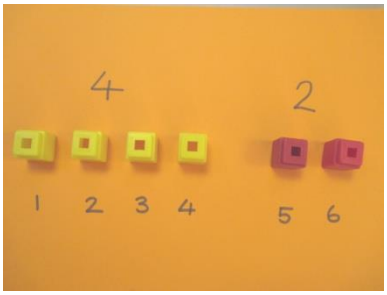
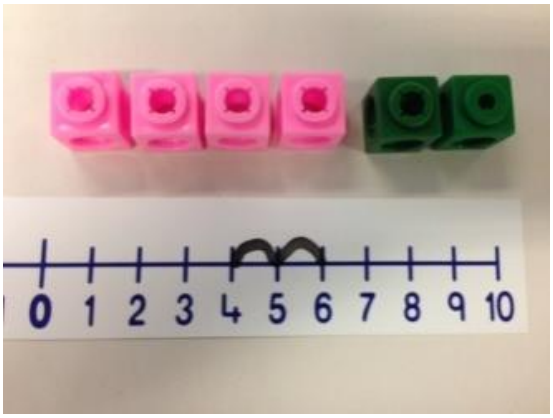
Addition methods

Young children will make a set of items to match each of the numbers and then count all of them to find the total.



The next step is to count on along a number line or 100 square from the first number.



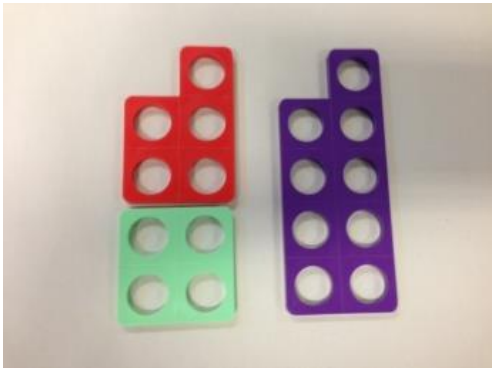
The concept of number bonds and how to record them will also be developing.

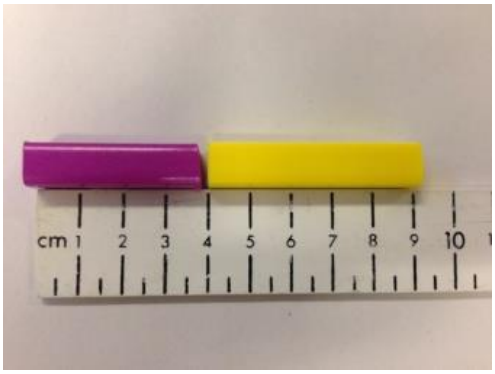
4 + 5 = 9

5 + 4 = 9

9 = 5 + 4

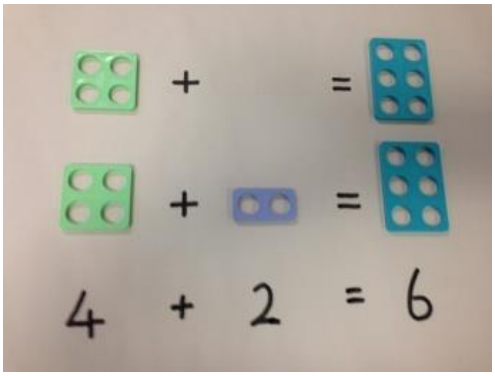
9 = 4 + 5





Understanding of the equals sign / equality and the concept of 'empty box' questions also develops.

Solutions to calculations such as 4 + ☐ = 9 can be made and recorded.

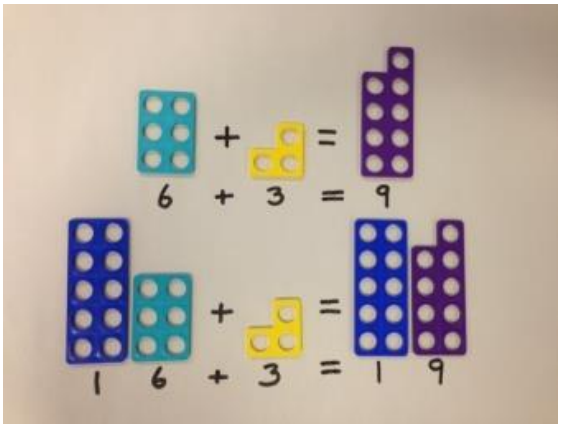


Next the understanding of patterning, place value and partitioning can be used to derive number facts.

e.g. 6 + 3 = 9 (known fact) so

16 + 3 = 19

26 + 3 = 29



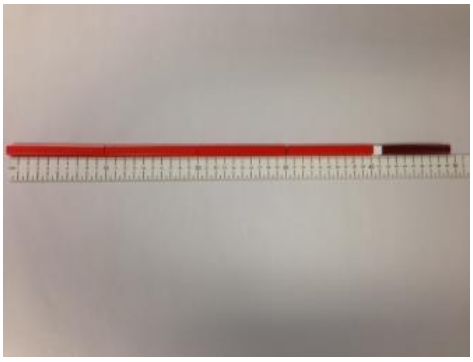
Children begin to use understanding of place value and partitioning to carry out addition of one- digit and two-digit numbers.

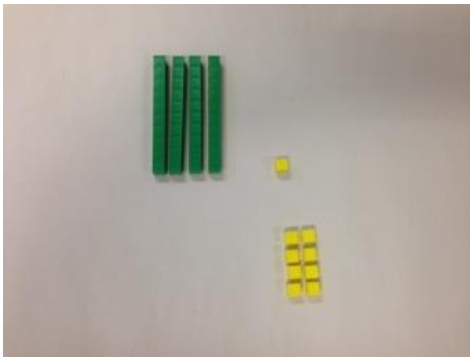
41+ 8

40 + 1 + 8

40 + 9= 49

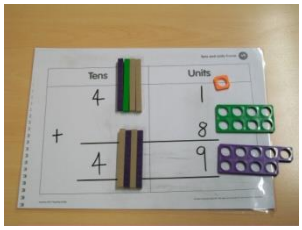
Practical apparatus is used to support this, as are number tracks /100 squares and number lines.





When confident with concepts of partitioning and place value, horizontal recording can be replaced with recording in columns with a focus on place value. <u>Resources need to be used alongside this method initially.</u>

	T	U
	4	1
+		8
	4	9



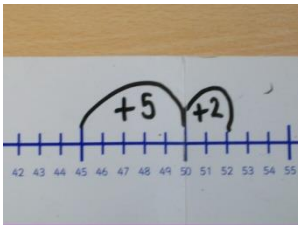
Mental addition continues to develop by bridging to the next multiple of 10.

45 + 7

45 + 5 = 50 How many of your 7 are left?

50 + 2 = 52

Practical apparatus is used to support this, as are number tracks /100 squares and number lines.



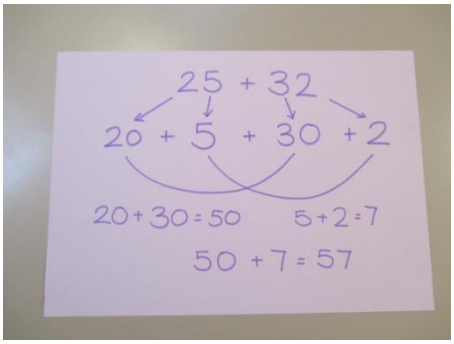
Understanding of partitioning and place value continue to develop and are used to support addition.

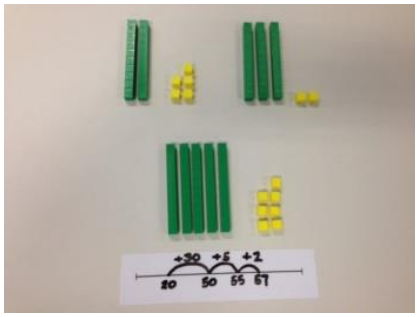
25 + 32

20 + 5 + 30 + 2

30 + 20 = 50 5 + 2 = 7

50 + 7 = 57





Practical apparatus can be used to support this.

Where units combine to make totals greater than 10, numbers can be regrouped using partitioning skills

25 + 36

20 + 30 = 50

5 + 6 = 11

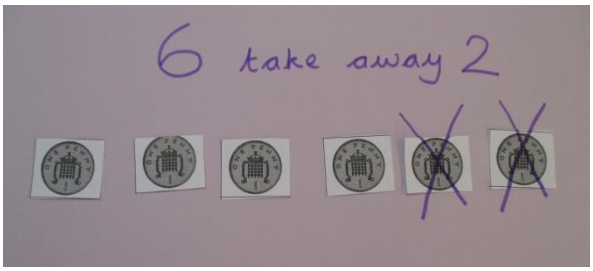
50 + 11 = 50 + 10 + 1= 61

Only when all these steps are secure, develop an understanding of the formal written method for column addition, initially without and then introducing carrying.

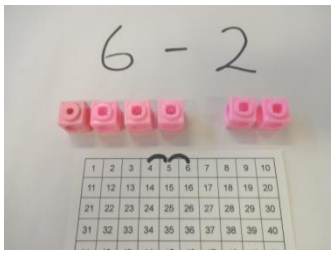
Even then, we continue use of practical apparatus to support.

Subtraction methods

Young children will count out objects to match the first number and then physically remove the number of objects being taken away before re-counting the number of objects left.

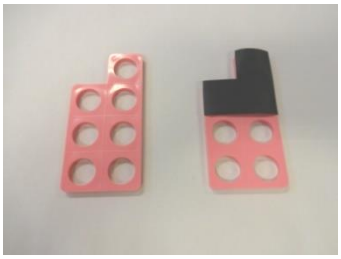


Next they learn to count back using number tracks / number lines / 100 grids to support the development of the concept of subtraction as "take away".



Mental recall of subtraction facts develops, initially to ten and then to 20. Begin to record related number facts (and make links to related addition facts).

e.g. 7 - 3 = 4, 7 - 4 = 3 (3 + 4 = 7)



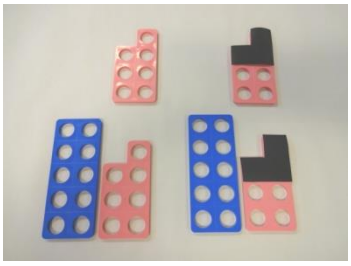
Understanding of the equals sign / equality and the concept of 'empty box' questions develops and solutions to calculations such as 9 - ☐ = 5 can be found and recorded.

Use understanding of patterning, place value and partitioning begins to be used to derive number facts.

e.g. 7 - 3 = 4 (known fact) so

17 – 3 = 14 and

27 – 3 = 24

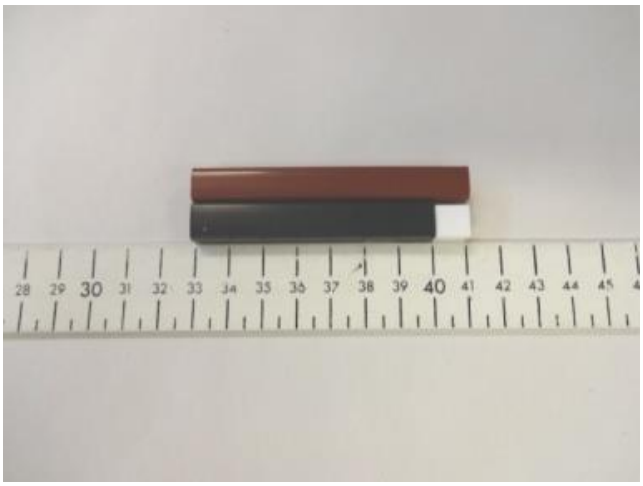


Then understanding of place value and partitioning is used to support subtraction of one-digit and two-digit numbers.

41 - 8 = 41 - 1 - 7

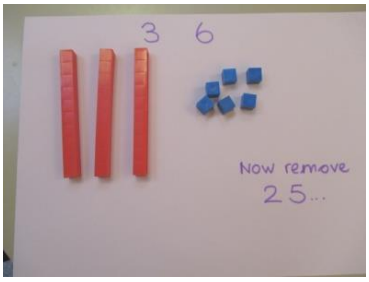
41 – 8 = 33

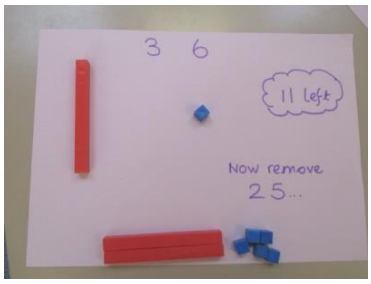
Practical apparatus is used to support this, as are number tracks /100 squares and number lines.

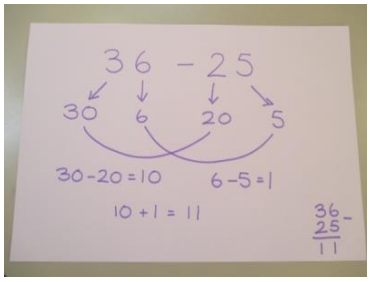


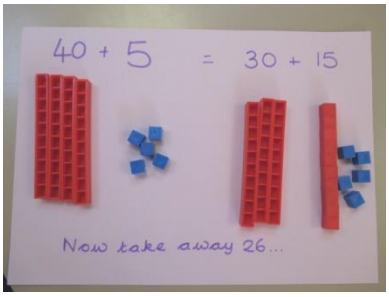
Outcomes of calculations are still recorded in horizontal format. 41 – 8 = 33

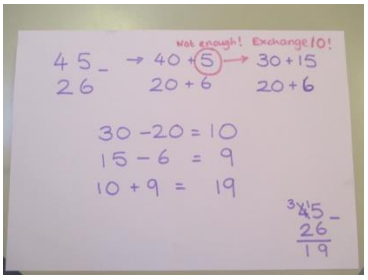
After this, use apparatus to illustrate how to subtract 2 digits from 2 digits.









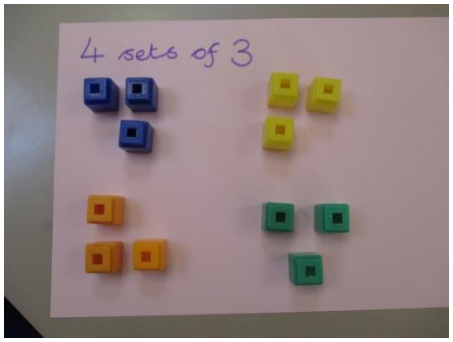


In this calculation children need to re-configure the number: 40 + 5 = 30 + 15

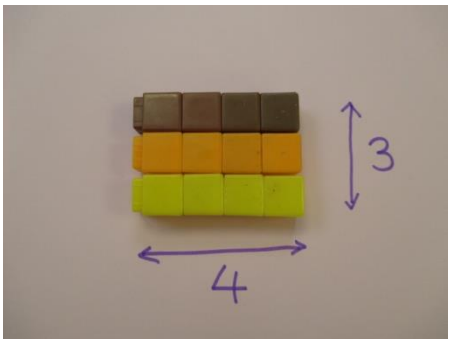
Only when children understand the process, proceed to "carrying" or "borrowing" ten in the formal method. This is not generally taught to children in KS1.

<u>Multiplication methods</u>

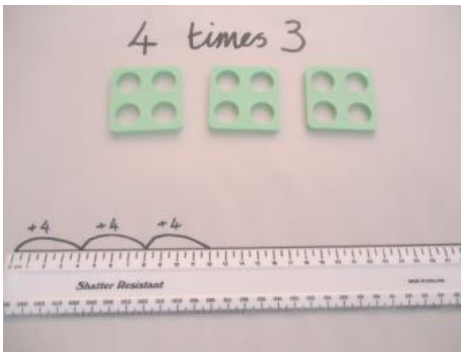
Initially multiplication is introduced as repeated grouping (making sets of the same size) using practical apparatus.

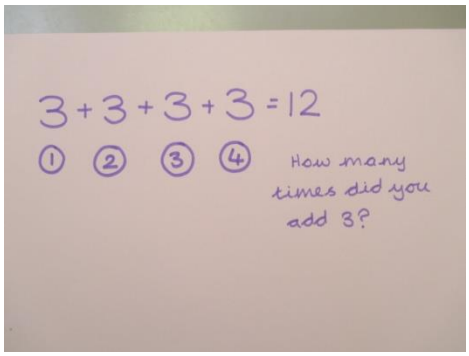


Children develop an understanding of multiplication using arrays showing repeated groups.



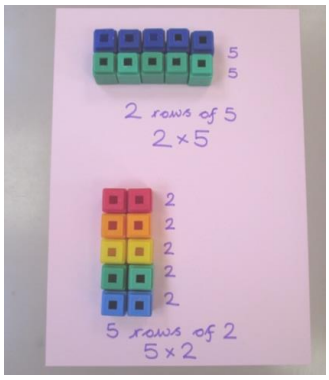
Number lines are used to show repeated grouping and then repeated addition of sets of the same size.

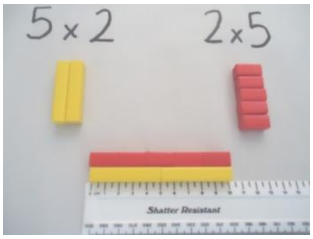


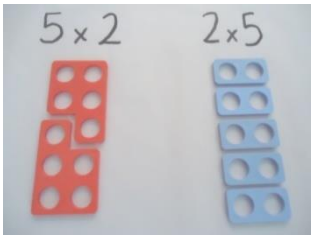


Children develop the use of x and = symbols and use them to record calculations horizontally.

We use arrays and other practical apparatus to illustrate that multiplication calculations can be carried out in any order e.g. 2 x 5 arrives at the same product as 5 x 2.







We begin to derive new facts from known facts

e.g. 3 x 2 = 6 (known fact)

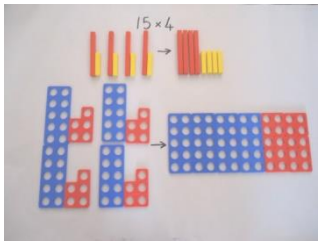
30 x 2 = 60

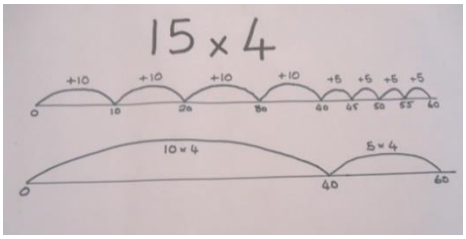
300 x 2 = 600 etc.

Finally we begin to use understanding of place value and partitioning to carry out multiplication of two- digit by one -digit numbers

15 x 4

10 5





10 x 4 = 40

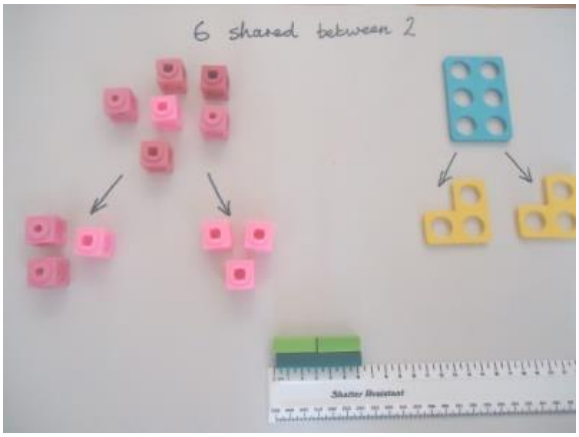
5 x 4 = 20

40 + 20 = 60

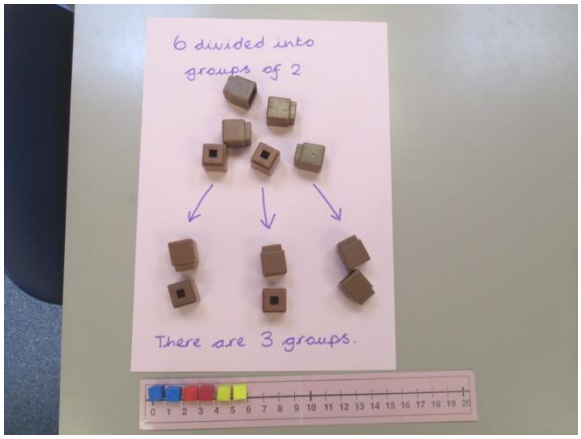
Column recording is not used at KS1.

<u>Division methods</u>

Initially we develop an understanding of division as sharing.

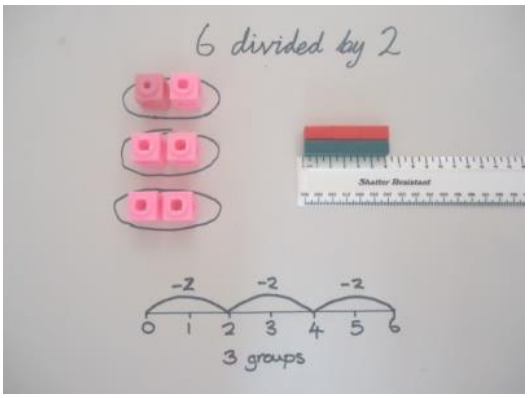


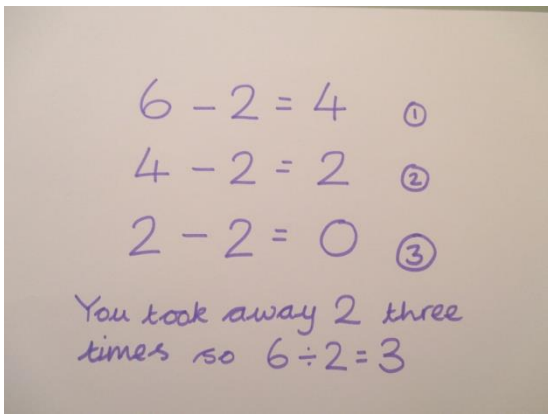
Then we develop an understanding of division as grouping into groups of a given size.



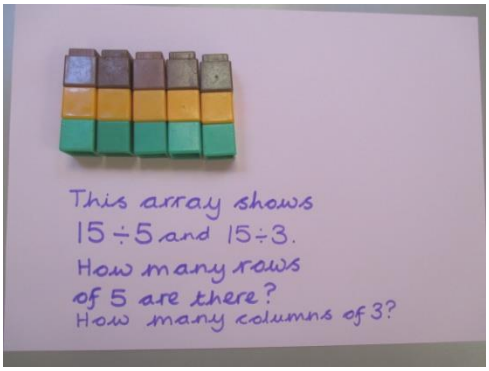
We also develop an understanding of division using number lines to show repeated groups.

Number lines can also be used to show repeated subtraction of sets of the same size.





We develop the use of ÷ and = symbols to record calculations horizontally and use arrays and other practical apparatus to illustrate making of repeated groups.



Next we begin to derive new facts from known facts

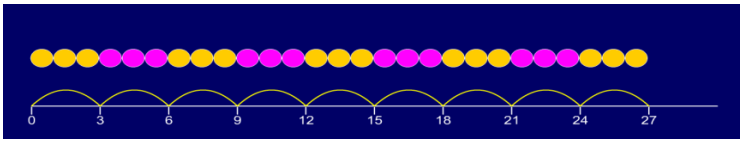
e.g. 6 ÷ 2 = 3 (known fact)

60 ÷ 2 = 30

600 ÷ 2 = 300

Then we begin to carry out division of two- digit by one -digit numbers, first without remainders, then introducing remainders, using informal methods first.

27 ÷ 3



Only after this, should children move to develop the standard method for short division, first with no remainders, then with remainders. This is not usually taught at KS1.