DIVISION

In order to support written calculations, the following mental strategies are essential.

To divide successfully, children need to be able to:

- count on in steps, e.g. work out 18 ÷ 3 by counting on in 3s
- understand and use multiplication and division as inverse operations;
- partition two-digit and three-digit numbers in different ways, e.g. partition 42 into 30 and 12 when dividing by 3 (dividing 30 by 3 and 12 by 3);
- recall multiplication and division facts to 12 × 12;
- divide numbers by 10, 100 and 1000 and understand the effect;
- understand that division can leave a remainder;
- understand that division by grouping and sharing (halving/quartering) give the same answer and choose which is most efficient for a given calculation
- use multiplication facts and place value to estimate how many times one number divides into another – for example, how many sixes there are in 147, or how many 23s there are in 472;

Note: It is important that children's mental methods of calculation are practised and secured alongside their learning and use of an efficient written method for division.

Key Vocabulary Related to Division

Foundation

Share, dividing, groups

Key Stage One

Halve, quarter, equal groups, sharing, remainders, divide.

Lower Key Stage Two

Fraction, how many.

Upper Key Stage Two

Quotient.

Division

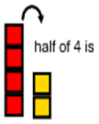
Foundation stage

Solve problems including halving and sharing

Children will understand equal groups and share items out in play and problem-solving.

Include practical experience of sharing during classroom routines/activities e.g. juice time

Halve objects and numbers by sharing



Year 1

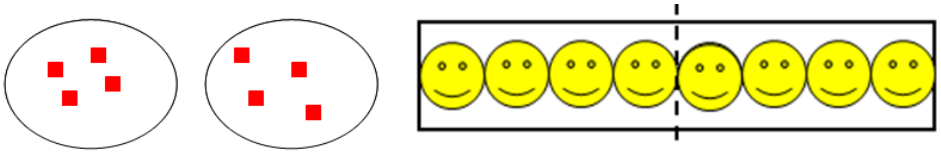
Group and share small quantities.

Count in multiples of 2s, 5s and 10s.

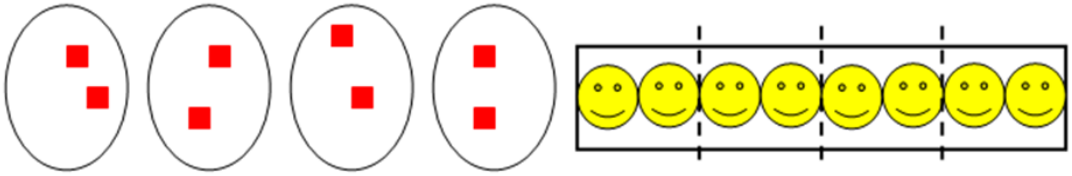
Using objects, diagrams and pictorial representations to solve problems involving **both grouping and sharing**.

Sharing

Find half of numbers, by sharing cubes (or other objects) between two people



Begin to find a quarter by halving and halving again



Grouping

How many groups of 2 can be made with 6 stars? = **3**

Children need to be taught the difference between 'grouping' objects (How many groups of 2 can you make?) and 'sharing' (Share these sweets between 2 people).

Division problems in a familiar context:

There are 2 pupils and there are 18 pieces of fruit to share between us. If we share them equally, how many will we each get?

Can they work it out and give a division statement… ?

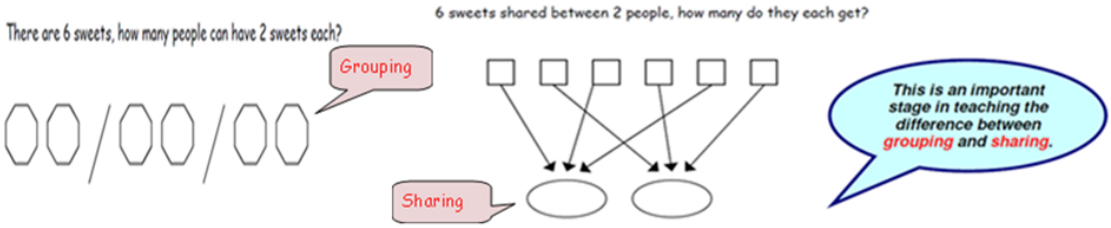
"18 shared between 2 people gives you 9 each."

Year 2

Group and share, using the ÷ and = sign

Use multiplication facts and arrays to derive division facts.

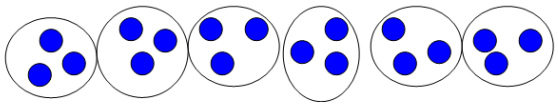
Know and understand sharing and grouping:

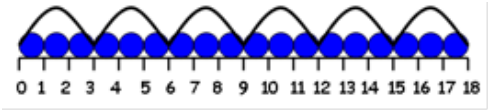


Children should be taught to recognise whether problems require sharing or grouping. However from Year 2 onwards pupils will be predominately taught division through grouping.

Understand division as grouping

18 ÷ 3, how many groups of 3 are in 18?

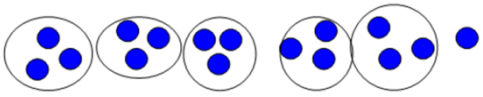




Grouping on a number line. Marked and progressing to their own number lines

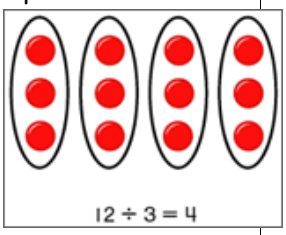
Introduce remainders

Realise that division can sometimes leave some 'left over' and this is called a remainder
16÷3



Arrays:

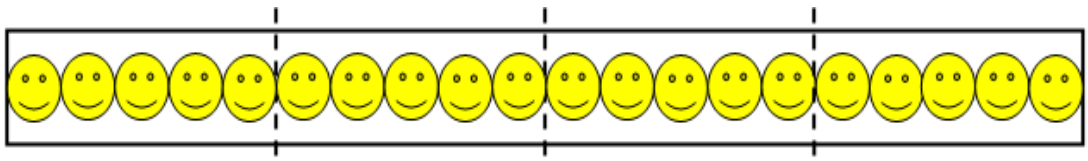
This represents **12 ÷ 3, posed as** 'How many groups of 3 are in 12?' Pupils should also show that the same array
can represent **12 ÷ 4 = 3** if grouped horizontally.



Halving and quartering

Halving, sharing by 2, Quartering, sharing by 4 (half and half again)

e.g. Find half and a quarter of 20.



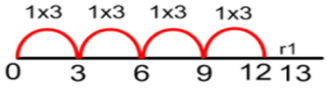
Year 3

Divide 2-digit numbers by a single digit

Step 1: Grouping on a number line

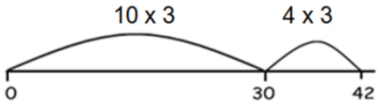
Children continue to work out unknown division calculations including ones that will end with remainders grouping on a number line from zero. Continue showing this practically and with arrays, as well as being translated to a number line. Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s, ready for 'carrying' remainders across within the short division method.

13 ÷ 3 = 4 r1



Moving on to understanding that as 12 ÷ 3 = 4 then 13 ÷ 3 = 4r1

42 ÷ 3 = 14



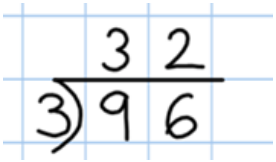
Step 2:Short division

Limit numbers to NO remainders in the answer OR carried (each digit must be a multiple of the divisor).

Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., **short division** for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.

Remind children of correct place value, that 96 is equal to 90 and 6, but in short division, pose:

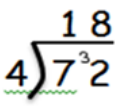
- *How many 3's in 9? = 3, and record it above the **9 tens**.*
- *How many 3's in 6? = 2, and record it above the **6 units**.*

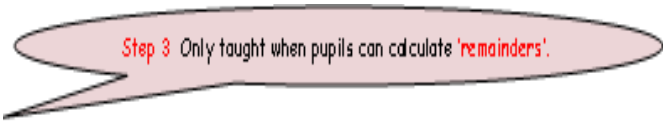


Step 3: Short division

Limit numbers to NO remainders in the final answer, but with remainders occurring within the calculation to be carried to the next digit.

Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. 96÷4), and be taught to 'carry' the remainder onto the next digit.



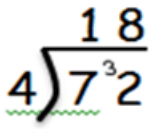


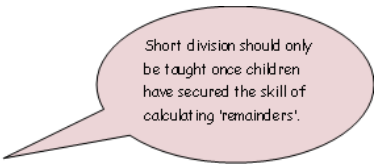
Year 4

Divide up to 3-digit numbers by a single digit

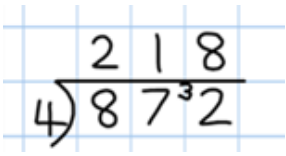
Continue to develop short division:

Step 1: Pupils must be secure with the process of short division for dividing 2-digit numbers by a single digit (see steps in Y3), but must understand how to calculate remainders, using this to 'carry' remainders within the calculation process (see example).

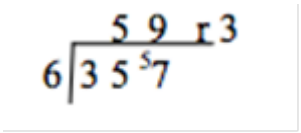




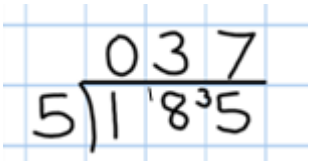
Step 2: Pupils move onto dividing numbers with up to **3-digits** by a single digit, begin with calculations that **result in a final answer with no remainder**.



Step 3: Progress to remainders in the final answer e.g. 85 ÷ 3 and 287 ÷ 4



When the answer for the **first column** is zero (1 ÷ 5, as in example), children could initially write a zero above to acknowledge its place, and must always 'carry' the number (1) over to the next digit as a remainder. Continue to reinforce place value.



Year 5

Divide up to 4 digit numbers by a single digit

Continue to use short division and interpret remainders as appropriate to the context including decimals

e.g. 4813 ÷ 3 =

$$3\overline{)\,4\,{}^{1}8\;1\,{}^{1}3} \quad \begin{matrix} 1\;6\;\;0\;\;4 \\ \text{r}1 \end{matrix}$$

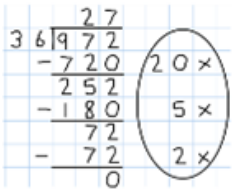
e.g. 481.2 ÷ 3 =

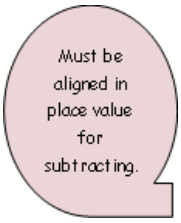
$$3\overline{)\,4\,{}^{1}8\;1\;.\;{}^{1}2} \quad 1\;6\;\;0\;.\;4$$

Year 6

Divide numbers up to 4 digits by 2 digits

Introduce long division for dividing by 2 digits.





Useful Key

1x = 36

2x = 72

5x = 180

10x = 360