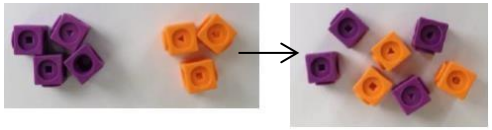
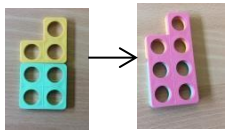
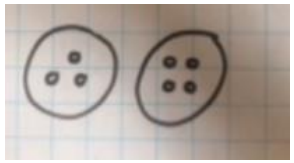
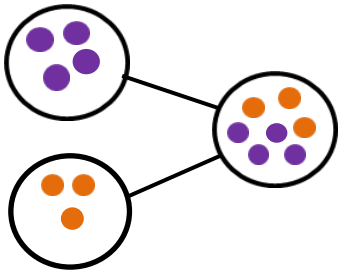
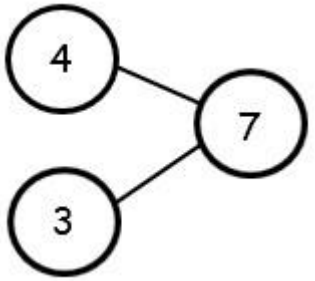
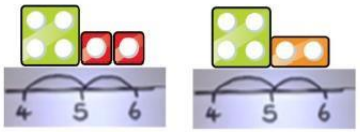
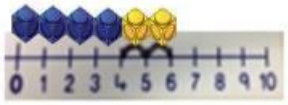
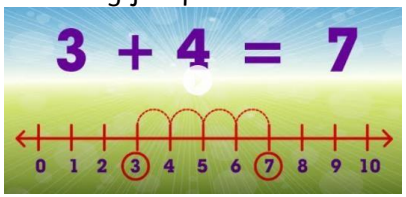
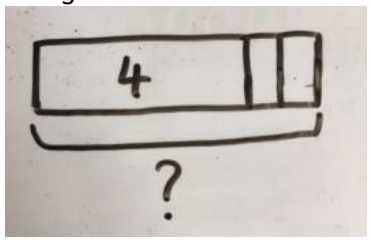
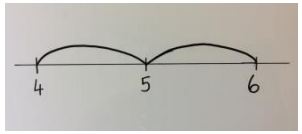
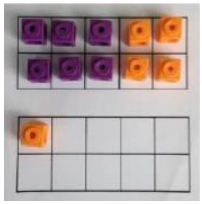
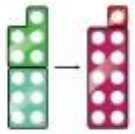
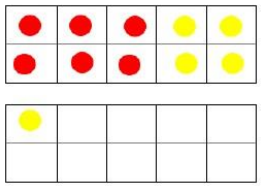
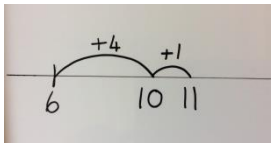
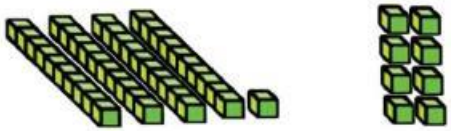
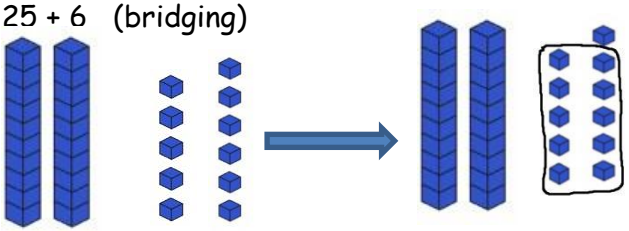
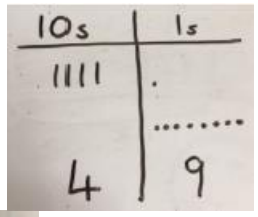
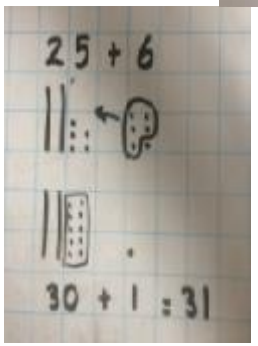
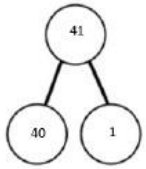
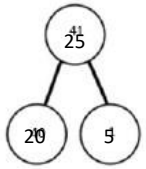
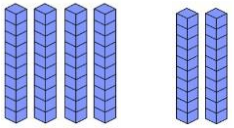
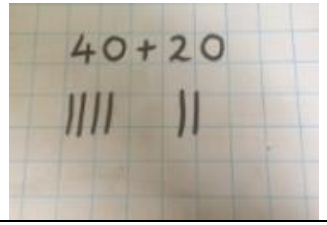
Addition

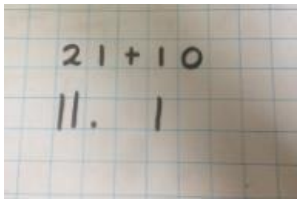
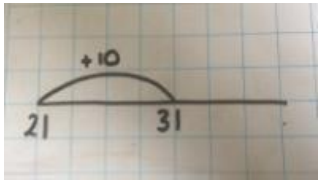
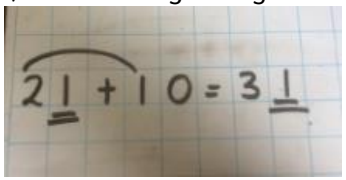
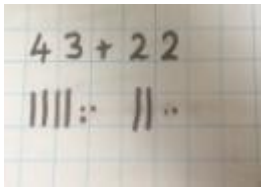
Key language which should be used: sum, total, parts and wholes, plus, add, altogether, more than, 'is equal to' 'is the same as', bridging and partitioning.

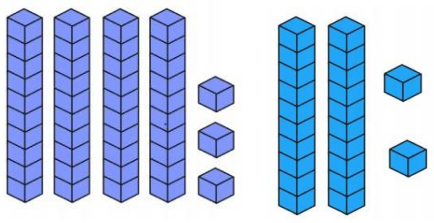
Concrete	Pictorial	Abstract
Combining two parts to make a whole Use a range of resources e.g. counters, shells, teddies, **Numicon** etc  	Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.  	4 + 3 = 7 four is a part, three is a part and the whole is seven 
Counting on using number lines Use cubes and numicon etc.  	Drawing jumps on a number line  Using a bar model 	The abstract number line: What is two more than four? What is the sum of four and two? What is the total of four and two? 4 + 2 

Regrouping to make 10 Use ten frames and counters/cubes and numicon 6 + 5  	Use the ten frame stamp and draw counters or drawings in 10 frame arrangements 	Children to show how they can make 10 by splitting the number 6 + 5 = 11 4 1  Children develop an understanding of equality eg. 6 + = 11 6 + 5 = 5 + 6 + 5 = + 4
Adding 3 single digit numbers Use counters, numicon, cubes, tens frames	Represent the concrete using symbols eg. circles, dots, squares.	Look for number bonds or doubles first. 3 + 5 + 7 = 10 + 5 = 15 4 + 3 + 4 = 8 + 3 = 11

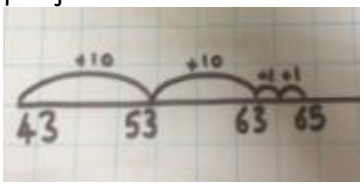
2 digit + 1 digit TO + O Continue to develop understanding of partitioning and place value 41+8 (no bridging)  25 + 6 (bridging) 	Children to represent the concrete using symbols e.g. lines for 10s and dots/crosses/ circles for ones.  	41 + 8 (no bridging)  1 + 8 = 9 40 + 9 = 49 25 + 6 (bridging)  5 + 6 = 11 20 + 11 = 31

Tens + Tens Continue to develop understanding of place value and use this to support addition 40 + 20 	Children to represent the concrete using symbols e.g. lines for 10s 	40 + 20 Count on in tens Use fluency facts "I know that 4 + 2 = 6, so I know that 40 +20 = 60" 4 +2 = 6 so 40 + 20 = 60

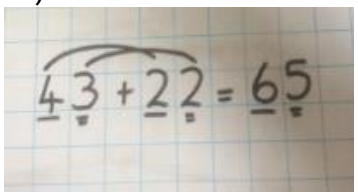
TO + Ts Continue to develop understanding of partitioning and place value and use this to support addition 21+ 10 	Children to represent the concrete using symbols e.g. lines for 10s and dots/crosses/ circles for ones.  Children can draw number lines with jumps of 10.  	21 + 10 Mental strategies: Counting on in 10s Add the 10s, the ones digit stays the same 
2 digit + 2 digit TO + TO begin with no bridging Continue to develop understanding of partitioning and place value and use this to support addition use base 10, numicon and money 43 + 22	Children to represent the concrete using symbols e.g. lines for 10s and dots/crosses/ circles for ones.  	43 + 22 Partitioning, add the tens and add the units 40 + 20 = 60 3 + 2 = 5 60 + 5 = 65



Children can draw number lines with jumps of 10 and jumps of 1



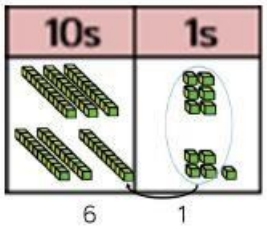
Partition across the number sentence ('eyebrows') – add the tens then add the ones



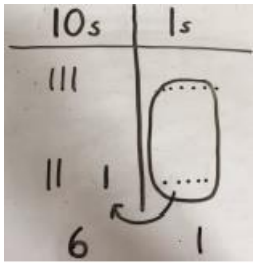
2 digit + 2 digit TO + TO
bridging 10

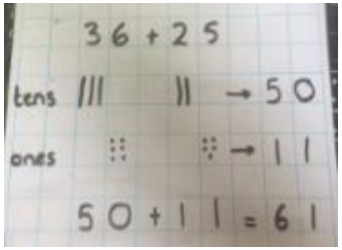
Continue to develop understanding of partitioning and place value and use this to support addition use base 10, numicon and money

36 + 25

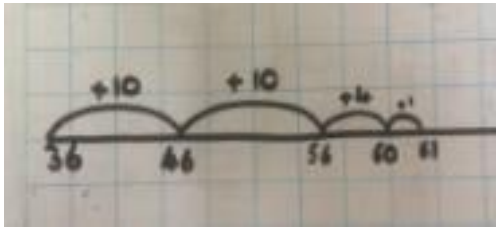


This could be done one of two ways:



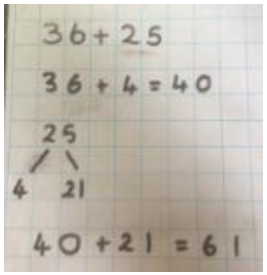


Children could also draw a number line:
Adding tens and partitioning the units to make the next tens number

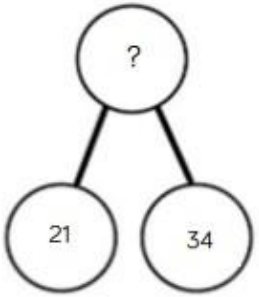
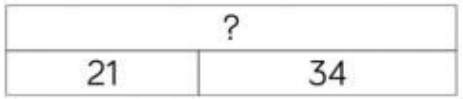
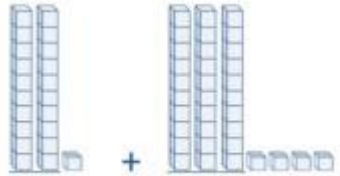


partitioning:
30 + 20 = 50
6 + 5 = 11
50 + 11 = 61

Using number bonds and partitioning, looking for ways to make 10:

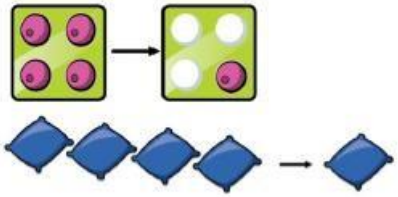
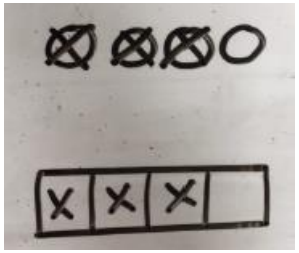
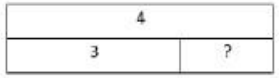
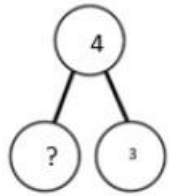
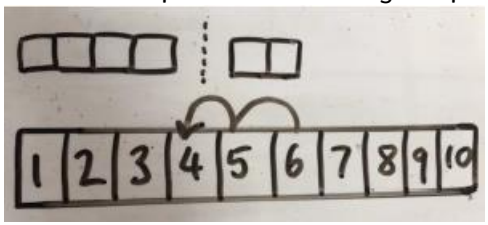
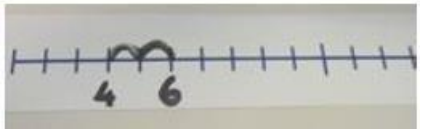


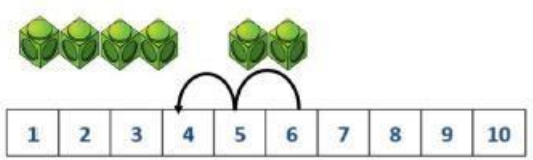
Partition across the number sentence ('eyebrows')

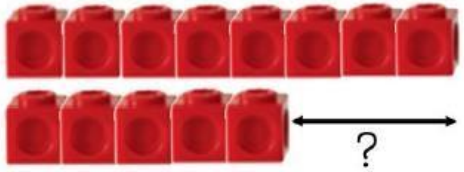
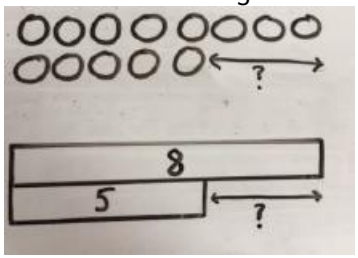
Conceptual variation; different ways to ask children to solve 21 +34			
 	Word problems: In year 1 there are 21 boys and 34 girls. How many children are there in total? 21 + 34 = 55 . Prove it	21 + 34 = ☐ = 21 + 34 Calculate the sum of twenty-one and thirty-four	 Missing digit problems 21 + 3 __ = __ 5

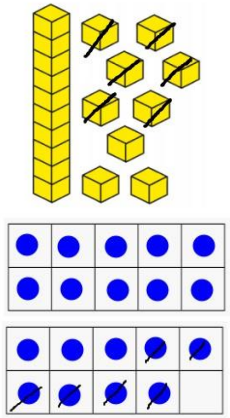
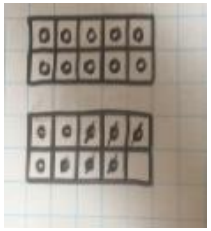
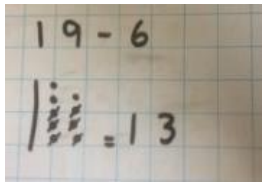
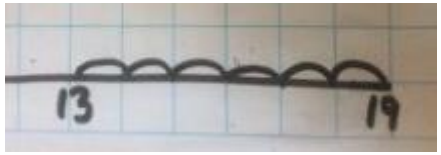
Subtraction

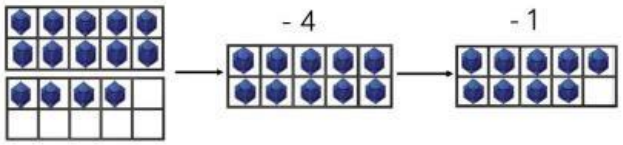
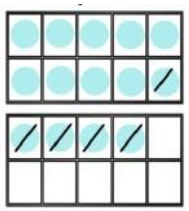
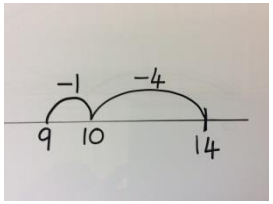
Key language which should be used: take away, less than, the difference, subtract, minus, fewer, decrease, bridging.

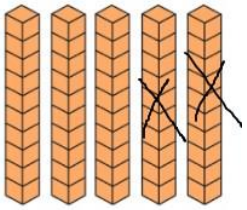
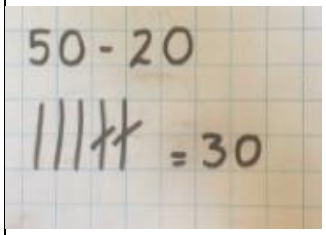
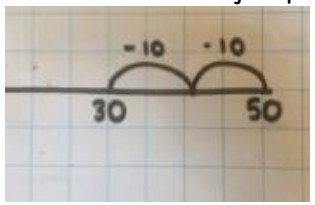
Concrete	Pictorial	Abstract
Physically taking away and removing objects from a whole Use ten frames, numicon, cubes, and other items such as bean bags 4 – 3 = 1 	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. 	4 – 3 = □ = 4 - 3 4-□ = 3 □ - 3 = 1  
Counting back Use number lines or number tracks 6 - 2 = 4	Children to represent what they see pictorially e.g. 	Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line.  

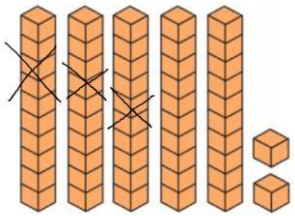
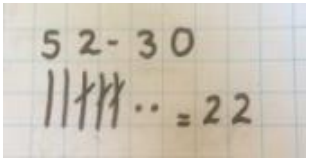
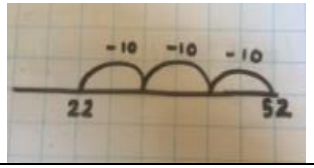
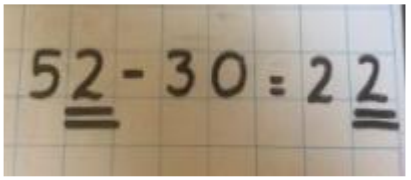
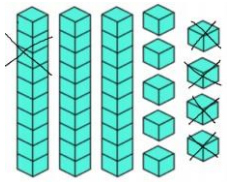
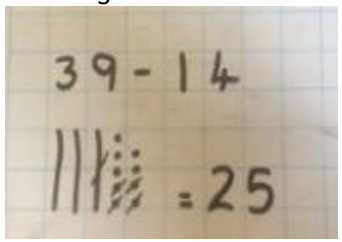
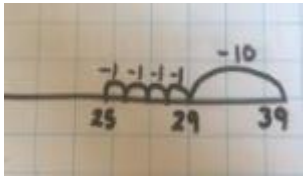
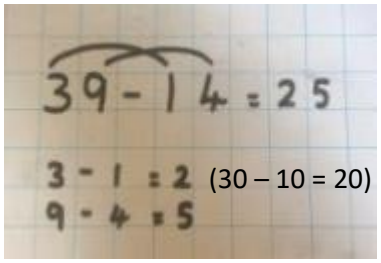
 Children start with 6 and count back 2		

Finding the difference Use cubes, Numicon or Cuisenaire rods, other objects etc. Calculate the difference between 8 and 5. 	Children to draw the cubes/ other concrete objects which they have used, or use the bar model to illustrate what they need to calculate. 	Find the difference between 8 and 5. 8 – 5, the difference is ☐ Children explore why 9 – 6 = 8 – 5 = 7-4 have the same difference

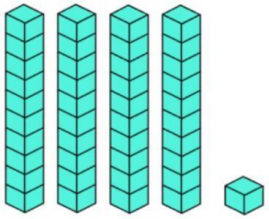
2 digit – 1 digit TO – O Using tens frames or base 10 19 – 6 	Children to represent the concrete using own drawings FS – tens frame KS1 – base 10    Children can also draw number lines	Explore and know that when subtracting units from tens and units number the tens will stay the same and the units will change. 19 – 6 =13 27 – 4 = 23 48 – 7 = 41 Using fluency facts: I know that….. 9 -6 = 3 so I know that 29 -6 = 23

Making 10 Use ten frames 14 – 5 	Children to represent the ten frame pictorially and discuss what they did to make 10 or bridge 10.  "14 – 4 = 10 10 – 1 = 9"	Children to show how they can make 10 by splitting the part they are subtracting (subtrahend.) 14 – 5 = 9 4 1 14 – 4 = 10 10 – 1 = 9 

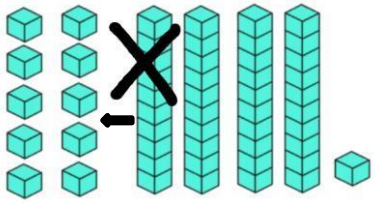
Tens – Tens Use understanding of place value to support subtraction 50 – 20 5 tens - 2 tens = 3 tens 	Children to represent the concrete using their own drawings  Children to draw jumps of 10 on number lines  	Using fluency facts and place value to find answers. 50 - 20 I know that 5 - 2 = 3 So I know that 50 -20 = 30

TO – Ts Continue to develop understanding of partitioning and place value and use this to support subtraction 52 – 30 = 22 	Children to represent the concrete using their own drawings  Children to draw jumps of 10 on number lines  	Mental strategies: Counting back in 10s To know that when you subtract a tens number, the ones/ units digit stay the same. 
2 digit – 2 digit TO – TO begin with no bridging Continue to develop understanding of partitioning and place value and use this to support subtraction use base 10, numicon and money 39 - 14 	Children to represent the concrete using their own drawings  Children to draw jumps of 10 and 1 on number lines  	39 – 14 /\ /\ 30 9 10 4 30 – 10 = 20 9 – 4 = 5 Partition across the number sentence ('eyebrows' method) 

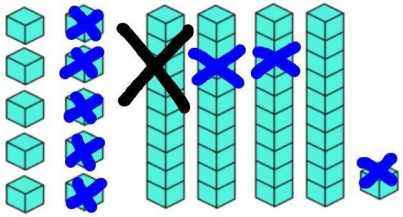
TO-O, TO - TO bridging 10
Using the exchange method
41 – 26

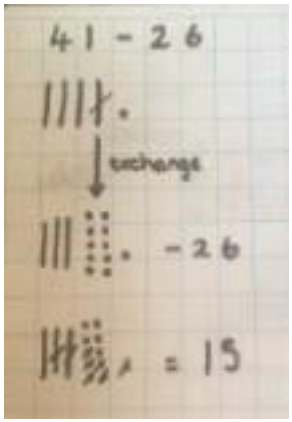


Do you have enough units to subtract 6 units? No – you need to exchange a ten rod for 10 units.



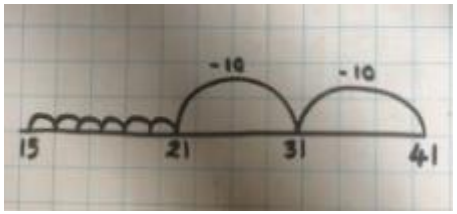
Now you can subtract 2 tens and 6 units



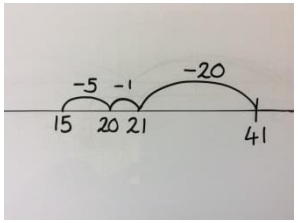


Children to represent the concrete using their own drawings

Children can also use number lines (this can simplify this process)

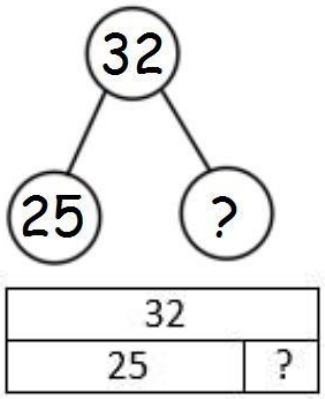


41 – 26
41 – 20 = 21
21 – 1 = 20
20 – 5 = 15



This becomes a mental strategy which relies upon previous mental strategies being fully understood. (Number bonds) The column method should not be used with two-digit numbers.

Conceptual variation; different ways to ask children to solve 32 - 25



Sam spent 32p, Tim spent 25p.
How much more did Sam spend?

Calculate the difference between 32 and 25.

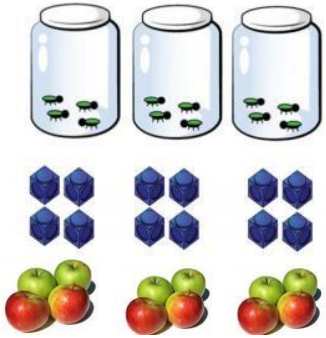
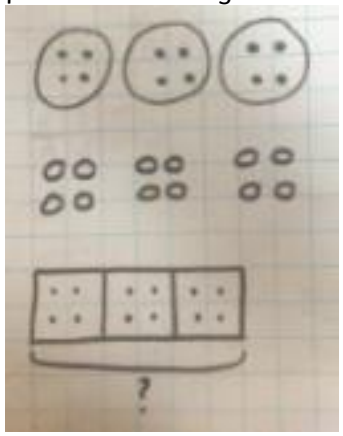
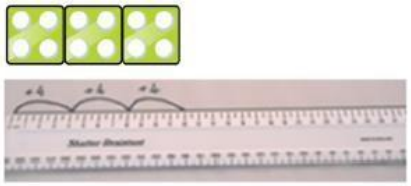
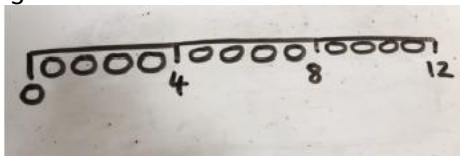
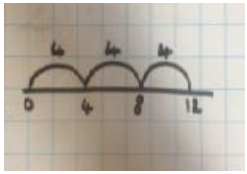
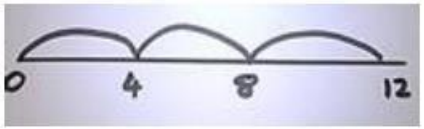
□ = 32 – 25

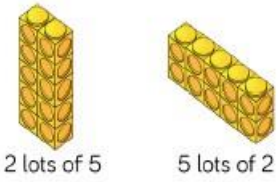
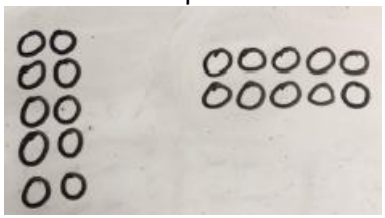
What is 25 less than 32?

Missing number calculations:
___ - 25 = 7

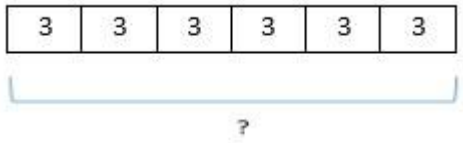
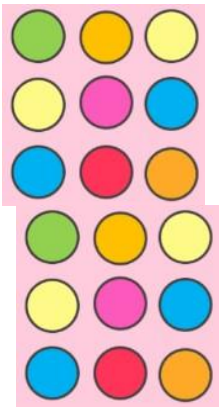
Multiplication

Key language which should be used: double, times, multiplied by, the product of, groups of, lots of, equal groups, repeated addition

Concrete	Pictorial	Abstract
Repeated addition/ repeated grouping 3 x 4 4 + 4 + 4 There are three equal groups, with 4 in each group.  (This can also be presented in an array- without the focus being on the array itself)	Children to represent the practical resources in a picture and using a bar model. 	3 x 4 = 12 4 + 4 + 4 = 12
Number lines to show repeated groups 3 x 4  (Cuisenaire rods can be used too.)	Represent this pictorially alongside a number line e.g.   	Abstract number line showing three jumps of four. 3 x 4 = 12 

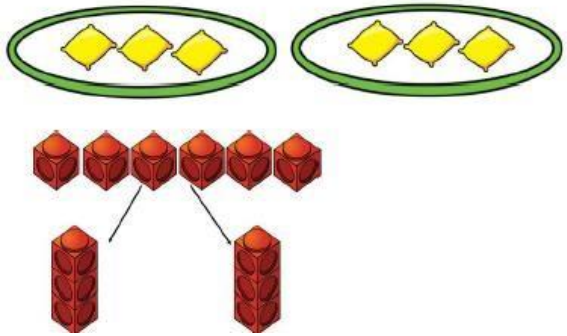
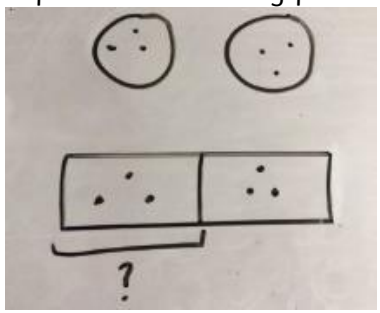
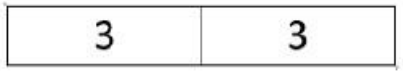
Use arrays to illustrate commutativity Use counters, pegs and boards and other objects 2 x 5 = 5 x 2  	Children to represent the arrays pictorially. 	Children to be able to use an array to write a range of calculations e.g. 10 = 2 x 5 5 x 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

Conceptual variation; different ways to ask children to solve 6 x 3

 	There are 3 lollies in a bag. How many lollies are in 6 bags? With counters show that 6 x 3 = 18	6 x 3 = ☐ ☐ = 6 x 3 Find the total of 6 groups of 3 What is 6 multiplied by 3?	What is the calculation? What is the answer?  How many number sentences can you write for this array?

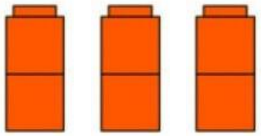
Division

Key language which should be used: share, group, divide, divided by, half, how many in.

Concrete	Pictorial	Abstract
Sharing Use a range of objects. 6 ÷ 2 6 shared equally into 2 groups 	Represent the sharing pictorially. 	6 ÷ 2 = 3  Children should also be encouraged to use their 2 times table facts. 2 x 3 = 6 6 ÷ 3 = 2 6 ÷ 2 = 3

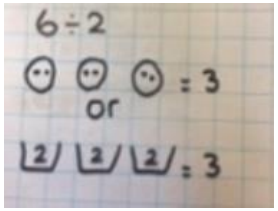
Grouping

Use a range of objects



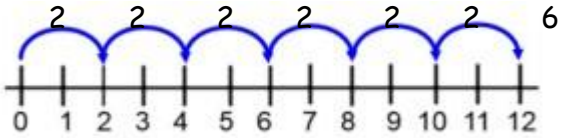
2 4 6

6 ÷ 2 – how many groups of 2 are there in 6?



Children to represent groups pictorially

Grouping can also be drawn on a number line 12 ÷ 2



6 groups

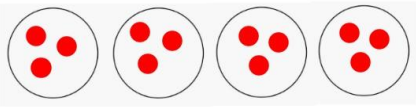
Count in groups

6 ÷ 2 count in 2s 2, 4, 6 = 3 groups

12 ÷ 2 count in 2s 2, 4, 6, 8, 10, 12 = 6 groups

20 ÷ 5 count in 5s 5, 10, 15, 20 = 4 groups

Conceptual variation; different ways to ask children to solve 12 ÷ 4

Share 12 into 4 equal groups How many groups of 4 are in 12? What is 12 divided by 4?	I have 12 strawberries and share them equally between 4 children. How many strawberries does each child have? 12 glue sticks need to be put into 4 pots. How many will be in each pot?	12 ÷ 4 ☐ = ☐ = 12 ÷ 4 Can you write a division and a multiplication number sentence  about this box of chocolates?	What is the division number sentence for this drawing?  Or this picture?