Introduction

The Mathematics work your child is doing at school may look very different to the kind of 'sums' you remember.

This is because children are encouraged to work mentally, where possible, using personal jottings to help support their thinking. Number lines are one example of this.

Even when children are taught more formal written methods they are only encouraged to use these methods for calculations they cannot solve in their heads.

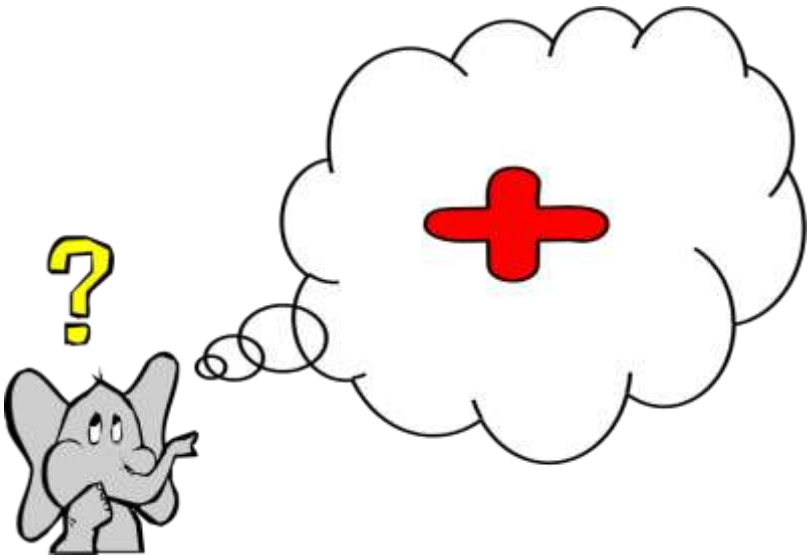
It will be a great help to your child, and to their teachers, if you could encourage them to use methods which they have learnt at school rather than teaching them different methods at home.

This booklet is designed to inform

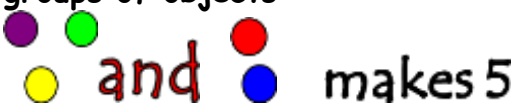
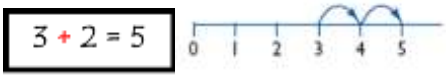
you about the progression through calculation methods that we use at Cranmore Infant School for addition, subtraction, multiplication and division. We have included the calculations that children learn in year 3. Some of our children will not be at that stage but we felt you would find it useful to see the whole process.

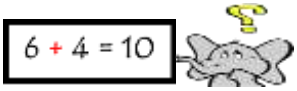
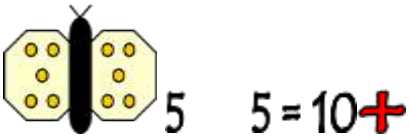
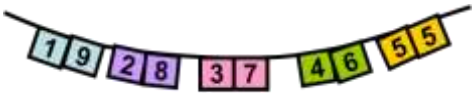
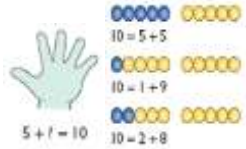
Paula Whittle
12/1/2014

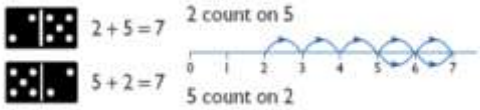
Addition



add and count on
addition plus
more sum total
altogether increase

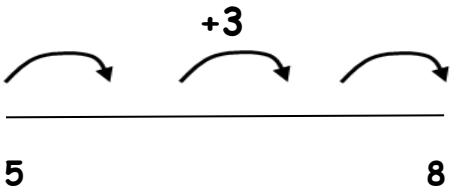
FS2	**Recognise numbers 0 to 10** 0 1 2 3 4 5 6 7 8 9 10 **Count reliably up to 10 everyday objects**  **Find one more than a number**  **Count in ones and tens**    **Begin to relate addition to combining two groups of objects**  **Count along a number line to add numbers together**  **Begin to use the + and = signs to record**	Children could draw a picture to help them work out the answer.

	mental calculations in a number sentence  **Combining two sets of objects** 2+3=☐ At a party, I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether? 	
Y1	**Know doubles of numbers**  **Know by heart all pairs of numbers with a total of 10 and 20**    **Know that addition can be done in any order** **1 + 2 = 3**  **2 + 1 = 3** 	Children could use dots or images to represent the numbers.



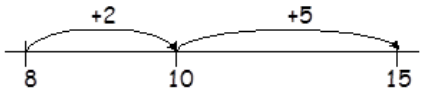
Put the biggest number first and count on

3+5

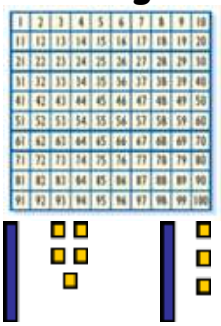


Add two single-digit numbers that bridge 10

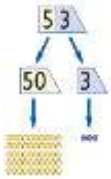
8 + 7 = 15



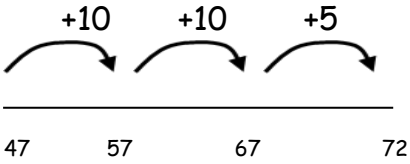
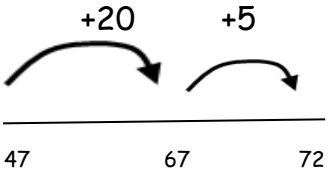
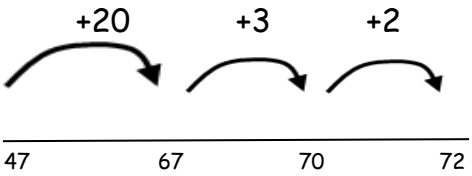
Counting on and back in 2,5,10's.



Begin to partition numbers in order to add.

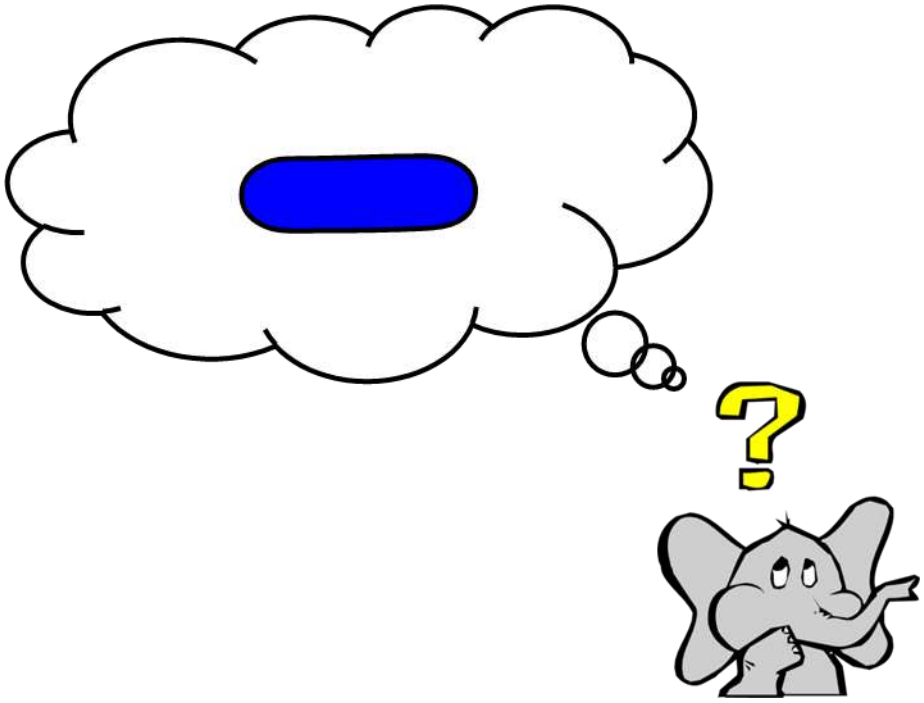


Understanding place value and using this to help add.

Y2	47 + 25 = ☐ My sunflower is 47cm tall. It grows another 25cm. How tall is it now?    246 + 87 246 + 80+7 or 246 + 7+ 80 356 + 427 = 356 + (400 + 20 + 7) **First steps** **leading to:** 356+400=756 =756+20+7 756+20=776 =776+7 776+7=783 =783	Drawing on a number line helps children to record the steps they have taken in a calculation (start on 47 + 10 + 10 then + 5). This is much more efficient than counting on in ones. They can progress to adding on in multiples of 10 (start at 47 +20 then +5). Develop methods for adding two digit and three digit numbers by partitioning second number only.

Y3	375+67= ☐ 300+70+5 60+7 300+130+12=442 **Leading to:** 67 83 + 24 +42 80 120 11 5 91 125 Add most significant digits first. Add mentally from top. This leads onto most significant digits first.	Use knowledge of place value and partitioning of three digit numbers to develop written methods for addition of two and three digit numbers using expanded methods of recording.

Subtraction

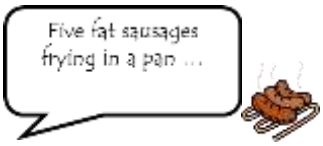
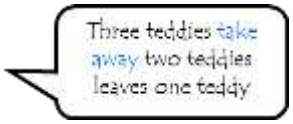
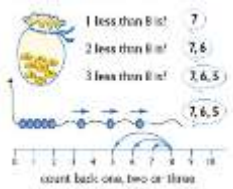


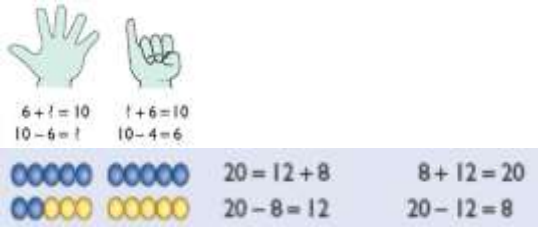
count back take away

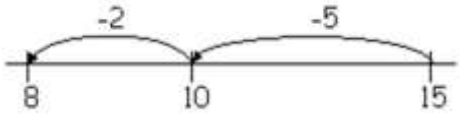
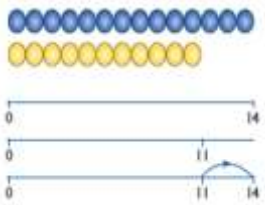
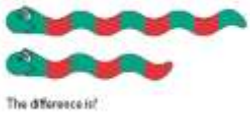
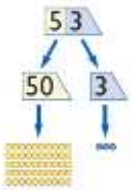
fewer subtract

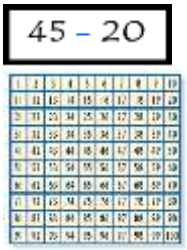
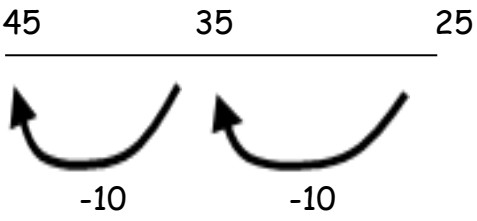
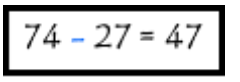
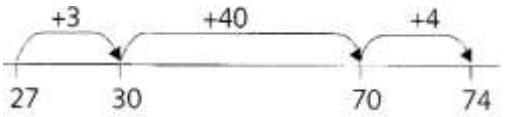
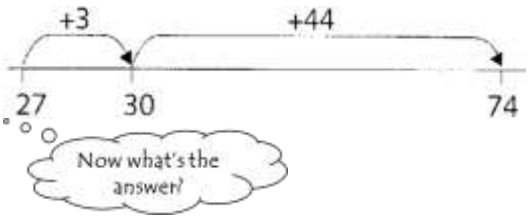
minus less

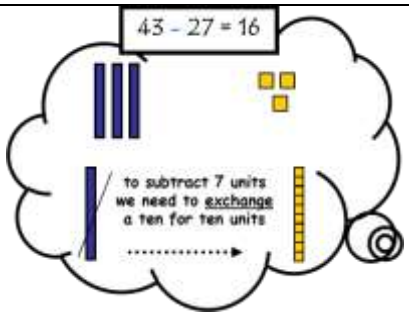
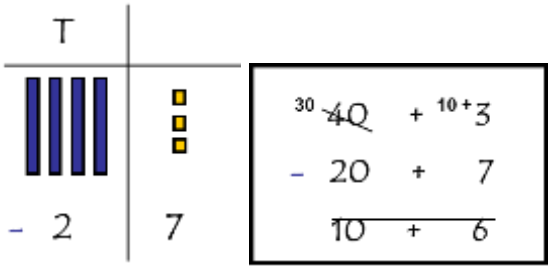
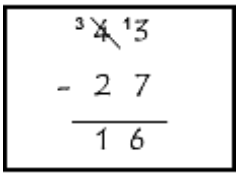
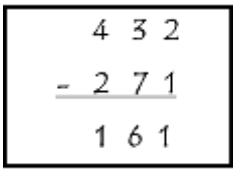
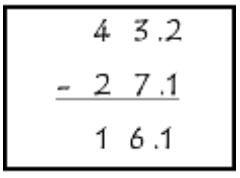
difference between

FS2	Begin to count backwards in familiar contexts such as number rhymes or stories   Continue the count back in ones from any given number.  Begin to relate subtraction to ' taking away   Find one less than a number  Count backwards along a number line to ' take away  	Drawing a picture helps children to visualise the problem.

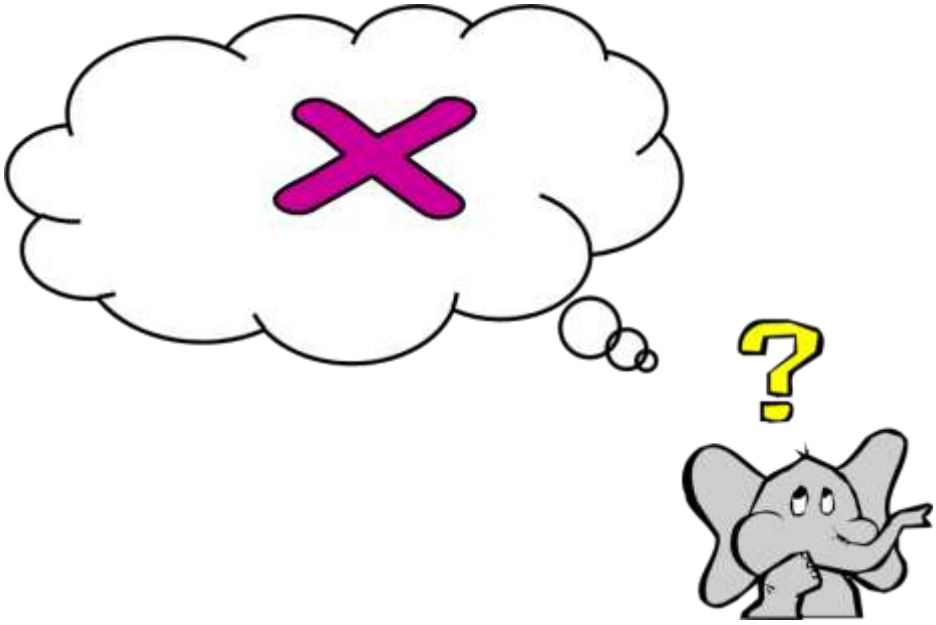
	5-2= ☐ I had five balloons. Two burst. How many did I have left?  **Take away** A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?  **Find the difference**	
Y1	Count back in tens    Begin to use the – and = signs to record mental calculations in a number sentence  6 – 4 = 2 Know by heart subtraction facts for numbers up to 10 and 20 	

	Subtract single digit numbers often bridging through 10 15 - 7 = 8  Begin to find the difference by counting up from the smallest number  The difference between 11 and 14 is 3. 14 – 11 = 3 11 + ☐ = 14  Begin to partition numbers in order to take away  	Understanding place value and using this to help add.
Y2	Subtract 10 from a two-digit number 45 - 10 	

	 Subtract multiples of 10 from any number   Decide whether to count on or count back     Expanded method	Begin to teach children about deciding to count on or back. Children could count on (from the smallest number to the biggest) using an empty number line. It is easiest to count up in multiples of 10. It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support

	 	calculations. The expanded method enables children to see what happens to numbers in the standard written method. NOTE: the correct language is '**exchanges**' not borrow.
Y3	**Compact (short) written method**   	The previous stages reinforce what happens to numbers when they are subtracted using more formal written methods. It is important that the children have a good understanding of place value and partitioning. This method can be used for larger numbers and decimals

Multiplication



multiplication product

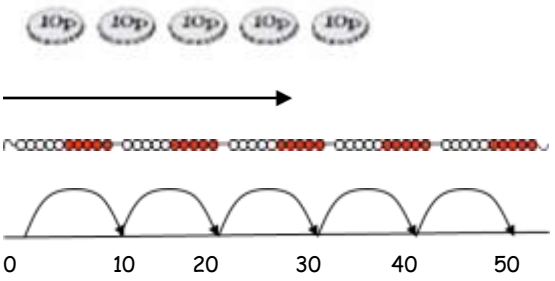
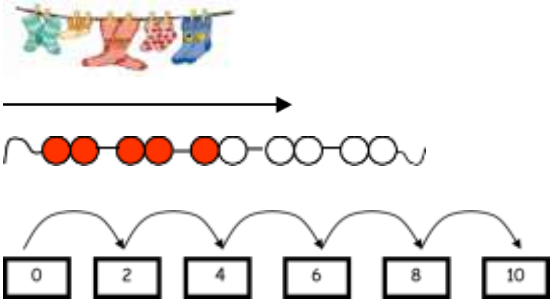
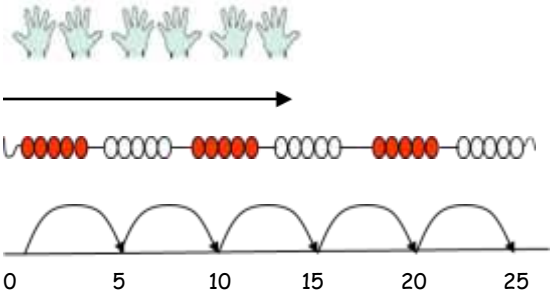
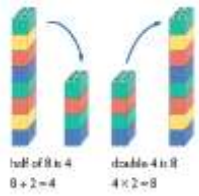
once, twice, three times

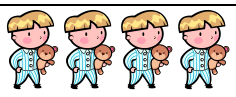
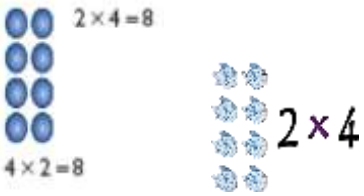
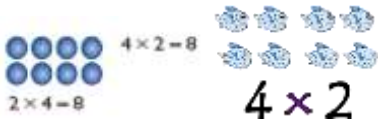
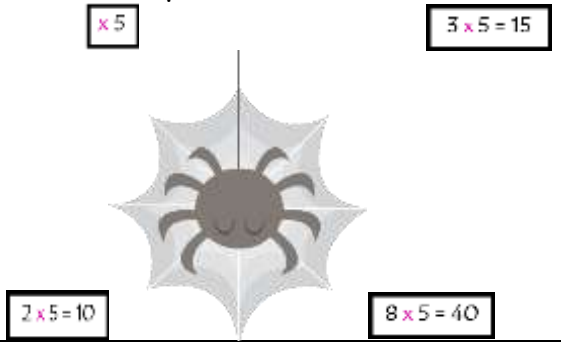
double groups of

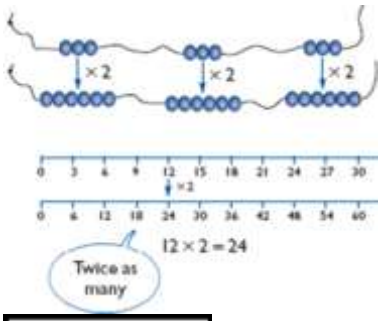
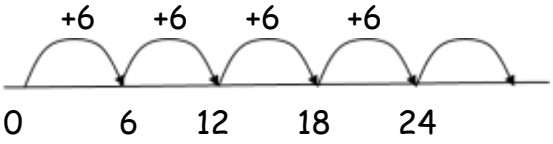
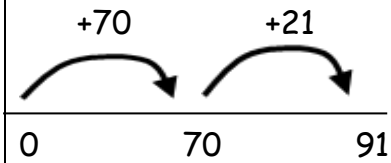
repeated addition lots of

array, row, column multiply

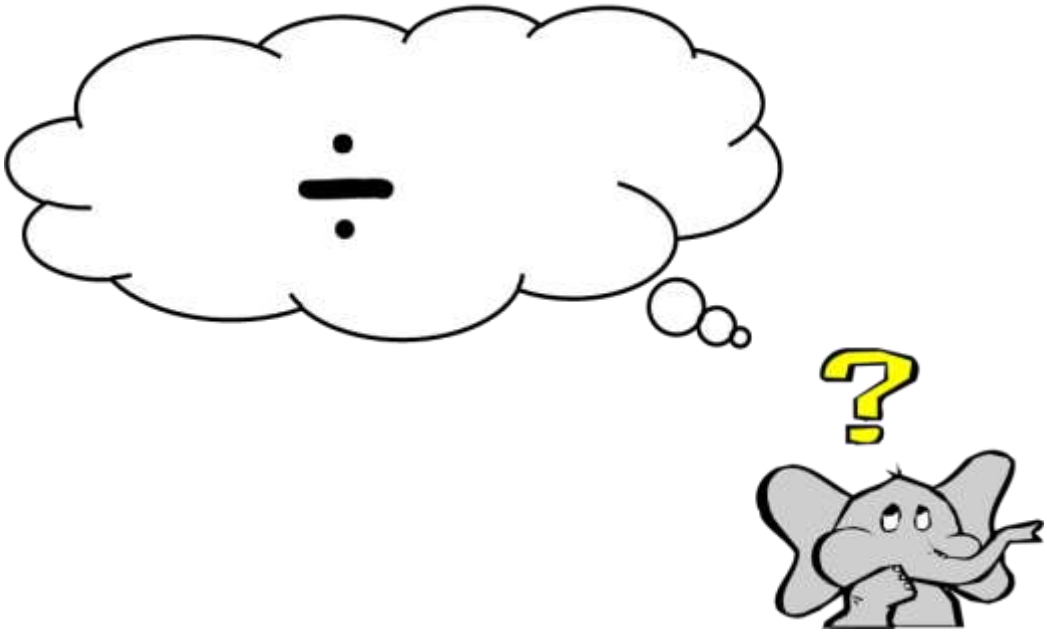
times multiple

FS2	Count in tens from zero  Count in twos from zero  Count in fives from zero  	Children are taught to understand multiplication as repeated addition and scaling. It can also describe an array.
Y1	Know doubles and corresponding halves  Knowing multiplication can be seen as repeat addition Each child has two eyes. How many eyes do four children have?	Again a picture can be useful.

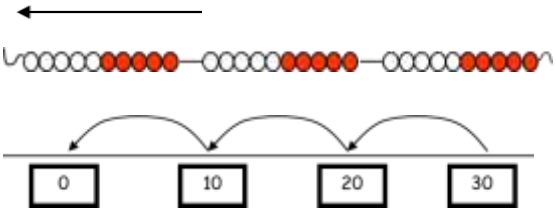
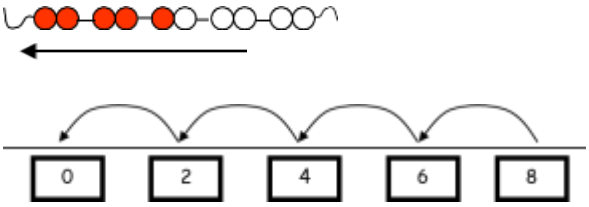
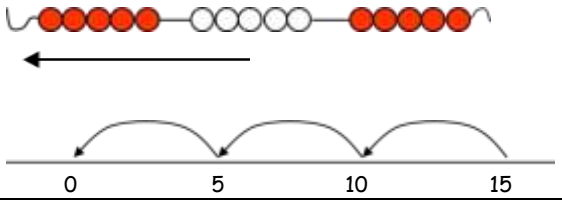
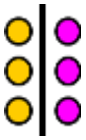
	 2 + 2 + 2 + 2 3 x 5 = ▭ There are 5 cakes in a pack. How many cakes in 3 packs? 5 + 5 + 5  Understand multiplication as an array   	4x2= 4 lots of 2 4 groups of 2 Dots or tally marks are often drawn in groups. This shows 3 lots of 5. Drawing an array (2 rows of 4 or 4 columns of 2) gives children an image of the answer. It also helps develop the understanding that 4x2 is the same as 2x4.
Y2	Know multiplication tables to 10 x 10  	

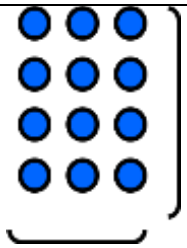
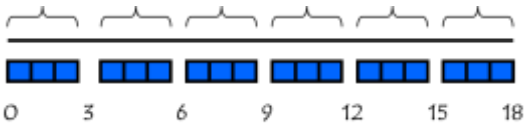
	6 x 5 = 30  Use known facts to work out new ones Use factors to multiply Understand that … 24 x 20 = 24 x 2 x 10 24 x 50 = 24 x 5 x 10 4x6 = ☐ There are 4 cats. Each cat has 6 kittens. How many kittens are there altogether?  	Children could count on in equal steps, recording each jump on an empty number line. This shows 4 jumps of 6.
Y3	13 x 7 = ☐ There are 13 biscuits in a packet. How many biscuits in 7 packets?  	When numbers get bigger it is inefficient to do lots of small jumps. Split 13 into parts (10 and 3). This gives you two jumps (10x7 and 3x7).

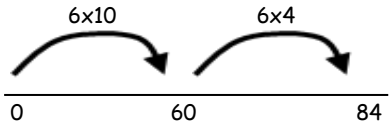
Division



group groups of
lots of divide
divided by quotient
division factor
remainder divisible
half halve share

FS2	Count back in tens  Count back in twos  Count back in fives  	
Y1	Know halves    Half of 6 is 3 ½ of 6 = 3 Reinforce division as grouping through the use of arrays	

	 12 divided into groups of 3 gives 4 groups 12 ÷ 3 = 4 12 divided into groups of 4 gives 3 groups 12 ÷ 4 = 3	
Y2	Use known multiplication facts to work out corresponding division facts If 2 x 10 = 20 then 20 ÷ 10 = 2 20 ÷ 2 = 10 Represent 'groups' for division on a number line using apparatus alongside the line 18 divided into groups of 3 18 ÷ 3 = 6  0 3 6 9 12 15 18 28 ÷ 7 = ☐ A chew bar costs 7p. How many can I buy with 28p?  0 7 14 21 28	To work out how many 7's there are in 28, draw jumps of 7 along a number line. This shows you need 4 jumps of 7. This can also be done starting from 28 and counting back in chunks of 7.

Y3	84 ÷ 6 = ☐ I need 6 drawing pins to put up a picture. How many pictures can I put up with 84 pins?  	It would take a long time to jump in sixes to 84 so children can jump on in bigger 'chunks'. A jump of 10 lots of 6 takes you to 60. Then you need another 4 lots of 6 to reach 84. Altogether, that is 14 sixes.