

# Calculation Policy Division



Obj

Gui

Year 1

Vid

Ex

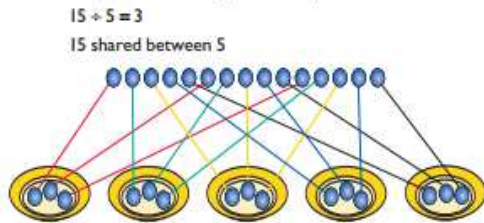
Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s.

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**

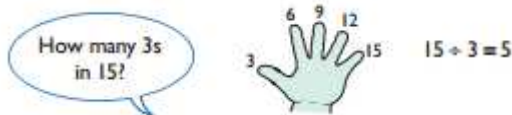
Develops importance of one-to-one correspondence.



Children should be taught to share using concrete apparatus.

**Grouping**

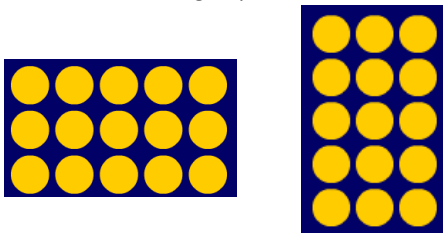
Children should apply their counting skills to develop some understanding of grouping.



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**

$$6 \div 2 = \square \quad \square = 6 \div 2$$

$$6 \div \square = 3 \quad 3 = 6 \div \square$$

$$\square \div 2 = 3 \quad 3 = \square \div 2$$

$$\square \div \square = 3 \quad 3 = \square \div \square$$

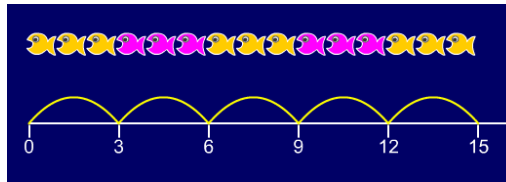
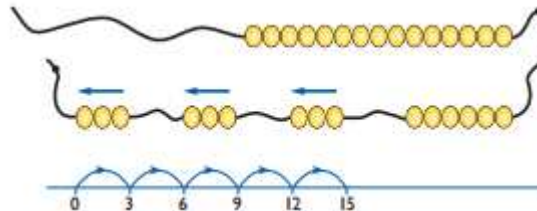
Know and understand sharing and grouping- introducing children to the  $\div$  sign.

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

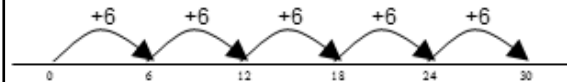
**$\div$  = signs and missing numbers**

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

**Grouping**

How many 6's are in 30?

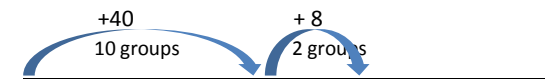
$30 \div 6$  can be modelled as:



**Becoming more efficient using a numberline**

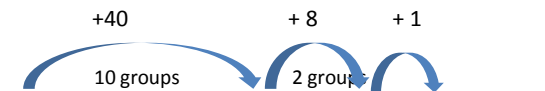
Children need to be able to partition the dividend in different ways.

$$48 \div 4 = 12$$



**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:

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

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



**÷ = 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
- Experiencing a logical progression in the numbers they use, for example:
  - 1.Divide just over 10x the divisor, e.g.  $84 \div 7$
  - 2.Divide just over 10x the divisor when the divisor is a teen number, e.g.  $173 \div 15$  (learning sensible strategies for calculations such as  $102 \div 17$ )
  - 3.Divide over 100x the divisor, e.g.  $840 \div 7$
  - 4.Divide over 20x the divisor, e.g.  $168 \div 7$

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)

e.g.  $840 \div 7 = 120$

*Jottings*

$7 \times 100 = 700$

$7 \times 10 = 70$

$7 \times 20 = 140$

**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. fig 1

	H	T	U
5	1	2	6

**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)

**4d by 1d**  
E.g.  $1435 \div 6$

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.  $1504 \div 8$

**4d by 2d**  
E.g.  $2364 \div 15$

## **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).



## Year 4 objectives

### Statutory requirements

Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects.



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**Year 4 guidance**

**Notes and guidance (non-statutory)**

Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.

Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example  $600 \div 3 = 200$  can be derived from  $2 \times 3 = 6$ ).

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**Mathematics**

**Notes and guidance (non-statutory)**

Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see [Mathematics Appendix 1](#)).

Pupils write statements about the equality of expressions (for example, use the distributive law  $39 \times 7 = 30 \times 7 + 9 \times 7$  and associative law  $(2 \times 3) \times 4 = 2 \times (3 \times 4)$ ).

They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example,  $2 \times 6 \times 5 = 10 \times 6 = 60$ .

Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.



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**Year 5 objectives**

**Statutory requirements**

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- 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
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

**Statutory requirements**

- recognise and use square numbers and cube numbers, and the notation for squared ( $^2$ ) and cubed ( $^3$ )
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.



## Year 5 guidance

### Notes and guidance (non-statutory)

Pupils practise and extend their use of the formal written methods of short multiplication and short division (see [Mathematics Appendix 1](#)). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.

They use and understand the terms factor, multiple and prime, square and cube numbers.

Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example,  $98 \div 4 = \frac{98}{4} = 24 \text{ r } 2 = 24\frac{1}{2} = 24.5 \approx 25$ ).

Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.

Distributivity can be expressed as  $a(b + c) = ab + ac$ .

They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example,  $4 \times 35 = 2 \times 2 \times 35$ ;  $3 \times 270 = 3 \times 3 \times 9 \times 10 = 9^2 \times 10$ ).

Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example,  $13 + 24 = 12 + 25$ ;  $33 = 5 \times \square$ ).



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**Year 6 objectives**

**Statutory requirements**

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- 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
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

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**Mathematics**

**Statutory requirements**

- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.



## Year 6 guidance

### Notes and guidance (non-statutory)

Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see [Mathematics Appendix 1](#)).

They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Pupils explore the order of operations using brackets; for example,  $2 + 1 \times 3 = 5$  and  $(2 + 1) \times 3 = 9$ .

Common factors can be related to finding equivalent fractions.

