

# Calculation Policy

## Division – Years 1-3



Obj

Gui

Year 1

Vid

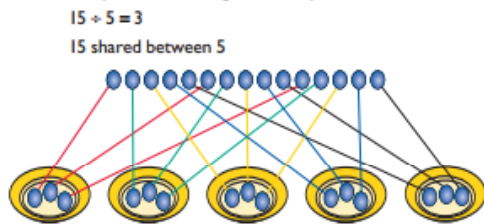
Ex

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.



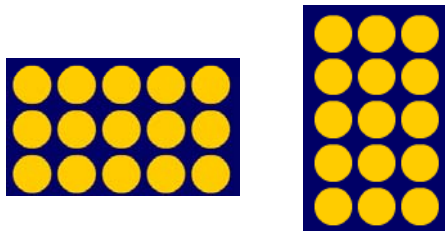
Children should be taught to share using concrete apparatus.

**Grouping**

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



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



Children should be able to find  $\frac{1}{2}$  and  $\frac{1}{4}$  and simple fractions of objects, numbers and quantities.

Obj

Gui

Year 2

Vid

Ex

**$\div$  = signs and missing numbers**

$6 \div 2 = \square$        $\square = 6 \div 2$   
 $6 \div \square = 3$        $3 = 6 \div \square$   
 $\square \div 2 = 3$        $3 = \square \div 2$   
 $\square \div \nabla = 3$        $3 = \square \div \nabla$

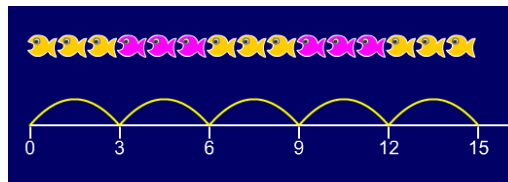
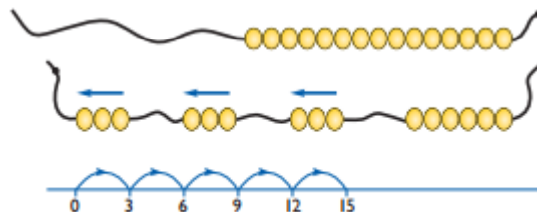
Know and understand sharing and grouping- introducing children to the  $\div$  sign.

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?'

$15 \div 3 = 5$



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

Obj

Gui

Year 3

Vid

Ex

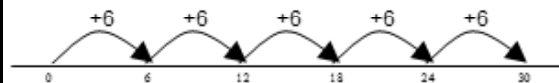
**$\div$  = signs and missing numbers**

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

**Grouping**

How many 6's are in 30?

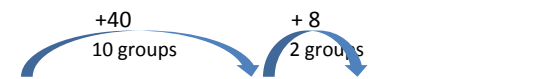
$30 \div 6$  can be modelled as:



**Becoming more efficient using a numberline**

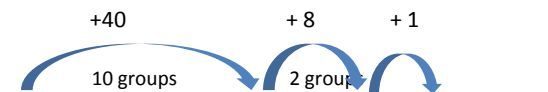
Children need to be able to partition the dividend in different ways.

$48 \div 4 = 12$



**Remainders**

$49 \div 4 = 12 \text{ r}1$



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:

$60 \div 10 =$  How many groups of 10 in 60?

$600 \div 100 =$  How many groups of 100 in 600?

## Year 1 objectives

### Statutory requirements

Pupils should be taught to:

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.



## Year 1 guidance

### Notes and guidance (non-statutory)

Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens.



## Year 2 objectives

### Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.



## Year 2 guidance

### Notes and guidance (non-statutory)

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example,  $40 \div 2 = 20$ , 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example,  $4 \times 5 = 20$  and  $20 \div 5 = 4$ ).



## Year 3 objectives

### Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects.



## Year 3 guidance

### Notes and guidance (non-statutory)

Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.

Pupils develop efficient mental methods, for example, using commutativity and associativity (for example,  $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$ ) and multiplication and division facts (for example, using  $3 \times 2 = 6$ ,  $6 \div 3 = 2$  and  $2 = 6 \div 3$ ) to derive related facts (for example,  $30 \times 2 = 60$ ,  $60 \div 3 = 20$  and  $20 = 60 \div 3$ ).

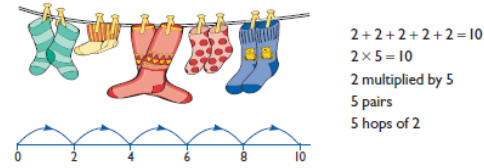






Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which  $m$  objects are connected to  $n$  objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).





## Division

Year 1	Year 2	Year 3
<p><b>Mental Strategies</b> Children should experience <a href="#">regular counting</a> on and back from different numbers in 1s and in multiples of 2, 5 and 10.</p> <p>They should begin to recognise the number of groups counted to support understanding of relationship between multiplication and division.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><math>2 + 2 + 2 + 2 = 10</math>  <math>2 \times 5 = 10</math>                      2 multiplied by 5                      5 pairs                      5 hops of 2</p> </div> </div> <p>Children should begin to understand division as both sharing and grouping.</p> <p>Sharing – 6 sweets are shared between 2 people. How many do they have each?</p> <div style="text-align: center;">  </div> <p>Grouping- How many 2's are in 6?</p> <div style="text-align: center;">  </div> <p>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?</p> <p>Children should begin to explore finding simple fractions of objects, numbers and quantities.</p> <p><i>E.g. 16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?</i></p>	<p><b>Mental Strategies</b> 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 <math>2 \times 6</math>, <math>5 \times 4</math>, <math>10 \times 9</math>. Show the children how to hold out their fingers and count, touching each finger in turn. So for <math>2 \times 6</math> (six twos), hold up 6 fingers:</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 10px; border: 1px solid black; padding: 5px;"> <p>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.</p> </div> </div> <p>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.</p> <p>Children should continue to develop understanding of division as sharing <b>and</b> grouping.</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; border-radius: 50%; padding: 5px; margin-right: 10px;"> <p>How many 3s in 15?</p> </div>  <div style="margin-left: 10px;"> <p>6 9 12 15  <math>15 \div 3 = 5</math></p> </div> </div> <p><i>15 pencils shared between 3 pots, how many in each pot?</i></p> <p>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.</p> <p>They will explore visually and understand how some fractions are equivalent – e.g. two quarters is the same as one half.</p> <p><a href="#">Use children's intuition to support understanding of fractions as an answer to a sharing problem.</a></p> <p>3 apples shared between 4 people = <math>\frac{3}{4}</math></p> <div style="text-align: center;">  </div>	<p><b>Mental Strategies</b> 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).</p> <p>Children will make use multiplication and division facts they know to make links with other facts.  <math>3 \times 2 = 6</math>, <math>6 \div 3 = 2</math>, <math>2 = 6 \div 3</math>  <math>30 \times 2 = 60</math>, <math>60 \div 3 = 20</math>, <math>2 = 60 \div 30</math></p> <p>They should be given opportunities to solve grouping and sharing problems practically (including where there is a remainder but the answer needs to be 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?</p> <p>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.</p> <p><a href="#">Use children's intuition to support understanding of fractions as an answer to a sharing problem.</a></p> <p>3 apples shared between 4 people = <math>\frac{3}{4}</math></p> <div style="text-align: center;">  </div> <p><b>Vocabulary</b> See Y1 and Y2 inverse</p> <p><b>Generalisations</b> 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.</p>

**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?

**Vocabulary**

group in pairs, 3s ... 10s etc  
equal groups of  
divide, ÷, divided by, divided into, remainder

**Generalisations**

Noticing how counting in multiples of 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  $12 \times 2 = 24$ , what is  $24 \div 2$ ?  
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?)

**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?  $17 = 5 \times 3 + \underline{\quad}$   
 $\underline{\quad} = 2 \times 8 + 1$