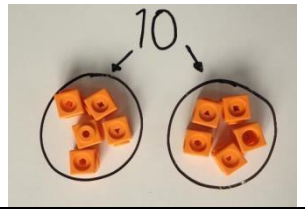
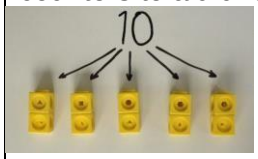
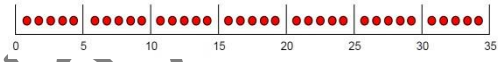
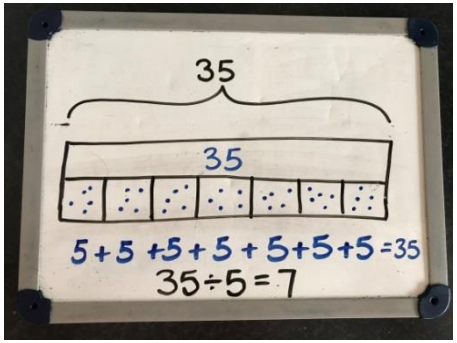
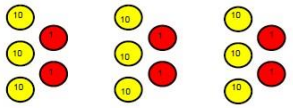
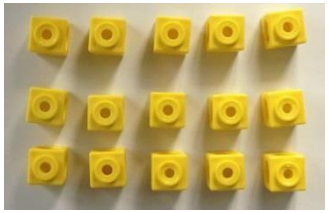
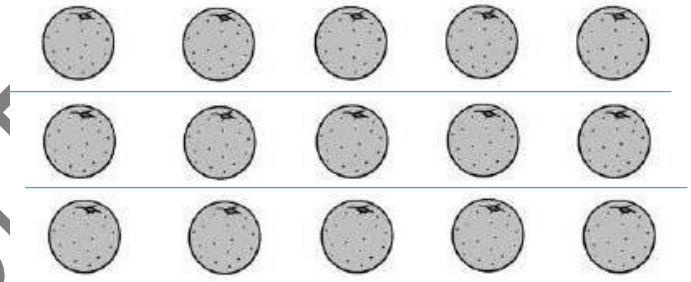
West Dean CE Primary School
Calculation Guide - Division

Links with multiplication are absolutely key throughout

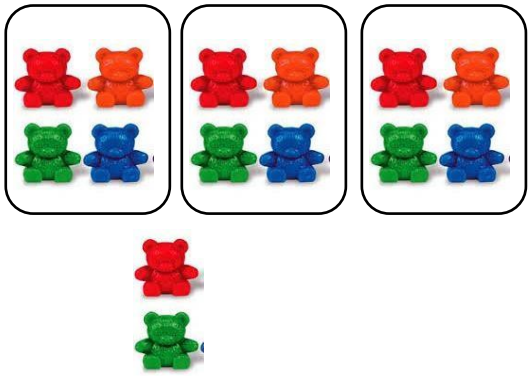
Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	   I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  10 ÷ 2 = 5 Using a number line is not helpful here	Share 10 buns between two people. Each person will have 5 buns. 10 ÷ 2 = 5 2 x 5 = 10 5 x 2 = 10
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  10 ÷ 2 = 5 35 grouped into groups of 5 equals 7 35 ÷ 5 = 7 	Use a number line to show jumps in groups. The number of jumps equals the number of groups. Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. 	10 ÷ 2 = 5 10 socks sorted into pairs will give us 5 pairs. 35 ÷ 5 = 7 5 x 7 = 35 7 x 5 = 35 Divide 35 into 7 groups. How many are in each group? There are 35 children and we want groups of 5. How many groups will I have? I have 96 wheels. How many

	96 ÷ 3 = 32 		tricycles could I make? 96 ÷ 3 = 32
Division within arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15 See multiplication progression document for more support here.	Draw an array and use lines to split the array into groups to make multiplication and division sentences. 	Find the inverse of multiplication and division sentences by creating four linking number sentences. 5 x 3 = 15 3 x 5 = 15 15 ÷ 3 = 5 15 ÷ 5 = 3 If we 15 oranges, how many glasses of orange juice can we make if we use 3 per glass? Or 5 per glass?

Division with a remainder

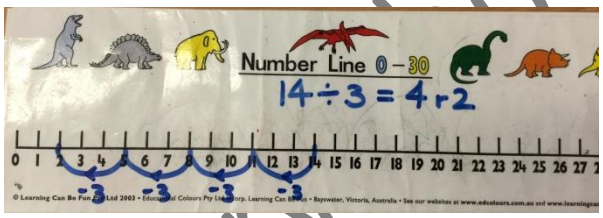
14 ÷ 3 =

Divide objects between groups and see how many are left over

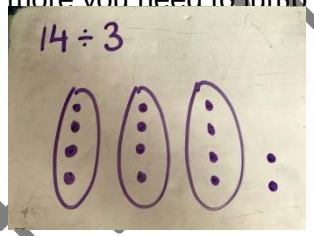


Take care with wording when teaching division – the type of word problem/context is vital:

If there were 14 wheels, how many tricycles can you make?



For this 'problem', jump backwards in equal jumps on a number line (repeated subtraction) then see how many more you need to jump to find a remainder.



Draw dots and group them to divide an amount and clearly show a remainder.

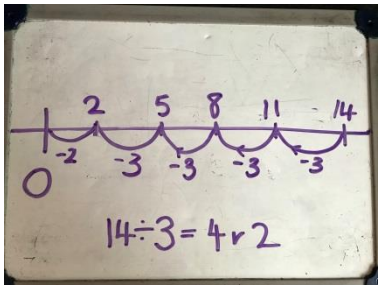
NB:

If there were 14 wheels, how many quad bikes can you make?

14 ÷ 4 = 3 r 2

Complete written divisions and show the remainder using r.

14 ÷ 3 = 4 r 2



14 ÷ 4 = 3 r 2

Steps towards Short Division

Begin without remainders

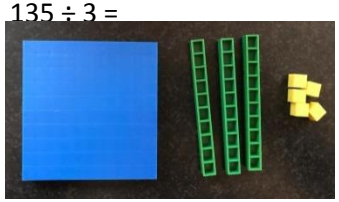
Then allow children to investigate with remainders

NB: impress upon the children to consider the CONTEXT when working out reminders.

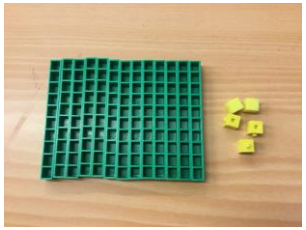
If the question is about people, we may have a remainder or someone left over…… if it is about flour, we may express the answer as a fraction or decimal, for example.

By Grouping

135 ÷ 3 =

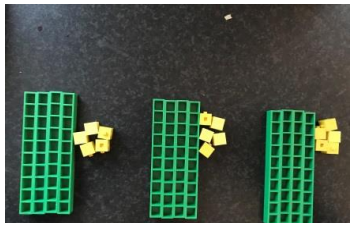


Begin with the Hundreds, which cannot be divided by 3, so need to be exchanged for 10 Tens.



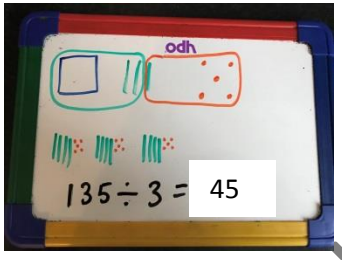
We can then share the tens into 3 groups of 40 leaving 15 still to divide by 3.

Children may know that 15 ÷ 3 = 5, but they will need to exchange the Ten for 10 Ones to be able to physically share them out into the 3 groups.



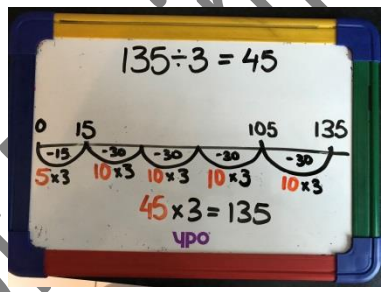
By Grouping

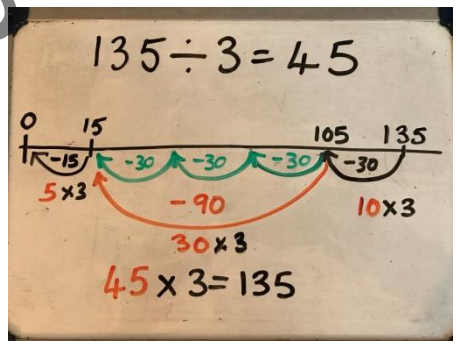
Pictorially, this can be represented thus:



It may take several steps of exchanging to show this.

By Repeated Subtraction



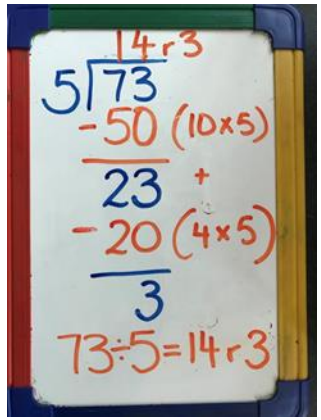


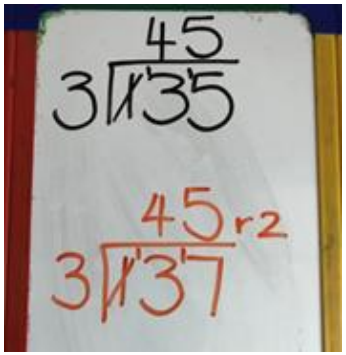
An understanding of the links between multiplication and division are key, as the understanding of these links:

135 ÷ 3 = 45
135 ÷ 45 = 3

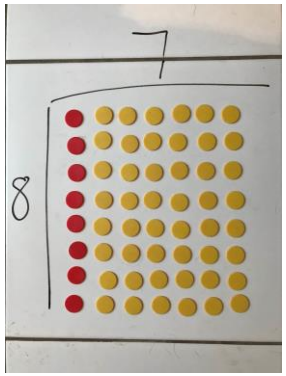
135 ÷ 3 = 45
135 ÷ 45 = 3

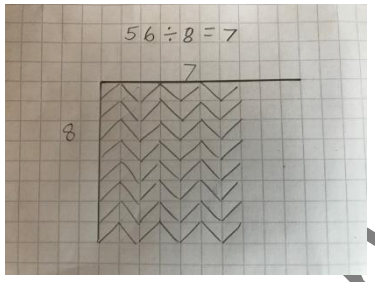
3 X 45 = 135
45 X 3 = 135

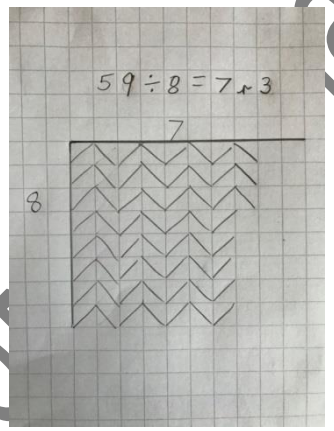




By using Arrays





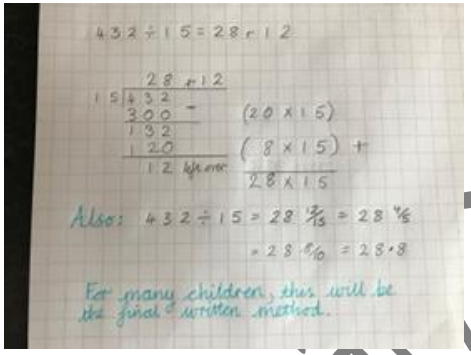


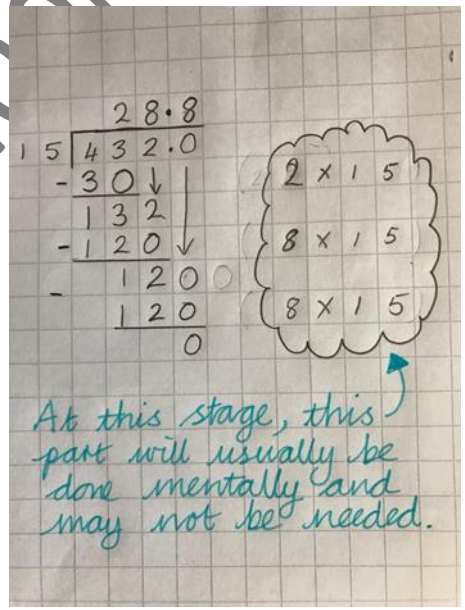
This array methodology leads into the short division formal short hand method of recording

Long Division

Concrete and visual pictorial approaches are not appropriate at this stage

Use repeated subtraction or chunking to support layout and understanding

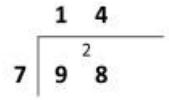




National Curriculum appendix:

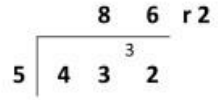
Short division

98 ÷ 7 becomes



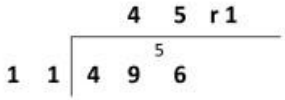
Answer: 14

432 ÷ 5 becomes



Answer: 86 remainder 2

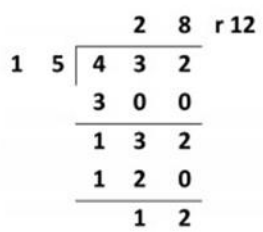
496 ÷ 11 becomes



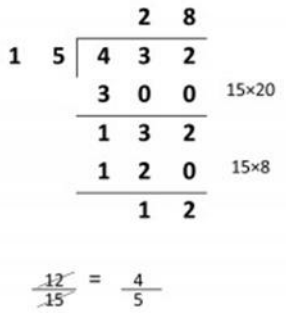
Answer: $45\frac{1}{11}$

Long division

432 ÷ 15 becomes



432 ÷ 15 becomes



432 ÷ 15 becomes