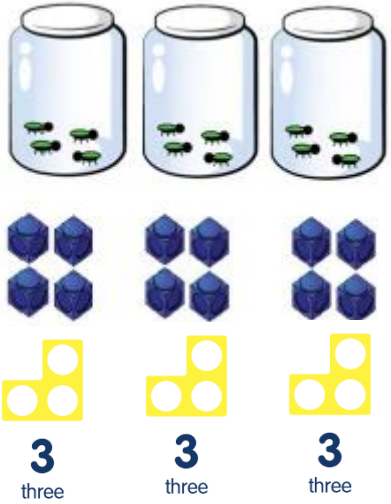
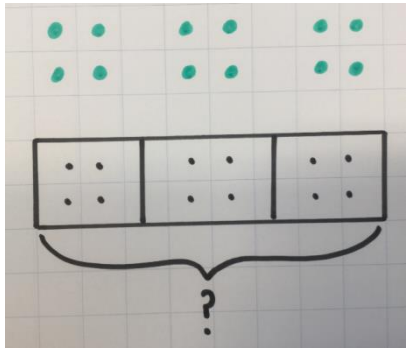
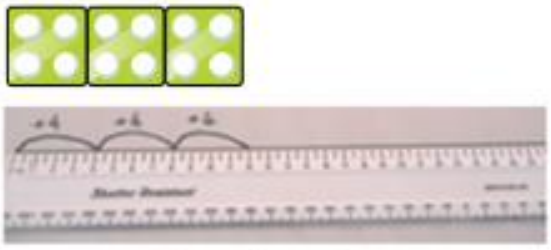
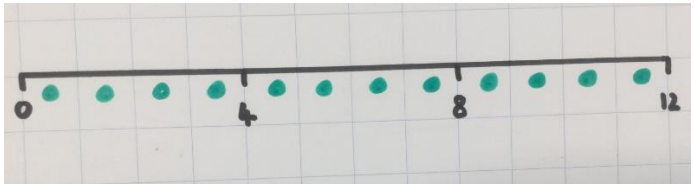
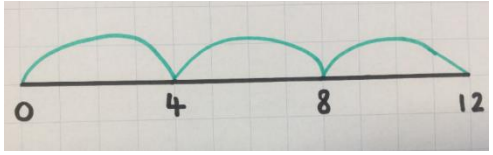
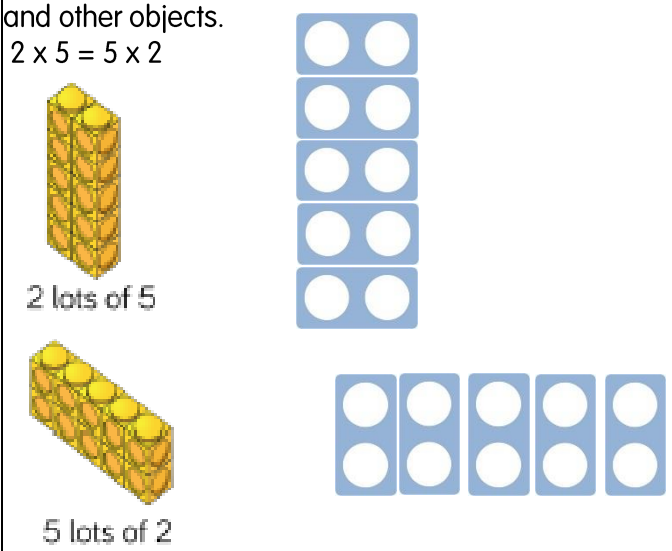
Calculation policy: Multiplication

Key language: double, times, multiplied by, multiplicand, multiplier, the product of, lots of, equal groups, exchange, repeated addition.

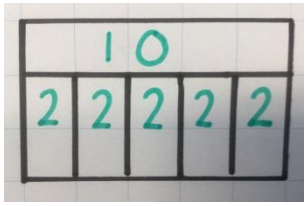
Concrete	Pictorial	Abstract
Repeated grouping / repeated addition 3x4= 4+4+4= There are 3 equal groups, with 4 in each group 	Children to represent the practical resources in a picture and use a bar model. 	3x4 = 12 4+4+4 = 12
Number lines to show repeated groups - 3 x 4 	Represent this pictorially alongside a number line 	Abstract number line showing three jumps of four. 3 x 4 = 12 

Use arrays to illustrative the communicative relationship between multiplications e.g. 2 x 5= 5 x 2 using counters and other objects.

2 x 5 = 5 x 2



Children to use the bar model to represent multiplication.



Children to represent the arrays pictorially.

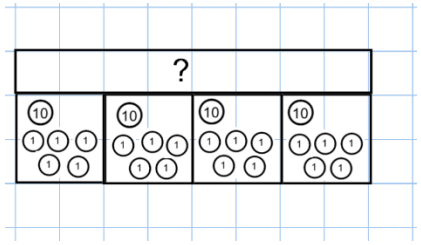
Children to be able to use a bar model to write a range of calculations.

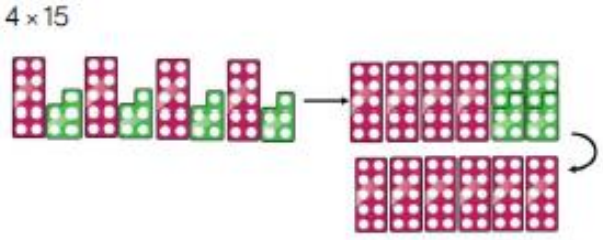
$10 = 2 \times 5$

$5 \times 2 = 10$

$2+ 2+ 2 +2 +2 = 10$

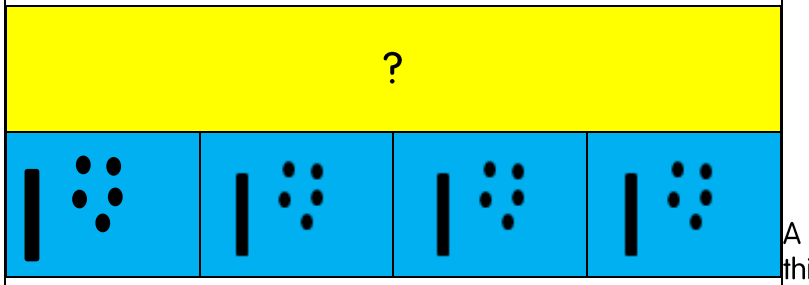
Partition to multiply using Numicon or base 10 or bar model.



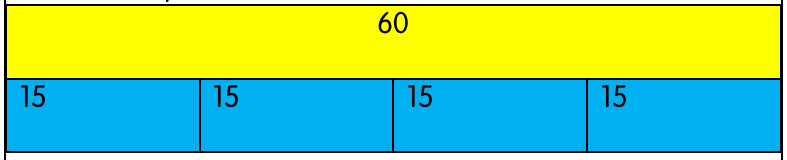


The example shows that the ones can be carried for tens which will enable children to be introduced to the concept of carrying.

Children to represent the concrete manipulatives pictorially.



Bar model representation should also be shown.



Children to be encouraged to show the steps they have taken.

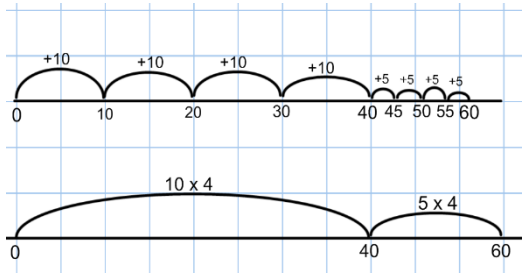
$4 \times 15 =$

$10 \times 4 = 40$

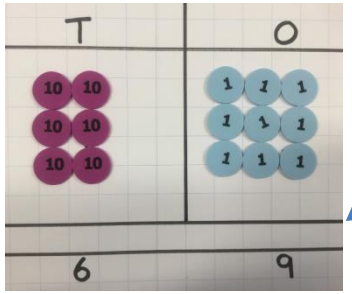
$5 \times 4 = 20$

$40 + 20 = 60$

A number line can be used to represent this.

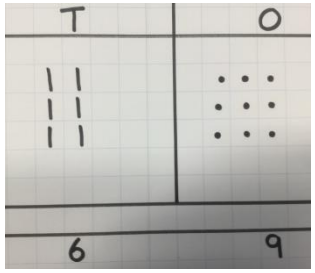


Formal column method with place value counters (base10 can also be used.) 3 x 23

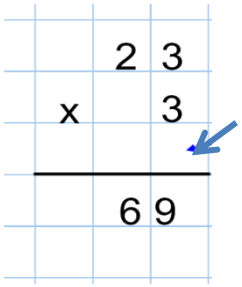


Blank line left in preparation for carrying.

Children to represent the counters pictorially. Dots for ones, lines for tens and squares for hundreds.



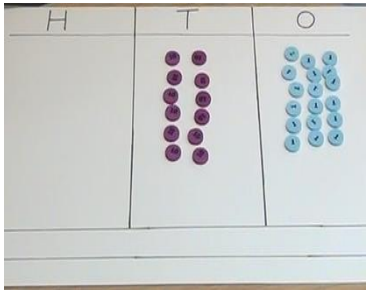
Children to record what it is they are doing to show understanding.

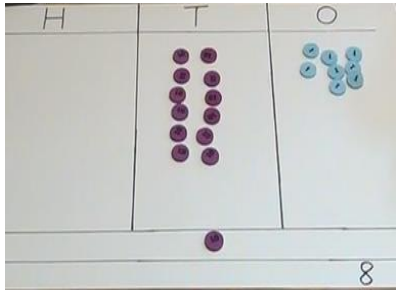


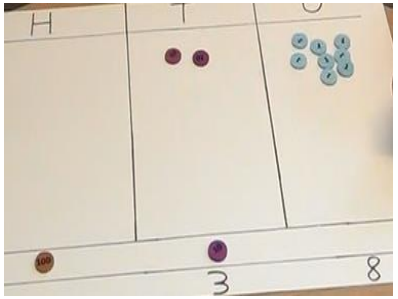
Blank line left in preparation for carrying.

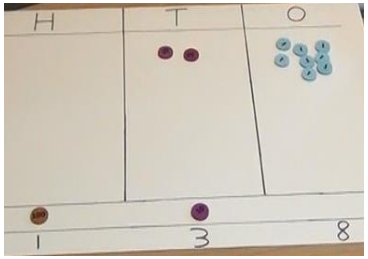
Formal column method with exchanging (concrete) with place value counters or base 10.

6 x 23 =





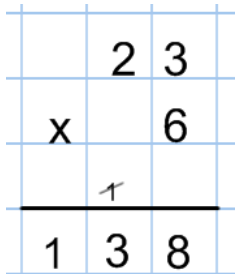




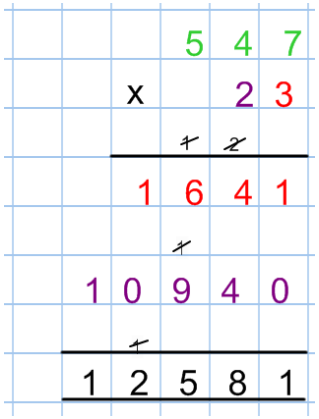
1. Pupils counts out 6 lots of 23 (repeated addition) in a column.
2. Count up how many ones are in the ones column. There are more than ten. So, exchange 10 ones for 1 ten and place **above the line** (as with addition). Count how many ones remain in the ones column and write **below the line**.
3. Count up how many tens are in the tens column. There are more than 10 tens. So, exchange 10 tens for 1 hundred and place **above the line** in the hundreds column. Count how many tens remain in the tens column and write **below the line**.
4. Count how many hundreds are in the hundreds column. Write the number below the line.

Formal written method

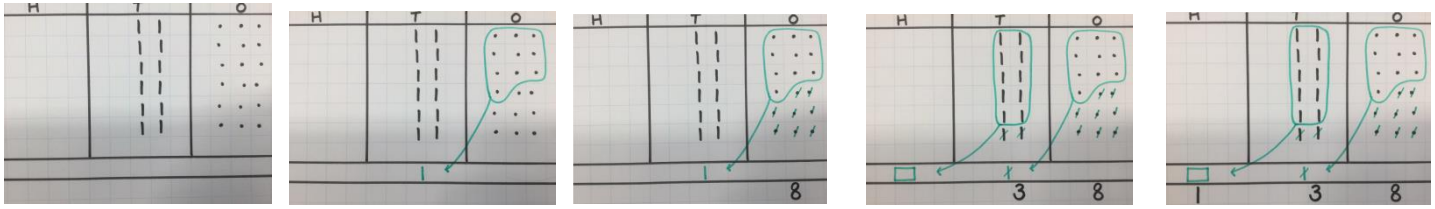
6 x 23 =



Next step:
Step 1 – multiply the multiplicand by the ones digit in the multiplier.
Step 2 – multiply the multiplicand by the tens digit in the multiplier.
Step 3 – recombine (total)



Formal column method with exchanging (pictorial) with place value counters or base 10.



1. Pupil draws out 6 lots of 23 (repeated addition) in a column – dots for ones, lines for tens, squares for hundreds.
2. Count up how many ones are in the ones column. There are more than ten. So, circle 10 ones and draw a line to indicate that you are exchanging them for 1 ten and draw a line to represent a ten **above the line** (as with addition). Count how many ones remain, putting a line through as counting, and write the digit **below the line**.
3. Count up how many tens are in the tens column. There are more than 10 tens. So, circle 10 tens and draw an arrow to the line above the answer to show that 10 tens have been exchanged for 1 hundred, shown with the drawing of a square **above the line** in the hundreds column. Count how many tens remain in the tens column and write the digit **below the line**.
4. Count how many hundreds are in the hundreds column. Write the digit below the line.