Primary maths

Calculation policy

Updated September 2024

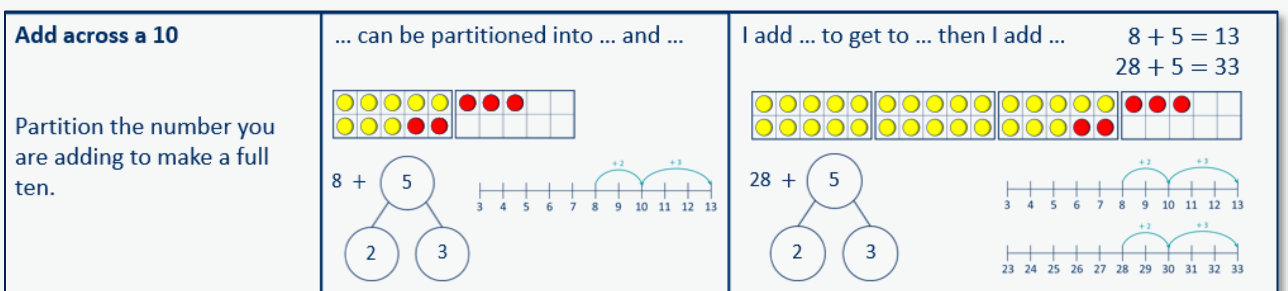
White Rose MATHS

Guidance for teachers

The calculation policy is divided into four sections: addition, subtraction, multiplication and division. At the start of each section, you will find an overview of the progression of skills. Calculations involving decimal numbers and fractions are included.

The calculation policy follows the same concrete, pictorial, abstract approach as our main schemes of learning. Where appropriate, sentence stems and key questions are included alongside the key representations.

Where skills are divided into more than one section across the page, there is a progression in the level of difficulty from left to right.
For example, when adding across a 10, children need to be able to add across 10 itself, before making links with related facts.



Progression of skills - Division

Year group	Skill
Nursery	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)
Reception	• Sharing • Grouping
Year 1	• Make equal groups – grouping • Make equal groups – sharing • Find a half • Find a quarter

Progression of skills - Division

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Year group	Skill
Year 2	• Divide by 2 • Divide by 10 • Divide by 5 • Missing numbers • Unit fractions • Non-unit fractions
Year 3	• Divide by 3 • Divide by 4 • Divide by 8 • Related facts • Divide a 2-digit number by a 1-digit number - no exchange • Divide a 2-digit number by a 1-digit number - with remainders • Unit fractions of a set of objects • Non-unit fractions of a set of objects

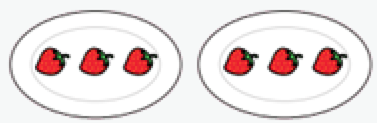
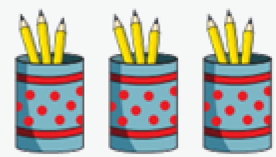
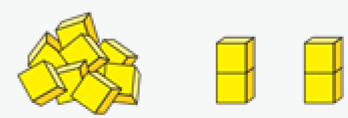
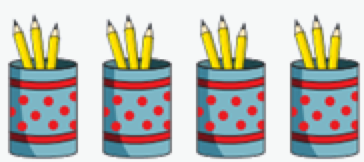
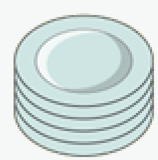
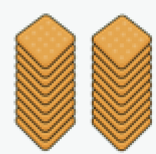
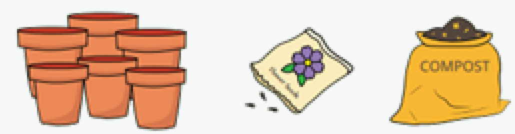
Progression of skills - Division

Year group	Skill
Year 4	• Division facts to 12×12 • Divide a number by 1 and itself • Related facts • Divide a 2 or 3-digit number by a 1-digit number • Divide by 10 and 100
Year 5	• Mental strategies • Divide numbers up to 4 digits by a 1-digit number • Divide by 10, 100 and 1,000 • Fraction of an amount

Progression of skills - Division

Year group	Skill
Year 6	• Short division • Mental strategies • Long division • Order of operations • Divide by 10, 100 and 1,000 • Divide decimals by integers • Decimal and fraction equivalents • Divide a fraction by an integer • Fraction of an amount • Calculate percentages • Calculations involving ratio

Division

Reception	• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.
Progression of skills	**Key representations**
Sharing Provide practical activities such as sharing items during snack time. Encourage children to check whether items have been shared fairly (equally).	There are … altogether. They are shared equally between … groups.   
Grouping Provide opportunities to make equal groups when tidying up or during snack time. Encourage children to check that each group has the same amount.	There are … groups of … There are … altogether.     

Division

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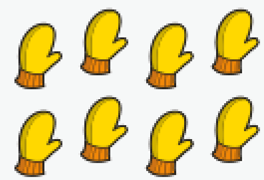
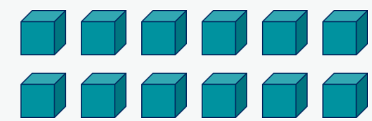
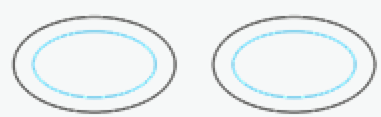
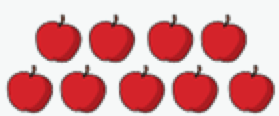
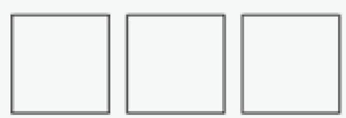
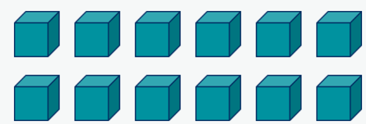
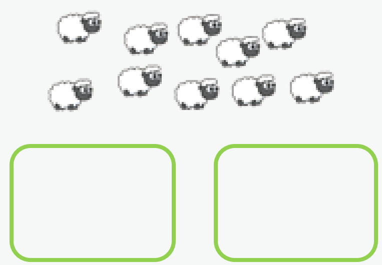
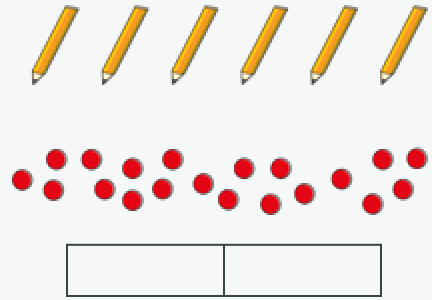
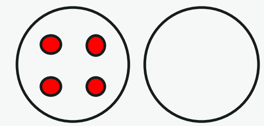
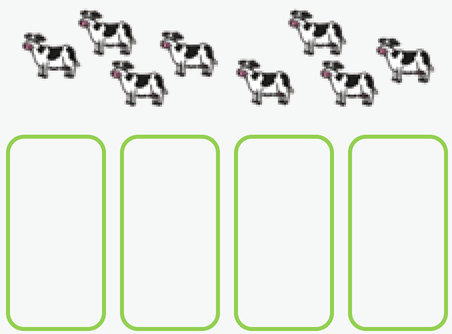
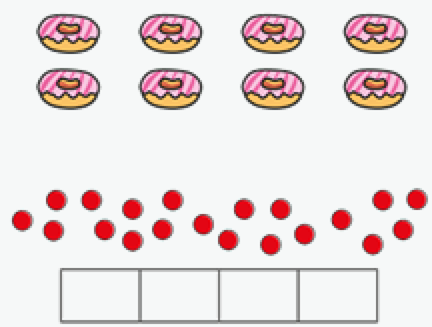
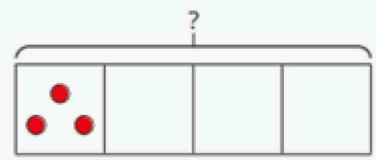
<table>
<tr><td>Year 1</td><td colspan="6">Solve simple one-step problems involving division, using concrete objects, pictorial representations and arrays with the support of the teacher.
Recognise, find and name a half as one of two equal parts of a quantity.
Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</td></tr>
<tr><td>Progression of skills</td><td colspan="6">Key representations</td></tr>
<tr><td>Make equal groups - grouping

Encourage children to physically move objects into equal groups. They can also circle equal groups when using pictures.</td><td colspan="2">There are … altogether.
How many groups of … can you make?

</td><td colspan="2">Circle groups of 2
There are … groups of 2
</td><td colspan="2">Take … cubes.
Make equal groups.

There are … groups of …</td></tr>
<tr><td>Make equal groups – sharing

Encourage children to check that the objects have been shared fairly and each group is the same.</td><td colspan="3">… have been shared equally between…
There are … on/in each …
 
 </td><td colspan="3">Take … cubes.
Share them between …

12 shared between … is …</td></tr>
</table>

Division

Progression of skills	Key representations		
Find a half Start with practical opportunities to share a quantity into 2 groups. Progress to circling half of the objects in a picture and then to finding the whole from a given half.	To find half, I need to share into 2 equal groups.  There are … in each group.	Half of … is … 	If … is half, what is the whole?  4 is half of …
Find a quarter Start with practical opportunities to share a quantity into 4 groups. Progress to using pictures or bar models to find a quarter and then to finding the whole from a given quarter.	To find a quarter, I need to share into 4 equal groups.  There are … in each group.	A quarter of … is … 	If … is one quarter, what is the whole?  3 is one quarter of …

Division

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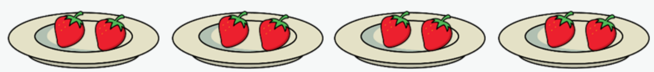
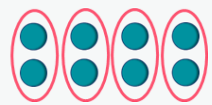
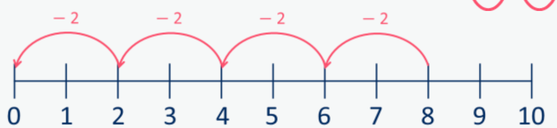
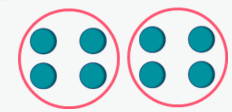
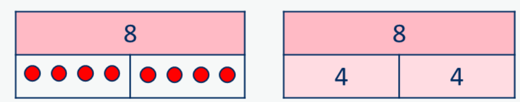
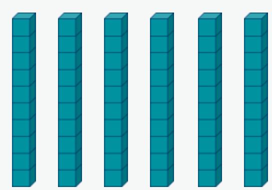
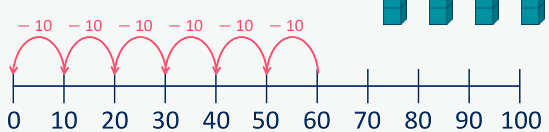
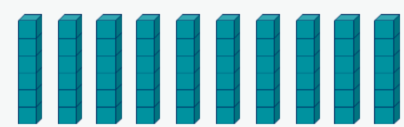
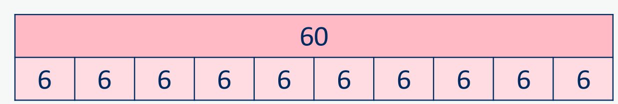
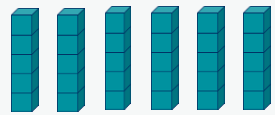
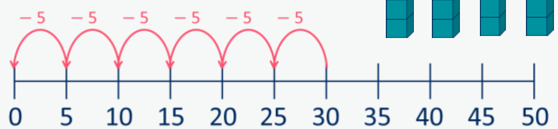
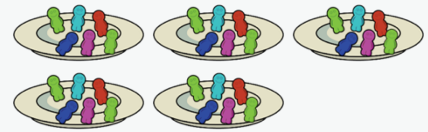
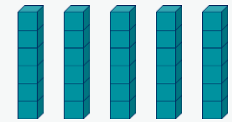
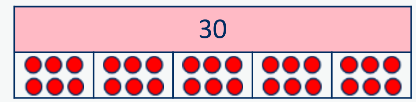
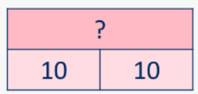
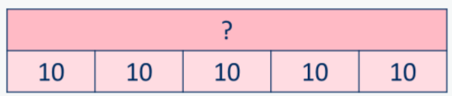
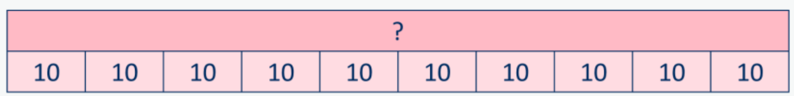
<table>
<tr><td>Year 2</td><td colspan="2">• Recall and use division facts for the 2, 5 and 10 multiplication tables.
• Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs.
• Recognise, find, name and write fractions $\frac{1}{3}, \frac{1}{4}, \frac{2}{4}$ and $\frac{3}{4}$ of a quantity.</td></tr>
<tr><td>Progression of skills</td><td colspan="2">Key representations</td></tr>
<tr><td>Divide by 2

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts and halving.</td><td>There are … equal groups of 2
… ÷ 2 = …

4 × 2 = 8
8 ÷ 2 = 4

</td><td>… shared equally between 2 is …
Half of … is …
… ÷ 2 = …

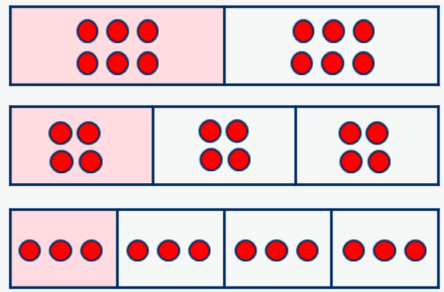
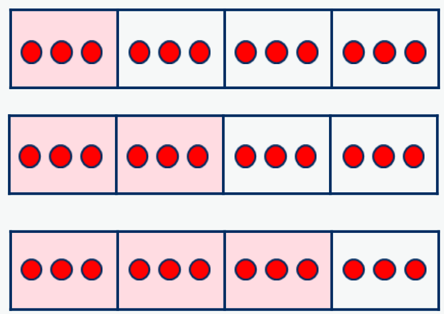
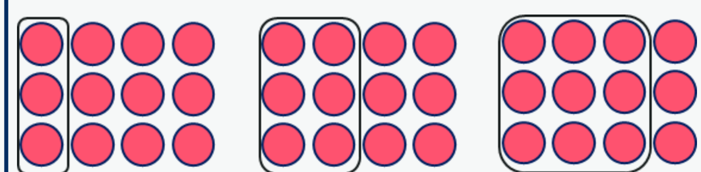
4 × 2 = 8
8 ÷ 2 = 4

</td></tr>
<tr><td>Divide by 10

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.</td><td>There are … equal groups of 10
… ÷ 10 = …
6 × 10 = 60
60 ÷ 10 = 6

</td><td>… shared equally between 10 is …
… ÷ 10 = …
6 × 10 = 60
60 ÷ 10 = 6

</td></tr>
</table>

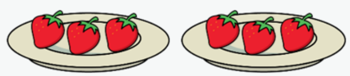
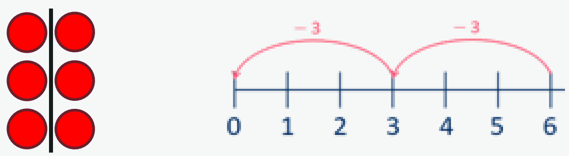
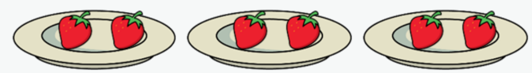
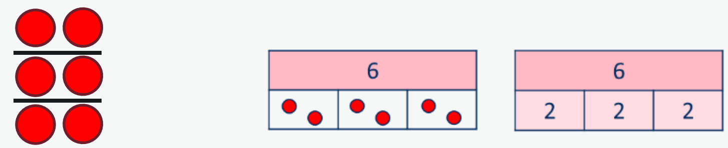
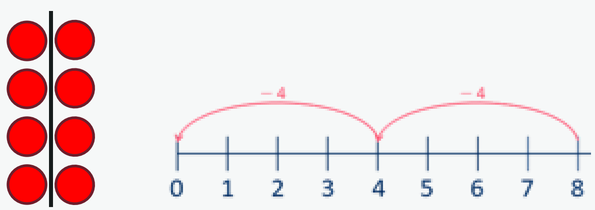
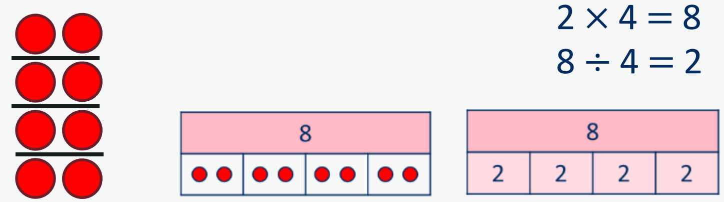
Division

Progression of skills	Key representations	
Divide by 5 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … equal groups of 5 … ÷ 5 = …  $6 \times 5 = 30$ $30 \div 5 = 6$  	… shared equally between 5 is … … ÷ 5 = …  $6 \times 5 = 30$ $30 \div 5 = 6$  
Missing numbers Bar models are useful to show the link between multiplication and division.	… divided by 2/5/10 is equal to …  $\square \div 2 = 10$  $\square \div 5 = 10$  $\square \div 10 = 10$	

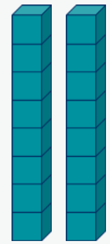
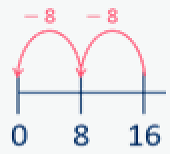
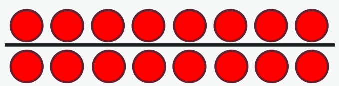
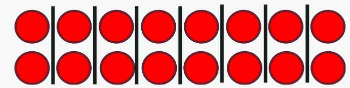
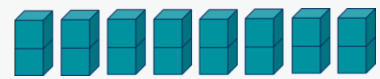
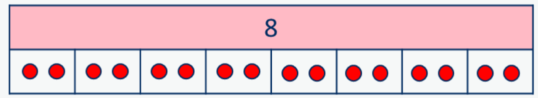
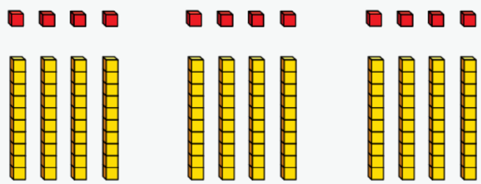
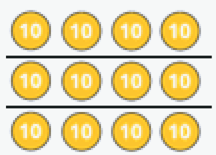
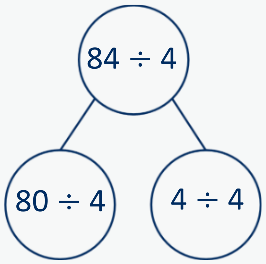
Division

Progression of skills	Key representations	
Unit fractions In Y2 the focus is on finding $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$ Bar models are useful to show the link between division and finding a fraction.	The objects have been shared fairly into … groups. $\frac{1}{\square}$ of … is … 	There are … equal parts. There is … part circled. $\frac{1}{\square}$ is circled. 
Non-unit fractions In Y2 the focus is on finding $\frac{2}{4}$ and $\frac{3}{4}$ Prompt children to notice that $\frac{2}{4}$ is equivalent to $\frac{1}{2}$	The objects have been shared fairly into … groups. $\frac{\square}{\square}$ of … is … 	There are … equal parts. There are … parts circled. $\frac{\square}{\square}$ is circled. 

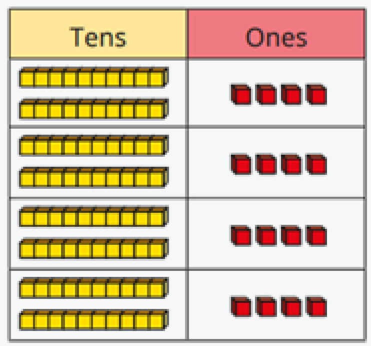
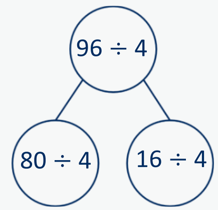
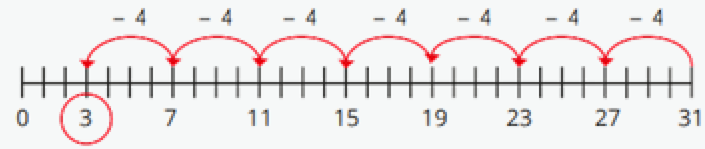
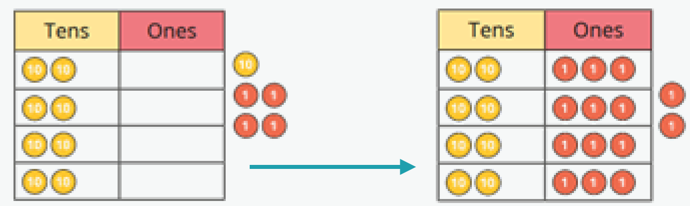
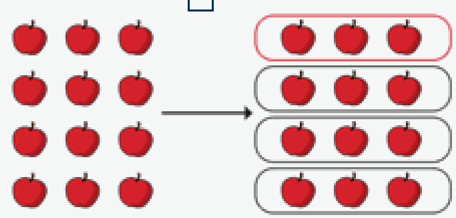
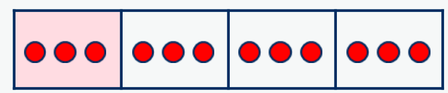
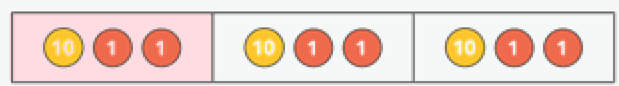
Division

Year 3	• Recall and use division facts for the 3, 4 and 8 multiplication tables. • Write and calculate mathematical statements for 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. • Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.	
Progression of skills	**Key representations**	
Divide by 3 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … groups of 3 in … … ÷ 3 =  $2 \times 3 = 6$ $6 \div 3 = 2$ 	… has been shared equally into 3 equal groups. … ÷ 3 =  $2 \times 3 = 6$ $6 \div 3 = 2$ 
Divide by 4 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … groups of 4 in … … ÷ 4 =  $2 \times 4 = 8$ $8 \div 4 = 2$ 	… has been shared equally into 4 equal groups. … ÷ 4 =  $2 \times 4 = 8$ $8 \div 4 = 2$ 

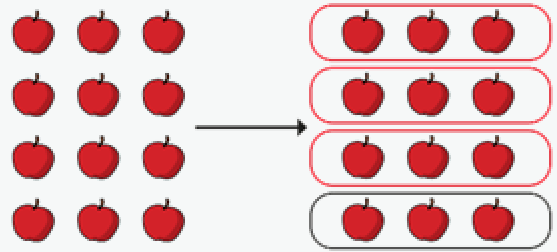
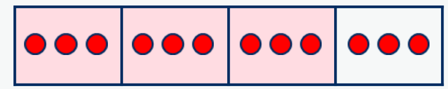
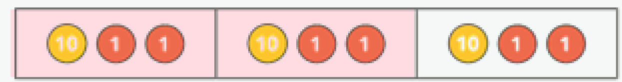
Division

Progression of skills	Key representations	
Divide by 8 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … groups of 8 in … … $\div$ 8 =  $2 \times 8 = 16$ $16 \div 8 = 2$  	… has been shared equally into 8 equal groups. … $\div$ 8 =    $2 \times 8 = 16$ $16 \div 8 = 2$
Related facts Link to known times-table facts.	… $\div$ … is equal to …, so … tens $\div$ … is equal to … tens.    $12 \div 3 = 4$ $120 \div 3 = 40$	
Divide a 2-digit number by a 1-digit number - no exchange Partition into tens and ones to divide and then recombine.	… tens divided by … is equal to … tens. … ones divided by … is equal to … ones.  $60 \div 2 = 30$ $4 \div 2 = 2$ $64 \div 2 = 32$  	

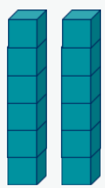
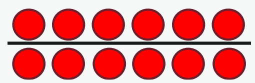
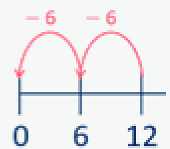
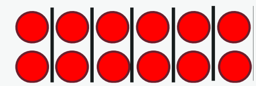
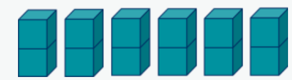
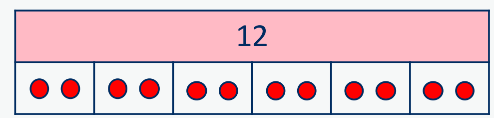
Division

Progression of skills	Key representations	
Divide a 2-digit number by a 1-digit number - with remainders Encourage children to partition numbers flexibly to help them to divide more efficiently.	... tens divided by ... is equal to ... tens. ... ones divided by ... is equal to ... ones. $80 \div 4 = 20$ $16 \div 4 = 4$ $96 \div 4 = 24$	There are ... groups of ... There are ... remaining. $31 \div 4 = 7$ r3 $94 \div 4 = 23$ r2 
Unit fractions of a set of objects Bar models are useful to show the link between division and fractions, for example, dividing by 3 and finding a third.	The whole is divided into ... equal parts. Each part is $\frac{1}{\square}$ of the whole. $\frac{1}{4}$ of 12 apples is 3 apples.	One ... of ... is ... $\frac{1}{4}$ of 12 is 3 $\frac{1}{3}$ of 36 is 12 

Division

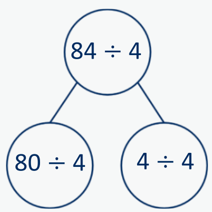
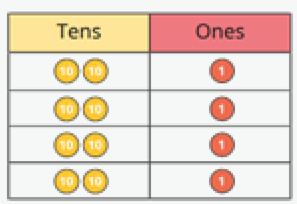
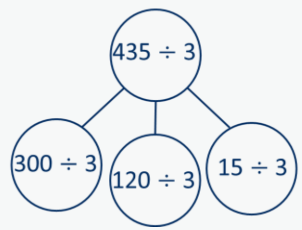
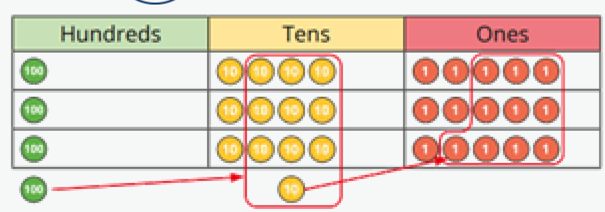
Progression of skills	Key representations	
Non-unit fractions of a set of objects Bar models are a useful representation and show the links with division and multiplication.	The whole is divided into … equal parts. Each part is $\frac{1}{\square}$ of the whole.  $\frac{3}{4}$ of 12 apples is 9 apples.	$\frac{1}{\square}$ of … is …, so $\frac{\square}{\square}$ of … is … $\frac{3}{4}$ of 12 is 9  $\frac{2}{3}$ of 36 is 24 

Division

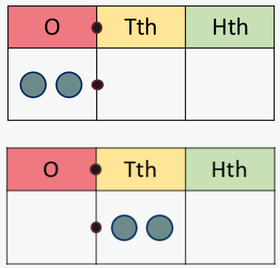
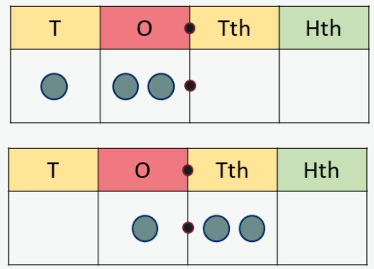
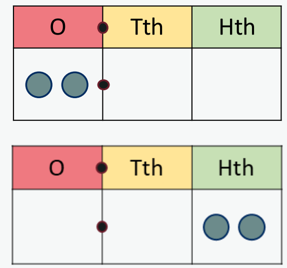
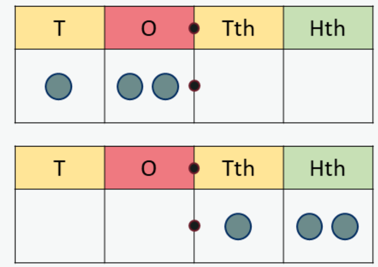
Year 4	• Recall division facts for multiplication tables up to 12×12 • Use place value, known and derived facts to divide mentally, including: dividing by 1 • Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.	
Progression of skills	**Key representations**	
Division facts to 12 × 12 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are … groups of … in … … ÷ … =  $2 \times 6 = 12$ $12 \div 6 = 2$ 	… has been shared equally into … equal groups. … ÷ … =   $2 \times 6 = 12$ $12 \div 6 = 2$
Divide a number by 1 and itself Children may try to divide a number by zero and it should be highlighted that this is not possible.	When I divide a number by 1, the number remains the same. 5 shared between 1 is 5  There are **5** groups of 1 in 5 	When I divide a number by itself, the answer is 1 5 shared between 5 is 1  There is **1** group of 5 in 5 

Division

White Rose MATHS

Progression of skills	Key representations	
Related facts Link to known times-table facts.	... ÷ ... is equal to ... so ... tens ÷ ... is equal to ... tens and ... hundreds ÷ ... is equal to ... hundreds.  $21 \div 7 = 3$ $210 \div 7 = 30$ $2{,}100 \div 7 = 300$	$21 \div 3 = 7$ $210 \div 3 = 70$ $2{,}100 \div 3 = 700$
Divide a 2 or 3-digit number by a 1-digit number Progress from divisions with no exchange, to divisions with exchange and then divisions with remainders.	I can partition ... into ... tens and ... ones.  $80 \div 4 = 20$ $4 \div 4 = 1$ $84 \div 4 = 21$ 	I cannot share the hundreds/tens equally, so I need to exchange 1 ... for 10 ...  $300 \div 3 = 100$ $120 \div 3 = 40$ $15 \div 3 = 5$ $435 \div 3 = 145$ 

Division

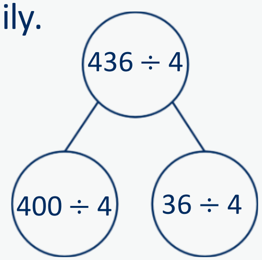
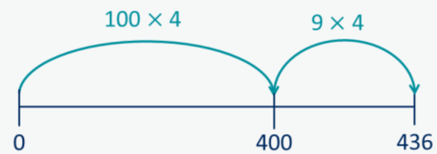
Progression of skills	Key representations	
Divide by 10 and 100 Encourage children to notice that dividing by 100 is the same as dividing by 10 twice.	When I divide by 10, the digits move 1 place value column to the right. … is one-tenth the size of …  $2 \div 10 = 0.2$  $12 \div 10 = 1.2$	When I divide by 100, the digits move 2 place value columns to the right. … is one-hundredth the size of …  $2 \div 100 = 0.02$  $12 \div 100 = 0.12$

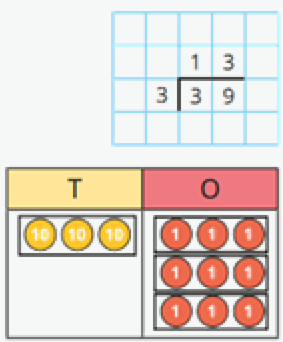
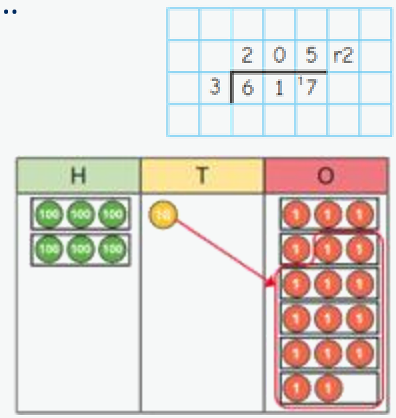
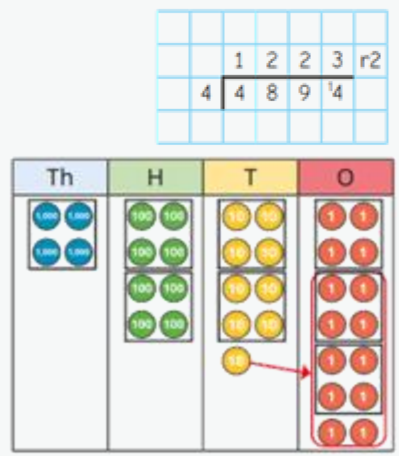
Division

White Rose MATHS

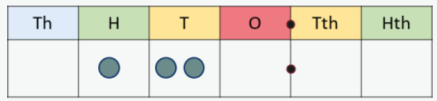
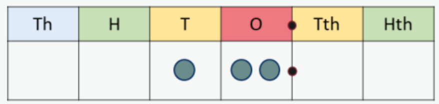
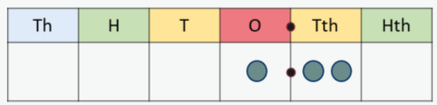
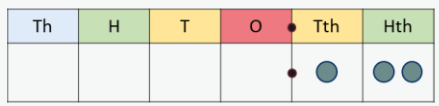
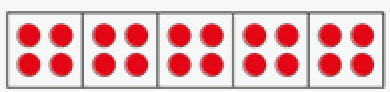
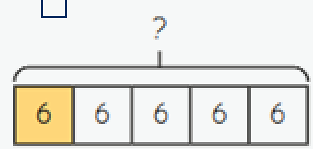
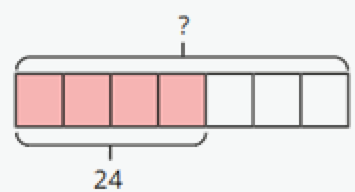
<table>
<tr><td>Year 5</td><td colspan="3">

- 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.
- Divide whole numbers and those involving decimals by 10, 100 and 1,000

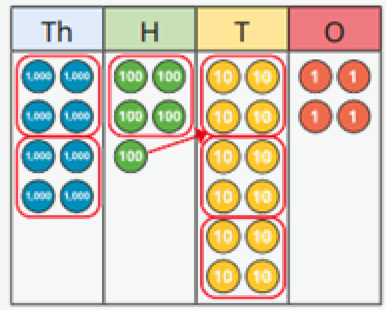
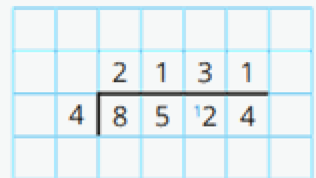
</td></tr>
<tr><td>Progression of skills</td><td colspan="3">Key representations</td></tr>
<tr><td>Mental strategies</td><td>I can partition … into … and … to help me to divide more easily.
</td><td>I can show groups of … on a number line.
</td><td>To divide by …, I can divide by … and then divide the result by …
$436 \div 4 = 436 \div 2 \div 2$
$436 \div 2 = 218$
$218 \div 2 = 109$</td></tr>
<tr><td>Divide numbers up to 4 digits by a 1-digit number

The short division method is introduced for the first time.</td><td colspan="3">There are … groups of … hundreds/tens/ones/ in …
I can exchange 1 … for 10 …
</td></tr>
</table>

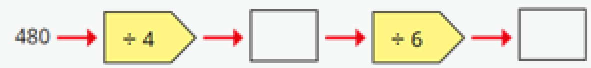
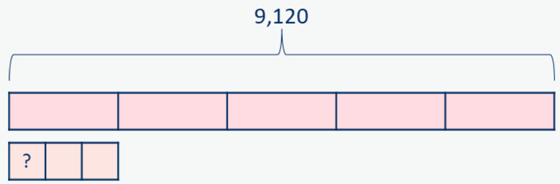
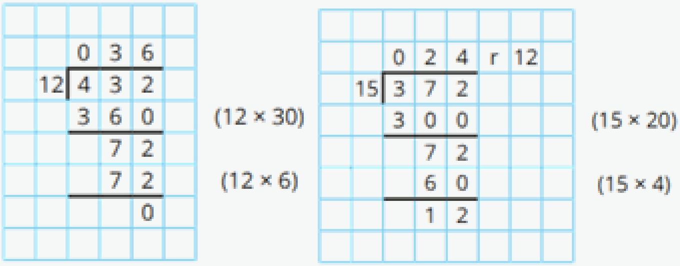
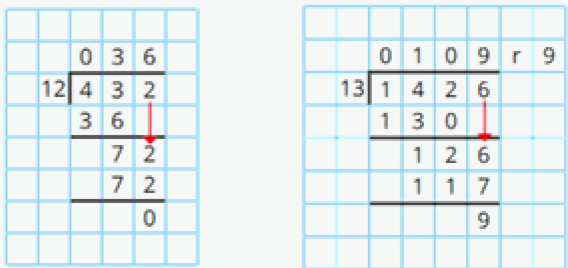
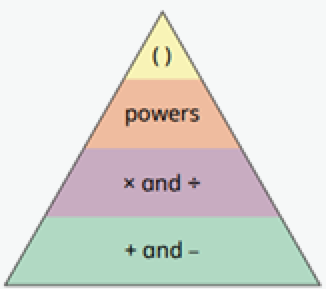
Division

Progression of skills	Key representations
Divide by 10, 100 and 1,000 Encourage children to notice that dividing by 100 is the same as dividing by 10 twice, and that dividing by 1,000 is the same as dividing by 10 three times.	To divide by 10/100/1,000, I move all the digits … places to the right. … is one-tenth/one-hundredth/one-thousandth the size of …   $120 \div 10 = 12$  $120 \div 100 = 1.2$  $120 \div 1{,}000 = 0.12$
Fraction of an amount Bar models support children to understand that to find a fraction of an amount, we divide by the denominator and multiply by the numerator.	To find $\frac{\square}{\square}$ of … , I need to divide by … and multiply by …   $\frac{1}{5}$ of $20 =$ $\frac{1}{4}$ of $84 =$ $\frac{3}{5}$ of $20 =$ $\frac{3}{4}$ of $84 =$ If $\frac{1}{\square}$ is … , then the whole is … × …  $\frac{1}{5}$ of ___ $= 6$  $\frac{4}{7}$ of ___ $= 24$

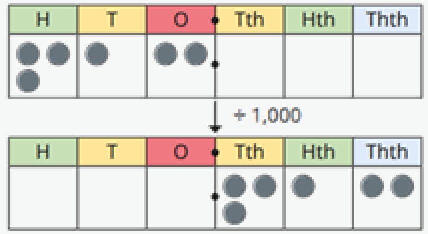
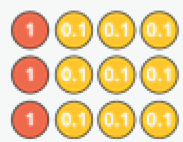
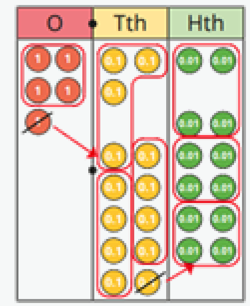
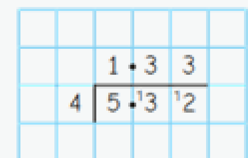
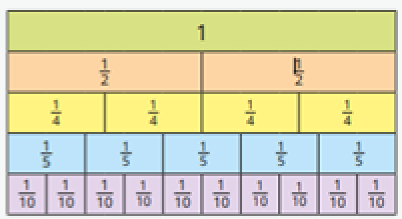
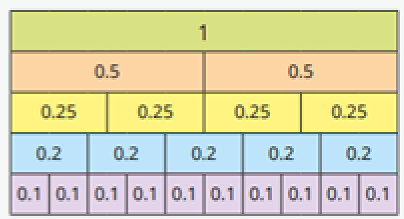
Division

Year 6	• Perform mental calculations, including with mixed operations and large numbers. • 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. • Divide numbers by 10, 100 and 1,000 giving answers up to three decimal places. • Use written division methods in cases where the answer has up to two decimal places. • Associate a fraction with division and calculate decimal fraction equivalents. • Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] • Solve problems involving the calculation of percentages.
Progression of skills	**Key representations**
Short division Encourage children to interpret remainders in context, for example knowing that "4 remainder 1" could mean 4 complete boxes with 1 left over so 5 boxes will be needed.	There are … groups of … hundreds/tens/ones/ in … I can exchange 1 … for 10 …  

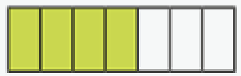
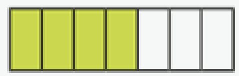
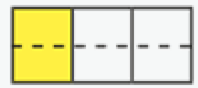
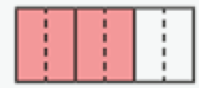
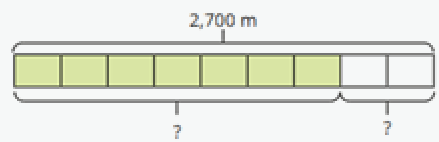
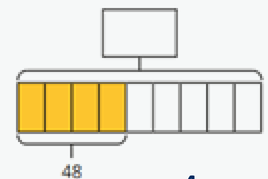
Division

Progression of skills	Key representations
Mental strategies Include partitioning and number line strategies outlined in Y5 as well as division using factors.	To divide by … , I can first divide by … and then divide the answer by … $240 \div 60 = 240 \div 10 \div 6$  $480 \div 24 = 480 \div 4 \div 6$  $9{,}120 \div 15 = 9{,}120 \div 5 \div 3$ 
Long division The long division method is introduced for the first time. Two alternative methods are shown.	Method 1  Method 2 
Order of operations Calculations in brackets should be done first, then powers. Multiplication and division should be performed before addition and subtraction.	… has greater priority than …, so the first part of the calculation I need to do is …   $(6 + 4) \div 2 = 5$  $6 + 4 \div 2 = 8$

Division

Progression of skills	Key representations
Divide by 10, 100 and 1,000 Encourage children to notice that dividing by 100 is the same as dividing by 10 twice, and that dividing by 1,000 is the same as dividing by 10 three times.	To divide by … , I move the digits … places to the right.  $312 \div 10 = 31.2$ $312 \div 100 = 3.12$ $312 \div 1{,}000 = 0.312$ $906 \div 10 = 90.6$ $906 \div 100 = 9.06$ $906 \div 1{,}000 = 0.906$
Divide decimals by integers This is the first time children divide decimals by numbers other than 10, 100 or 1,000	I know that … ÷ … = …, so I also know that … ÷ … = …  $39 \div 3 = 13$  $3.9 \div 3 = 1.3$  $0.39 \div 3 = 0.13$ I need to exchange 1 … for 10 …  
Decimal and fraction equivalents	The fraction … is equivalent to the decimal …   $\frac{1}{5} = 0.2$ $\frac{2}{5} = 0.4$ $\frac{3}{5} = 0.6$ $\frac{\square}{\square}$ is equal to $\frac{\square}{100}$ × 25 $\frac{3}{4} = \frac{75}{100} = 0.75$ × 25

Division

Progression of skills	Key representations		
Divide a fraction by an integer This is the first time children divide fractions by an integer.	… ones divided by 2 is … ones so … sevenths divided by 2 is … sevenths.  $\frac{4}{7} \div 4 = \frac{1}{7}$  $\frac{4}{7} \div 2 = \frac{2}{7}$	I am dividing by … , so I can split each part into … equal parts.  $\frac{1}{3} \div 2 = \frac{1}{6}$	… is equivalent to … so … ÷ … = … ÷ …  $\frac{2}{3} = \frac{4}{6}$ so $\frac{2}{3} \div 4 = \frac{4}{6} \div 4 = \frac{1}{6}$
Fraction of an amount Children divide and multiply to find fractions of an amount. Bar models can still be used to support understanding where needed.	To find $\frac{1}{\square}$ I divide by … $\frac{1}{2}$ of $36 = 36 \div 2$ $\frac{1}{12}$ of $36 = 36 \div 12$	If $\frac{1}{\square}$ is equal to …, then $\frac{\square}{\square}$ are equal to …  $\frac{7}{9}$ of $2{,}700 = \frac{1}{9}$ of $2{,}700 \times 7$	If $\frac{\square}{\square}$ is equal to …, then the whole is equal to …  $\frac{4}{9}$ of ___ $= 48$

Division

White Rose MATHS

Progression of skills	Key representations

Calculate percentages

Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples of these amounts to find any percentage.

There are … lots of … % in 100%
To find … %, I need to divide by …

100%			
50%		50%	
25%	25%	25%	25%

50% of … = …÷ 2
25% of … = …÷ 4

… % is made up of … %, and … %

100%									
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

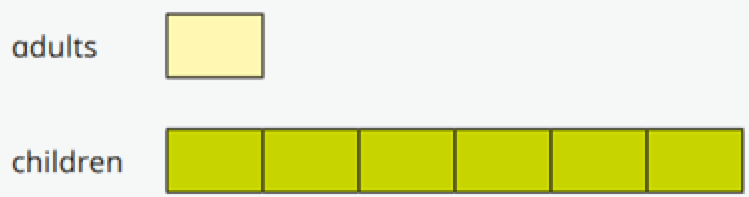
To find 30%, I can find 10% and then multiply it by 3
To find 23%, I can use 10% × 2 and 1% × 3
To find 99%, I can find 1%, then subtract from 100%

Calculations involving ratio

Encourage children to see the multiplicative relationship between ratios. They will need to multiply or divide each value by the same number to keep the ratio equivalent.
Double number lines and ratio tables help children to see both horizontal and vertical multiplicative relationships.

For every … , there are …

For every 6 children on a school trip, there is 1 adult.



The ratio of children to adults is 6 : 1

÷ 6

Adults	Children
1	6
2	12
3	18

÷ 3 ÷ 3

÷ 6