



EQUA Mead
Learning Trust
Every Child, Every Chance

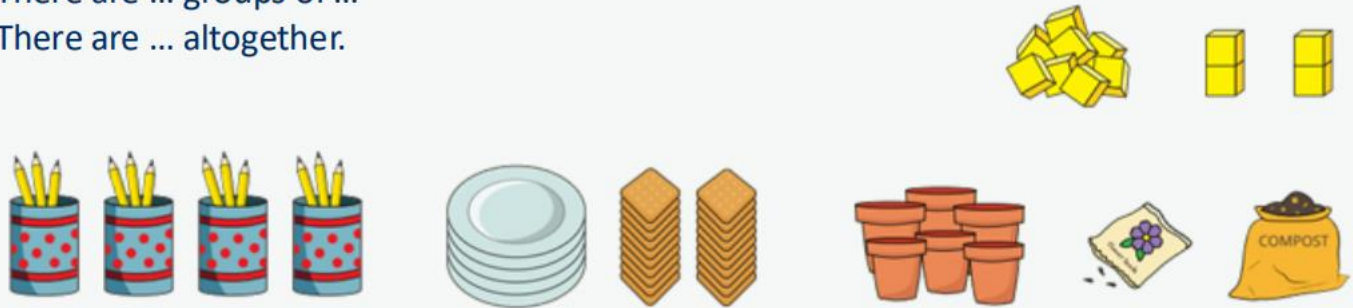
SOUTHWICK CE PRIMARY SCHOOL

Love, Learn, Grow

"Do everything in love." 1 Corinthians 16:14

Progression Through Calculation: Subtraction

Reception Progression of Skills	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.					
Sharing Provide practical activities such as sharing items during snack time. Encourage children to check whether items have been shared fairly (equally).	Key Representations There are ... altogether. They are shared equally between ... groups.  <table><tr><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr></table>			Concrete	Pictorial	Abstract
Concrete	Pictorial	Abstract				
Grouping	Key Representations					

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. 		
	Concrete	Pictorial	Abstract
Year 1 Progression of Skills	Year 1 - 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		
	Key Representations		

Make equal groups - grouping

Encourage children to physically move objects into equal groups. They can also circle equal groups when using pictures.

There are ... altogether.
How many groups of ... can you make?



Circle groups of 2
There are ... groups of 2



Take ... cubes.
Make equal groups.



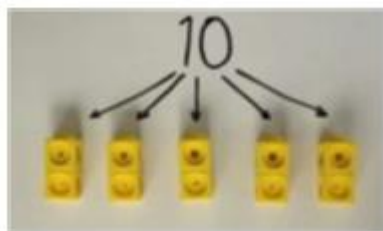
There are ... groups of ...

Concrete



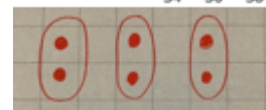
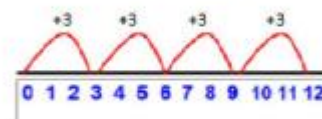
Divide quantities into equal groups.

Use cubes, counters, objects or place value counters to aid understanding.



Pictorial

Use number lines for grouping



Abstract

$$28 \div 7 = 4$$

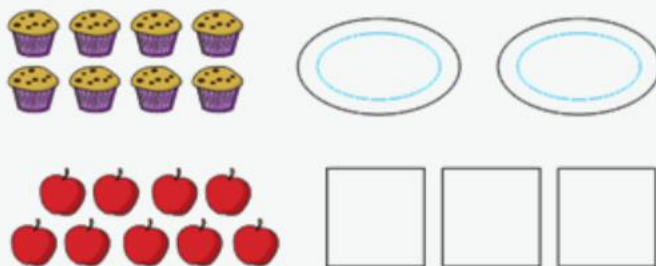
Divide 28 into 7 groups. How many are in each group?

Make equal groups – sharing

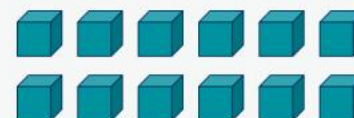
Encourage children to check that the objects have been shared fairly and each group is the same

Key Representations

... have been shared equally between...
There are ... on/in each ...

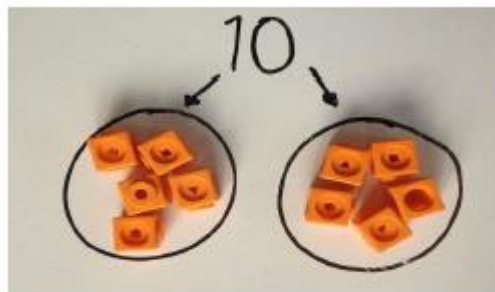


Take ... cubes.
Share them between ...



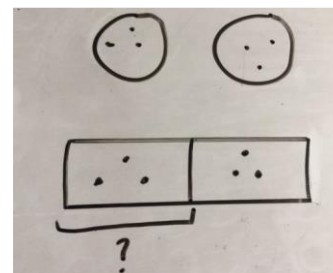
12 shared between ... is ...

Concrete

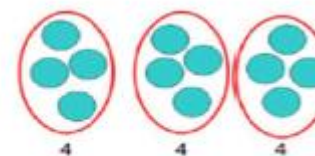


I have 10 cubes, can you share them equally in 2 groups?

Pictorial



Sharing:



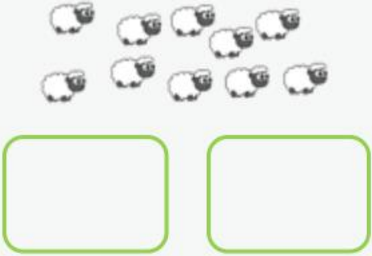
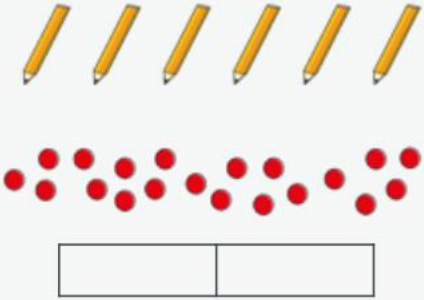
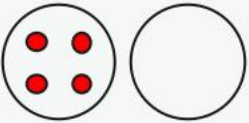
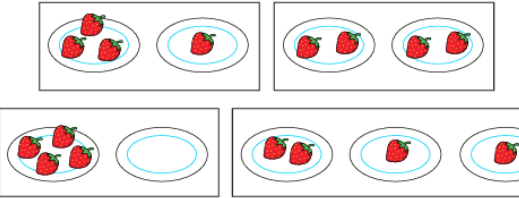
12 shared between 3 is 4

Abstract

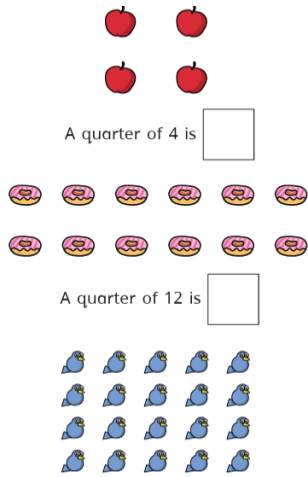
$$6 \div 2 = 3$$

3	3
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Children should also be encouraged to check their 2 times tables facts.

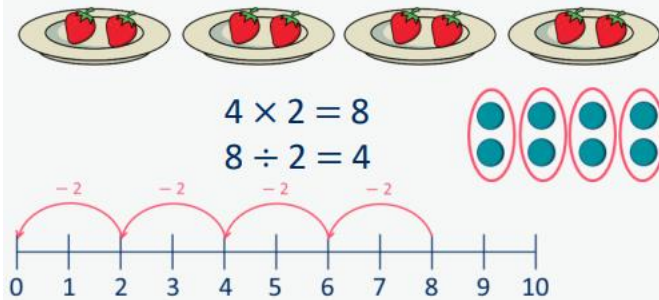
			
Find a half Start with practical opportunities to share a quantity into 2 groups. Progress to circling half of the objects in a picture and then to finding the whole from a given half.	Key Representations To find half, I need to share into 2 equal groups.  There are ... in each group. Half of ... is ...  If ... is half, what is the whole?  4 is half of ... Concrete  Pictorial  Which pictures show half? Abstract Half of 6 is...		

		Half of ____ is ____ Shade half of the stars.		
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 ...			Concrete Pictorial Use the bar model to find a quarter of 20 Abstract

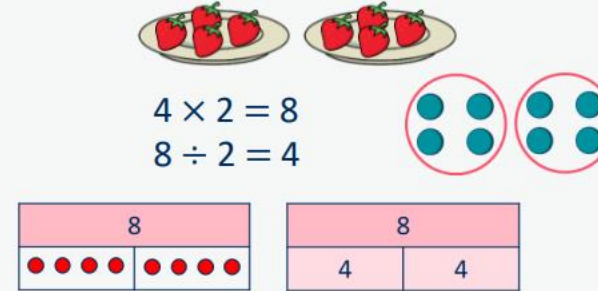
		 A quarter of 4 is A quarter of 12 is A quarter of 20 is	Half of 4 is _____ A quarter of 4 is _____ Half of 8 is _____ A quarter of 8 is _____ Half of 12 is _____ A quarter of 12 is _____
Year 2 Progression of Skills	Year 2 - Recall and use division facts for the 2, 5 and 10 multiplication tables. - Calculate 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.		
Divide by 2	Key Representations		

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts and halving.

There are ... equal groups of 2
 $\dots \div 2 = \dots$



... shared equally between 2 is ...
 Half of ... is ...
 $\dots \div 2 = \dots$

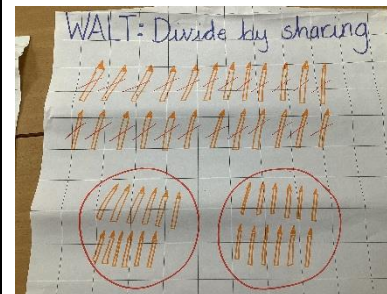
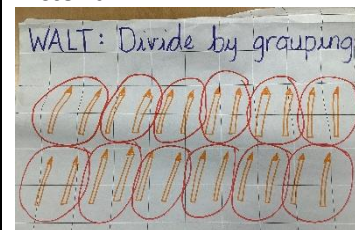


Concrete

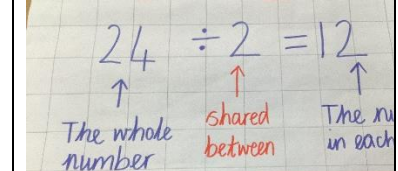
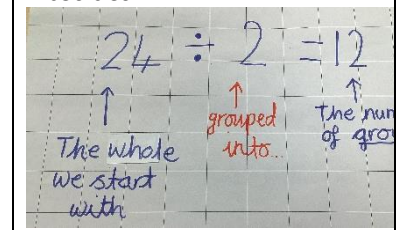


4 groups of 3
 12 grouped into 3s

Pictorial



Abstract



$\times 5$	$\div 5$
$1 \times 5 = 5$	$5 \div 5 = 1$
$2 \times 5 = 10$	$10 \div 5 = 2$
$3 \times 5 = 15$	$15 \div 5 = 3$
$4 \times 5 = 20$	$20 \div 5 = 4$
$5 \times 5 = 25$	$25 \div 5 = 5$
$6 \times 5 = 30$	$30 \div 5 = 6$
$7 \times 5 = 35$	$35 \div 5 = 7$
$8 \times 5 = 40$	$40 \div 5 = 8$
$9 \times 5 = 45$	$45 \div 5 = 9$
$10 \times 5 = 50$	$50 \div 5 = 10$
$11 \times 5 = 55$	$55 \div 5 = 11$
$12 \times 5 = 60$	$60 \div 5 = 12$

Divide by 10

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.

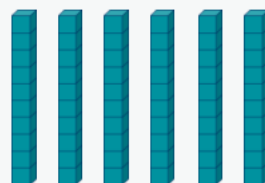
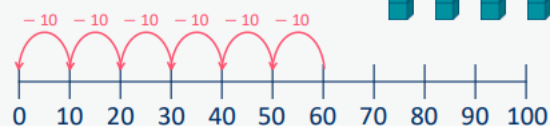
Key Representations

There are ... equal groups of 10

$$\dots \div 10 = \dots$$

$$6 \times 10 = 60$$

$$60 \div 10 = 6$$

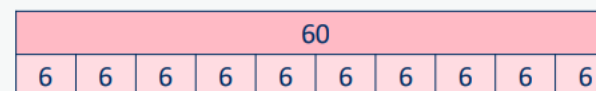
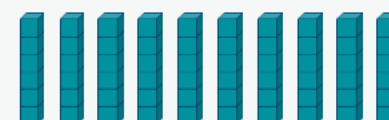


... shared equally between 10 is ...

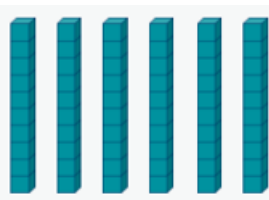
$$\dots \div 10 = \dots$$

$$6 \times 10 = 60$$

$$60 \div 10 = 6$$



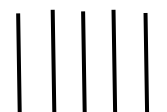
Concrete



6 rods of 10 are 60

60 grouped into 10s makes 6 groups

Pictorial



Abstract

$3 \times 10 = 30$	$6 \times 10 = 60$	$5 \times 10 = 50$
$30 \div 10 = 3$	$50 \div 10 = 5$	$3 \times 10 = 30$
$12 \times 10 = 120$	$9 \times 10 = 90$	$10 \times 12 = 120$
$10 \times 3 = 30$	$10 \times 10 = 100$	$100 \div 10 = 10$
$10 \times 4 = 40$	$40 \div 10 = 4$	$7 \times 10 = 70$
$10 \times 11 = 110$	$10 \times 12 = 120$	$9 \times 10 = 90$

Divide by 5

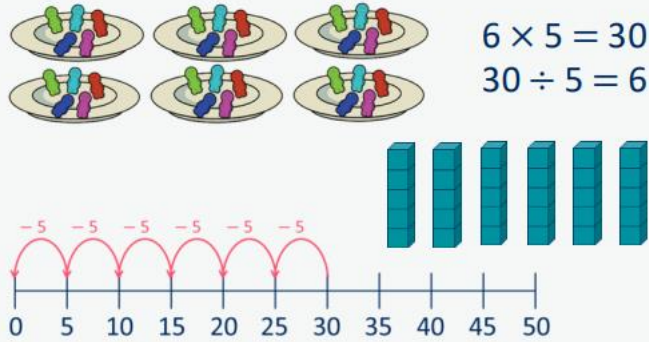
Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.

60									
6	6	6	6	6	6	6	6	6	6

Key Representations

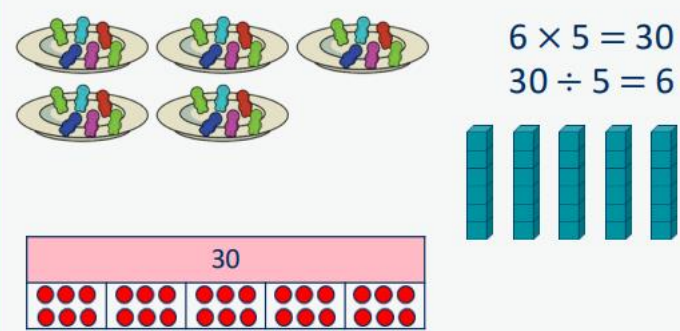
There are ... equal groups of 5

$$\dots \div 5 = \dots$$

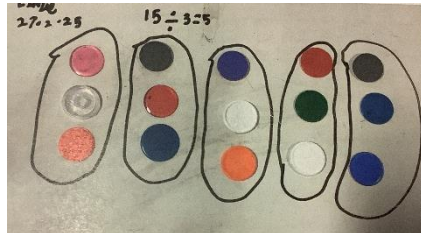


... shared equally between 5 is ...

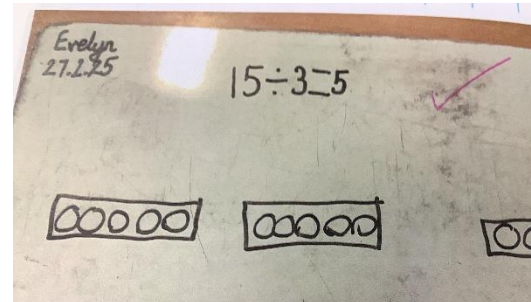
$$\dots \div 5 = \dots$$



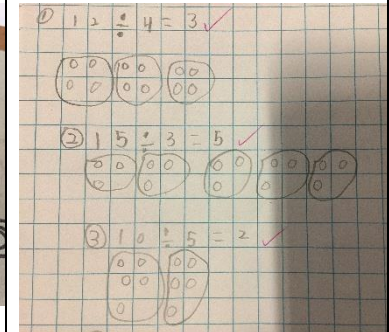
Concrete



Pictorial



Abstract

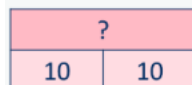


Key Representations

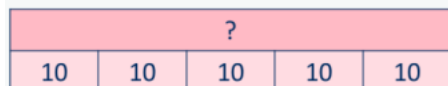
Missing numbers

Bar models are useful to show the link between multiplication and division.

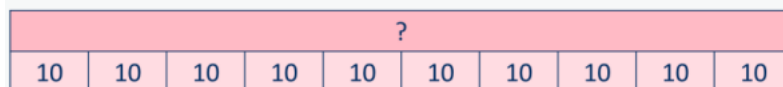
... divided by 2/5/10 is equal to ...



$$\square \div 2 = 10$$



$$\square \div 5 = 10$$

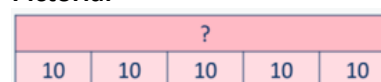


$$\square \div 10 = 10$$

Concrete



Pictorial



$$\square \div 5 =$$

Abstract

$$15 \div \underline{\quad} = 5$$

$$\underline{\quad} \div 3 = 10$$

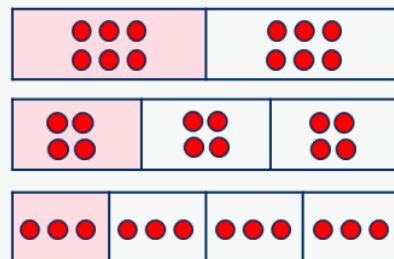
Unit fractions

In Y2 the focus is on finding $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$. Bar models are useful to

Key Representations

The objects have been shared fairly into ... groups.

$\frac{1}{\square}$ of ... is ...



There are ... equal parts.

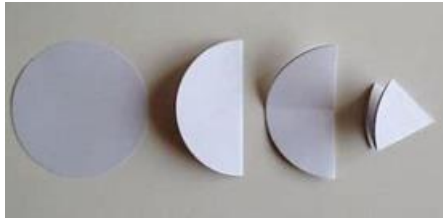
There is ... part circled.

$\frac{1}{\square}$ is circled.

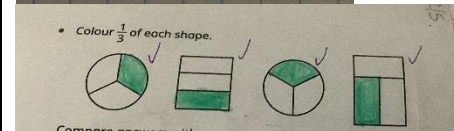
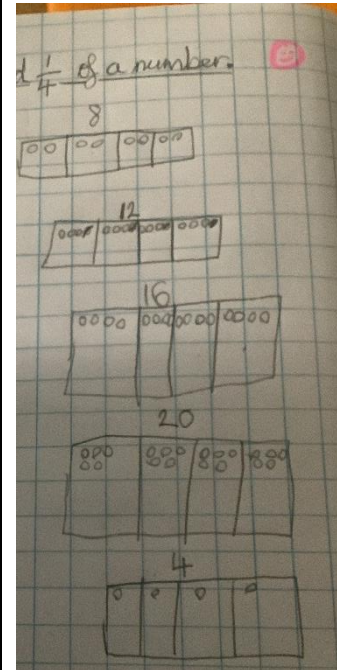


show the link between division and finding a fraction.

Concrete



Pictorial



Abstract

① $\frac{1}{4}$ of 8 = 2 ✓
 ② $\frac{1}{4}$ of 12 = 3 ✓
 ③ $\frac{1}{4}$ of 16 = 4 ✓
 ④ $\frac{1}{4}$ of 20 = 5 ✓
 ⑤ $\frac{1}{4}$ of 4 = 1 ✓
 ⑥ $\frac{1}{4}$ of 24 = 6 ✓

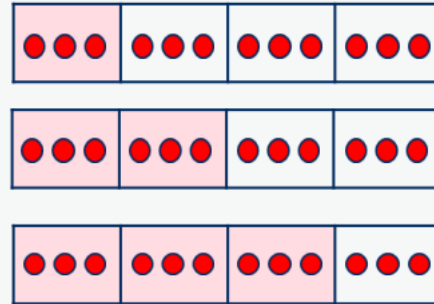
Non-unit fractions

Key Representations

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 $\frac{1}{2}$

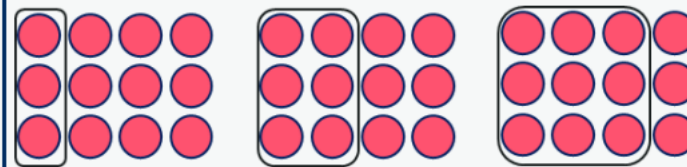
The objects have been shared fairly into ... groups.

$\frac{\square}{\square}$ of ... is ...

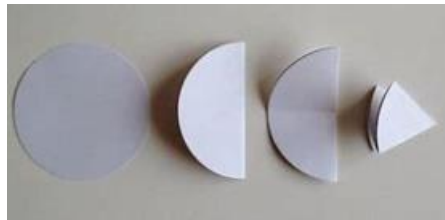


There are ... equal parts.
There are ... parts circled.

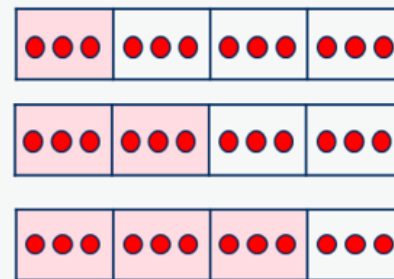
$\frac{\square}{\square}$ is circled.



Concrete

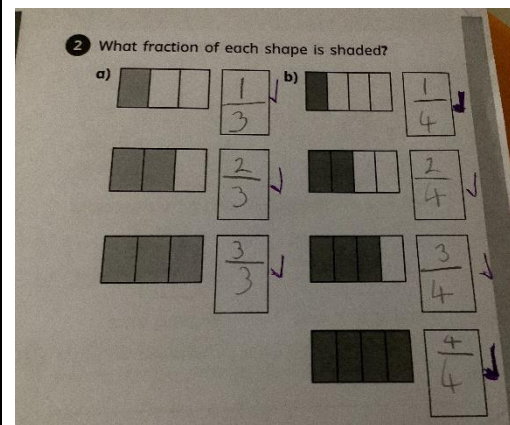


Pictorial



Abstract

$\frac{1}{4}$ of 12 = 3
 $\frac{2}{4}$ of 12 = 6
 $\frac{3}{4}$ of 12 = 9
 $\frac{4}{4}$ of 12 = 12



**Year 3
Progression
of Skills**

Divide by 3

Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.

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.

Key Representations

There are ... groups of 3 in ...

$$\dots \div 3 =$$



$$2 \times 3 = 6$$

$$6 \div 3 = 2$$



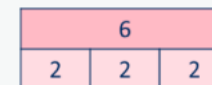
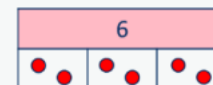
... has been shared equally into 3 equal groups.

$$\dots \div 3 =$$

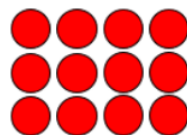


$$2 \times 3 = 6$$

$$6 \div 3 = 2$$



Concrete



Pictorial

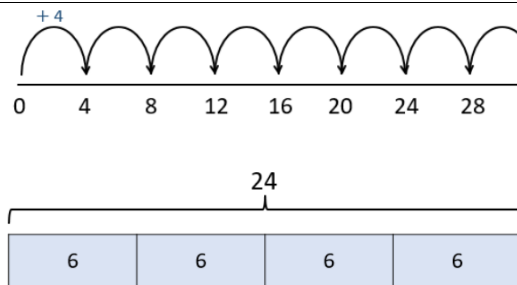
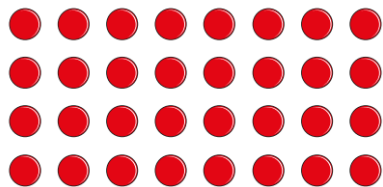


Abstract

24 children stand in groups of 3
How many groups are there?

$$\square \div \square = \square$$

		<table><tr><td colspan="3">6</td></tr><tr><td>2</td><td>2</td><td>2</td></tr></table>	6			2	2	2	
6									
2	2	2							
Divide by 4 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	Key Representations There are ... groups of 4 in ÷ 4 = $2 \times 4 = 8$ $8 \div 4 = 2$... has been shared equally into 4 equal groups. ... ÷ 4 = $2 \times 4 = 8$ $8 \div 4 = 2$ Concrete Pictorial Abstract 32 ÷ 4 =								

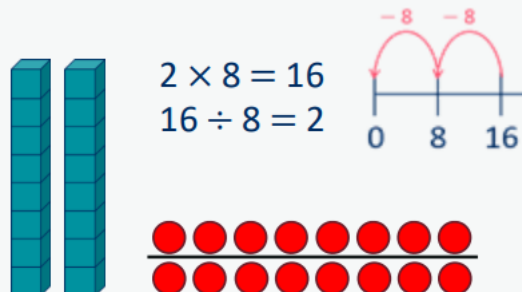


Divide by 8

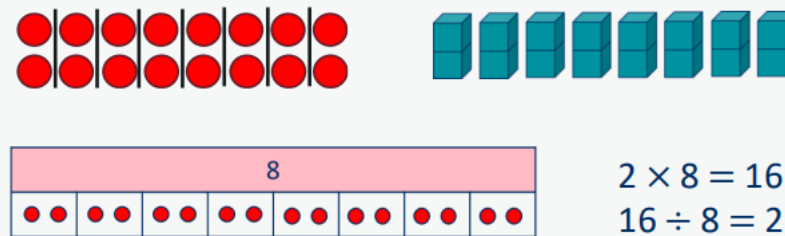
Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.

Key Representations

There are ... groups of 8 in ...
 $\dots \div 8 =$



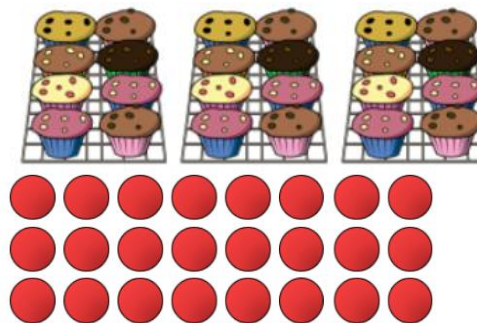
... has been shared equally into 8 equal groups.
 $\dots \div 8 =$



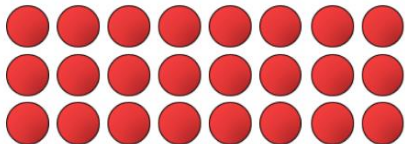
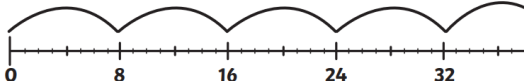
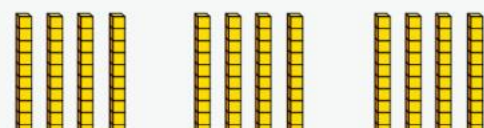
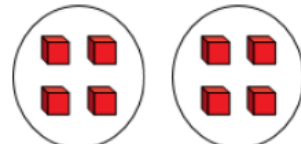
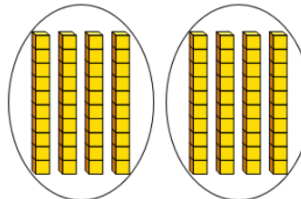
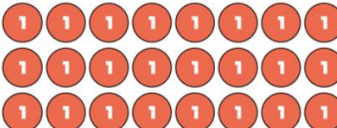
Concrete



Pictorial



Abstract

		<table border="1" data-bbox="1144 197 1626 276"><tr><td colspan="5">40</td></tr><tr><td>8</td><td>8</td><td>8</td><td>8</td><td>8</td></tr></table> 	40					8	8	8	8	8	
40													
8	8	8	8	8									
Related facts Link to known times-table facts.	Key Representations ... ÷ ... is equal to ..., so ... tens ÷ ... is equal to ... tens.     $12 \div 3 = 4$ $120 \div 3 = 40$												
	Concrete  	Pictorial  	Abstract $14 \div 2 = \square$ $140 \div 2 = \square$										
	Key Representations												

Divide a 2-digit number by a 1-digit number - no exchange

Partition into tens and ones to divide and then recombine.

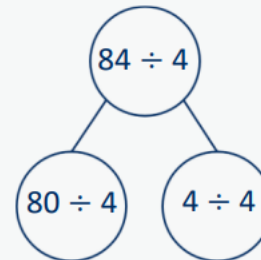
... tens divided by ... is equal to ... tens.
... ones divided by ... is equal to ... ones.

Tens	Ones
	
	

$$60 \div 2 = 30$$

$$4 \div 2 = 2$$

$$64 \div 2 = 32$$



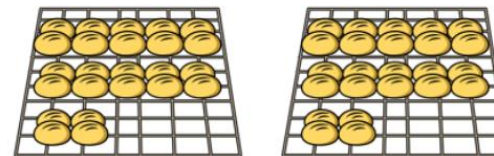
Tens	Ones
	
	
	
	

Concrete

T	O
	
	
	

Tens	Ones
	
	
	

Pictorial



Tens	Ones
	
	
	

Abstract

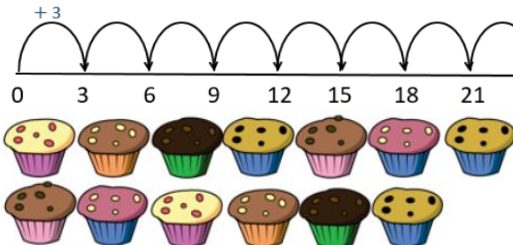
$$66 \div 2 =$$

		96 90 6 ÷ 3 ÷ 3 30 2 30 + 2 = 32																								
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.	Key Representations ... tens divided by ... is equal to ... tens. ... ones divided by ... is equal to ... ones. <table><tr><th>Tens</th><th>Ones</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> 96 ÷ 4 80 ÷ 4 16 ÷ 4 80 ÷ 4 = 20 16 ÷ 4 = 4 96 ÷ 4 = 24 There are ... groups of ... There are ... remaining. 31 ÷ 4 = 7 r3 94 ÷ 4 = 23 r2 <table><tr><th>Tens</th><th>Ones</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	Tens	Ones											Tens	Ones											Concrete Pictorial Abstract 73 ÷ 3 = 24 remainder
Tens	Ones																									
Tens	Ones																									

$$73 \div 3 = 24 \text{ remainder } 1$$

1

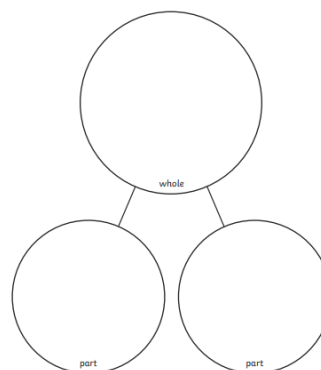
Tens	Ones
10 10	1 1 1 1
10 10	1 1 1 1
10 10	1 1 1 1



$$73 \div 3 = 24 \text{ remainder } 1$$

1

Tens	Ones
10 10	1 1 1 1
10 10	1 1 1 1
10 10	1 1 1 1



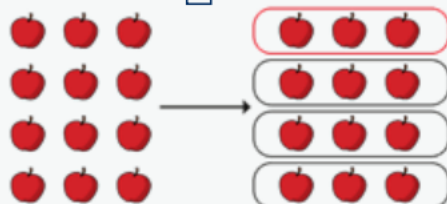
Key Representations

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.

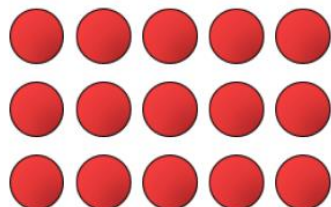
The whole is divided into ... equal parts.

Each part is $\frac{1}{\square}$ of the whole.



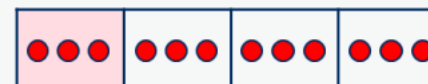
$\frac{1}{4}$ of 12 apples is 3 apples.

Concrete



One ... of ... is ...

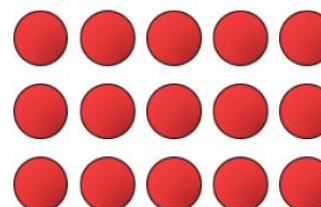
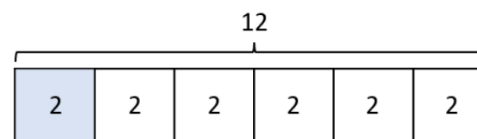
$\frac{1}{4}$ of 12 is 3



$\frac{1}{3}$ of 36 is 12



Pictorial



Abstract

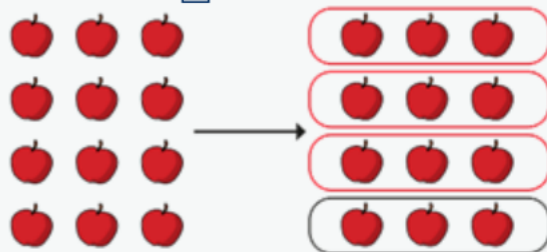
$$\frac{1}{4} \text{ of } 16 = \square$$

Key Representations

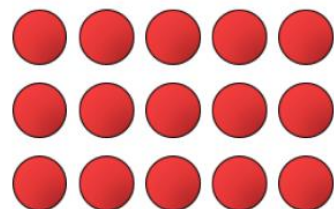
Non-unit fractions of a set of objects

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.

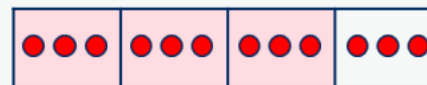


$\frac{3}{4}$ of 12 apples is 9 apples.



$\frac{1}{\square}$ of ... is ..., so $\frac{\square}{\square}$ of ... is ...

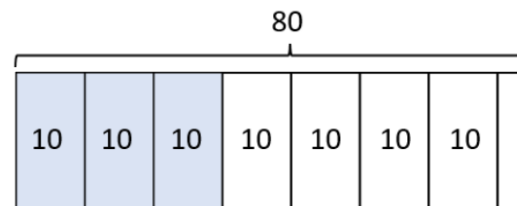
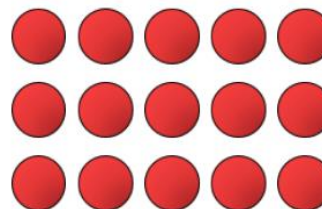
$\frac{3}{4}$ of 12 is 9



$\frac{2}{3}$ of 36 is 24

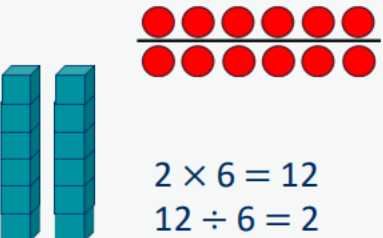
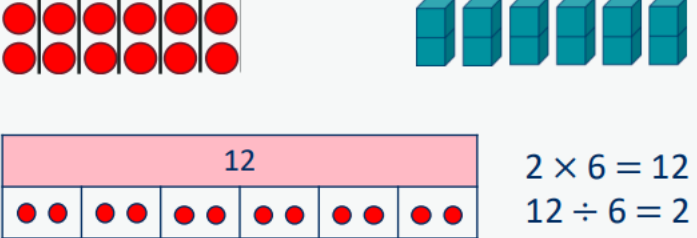
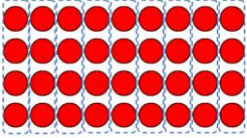
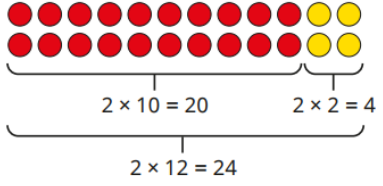


Pictorial



Abstract

$\frac{3}{4}$ of 48 =

Year 4 Progression of Skills	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.
Division facts to 12×12 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	Key Representations There are ... groups of ... in ... $\dots \div \dots =$  $2 \times 6 = 12$ $12 \div 6 = 2$  ... has been shared equally into ... equal groups. $\dots \div \dots =$  $2 \times 6 = 12$ $12 \div 6 = 2$
	Concrete  $9 \times 4 = 36$ $4 \times 9 = 36$ Pictorial  $2 \times 10 = 20$ $2 \times 2 = 4$ $2 \times 12 = 24$ Abstract $3 \times 9 = \square$ $9 \times \square = \square$ $\square \div 9 = 3$ $\square \div \square = 9$
	Key Representations

Related facts

Link to known times-table facts.

... $\div$... is equal to ...
so ... tens $\div$... is equal to ... tens
and ... hundreds $\div$... is equal to ... hundreds.



$$\begin{aligned} 21 \div 7 &= 3 \\ 210 \div 7 &= 30 \\ 2,100 \div 7 &= 300 \end{aligned}$$

$$\begin{aligned} 21 \div 3 &= 7 \\ 210 \div 3 &= 70 \\ 2,100 \div 3 &= 700 \end{aligned}$$

... $\div$... is equal to ...
so ... tens $\div$... is equal to ... tens
and ... hundreds $\div$... is equal to ... hundreds.



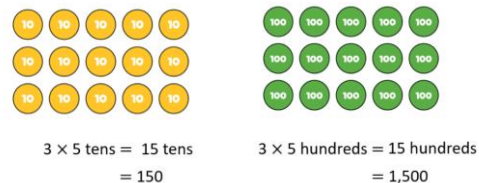
$$\begin{aligned} 21 \div 7 &= 3 \\ 210 \div 7 &= 30 \\ 2,100 \div 7 &= 300 \end{aligned}$$

$$\begin{aligned} 21 \div 3 &= 7 \\ 210 \div 3 &= 70 \\ 2,100 \div 3 &= 700 \end{aligned}$$

Concrete



Pictorial



Abstract

4 Complete the calculations.

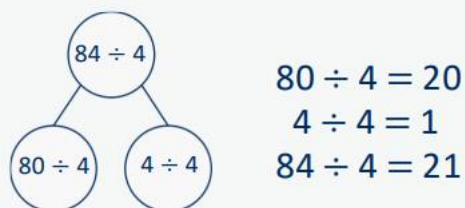
- a) $36 \div 4 = \square$ $360 \div 4 = \square$ $3,600 \div 4 = \square$
b) $56 \div 7 = \square$ $560 \div 7 = \square$ $5,600 \div 7 = \square$
c) $72 \div 9 = \square$ $720 \div 9 = \square$ $7,200 \div 9 = \square$

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

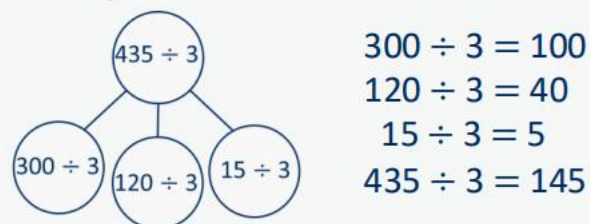
Key Representations

I can partition ... into ... tens and ... ones.



Tens	Ones
10 10	1
10 10	1
10 10	1
10 10	1

I cannot share the hundreds/tens equally, so I need to exchange 1 ... for 10 ...

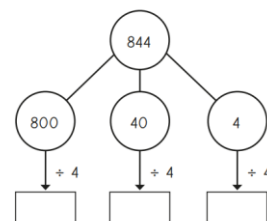


Hundreds	Tens	Ones
100	10 10 10 10	1 1 1 1 1 1 1 1
100	10 10 10 10	1 1 1 1 1 1 1 1
100	10 10 10 10	1 1 1 1 1 1 1 1
100	10 10 10 10	1 1 1 1 1 1 1 1

Concrete

H	T	O
100 100	10	1
100 100	10	1
100 100	10	1
100 100	10	1

Pictorial



Abstract

Complete the divisions.

a) $36 \div 4 = \square$

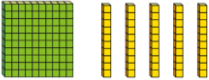
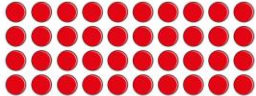
$37 \div 4 = \square$

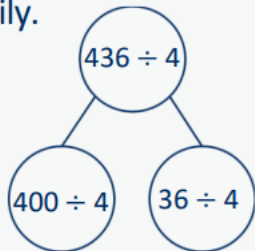
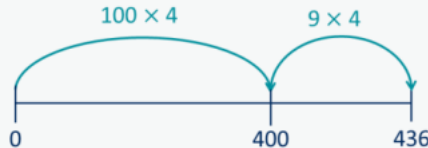
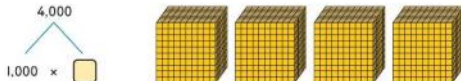
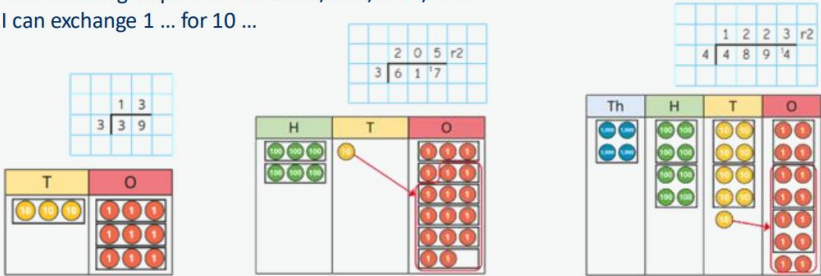
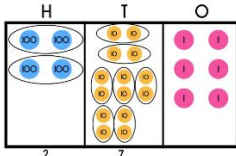
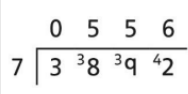
$38 \div 4 = \square$

$39 \div 4 = \square$

$40 \div 4 = \square$

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 ... O Tth Hth ●●● T O Tth Hth ●●●● O Tth Hth ●● T O Tth Hth ●●● $2 \div 10 = 0.2$ $12 \div 10 = 1.2$	When I divide by 100, the digits move 2 place value columns to the right. ... is one-hundredth the size of ... O Tth Hth ●● T O Tth Hth ●●● O Tth Hth ● T O Tth Hth ●● $2 \div 100 = 0.02$ $12 \div 100 = 0.12$	
	Concrete base 10 to work out $150 \div 10$  place value counters to work out $250 \div 10$ H T O ●●●● ↓ ÷ 10 H T O ●●	Pictorial  There are groups of 10 in 40 $40 =$ $\text{ groups of } 10$ $40 \div 10 =$	Abstract a) $360 \div 10 \div 3 =$ c) $720 \div 10 \div$ b) $450 \div 10 \div 5 =$ d) $$ $\div 10 \div$
Year 5 Progression of Skills	Year 5 - 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 Key Representations		

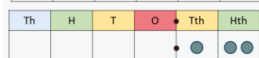
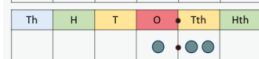
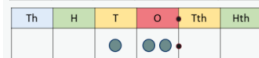
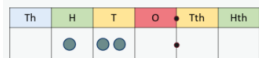
Mental strategies	I can partition ... into ... and ... to help me to divide more easily. 	I can show groups of ... on a number line. 	To divide by ..., I can divide by ... and then divide the result by ... $436 \div 4 = 436 \div 2 \div 2$ $436 \div 2 = 218$ $218 \div 2 = 109$
	Concrete  $24 \div 3 = 8$ $24 \div 8 = 3$	Pictorial $4,000 \div 1,000$ 	Abstract <i>4,000 is 4 thousands.</i> $4 \times 1,000 = 4,000$ <i>So, $4,000 \div 1,000 = 4$</i>
Divide numbers up to 4 digits by a 1-digit number	Key Representations There are ... groups of ... hundreds/tens/ones/ in ... I can exchange 1 ... for 10 ... 		
	Concrete Explore grouping using place value equipment.	Pictorial $546 \div 2 =$ 	Abstract 

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.

Key Representations

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 ...



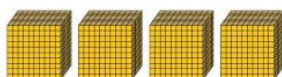
$$120 \div 10 = 12$$

$$120 \div 100 = 1.2$$

$$120 \div 1,000 = 0.12$$

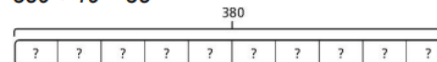
Concrete

$$4,000 \div 1,000$$



Pictorial

$$380 \div 10 = 38$$



380 is 38 tens.
 $38 \times 10 = 380$
 $10 \times 38 = 380$
So, $380 \div 10 = 38$

Abstract

$$180,000 \div \underline{\hspace{2cm}} = 180$$

$$\underline{\hspace{2cm}} \div 1,000 = 22$$

$$\underline{\hspace{2cm}} \times 1,000 = 66,000$$

$$\underline{\hspace{2cm}} \times 100 = 4,000$$

Fraction of an amount

Bar models support children to understand that to find a fraction of an amount, we divide

Key Representations

To find $\frac{1}{5}$ of ... , I need to divide by ... and multiply by ...



$$\frac{1}{5} \text{ of } 20 =$$

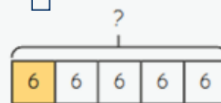
$$\frac{3}{5} \text{ of } 20 =$$



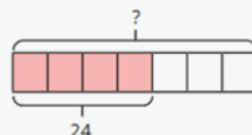
$$\frac{1}{4} \text{ of } 84 =$$

$$\frac{3}{4} \text{ of } 84 =$$

If $\frac{1}{5}$ is ... , then the whole is ... $\times$...



$$\frac{1}{5} \text{ of } \underline{\hspace{2cm}} = 6$$

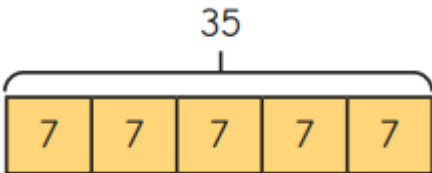
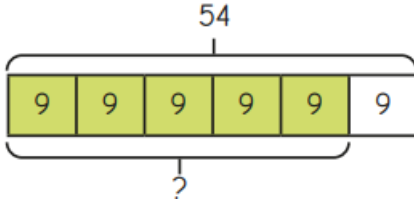
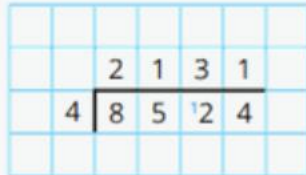
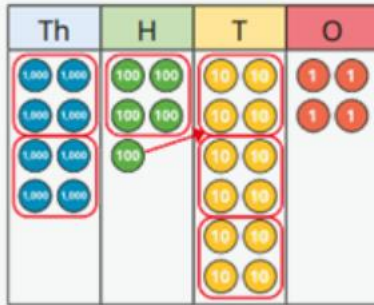


$$\frac{4}{7} \text{ of } \underline{\hspace{2cm}} = 24$$

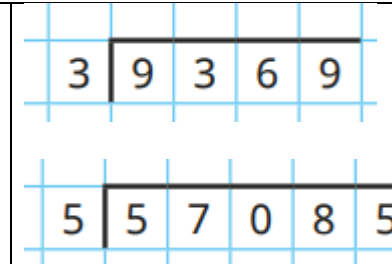
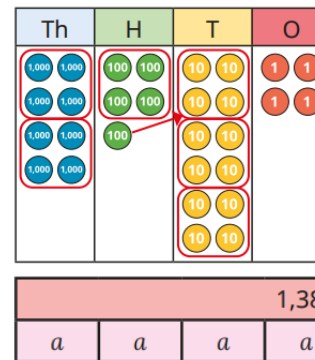
Concrete

Pictorial

Abstract

	by the denominator and multiply by the numerator.			$\frac{3}{7}$ of 21 kg $\frac{4}{5}$ of 100 cm
Year 6 Progression of Skills	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.			
Short division Encourage children to interpret remainders in context, for example knowing that “4 remainder 1” could	Key Representations There are ... groups of ... hundreds/tens/ones/ in ... I can exchange 1 ... for 10 ... 			
	Concrete	Pictorial	Abstract	

mean complete boxes with 1 left over so 5 boxes will be needed.



Mental strategies

Include partitioning and number line strategies outlined in Y5 as well as division using factors.

Key Representations

To divide by ... , I can first divide by ... and then divide the answer by ...

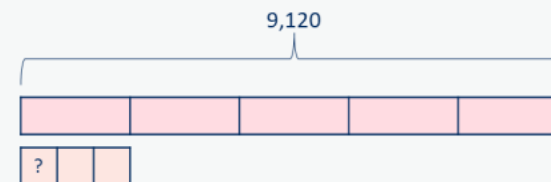
$$240 \div 60 = 240 \div 10 \div 6$$



$$480 \div 24 = 480 \div 4 \div 6$$



$$9,120 \div 15 = 9,120 \div 5 \div 3$$



Concrete

Pictorial

Abstract

$$900 \div 30$$

$$824 \div 4$$

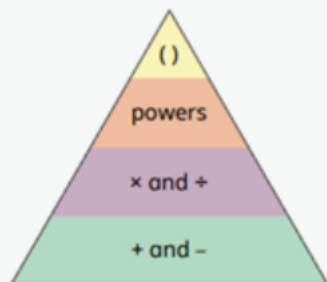
		861 ÷ 41 861 820	
Long division The long division method is introduced for the first time. Two alternative methods are shown.	Key Representations Method 1 036 12 432 360 72 72 0 (12 × 30) 024r12 15 372 300 72 60 12 (15 × 20) (12 × 6) (15 × 4) Method 2 036 12 432 36 72 72 0 0109r9 13 1426 130 126 117 9		
	Concrete	Pictorial	Abstract
			0489 15 7335 6000 1335 1200 135 135 0

Order of operations

Calculations in brackets should be done first, then powers. Multiplication and division should be performed before addition and subtraction.

Key Representations

... has greater priority than ..., so the first part of the calculation I need to do is ...



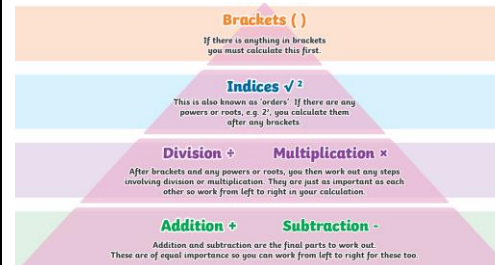
$$(6 + 4) \div 2 = 5$$

$$6 + 4 \div 2 = 8$$

Concrete



Pictorial



Abstract

$$6 \times (4 + 5) \times 2$$

$$7 \times (5 + 1)$$

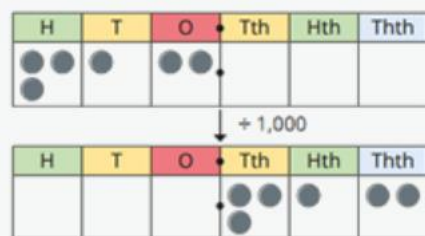
$$(4 + 1) \times 3$$

Divide by 10, 100 and 1,000

Encourage children to notice that dividing by 100 is the same as dividing by 10 twice,

Key Representations

To divide by ... , I move the digits ... places to the right.



$$312 \div 10 = 31.2$$

$$312 \div 100 = 3.12$$

$$312 \div 1,000 = 0.312$$

$$906 \div 10 = 90.6$$

$$906 \div 100 = 9.06$$

$$906 \div 1,000 = 0.906$$

Concrete

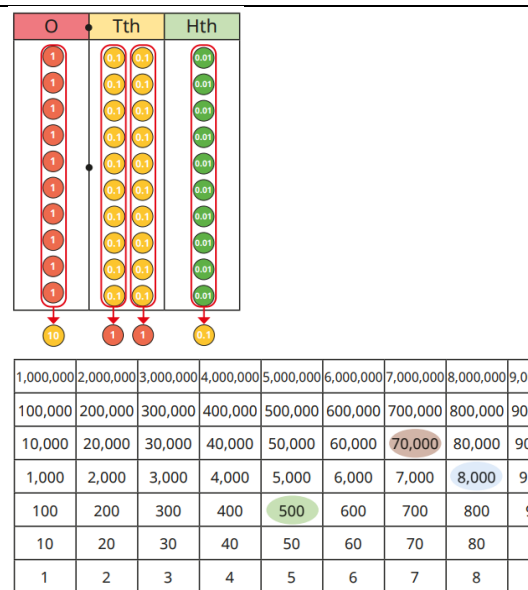
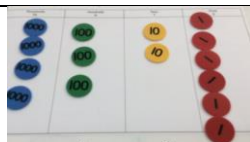
Pictorial

Abstract

$$460 \times 10$$

$$46,000 \div 1,000$$

and that dividing by 1,000 is the same as dividing by 10 three times.



Divide decimals by integers

This is the first time children divide decimals by numbers other than 10, 100 or 1,000

Key Representations

I know that $\dots \div \dots = \dots$,
so I also know that $\dots \div \dots = \dots$



$$39 \div 3 = 13$$

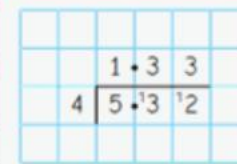
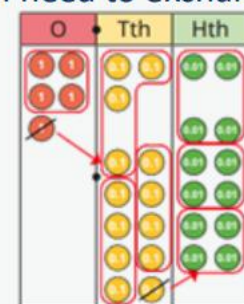


$$3.9 \div 3 = 1.3$$



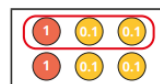
$$0.39 \div 3 = 0.13$$

I need to exchange 1 ... for 10 ...



Concrete

Pictorial



$$2.4 \div 2 = 1.2$$

Abstract

$$3.27 \div 3 =$$

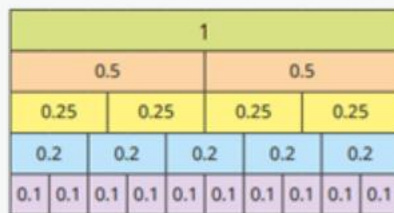
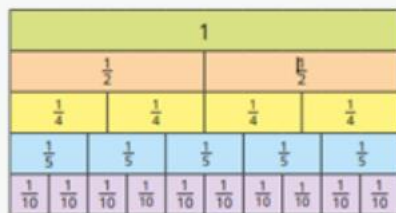
$$\underline{\quad} = 6.05 \div 5$$



Decimal and fraction equivalents

Key Representations

The fraction ... is equivalent to the decimal ...



$$\frac{1}{5} = 0.2$$

$$\frac{2}{5} = 0.4$$

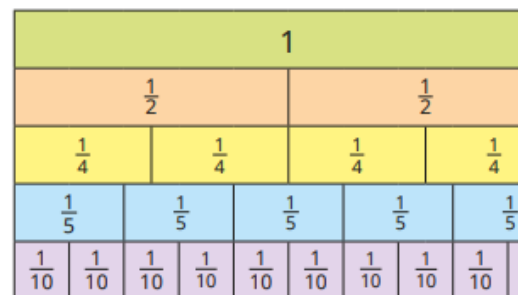
$$\frac{3}{5} = 0.6$$

$\frac{3}{4}$ is equal to $\frac{75}{100}$

$$\frac{3}{4} \xrightarrow{\times 25} \frac{75}{100} = 0.75$$

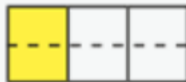
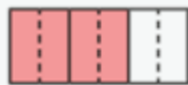
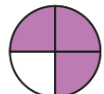
Concrete

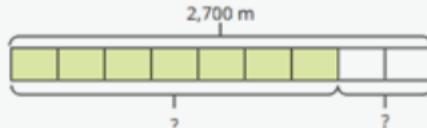
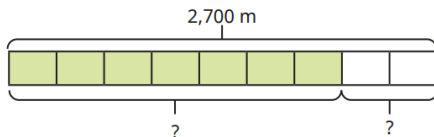
Pictorial



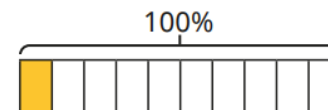
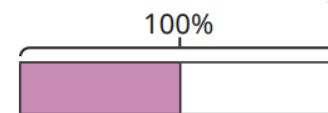
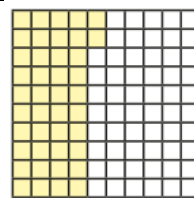
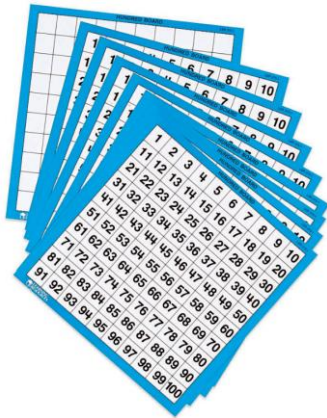
Abstract

$$\frac{3}{4} \xrightarrow{\times 25} \frac{75}{100} = 0.75$$

		<table><tr><td colspan="10">1</td></tr><tr><td colspan="5">0.5</td><td colspan="5">0.5</td></tr><tr><td colspan="2">0.25</td><td colspan="3">0.25</td><td colspan="2">0.25</td><td colspan="3">0.25</td></tr><tr><td colspan="2">0.2</td><td colspan="2">0.2</td><td colspan="2">0.2</td><td colspan="2">0.2</td><td colspan="2">0.2</td></tr><tr><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0.1</td><td>0</td></tr></table>	1										0.5					0.5					0.25		0.25			0.25		0.25			0.2		0.2		0.2		0.2		0.2		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0
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0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0																																											
Divide a fraction by an integer This is the first time children divide fractions by an integer.	Key Representations ... 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 ... $\div$... = ... $\div$...  $\frac{2}{3} = \frac{4}{6}$ so $\frac{2}{3} \div 4 = \frac{4}{6} \div 4 = \frac{1}{6}$	Concrete 	Pictorial  $\frac{3}{4} \div 3 = \underline{\hspace{2cm}}$  $\frac{4}{7} \div 2 = \underline{\hspace{2cm}}$	Abstract $\frac{6}{11} \div 3$$\frac{20}{23} \div \underline{\hspace{2cm}} = \frac{4}{23}$																																																
	Key Representations																																																			

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 $\square$ = 48																																
	Concrete 	Pictorial 	Abstract $\frac{5}{8}$ of 160 = $\square$ $\square$ of 160 = 60																																
	Calculate percentages Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples	Key Representations There are ... lots of ... % in 100% To find ... %, I need to divide by ... <table><tr><td colspan="4">100%</td></tr><tr><td colspan="2">50%</td><td colspan="2">50%</td></tr><tr><td>25%</td><td>25%</td><td>25%</td><td>25%</td></tr></table> 50% of ... = $\dots \div 2$ 25% of ... = $\dots \div 4$... % is made up of ... %, and ... % <table><tr><td colspan="10">100%</td></tr><tr><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td><td>10%</td></tr></table> To find 30%, I can find 10% and then multiply it by 3 To find 23%, I can use $10\% \times 2$ and $1\% \times 3$ To find 99%, I can find 1%, then subtract from 100%			100%				50%		50%		25%	25%	25%	25%	100%										10%	10%	10%	10%	10%	10%	10%	10%	10%
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10%	10%	10%	10%	10%	10%	10%	10%	10%	10%																										
	Concrete	Pictorial	Abstract																																

of these amounts to find any percentage .



50% of 3420 =

10% of 3000 =

5% of 20 =

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

Key Representations

For every ... , there are ...

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

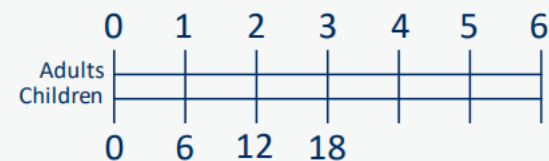
adults



children



		$\div 6$	
		Adults	Children
$\div 3$	1	1	6
	2	2	12
	3	3	18
		$\div 6$	



The ratio of children to adults is 6 : 1

keep the ratio equivalent. Double number lines and ratio tables help children to see both horizontal and vertical multiplicative relationships	Concrete 	Pictorial   yellow purple	Abstract Write the ratio of: - bananas to strawberries - cherries to strawberries - strawberries to bananas to cherries - cherries to strawberries to bananas Draw a bar model to represent each ratio. 
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