exchange) **45-26**  1) Start by partitioning 45 2) Exchange one ten for ten more ones 3) Subtract the ones, then the tens.	Represent the Dienes pictorially 	It's crucial that the children understand that when they have exchanged the 10 they still have 45. 45 = 30 + 15  

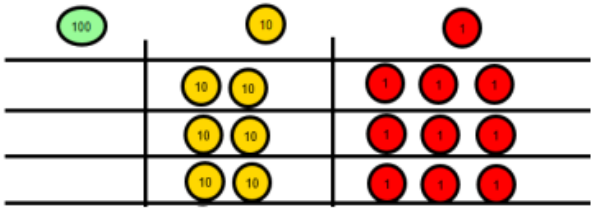
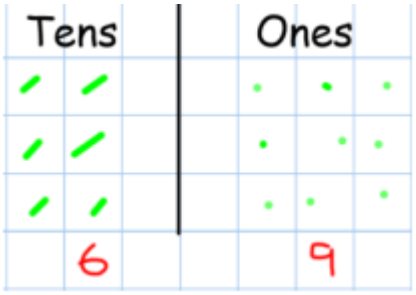
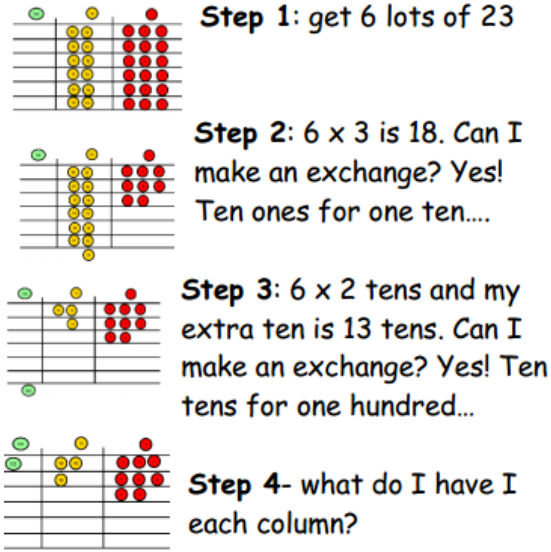
Concrete	Pictorial	Abstract
Column method (using place value counters) 234-88 	Once the children have had practice with the concrete, they should be able to apply it to any subtraction. Like the other pictorial representations, children to represent the counters. 	 

Multiplication

Key language which should be used: double, times, multiplied by, the product of, groups of, lots of, 'is equal to' 'is the same as , array, multiple, repeated addition, commutative.

Concrete	Pictorial	Abstract
Repeated grouping/repeated addition (does not have to be restricted to cubes) 3 x 4 or 3 lots of 4 	Children to represent the practical resources in a picture e.g. XX XX XX XX XX XX Use of a bar model for a more structured method. 	3 x 4 4 + 4 + 4
Use number lines to show repeated groups- 3 x 4 	Represent this pictorially alongside a number line e.g: 	Abstract number line **3 x 4 = 12** 

Concrete	Pictorial	Abstract
Use arrays to illustrate commutativity (counters and other objects can also be used) **2 x 5 = 5 x 2** 	Children to draw the arrays (draw round numicon) 	Children to be able to use an array to write a range of calculations e.g. 2 x 5 = 10 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 5 + 5 =10
Partition to multiply (use numicon, Dienes, Cuisenaire rods) 4 x 15 	Children to represent the concrete manipulatives in a picture 	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 Children to move to show partitioning steps in an expanded column method. 

Concrete	Pictorial	Abstract
Formal column method with place value counters or base 10 (at the first stage no exchanging) 3 x 23. Make 23, 3 times. See how many ones, then how many tens.  	Children to represent the counters in a pictorial way  	Children to record what it is they are doing to show understanding 3 x 23 20 3 3 x 20 = 60 3 x 3 = 9 60 + 9= 69 23 x 3 69
Formal column method with place value counters (children need this stage, initially, to understand how the column method works) 6 x 23  **Step 1**: get 6 lots of 23 **Step 2**: 6 x 3 is 18. Can I make an exchange? Yes! Ten ones for one ten.... **Step 3**: 6 x 2 tens and my extra ten is 13 tens. Can I make an exchange? Yes! Ten tens for one hundred... **Step 4**- what do I have I each column?	Children to represent the counters/Dienes, pictorially e.g. the image below.  	The aim is to get to the formal method but the children need to understand how it works. 6 x 23 = 23 x 6 138 1 1