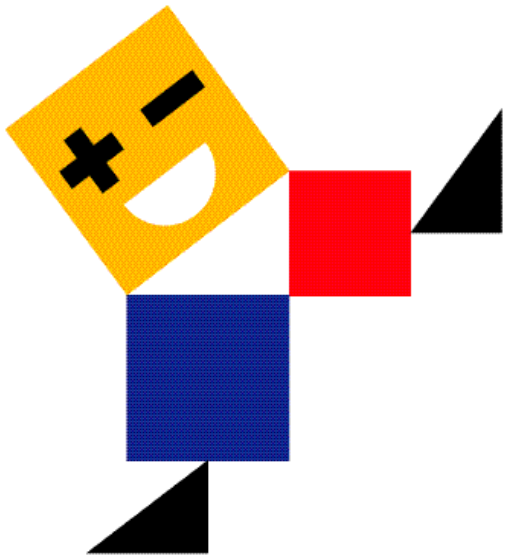
Milton Primary School

Guidance on calculation approaches for parents



Division

Milton Primary School – Guidance on calculation approaches for parents.

This booklet has been written in order to help you understand how the four operations of addition, subtraction, multiplication and division are taught in our school and to give you some ideas of how to help your child with their work.

One of the most valuable things you can do with your child is talk to them about mathematics, when out shopping, playing games involving numbers, cooking etc. Talk, particularly linked to everyday situations, is central to encouraging good mathematical understanding. Above all, listen to your child explaining the approach that he or she selects. Avoid leading your child to an approach you remember from school, however tempting this may be, and instead try to keep in mind the progression that is set out in this document.

It is also worth mentioning that the different stages in the progression are developmental, so children move through the stages based on their individual progress. Moving a child too rapidly to the final compact approach, before the child is ready, can impede progress rather than be supportive.

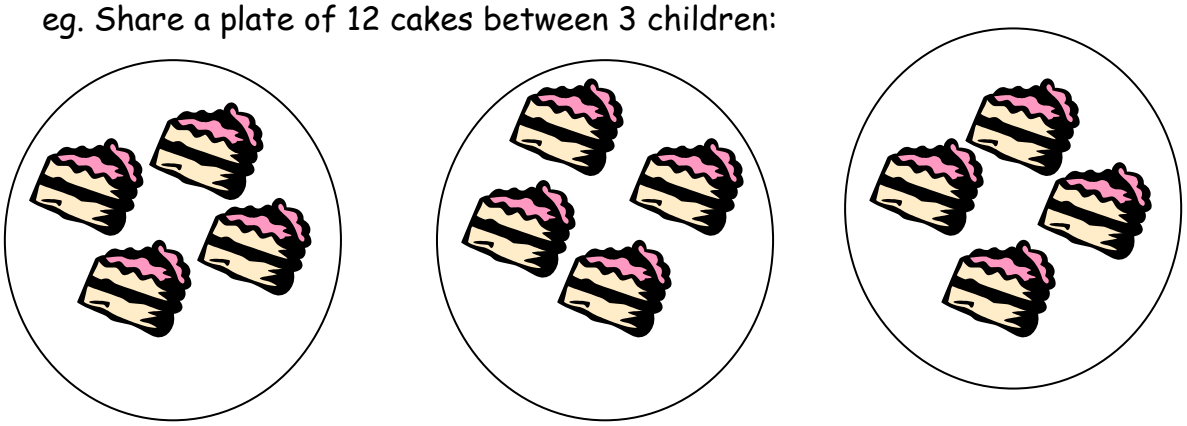
Progression in written division

The children are taught to understand division as collecting equal sized groups (or repeated addition) that can be represented on a number line. It is acknowledged that this is a shift from the way we, as adults, were taught at school. The approach is based upon research that has shown that children are generally more accurate and confident this way - the calculations are more reliably correct! Furthermore it is underpinned by children's understanding of the operation and size of numbers. Children are able to make choices depending on their ease with the approach so that calculations become increasingly efficient.

Division as sharing

Children's first encounter with division is generally through sharing. Children should first gain practical experience of sharing and become familiar with the language of sharing and division.

eg. Share a plate of 12 cakes between 3 children:



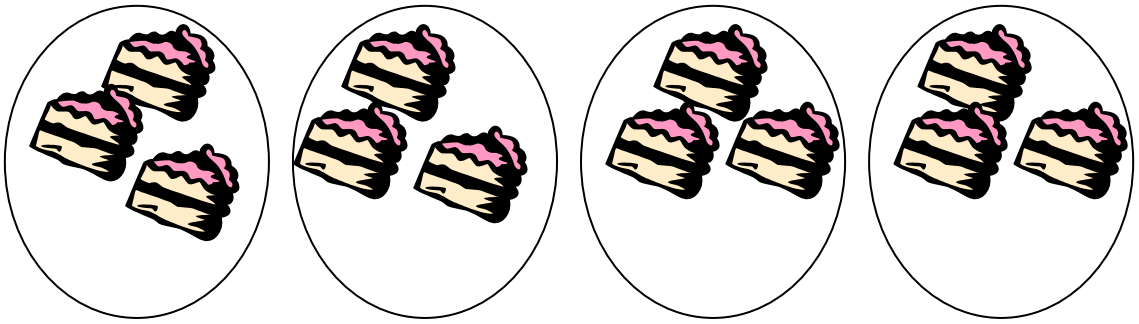
12 ÷ 3 = 4
Each child has 4 cakes after sharing.

Division as grouping

At Key Stage 1, children will move onto the language and concept of division as grouping as well as sharing.

12 ÷ 3 will be represented as 12 divided into groups of 3.

e.g. 12 cakes need to be put onto plates with three cakes on each plate.
This can be illustrated as:



12 ÷ 3 = 4

There are 4 plates with 3 cakes on each.

Alongside the model of moving objects into sets, the children experience a range of other representations of division.

* * * * * * * *
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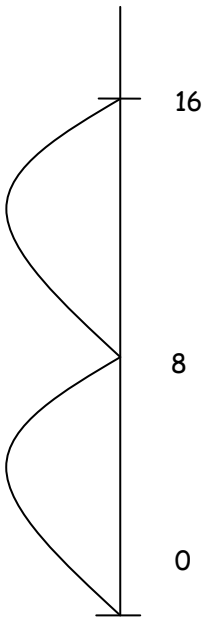
as arrays

16 ÷8 = 2
or as number sentences

or as jumps on a number line
(I start at zero and count in 8s until I get to 16.)

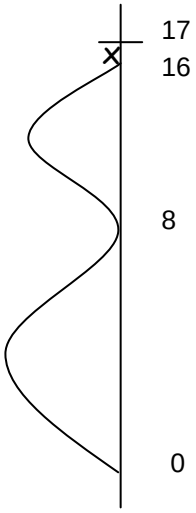


This strategy of jumping on in groups of the divisor is used throughout the school.

Division with remainders

Calculations that involve remainders can also be recorded on a number line.

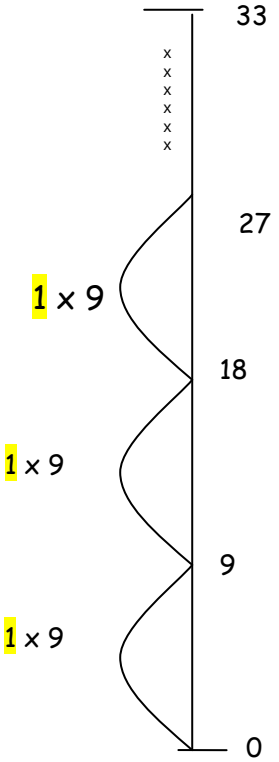
So 17 ÷ 8 can be represented like this:



(I start on zero and count in 8s until I get to 16. There is 1 more to get to 17. So I have 2 jumps of 8 and 1 remainder.)

The same approach is used for more complex calculations.

33 ÷ 9 =

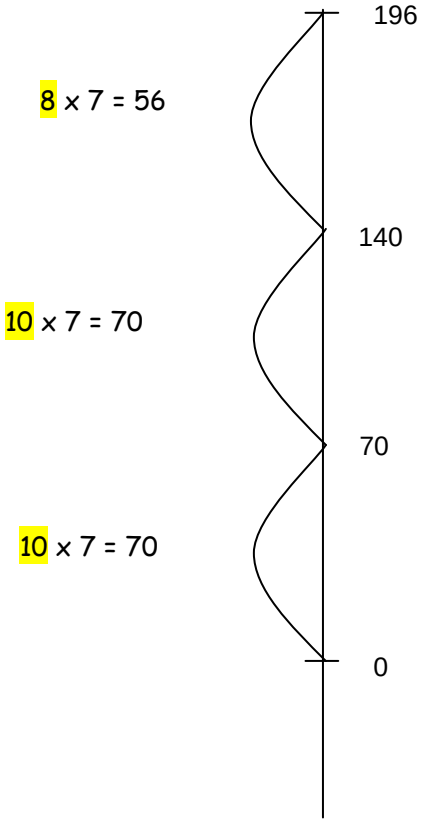


So 33 ÷ 9 = 3 r 6 (where r stands for remainder)

Division as chunking from Year Four onwards

For larger numbers it becomes inefficient to jump in individual groups of divisor. It would be too lengthy a process and so likely to be more error-prone too. Instead 'chunks' or several lots of the divisor are added on at once. Thinking in groups of ten cuts down on the steps required, as well as using facts with which the children are very familiar.

196 ÷ 7 =



so 196 ÷ 7 = 28

To avoid mistakes totalling the number of groups (eg. 10 + 10 + 8) it is important that each number sentence is written consistently with the multiple of the divisor first and the divisor second. Indeed a child may find it useful to circle the multiples of the divisor, (in the example these are highlighted), to emphasise that these numbers are to be totalled as a later stage in the process.

To be proficient with division, it is clear children need to have good recall of multiplication facts and to be able to derive facts using their understanding of place value. For many children, starting off by jotting down known useful facts

can take the pressure off carrying out the division process itself. So making an 'I Know' box can be very beneficial, as exemplified below. In this way selecting the closest product below the 'target' number can make the process more efficient still.

By Year 5 children are starting to divide any three-digit number by a single digit or to divide a decimal by a single digit as exemplified below.

259 ÷ 6 =

I Know

10 x 6 = 60

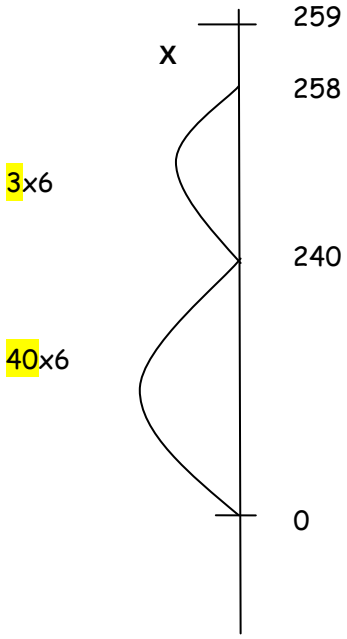
20 x 6 = 120

30 x 6 = 180

40 x 6 = 240

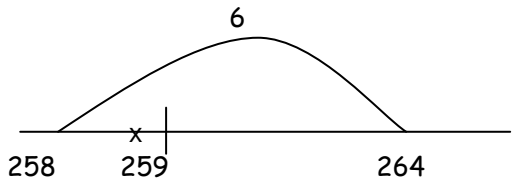
50 x 6 = 300 too many

so I will use 6 x 40



259 ÷ 6 = 43r1 or 43 1/6

The remainder can be expressed as a fraction of the divisor. The use of the number line supports this.
If a final jump was to be made from 258 this would land on 264. The remainder can be seen to be one part, or fraction of this line as shown below.



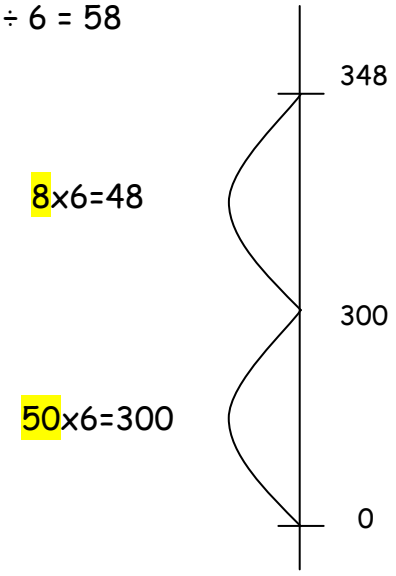
This same process can be extended to use with larger number or with decimals.

To solve 348 ÷ 6 =

I know	
10x6= 60	1x6=6
20x6=120	2x6=12
30x6=300	3x6=30
	4x6=48

Note: It can be useful to jot 1x, 2x, 5x the number since these can be reviewed and then combined to provide further facts such as 6x, 7x, or 8x.

348 ÷ 6 = 58



With decimals: 34.8 ÷ 6 =

I know	
1 x 6 = 6	0.1 x 6 =0.6
2 x 6 = 12	0.2 x 6 =1.2
5 x 6 = 30	0.5 x 6 = 3
	0.8 x 6 =4.8