Progression Towards a Written Method for Division

In developing a written method for division, it is important that children understand the concept of division, in that it is:

- repeated subtraction

They also need to understand and work with certain principles, i.e. that it is:

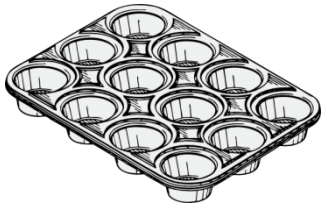
- the inverse of multiplication
- not commutative i.e. 15 ÷3 is not the same as 3 ÷ 15
- not associative i.e. 30 ÷ (5 ÷ 2) is not the same as (30 ÷ 5) ÷ 2

YR

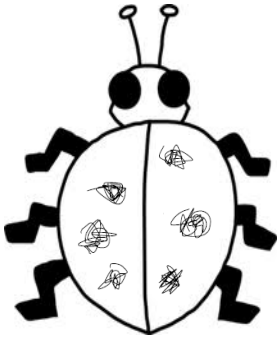
Early Learning Goal:
Children solve problems, including halving and sharing.

Children 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.



They may develop ways of recording calculations using pictures, etc.



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

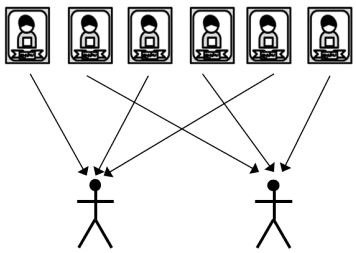
A child's jotting showing how they shared the apples at snack time between two groups.

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 should 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'.

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 =

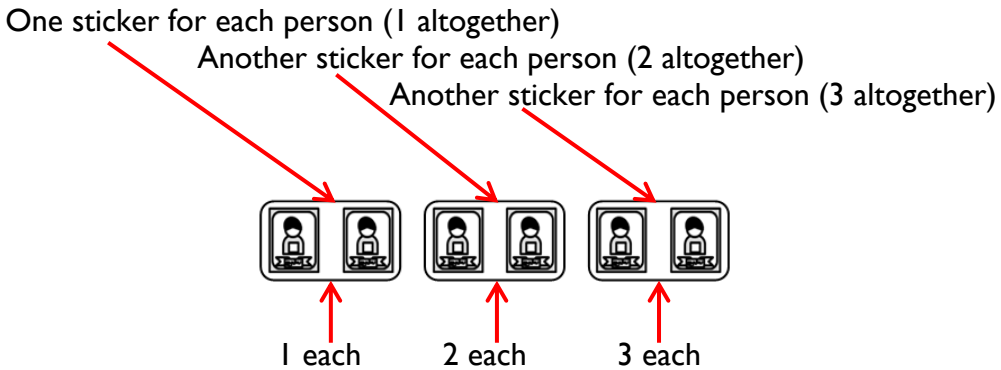
Children need to understand that this calculation reads as 'How many groups of 3 are there in 12?'

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?'

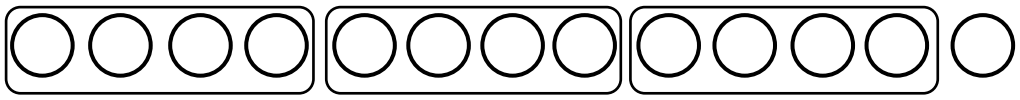
Place the football stickers in a bag or box and ask the children how many stickers would need to be taken out of the box to give each person one sticker each (i.e. 2) and exemplify this by putting the cards in groups of 2 until all cards have been removed from the bag.

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:

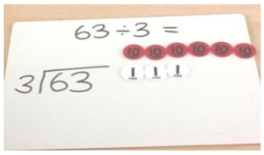
I have £13. Books are £4 each. How many can I buy?
Answer: 3 (the remaining £1 is not enough to buy another book)

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)

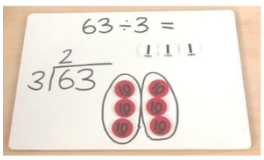
Y3

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.

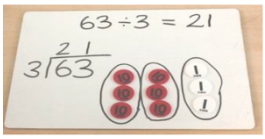
Children will use practical resources to support the short division method and will be encouraged to use multiples of the divisor to assist. (TU ÷ U)



Create the dividend using Place Value counters.



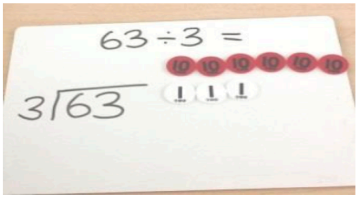
Group the tens counters according to the divisor and write the number of groups above the line in the tens column.



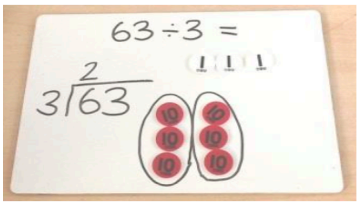
Group the tens counters according to the divisor and write the number of groups above the line in the tens column.

The quotient can be seen across the groups.

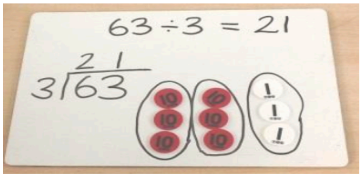
Children will use practical resources to support the short division method and will be encouraged to use multiples of the divisor to assist. (HTU ÷ U)



Create the dividend using Place Value counters.



Group the tens counters according to the divisor and write the number of groups above the line in the tens column.



Group the tens counters according to the divisor and write the number of groups above the line in the tens column.

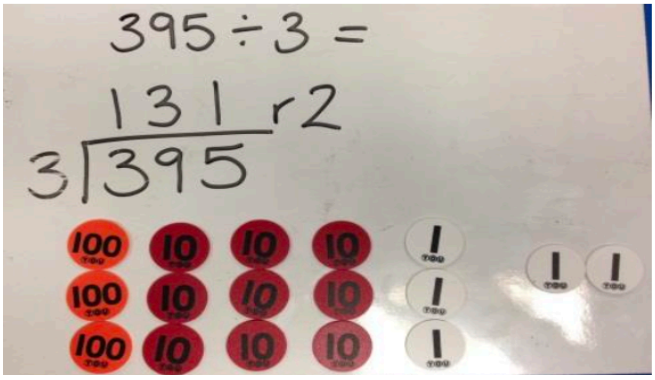
The quotient can be seen across the groups.

Children will use practical resources to support solving division number sentences with remainders. (TU ÷ U)

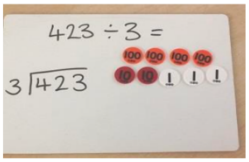
Y4

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.

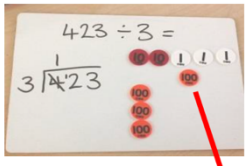
Children will use practical resources to support solving division number sentences with remainders. (HTU ÷ U)



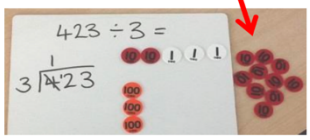
Children will use practical resources to support the short division method where exchange across place value columns occurs. (HTU ÷ U)



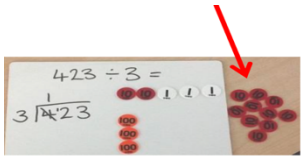
Create the dividend using Place Value counters.



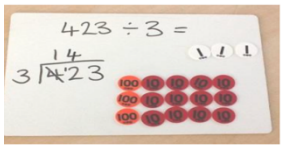
Group the hundreds counters according to the divisor. Write the number of groups above the line in the hundreds column.



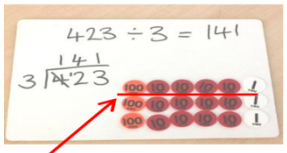
Exchange the left over 100s counter for ten 10s counters and represent this beneath the line in the tens column.



Exchange the left over 100s counter for ten 10s counters and represent this beneath the line in the tens column.



Next, group the 10s counters according to the divisor and write the number of groups above the line in the tens column.



Group the units counters according to the divisor and write the number of groups above the line in the units column.

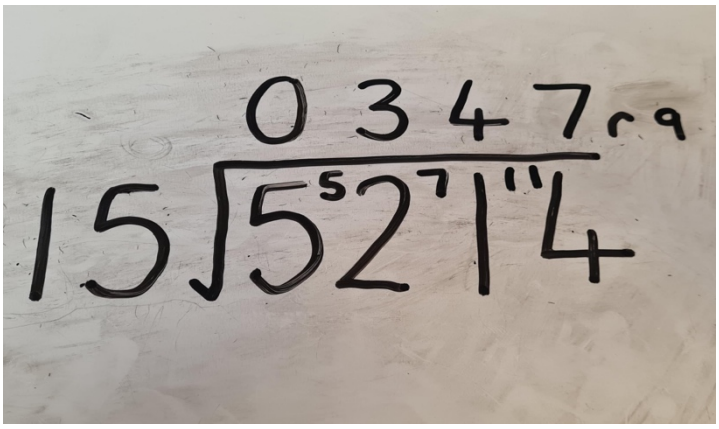
The quotient can be seen across each group.

Find the effect of dividing a 1 or 2-digit number by 10 and 100; identifying the value of the digits in the answer as units, tenths and hundredths.

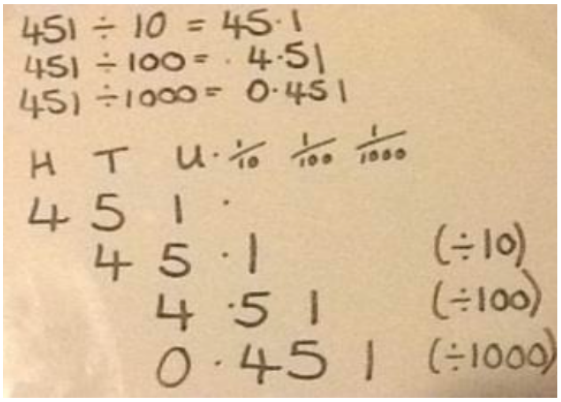
Y5

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.

Children will use short division to solve division number sentences with remainders. (ThHTU ÷ TU)
Children will use practical resources to support solving division number sentences with remainders.



Children will learn to divide whole numbers and those involving decimals by 10, 100 and 1000 by moving the digits around the fixed decimal.



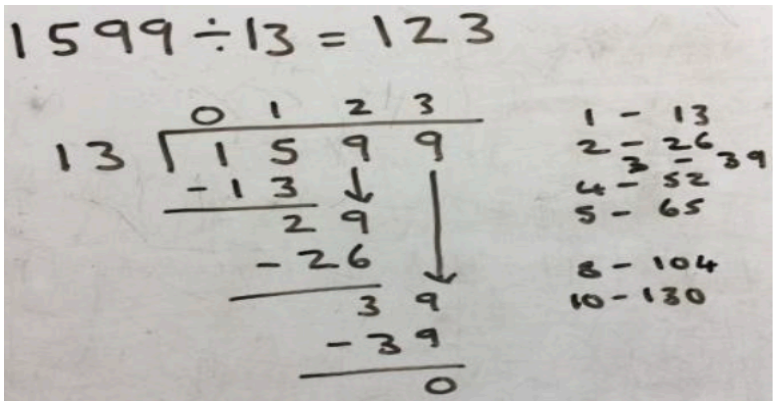
Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly.

Y6

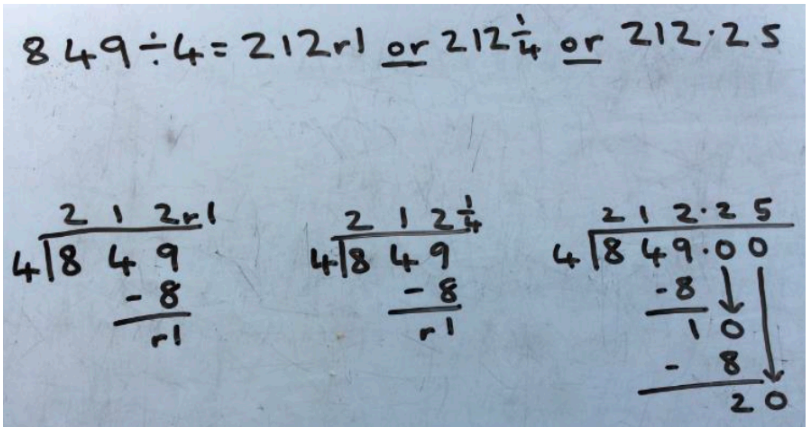
End of Year Objective:
Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.

Use written division methods in cases where the answer has up to two decimal places.

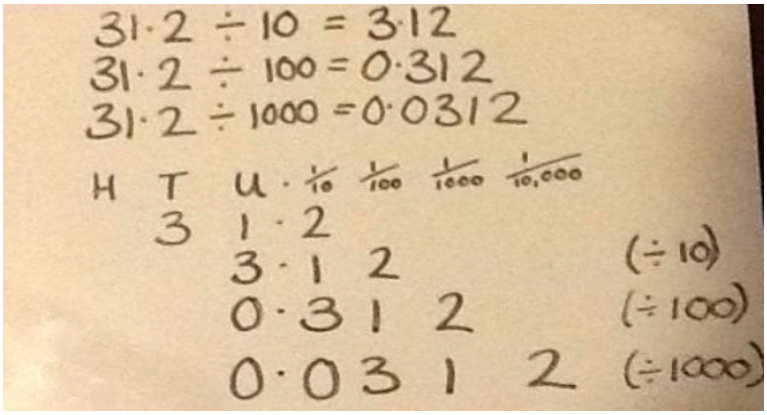
Divide numbers up to 4 digits by a two-digit whole number using the formal written method of division.



Interpret remainders as whole number remainders, fractions or decimals.



Divide numbers decimal numbers with up to 3 decimal places by 10, 100 and 1000 by moving the digits around a fixed decimal.



Divide proper fractions by whole numbers.