Overview of Division at Hanley St Luke's

- Children at Hanley St Luke's are immersed in a number of different division calculation strategies according to their needs and abilities. The overall aim is to ensure that children will use both written and mental methods to solve problems, choosing their own 'best fit' method. The journey is towards the chunking/ short division methods. Seeing the relationship between division and subtraction and increased accuracy when mentally dividing; including the rapid recall of multiplication tables and related division facts.

- Children working at P levels will mainly use grouping and sharing to build up towards repeated subtraction and the idea of division as a concept.

- The mental methods that lead to chunking and long division methods generally involve, splitting physical objects into smaller groups, using informal drawings to share dots and crosses, relating division to times tables and the inverse. Learning by heart of the multiplication tables is of paramount importance, they provide a solid foundation for division methods and other areas of mathematics.

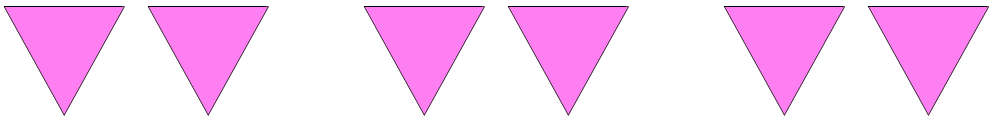
Subtraction

Children at the beginning stages of understanding division can use repeated subtraction as a tool to understand the concept of division and to visualize the answer getting repeatedly smaller. They will use visual aids such as unifix cubes and numicon. They would then be introduced to the idea of using their knowledge of times tables to work out division inverses eg 15 divided by 3 is the same as how many 3's in 15.

Grouping

As children are introduced to the notion of division as repeated subtraction they are immersed in a number of visual, kinaesthetic and auditory methods to learn the associated vocabulary and concepts. Children should experience seeing and handling objects and sharing them into equal groups. They will begin by sharing in twos and fives. Then introducing 3's and other times table groupings.

6 divided by 3 =2



Hundred Squares

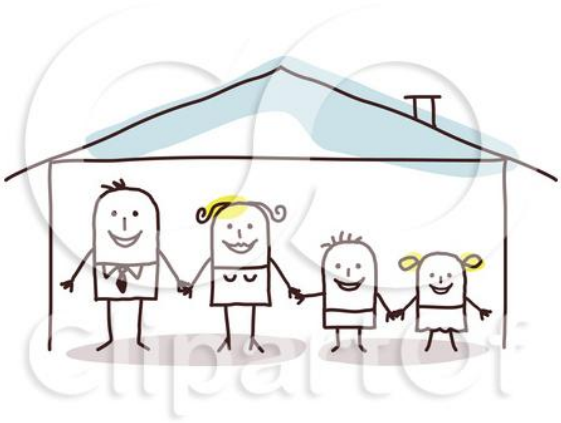
×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Hundred squares can be used to reinforce repeated subtraction, inverse of multiplication and later in the child's understanding for more challenging division work such as factors.

Inverse

Use of mnemonics or visual aids like "factor folk go into multiple mansion" help the children to visualise a concrete representation of an abstract idea.

Children will then begin to use and apply known methods to find symbols that stand for unknown numbers to complete equations. They are taught to use division as the inverse or opposite of multiplication as a strategy to complete missing number sentences.



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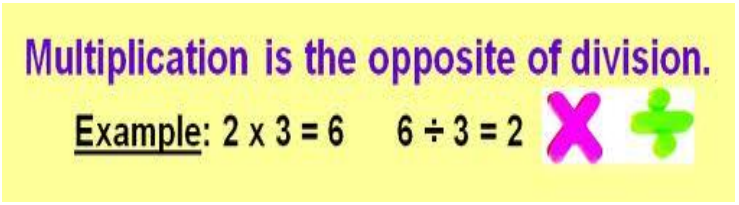
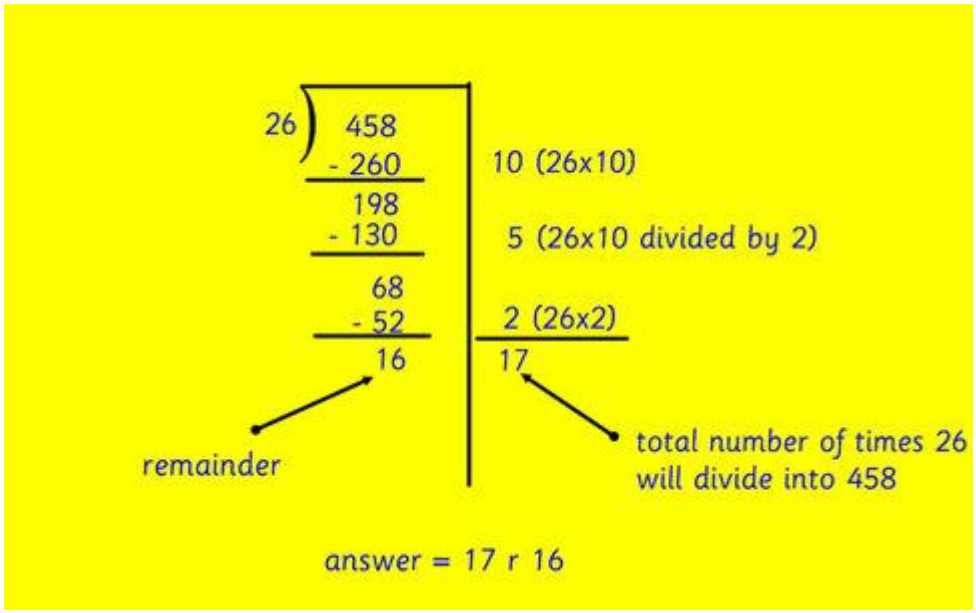


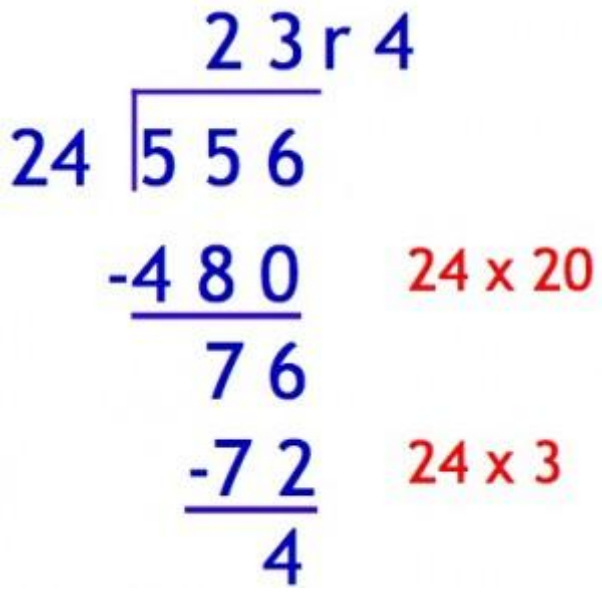
Chunking method

We use the chunking method to allow children to visualize what is happening to the numbers as we divide larger amounts. This method is based on subtracting multiples of the original number or "chunks". Initially children subtract several chunks, but with practice they should look for the biggest multiples of the original number that they can find to subtract. However the children need to recognize that chunking is inefficient if too many subtractions need to be carried out. Encourage them to reduce the number of steps and move them on quickly to find the largest possible multiples, eg. In chunks of hundreds, tens, then units.



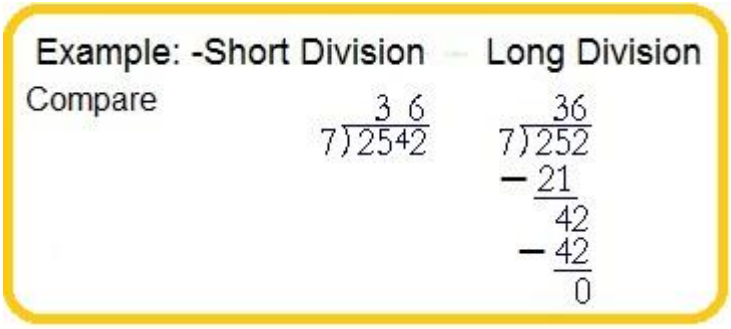
The key to the efficiency in chunking lies in the estimate that is made before the chunking starts.

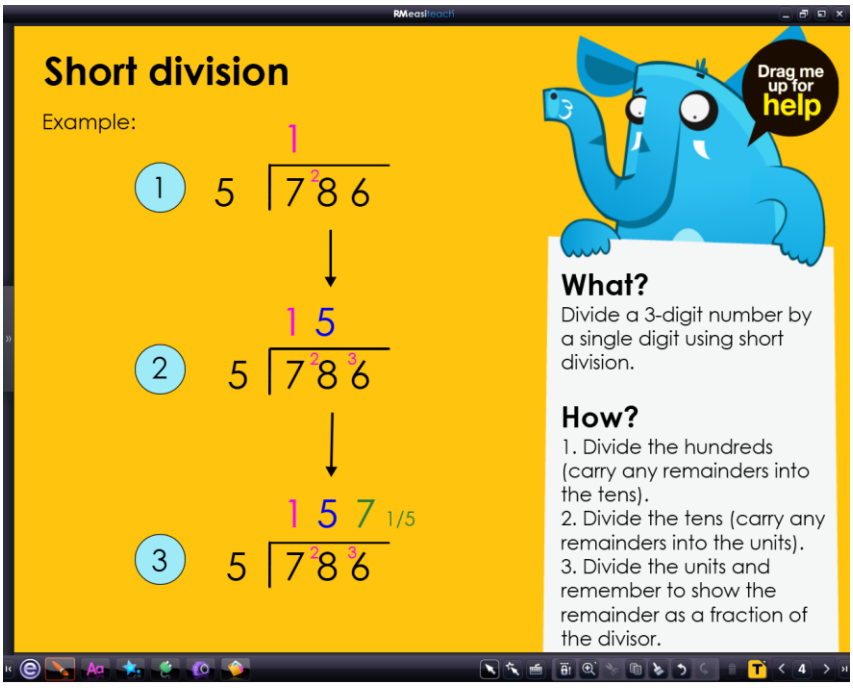
When recording the chunking method, the multiplication calculations should be in brackets to the right of the division calculation. The answer should be then written again above the "bus stop".



Short division

Short division can be introduced as an alternative, more compact recording. No chunking is involved since the links are to partioning and not repeated subtraction. Short division of a three digit number can be introduced to children who are confident with multiplication and division facts, and with subtracting multiples of 10, mentally and whose understanding of partitioning and place value is sound. For most children this will be at the end of year 5 or the beginning of year 6. However more gifted and talented children may be introduced to these method earlier and less able children, later.





Dividing Decimals

The grid method should be used later to divide decimal numbers e.g. If a skipping rope is 3.4 metres long how much cord is needed for 7 skipping ropes? So we need 3.4 x7=

	3	0.4
7	21	2.8

First, partition the 3.4 (split into units/ one and tenths) and place on the outside of the grid. The 7 we are multiplying is placed at the right hand side of the grid. To calculate 0.4x7 we use the knowledge that 4x7=28 so 0.4x7= 2.8.

The numbers can now be added 21+2+0.8= 23.8 metres of cord would be needed.

The chunking method or short method may also be used by removing the decimal point during calculation, then reinserted as necessary.

Missing Number/ Equal sign as a Balance

Children should always be used to seeing division calculations in a variety of different ways, including the understanding of the role of the equals sign as a balance. E.g. Missing numbers need to be placed in all possible places.

8 divided by 4 = □

□ = 20 divided by 4

6 divided by □ = 3

8 = □ divided by 4

□ divided by 4 = 16

3 = 21 divided by □

□ divided by ∇ = 70 5 = □ divided by ∇

Worded Problems

Children should be used to using and applying division skills in word problems by looking for key vocabulary associated with division such as share, factor, groups, split by etc.

E.g. If there are 38 children in a class and they share 152 sweets, how many sweets would they have each?