Abbey Village Primary School- Written Method for Division Policy

At Abbey Village, we believe it is important that children understand the concept of division, in that it is:

- **repeated subtraction**

We also believe the need to understand and work with certain principles i.e. that it is:

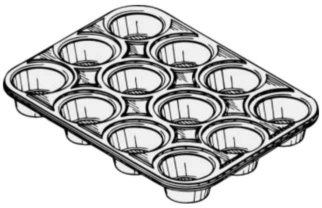
- the inverse of multiplication
- not **commutative** i.e. 15 ÷3 is not the same as 3 ÷ 15
- not **associative** i.e. 30 ÷ (5 ÷ 2) is not the same as (30 ÷ 5) ÷ 2

YR

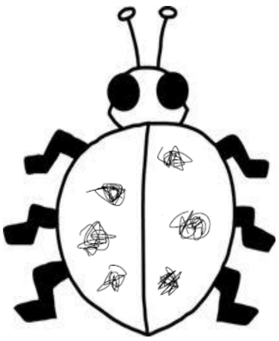
Early Learning Goal: ***Children solve problems, including halving and sharing.***

Children in our Reception class are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities using a wide variety of equipment, including small world play, role play, counters, cubes etc.

Children may also investigate sharing items or putting items into groups using items such as egg boxes, ice cube trays and baking tins which are arrays.

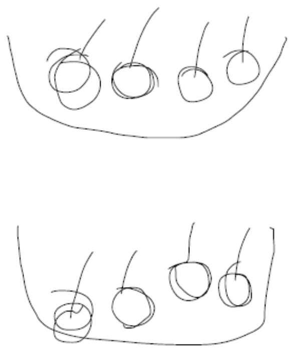


We encourage developing ways of recording calculations using pictures, etc.



A child's jotting showing halving six spots between two sides of a ladybird.

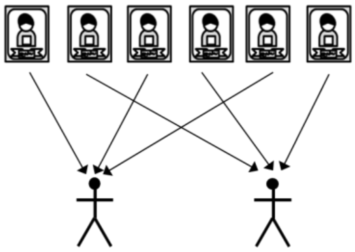
Jotting showing how they shared the apples at snack time between two groups.



Y1

End of Year Objective: **Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.**

In year one, children will continue to solve division problems using practical equipment and jottings. They will use the equipment to share objects and separate them into groups, answering questions such as 'If we share these six apples between the three of you, how many will you each have? How do you know?' or 'If six football stickers are shared between two people, how many do they each get?' They may solve both of these types of question by using a 'one for you, one for me' strategy until all of the objects have been given out.



Children should be introduced to the concept of simple remainders in their calculations at this practical stage, being able to identify that the groups are not equal and should refer to the remainder as '… left over'.

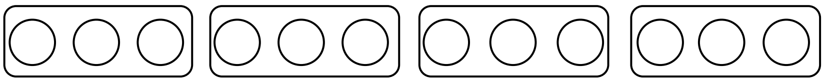
In Year 1, we will introduce the division sign (÷) to our children alongside using our practical equipment to divide.

Y2

> **End of Year Objective:**
>
> **Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs.**

Children will utilise practical equipment to represent division calculations as grouping (repeated subtraction) and use jottings to support their calculation, e.g.

12 ÷ 3 =

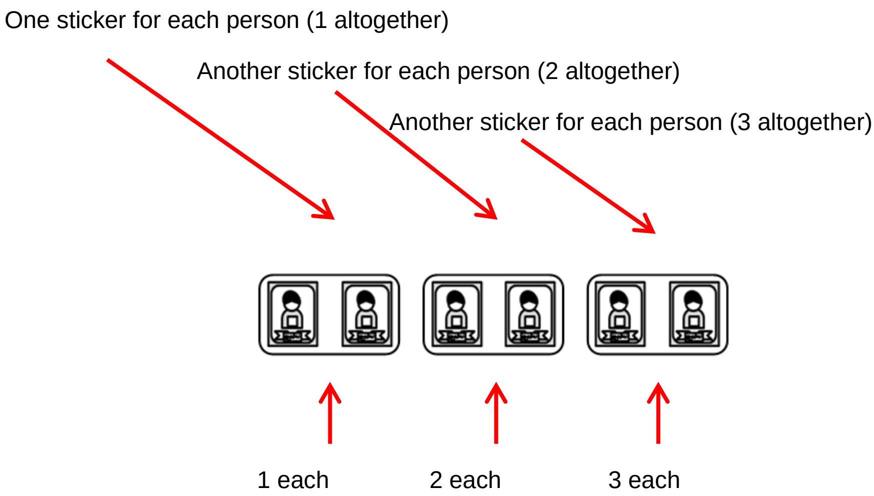


Children need to understand that this calculation reads as 'How many groups of 3 are there in 12?'

The link between sharing and grouping can be modelled in the following way:

To solve the problem 'If six football stickers are shared between two people, how many do they each get?'

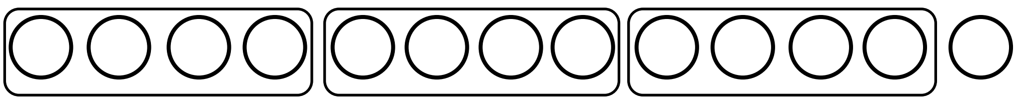
Place the football stickers in a bag or box and ask the children how many stickers would need to be taken out of the box to give each person one sticker each (i.e. 2) and exemplify this by putting the cards in groups of 2 until all cards have been removed from the bag.



Or:

Children should also continue to develop their knowledge of division with remainders, e.g.

13 ÷ 4 =



13 ÷ 4 = 3 remainder 1

Children need to be able to make decisions about what to do with remainders after division and round up or down accordingly. In the calculation 13 ÷ 4, the answer is 3 remainder 1, but whether the answer should be rounded up to 4 or rounded down to 3 depends on the context, as in the examples below:

I have £13. Books are £4 each. How many can I buy?

Answer: 3 (the remaining £1 is not enough to buy another book)

Apples are packed into boxes of 4. There are 13 apples. How many boxes are needed?

Answer: 4 (the remaining 1 apple still need to be placed into a box)

At Abbey Village, the class teacher, ensures the explicit teaching of division as sharing and grouping. We expect our children to be able to demonstrate their knowledge of sharing and grouping through practical equipment and pictorial representation.

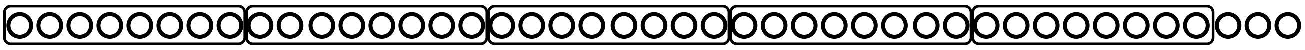
Y3

End of Year Objective:

Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers divided by one-digit numbers, progressing to formal written methods.

Initially, children will continue to use division by grouping (including those with remainders), where appropriate linked to the multiplication tables that they know (2, 3, 4, 5, 8 and 10), e.g.

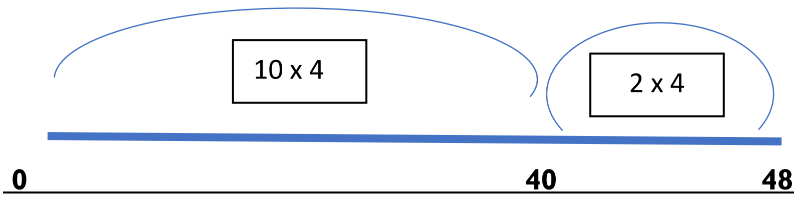
43 ÷ 8 =



43 ÷ 8 = 5 remainder 3

In preparation for developing the 'chunking' method of division, children should first use the repeated subtraction on a horizontal number line starting from 0.

e.g. 48 ÷ 4 =



Y4

End of Year Objective:

Divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

Children will continue to develop their use of grouping (repeated subtraction) to be able to subtract multiples of the divisor, moving on to the use of the 'chunking' method.

The number line method used in year 3 can be linked to the chunking method to enable children to make links in their understanding.

```
     12
4 ) 48
    40   10x
 -  --
     8
     8    2x
 -  --
     0
```

Children should write their answer above the calculation to make it easy for them and the teacher to distinguish.

Answer: 12

73 ÷ 3

```
    24r1
3 ) 73
 -  30   10x
    --
    43
 -  30   10x
    --
    13
 -   6    2x
    --
     7
 -   6    2x
    --
     1
```

By the end of year 4, children should be able to use the chunking method to divide a three digit number by a single digit number.

196 ÷ 6

```
     32r4
3 ) 196
 -  120   20x
    ---
     76
 -   60   10x
    ---
     16
 -   12    2x
    ---
      4
```

Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly.

Y5

End of Year Objective: **Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.**

Throughout year 5, children should use their knowledge of linked times table facts, and to use higher multiples of the divisor. For example, when performing 347 ÷ 8 an initial subtraction of 160 (20 x 8) and a further subtraction of 160 (20 x 8) should be changed to a single subtraction of 320 (40 x 8).

By the end of year 5, children should be able to use the chunking method to divide a four digit number by a single digit number. If children still need to use the key facts box, it can be extended to include 100x.

2458 ÷ 7

```
      351r1
 7 ) 2458
   - 2100     300x
      358
   -  350      50x
        8
   -    7       1x
        1
```

Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly.

Y6

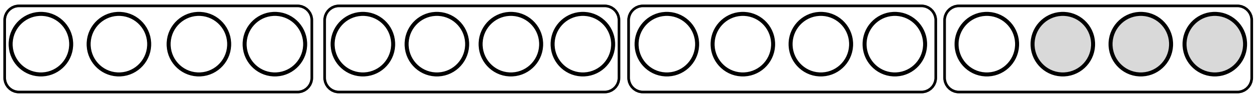
End of Year Objective: **Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.** **Use written division methods in cases where the answer has up to two decimal places.**

To develop the chunking method further, it should be extended to include dividing a four-digit number by a two-digit number, e.g.

6367 ÷ 28

```
        227r11
 28 ) 6367
    - 5600     200x
       767
    -  560      20x
       207
    -  140       5x
        67
    -   56       2x
        11
```

Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly. In addition, children should also be able to use the chunking method and solve calculations interpreting the remainder as a decimal up to two decimal places. This should first be demonstrated using a simple calculation such as 13 ÷ 4 to show the remainder initially as a fraction.



Using practical equipment, children can see that for 13 ÷ 4, the answer is 3 remainder 1, or put another way, there are three whole groups and a remainder of 1. This remainder is one part towards a full group of 4, so is $\frac{1}{4}$. To show the remainder as a fraction, it becomes the numerator where the denominator is the divisor (the number that you are dividing by in the calculation).

3574 ÷ 8

8)	3574	
-	3200	400x
	374	
-	320	40x
	54	
-	48	6x
	6	

$\frac{6}{8}$ $\frac{\text{Remainder}}{\text{divisor}}$

So 3574 ÷ 8 is $446\frac{6}{8}$
(when the remainder is shown as a fraction)

To show the remainder as a decimal relies upon children's knowledge of decimal fraction equivalents. For decimals with no more than 2 decimal places, they should be able to identify:

Half: $\frac{1}{2}$ = 0.5

Quarters: $\frac{1}{4}$ = 0.25, $\frac{3}{4}$ = 0.75

Fifths: $\frac{1}{5}$ = 0.2, $\frac{2}{5}$ = 0.4, $\frac{3}{5}$ = 0.6, $\frac{4}{5}$ = 0.8

Tenths: $\frac{1}{10}$ = 0.1, $\frac{2}{10}$ = 0.2, $\frac{3}{10}$ = 0.3, $\frac{4}{10}$ = 0.4, $\frac{5}{10}$ = 0.5, $\frac{6}{10}$ = 0.6, $\frac{7}{10}$ = 0.7, $\frac{8}{10}$ = 0.8, $\frac{9}{10}$ = 0.9

and reduce other equivalent fractions to their lowest terms.

In the example above, 3574 ÷ 8, children should be able to identify that the remainder as a fraction of $\frac{6}{8}$ can be written as $\frac{3}{4}$ in its lowest terms. As $\frac{3}{4}$ is equivalent to 0.75, the answer can therefore be written as 446.75.