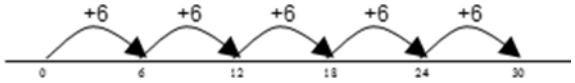
CALCULATION POLICY – DIVISION

Years 1~3

Honesty Encourage Inspire Respect Create

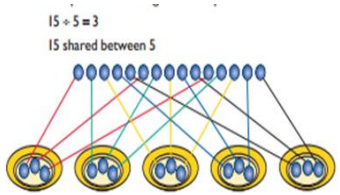
Year 1



Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s.
Children should be given opportunities to reason about what they notice in number patterns.

Group AND share small quantities- understanding the difference between the two concepts.

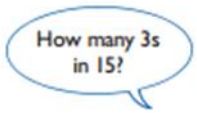
Sharing



Develops importance of one-to-one correspondence.
Children should be taught to share using concrete apparatus.

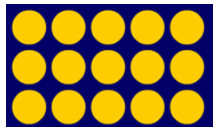
Grouping

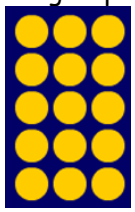
Children should apply their counting skills to develop some understanding of grouping.



15 ÷ 3 = 5

Use of arrays as a pictorial representation for division. 15 ÷ 3 = 5 There are 5 groups of 3.
15 ÷ 5 = 3 There are 3 groups of 5.





Children should be able to find ½ and ¼ and simple fractions of objects, numbers and quantities.

Year 2

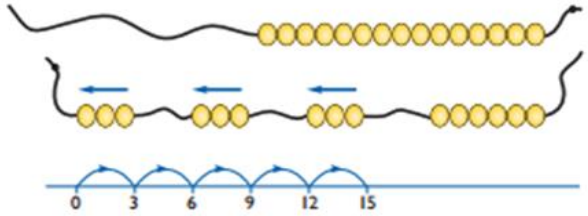
÷ = signs and missing numbers

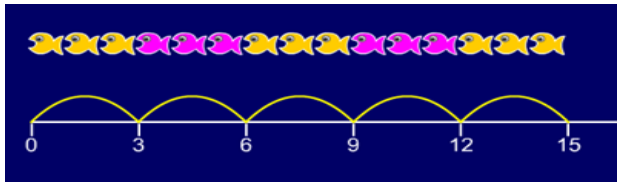
6 ÷ 2 = □ □ = 6 ÷ 2
6 ÷ □ = 3 3 = 6 ÷ □
□ ÷ 2 = 3 3 = □ ÷ 2
□ ÷ ∇ = 3 3 = □ ÷ ∇

Know and understand sharing and grouping- introducing children to the ÷ sign.
Children should continue to use grouping and sharing for division using practical apparatus, arrays and pictorial representations.

Grouping using a numberline

Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'.
15 ÷ 3 = 5





Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?

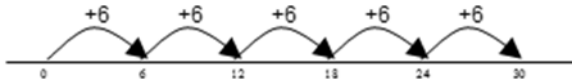
Year 3

÷ = signs and missing numbers

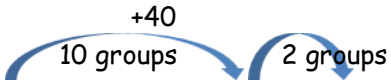
Continue using a range of equations as in year 2 but with appropriate numbers.

Grouping

How many 6's are in 30?
30 ÷ 6 can be modelled as:



Becoming more efficient using a numberline
Children need to be able to partition the dividend in different ways.
48 ÷ **4** = **12**



Remainders
49 ÷ 4 = 12 r1

Sharing – 49 shared between 4. How many left over?
Grouping – How many 4s make 49. How many are left over?
Place value counters can be used to support children apply their knowledge of grouping.
For example:
60 ÷ 10 = How many groups of 10 in 60?
600 ÷ 100 = How many groups of 100 in 600?

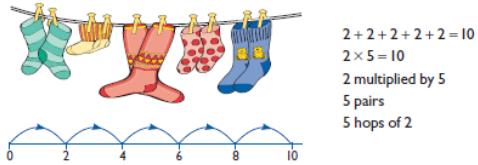
EXTRA GUIDANCE – PROGRESSION IN REASONING -DIVISION

Year 1

Mental Strategies

Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.

They should begin to recognise the number of groups counted to support understanding of relationship between multiplication and division.



Children should begin to understand division as both ***sharing*** and ***grouping***.
Sharing – 6 sweets are shared between 2 people. How many do they have each?

Grouping- How many 2's are in 6?

They should use objects to group and share amounts to develop understanding of division in a practical sense.
E.g. using Numicon to find out how many 5's are in 30? How many pairs of gloves if you have 12 gloves?

Children should begin to explore finding simple fractions of objects, numbers and quantities.
E.g.16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?

Year 2

Mental Strategies

Children should count regularly, on and back, in steps of 2, 3, 5 and 10.
Children who are able to count in twos, threes, fives and tens can use this knowledge to work out other facts such as 2 × 6, 5 × 4, 10 × 9. Show the children how to hold out their fingers and count, touching each finger in turn. So for 2 × 6 (six twos), hold up 6 fingers:

Touching the fingers in turn is a means of keeping track of how far the children have gone in creating a sequence of numbers. The physical action can later be visualised without any actual movement.

This can then be used to support finding out 'How many 3's are in 18?' and children count along fingers in 3's therefore making link between multiplication and division.

Children should continue to develop understanding of division as sharing **and** grouping.

15 pencils shared between 3 pots, how many in each pot?
Children should be given opportunities to find a half, a quarter and a third of shapes, objects, numbers and quantities. Finding a fraction of a number of objects to be related to sharing.

Year 3

Mental Strategies

Children should count regularly, on and back, in steps of 3, 4 and 8. Children are encouraged to use what they know about known times table facts to work out other times tables.
This then helps them to make new connections (e.g. through doubling they make connections between the 2, 4 and 8 times tables).

Children will make use multiplication and division facts they know to make links with other facts.
3 x 2 = 6, 6 ÷ 3 = 2, 2 = 6 ÷ 3
30 x 2 = 60, 60 ÷ 3 = 20, 2 = 60 ÷ 30

They should be given opportunities to solve grouping and sharing problems practically (including where there is a remainder but the answer needs to given as a whole number)
e.g. Pencils are sold in packs of 10. How many packs will I need to buy for 24 children?

Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fraction of a quantity or measure.

Use children's intuition to support understanding of fractions as an answer to a sharing problem.
3 apples shared between 4 people = $\frac{3}{4}$

Vocabulary

See Y1 and Y2
inverse

Vocabulary share, share equally, one each, two each…, group, groups of, lots of, array **Generalisations** True or false? I can only halve even numbers. Grouping and sharing are different types of problems. Some problems need solving by grouping and some by sharing. Encourage children to practically work out which they are doing. **Some Key Questions** How many groups of…? How many in each group? Share… equally into… What can do you notice?	They will explore visually and understand how some fractions are equivalent – e.g. two quarters is the same as one half. Use children's intuition to support understanding of fractions as an answer to a sharing problem. 3 apples shared between 4 people = $\frac{3}{4}$  **Vocabulary** group in pairs, 3s … 10s etc equal groups of divide, ÷, divided by, divided into, remainder **Generalisations** Noticing how counting in multiples if 2, 5 and 10 relates to the number of groups you have counted (introducing times tables) An understanding of the more you share between, the less each person will get (e.g. would you prefer to share these grapes between 2 people or 3 people? Why?) Secure understanding of grouping means you count the number of groups you have made. Whereas sharing means you count the number of objects in each group. **Some Key Questions** How many 10s can you subtract from 60? I think of a number and double it. My answer is 8. What was my number? If 12 x 2 = 24, what is 24 ÷ 2? Questions in the context of money and measures (e.g. how many 10p coins do I need to have 60p? How many 100ml cups will I need to reach 600ml?)	**Generalisations** Inverses and related facts – develop fluency in finding related multiplication and division facts. Develop the knowledge that the inverse relationship can be used as a checking method. **Some Key Questions** Questions in the context of money and measures that involve remainders (e.g. How many lengths of 10cm can I cut from 81cm of string? You have £54. How many £10 teddies can you buy?) What is the missing number? 17 = 5 x 3 + __ __ = 2 x 8 + 1

CALCULATION POLICY – DIVISION

Years 4~6

Honesty Encourage Inspire Respect Create

Year 4	Year 5	Year 6

÷ = signs and missing numbers

Continue using a range of equations as in year 3 but with appropriate numbers.

Sharing, Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line until they have a secure understanding. Children should progress in their use of written division calculations: Using tables facts with which they are fluent

e.g. 840 ÷ 7 = 120

Experiencing a logical progression in the numbers they use, for example:

1. Dividend just over 10x the divisor, e.g. 84 ÷ 7
2. Dividend just over 10x the divisor when the divisor is a teen number, e.g. 173 ÷ 15 (learning sensible strategies for calculations such as 102 ÷ 17)
3. Dividend over 100x the divisor, e.g. 840 ÷ 7
4. Dividend over 20x the divisor, e.g. 168 ÷ 7

Jottings

7 x 100 = 700

7 x 10 = 70

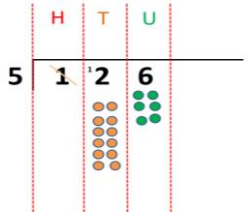
7 x 20 = 140

All of the above stages should include calculations with remainders as well as without. Remainders should be interpreted according to the context. (i.e. rounded up or down to relate to the answer to the problem)

Formal Written Methods

Formal short division should only be introduced once children have a good understanding of division, its links with multiplication and the idea of 'chunking up' to find a target number (see use of number lines above) Short division to be modelled for understanding using place value counters as shown below.

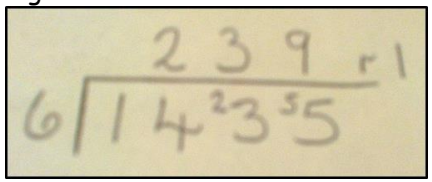
Calculations with 2 and 3-digit dividends. E.g



Formal Written Methods

Continued as shown in Year 4, leading to the efficient use of a formal method. The language of grouping to be used (see link from fig. 1 in Year 4)

E.g. 1435 ÷ 6



Children begin to practically develop their understanding of how express the remainder as a decimal or a fraction. Ensure practical understanding allows children to work through this (e.g. what could I do with this remaining 1? How could I share this between 6 as well?)

÷ = signs and missing numbers

Continue using a range of equations but with appropriate numbers

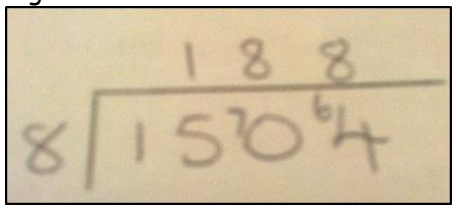
Sharing and Grouping and using a number line

Children will continue to explore division as sharing and grouping, and to represent calculations on a number line as appropriate.

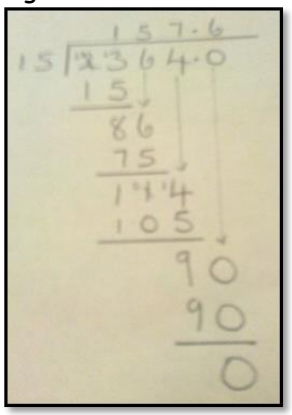
Quotients should be expressed as decimals and fractions

Formal Written Methods – long and short division

E.g. 1504 ÷ 8



E.g. 2364 ÷ 15



EXTRA GUIDANCE – PROGRESSION IN REASONING -DIVISION

Year 4

Mental Strategies

Children should experience regular counting on and back from different numbers in multiples of 6, 7, 9, 25 and 1000.

Children should learn the multiplication facts to 12 x 12.

Vocabulary

see years 1-3

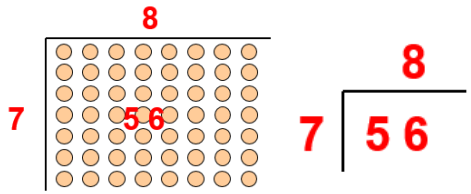
divide, divided by, divisible by, divided into

share between, groups of, factor, factor pair, multiple

times as (big, long, wide …etc) equals, remainder, quotient, divisor, inverse

Towards a formal written method

Alongside pictorial representations and the use of models and images, children should progress onto short division using a bus stop method.



$$7\overline{)56}\quad 8$$

Place value counters can be used to support children apply their knowledge of grouping. Reference should be made to the value of each digit in the dividend.

Each digit as a multiple of the divisor

'How many groups of 3 are there in the hundreds column?'

'How many groups of 3 are there in the tens column?'

'How many groups of 3 are there in the units/ones column?'

Year 5

Mental Strategies

Children should count regularly using a range of multiples, and powers of 10, 100 and 1000, building fluency.

Children should practice and apply the multiplication facts to 12 x 12.

Vocabulary

see year 4, common factors, prime number, prime factors, composite numbers, short division, square number, cube number, inverse, power of

Generalisations

The = sign means equality. Take it in turn to change one side of this equation, using multiplication and division, e.g.

Start: 24 = 24

Player 1: 4 x 6 = 24

Player 2: 4 x 6 = 12 x 2

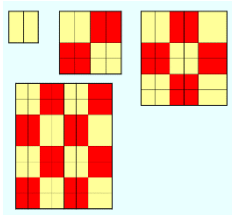
Player 1: 48 ÷ 2 = 12 x 2

Sometimes, always, never true questions about multiples and divisibility. E.g.:

If the last two digits of a number are divisible by 4, the number will be divisible by 4.

If the digital root of a number is 9, the number will be divisible by 9.

When you square an even number the result will be divisible by 4 (one example of 'proof' shown left)



Year 6

Mental Strategies

Children should count regularly, building on previous work in previous years.

Children should practice and apply the multiplication facts to 12 x 12.

Vocabulary

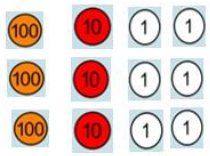
see years 4 and 5

Generalisations

Order of operations: brackets first, then multiplication and division (left to right) before addition and subtraction (left to right). Children could learn an acrostic such as PEMDAS, or could be encouraged to design their own ways of remembering.

Sometimes, always, never true questions about multiples and divisibility. E.g.: If a number is divisible by 3 and 4, it will also be divisible by 12. (also see year 4 and 5, and the hyperlink from the Y5 column)

Using what you know about rules of divisibility, do you think 7919 is a prime number? Explain your answer.

1 1 2 3 | 3 3 6  When children have conceptual understanding and fluency using the bus stop method without remainders, they can then progress onto 'carrying' their remainder across to the next digit. **Generalisations** True or false? Dividing by 10 is the same as dividing by 2 and then dividing by 5. Can you find any more rules like this? Is it sometimes, always or never true that □ ÷ Δ = Δ ÷ □? Inverses and deriving facts. 'Know one, get lots free!' e.g.: 2 x 3 = 6, so 3 x 2 = 6, 6 ÷ 2 = 3, 60 ÷ 20 = 3, 600 ÷ 3 = 200 etc. Sometimes, always, never true questions about multiples and divisibility. (When looking at the examples on this page, remember that they **may not** be 'always true'!) E.g.: Multiples of 5 end in 0 or 5. The digital root of a multiple of 3 will be 3, 6 or 9. The sum of 4 even numbers is divisible by 4.		