PROGRESSION THROUGH CALCULATIONS FOR DIVISION

Use pictorial representations using to support understanding

MENTAL CALCULATIONS
(ongoing)

Doubling and halving
Knowing that halving is dividing by 2
Use halving and halving again to divide by 4 (and again to divide by 8)
e.g. 1 000 ÷ 8 is easy if you use this method; a written method would be difficult.

Deriving and recalling division facts

Tables (to x12 fact) should be taught from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day. Children should know and be able to use all the related division facts.

Year 2	2 , 5 and 10 times table
Year 3	2, 3, 4, 5, 8 and 10 times table
Year 4 onwards	All tables up to 12 x 12

Using and applying division facts
Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 21 ÷ 7 = 3 , what else do I know?
210 ÷ 7 = 30 , 2100 ÷ 7 = 300, 2.1 ÷ 0.3 = 7etc

Dividing by 10, 100 or 1000
Knowing that the effect of dividing by 10 (100, 1000) is a shift in the digits one place (two, three places)to the right.

Use of factors
168 ÷ 14 168 ÷ 2 = 84 so 168 ÷ 14 = 12
84 ÷ 7 = 12

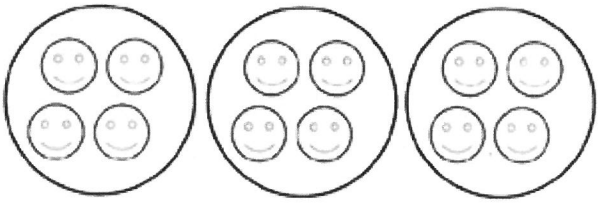
Use related facts
Given that 1.4 x 1.1 = 1.54
What is 1.54 ÷ 1.4, or 1.54 ÷ 1.1?

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

YR and Y1 DIVISION

Children will understand equal groups (How many groups of 2 can you make?) and share items out (Share these between 2 people) in play and problem solving. They will count in 2s and 10s and later in 5s.



How many groups of 3 can we make out of 12?

How many will I need for 3 children if they each have 4?

Begin to use arrays to find how many sets of a small number make a larger number.

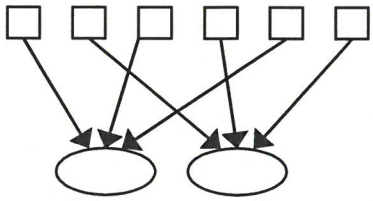
How many children can have 2 pencils each?

Y2 DIVISION

Children will develop their understanding of division and use jottings to support calculation

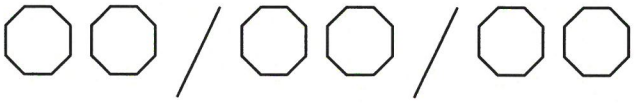
✓ **Sharing equally**

6 sweets shared between 2 people,
how many do they each get?



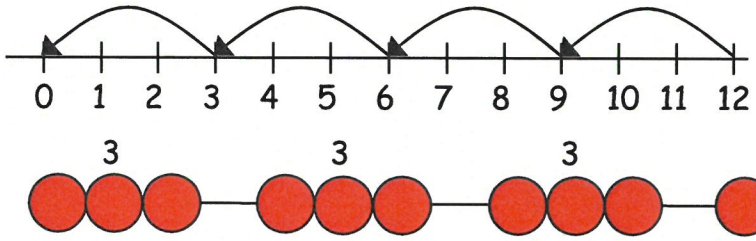
✓ **Grouping or repeated subtraction**

There are 6 sweets, how many people can have 2 sweets each?



✓ **Repeated subtraction using a number line or bead bar**

12 ÷ 3 = 4



The bead bar will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'

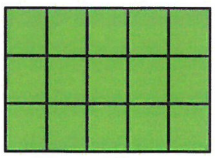
Use fingers or counting stick to count how many 'groups of' in a given number.

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ ÷ 2 = 4 20 ÷ △ = 4 □ ÷ △ = 4

✓ Children should be able to record and know families of multiplication and division facts for 2, 5 , 10 x tables.

For example:
3 x 5 = 15
5 x 3 = 15
15 ÷ 3 = 5
15 ÷ 5 = 3



Know that although multiplication can be done in any order (commutative), division cannot.

✓ **Find ½, ⅓, ¼ and ¾ of a quantity of objects** and of amounts (whole number answers)

Y3 DIVISION

quotient
divisor | dividend

Begin by writing simple divisions using multiplication facts. Use visual images or apparatus to aid understanding.
For Example: How many pairs are there if there are 16 shoes?

16 ÷ 2 = 8 pairs

Perform divisions just above the 10th multiple of the divisor with an exact answer, using a number line. Visual images of objects will help understanding.

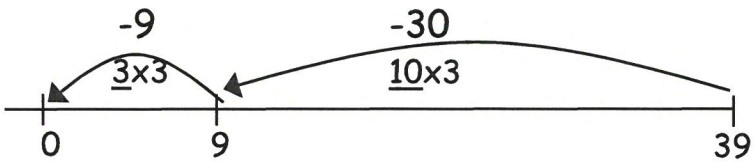
For Example: How many pots of 3 pencils can I fill if I have 39 pencils?

I know **10** pots x 3 = 30 pencils

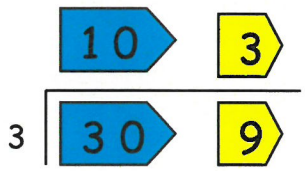
and **3** pots x 3 = 9 pencils

So I can fill 13 pots.

39 ÷ 3 = 13



Introduce formal layout

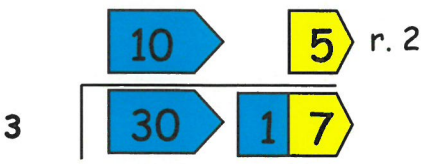


How many 3's in 39?
Start with the tens.
3 tens divided by 3 is 1 ten. so write 1 in the tens place
9 units divided by 3 is 3
There is no remainder.

Children record:

```
  1 3
3 | 3 9
```

Include examples with remainders, including exchanging remaining tens for ones



Children record:

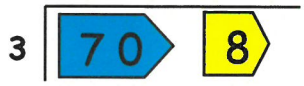
```
  1 5 r.2
3 | 4 17
```

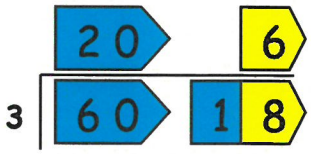
Y4 DIVISION

quotient
divisor | dividend

Perform divisions above the 20th multiple of the divisor using the formal written layout.

TO ÷ O





Children record:

```
  T O
    2 6
3 | 7 1 8
```

7 tens divided by 3 is 2 tens, remainder 1 ten.
Write 2 in the tens place of the answer.
Write a small 1 before the 8 to show the remainder of 1 ten.
There are now 18 ones.
18 divided by 3 is 6.
Write 6 in the ones place of the answer.

Extend to 3 -digit numbers with whole number remainders.

Y5 DIVISION

quotient
divisor ⟌ dividend

Children will divide up to 4 digits by a one-digit number using the formal written method of short division.

Children need to be able to decide what to do after division and round up or down accordingly. For example 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?
Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?
Answer: 8 (the remaining 6 apples still need to be placed into a box)

Remainders can be shown as an integer, fractions or decimals, i.e. if the children were dividing 32 by 5, the answer could be shown as 6 r. 2 or $6\ ^{2}/_{5}$ or 6.4

$$4 \overline{)\ 9\,^{1}4\,.\,^{2}0}\ \ 2\ 3\ .\ 5$$

23 r 2 is also $23\ ^{2}/_{4}$ or $23\ ^{1}/_{2}$

9 tens divided by 4 is 2 tens, remainder 1 ten.
Write 2 in the tens place of the answer.
Write a small 1 before the 4 to show the remainder of 1 ten.
There are now 14 ones.
14 divided by 4 is 3, remainder 2 .
Write 2 in the ones place of the answer.
Write a small 2 before the 0 to show the remainder of 2 ones
There are now 20 tenths.
20 divided by 4 is 5
Write a 5 in the tenths place of the answer.

They should realise that the denominator of the fraction remainder is the divisor.

Y6 DIVISION

quotient
divisor | dividend

Children will continue to use the formal written methods of short division when dividing by a single digit. This will include division of decimals (2dp) by a whole number.

They will divide numbers up to 4 digits by a two-digit whole number using long division and interpret remainders as whole numbers, fractions or by rounding, as appropriate for the context.

Long division HTO ÷ TO

975 ÷ 36 is approximately 900 ÷ 30 = 30

List useful facts

10x	360
20x	720
5x	180
6x	216
7x	252

```
   27 r 3
36 ) 975
   - 720      20 x 36
     255
   - 252       7 x 36
       3
```

Answer 27 r 3 or $27\ ^{3}/_{36} = 27\ ^{1}/_{12}$

They should make sensible decisions about rounding up or down after division. For example 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Remainders can be shown as an integer, fractions or decimals, i.e. if the children were dividing 32 by 5, the answer could be shown as 6 r. 2 or $6\ ^{2}/_{5}$ or 6.4

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By the end of year 6, children will have a range of mental calculation methods, and can use the formal method fluently to solve a range of problems.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Children should not be made to go onto the next stage if:

1) **they are not ready.**
2) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.