

Division

Key Language: Half, halved, groups, equal, fair, unfair, unequal, odd, even

Nursery

•

Concrete

Pictorial

Abstract

Conceptual Vairation: Can you share 7 equally?

Division

Key Language:

Half, halved, groups, equal, fair, unfair, unequal, odd, even

Reception

ELG

- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

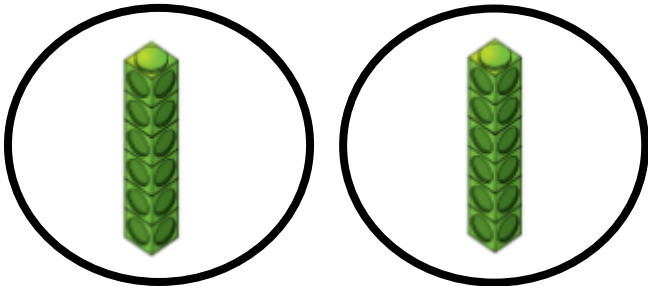
Resources

- multilink
- numicon
- part whole
- objects to count
- tens frames
- number lines

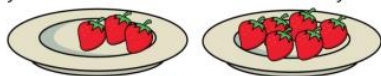
Concrete

Halving

Understanding halving as sharing equally/fairly between 2 things

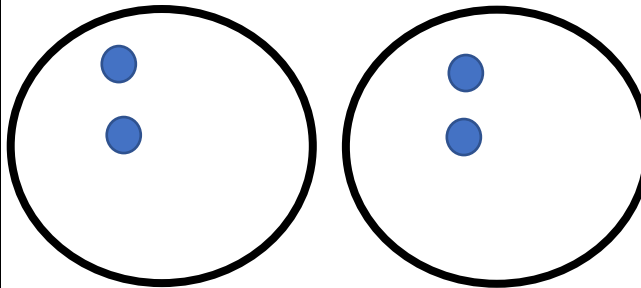


Children to move objects between two groups making sure the groups



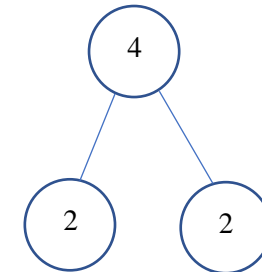
Pictorial

sharing between 2 groups- children to check the groups are equal



Abstract

Part whole model- children to check the 2 groups add to give the whole (how many they started with)

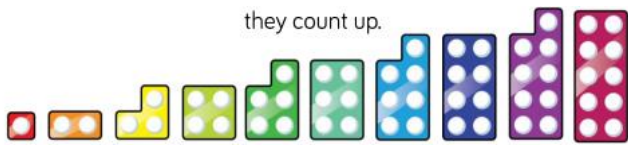


Odds and evens

Children to understand that numbers that can be shared/halved equally are even and those that can't are odd.

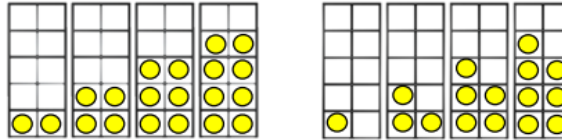


use multilink to show that the numbers can be halved or paired equally.



Numicon to show that the groups cannot be shared equally between two/ do not have pairs and one left on its own

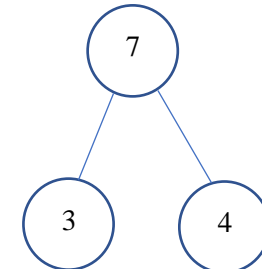
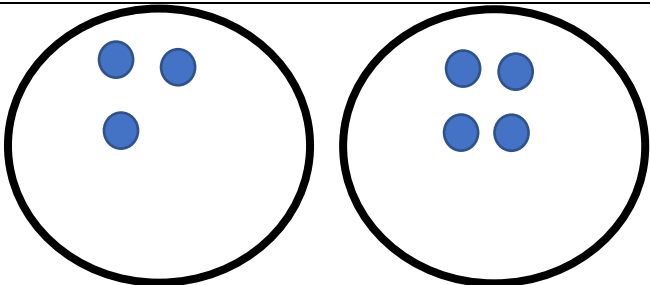
children to draw into tens frames to show odd and even numbers- similar pattern to numicon.



Children to recognise the pattern of odd and even numbers.



Conceptual Variation: Can you share 7 equally?



Division

Key Language: Half, halved, groups, equal, fair, unfair, unequal, odd, even, sharing, grouping

Year 1

Year 1

- 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.

Resources

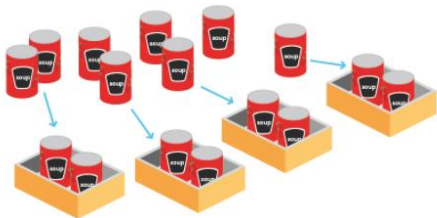
- counters
- objects for counting
- number lines
- multilink

Concrete

Grouping



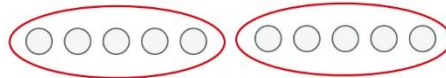
*There are 10 children altogether.
There are 2 in each group.
There are 5 groups.*



*There are 8 cans of soup altogether.
There are 2 in each group.
There are 4 groups.*

Pictorial

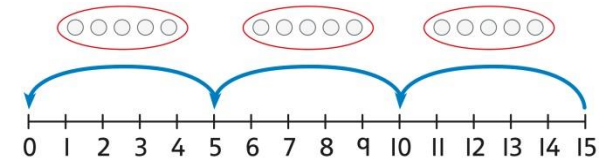
Using counters to create equal groups



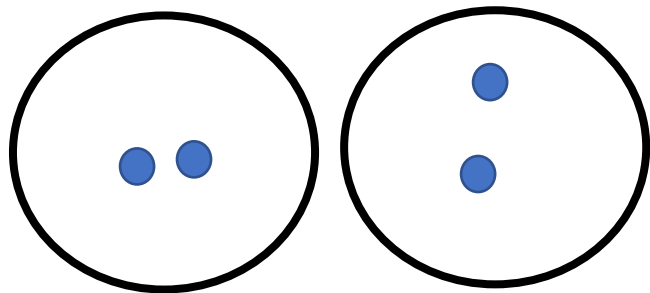
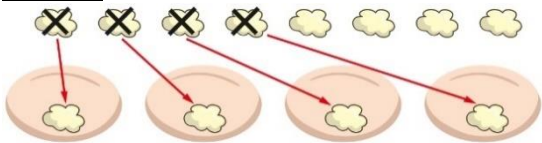
*There are 10 children altogether.
There are 2 in each group.
There are 5 groups.*

Abstract

skip counting



Sharing



children to draw groups and share objects between each group

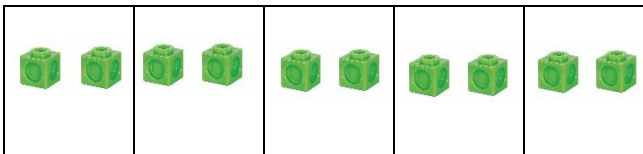


Children could also use multilink/counters

Use of stem sentences:

10 shared into 2 equal groups gives 5 in each group.

Conceptual Vairation: I have 10 cubes. If I put them into groups of 2, how many groups will I have?



use of a number line to show that they have made jumps of 2 to 10

Division

Key Language: Half, halved, groups, equal, fair, unfair, unequal, odd, even, sharing, grouping, dividing

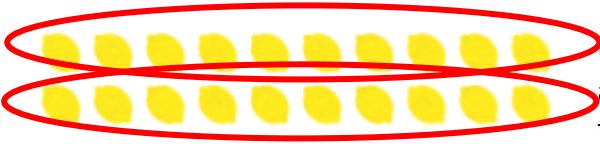
Year 2

- Year 2**
- 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.

- Resources**
- counters
 - tens frames
 - number lines
 - bar model
 - plates

Concrete

Grouping



Use of arrays to group- children to see the link between multiplying and dividing.

Pictorial

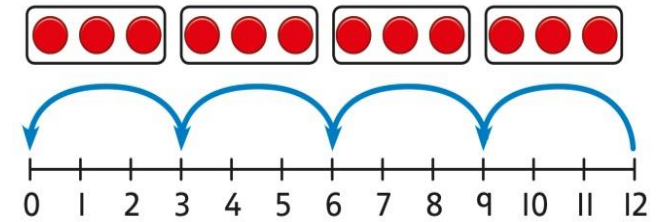
$12 \div 3 = 4$

$12 \div 4 = 3$

$12 \div 6 = 2$

$12 \div 2 = 6$

Abstract

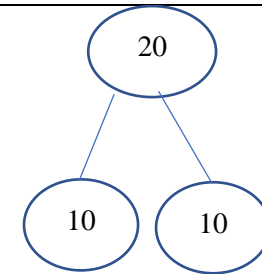


There are 4 groups now.

or

$20 \div 2 = 10$ is a division equation.
 $20 \div 2 = 10$ is read as twenty divided by two equals ten.

or



Sharing

There are 18 sausages.



Put 18 sausages
equally on 2 plates.



or

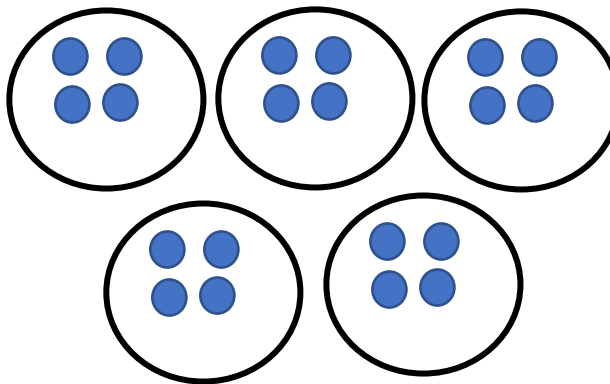


15

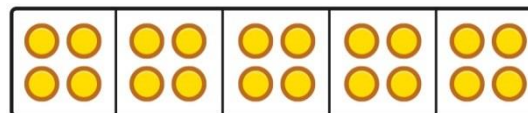


They get 5  each.

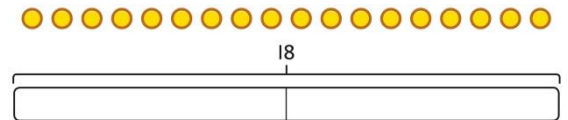
Sharing between groups:
Plates/squares



or



Sharing between groups- using a bar model

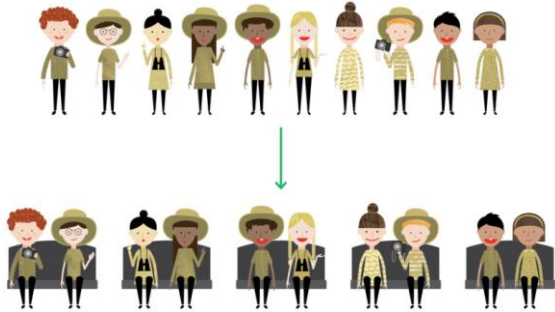


Or

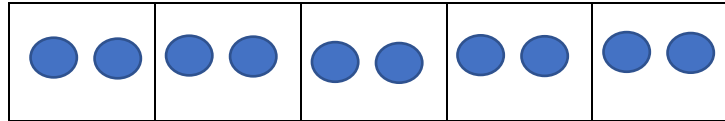
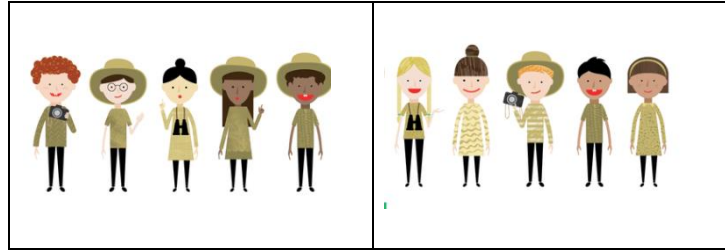
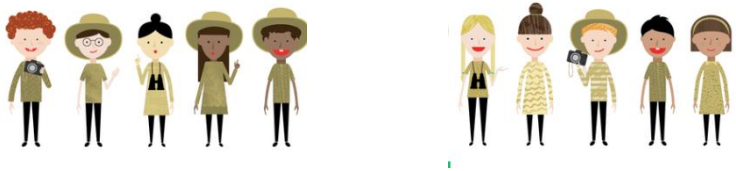
18 share equally between two groups leaves 9 in each group.

Dividing by 2

See concrete



Or



Represent using division statements

Dividing by 5
Grouping in groups of 5

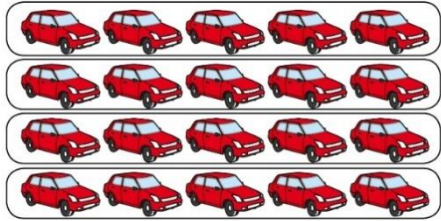
20 divided in to groups of 5 is 4 groups.

Represent pictorially.

Use known multiplication facts to support.

I know that 4 groups of 5 makes 20 so I know that 20 divided by 5 is 4.

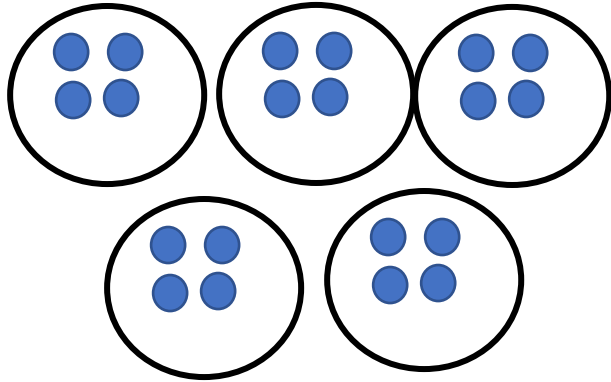
$4 \times 5 = 20$ so $20 \div 5 = 4$



(Array)

Or

20 shared equally into 5 groups is 4 in each group



Use understanding of repeated addition to support dividing- shows links/relationship between multiplication



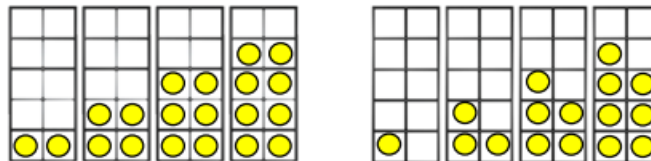
20			
5	5	5	5

Dividing by 10

Follow methods in dividing by 5

Odd and even numbers

children to recognise patterns of odd numbers.



Children to recognise odd and even numbers using known facts- 2 times table.

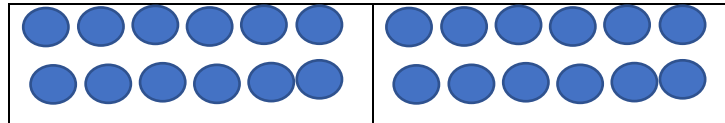
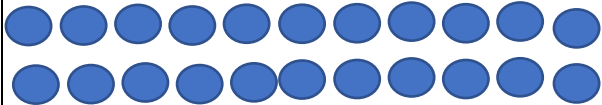
Children to recognise that even are divisible by 2



4 cupcakes



Conceptual Vairation: *I have 24 cakes that I want to share between 2 people at a party. How many cakes will they get each?*



Recall of division facts

$$24 \div 2 = 12$$

Division

Key Language: groups, equal, fair, unfair, unequal, odd, even, sharing, grouping, dividing, dividend, divisor, quotient, fact families, related facts, regrouping

Year 3

Year 3

- 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.

Resources

- dienes
- plates
- counters
- multiplication grids
- number lines
- part whole models
- bar models

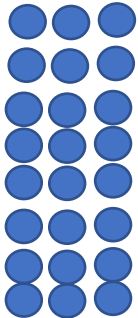
Concrete

Dividing by 3

Sharing



Or grouping

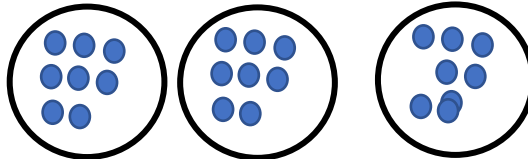


Pictorial

$$24 \div 3 = 8$$

$$3 \times 8 = 24$$

Sharing



Grouping

$$24 \div 3 = 8$$

$$8 \times 3 = 24$$

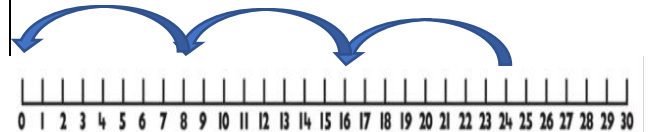
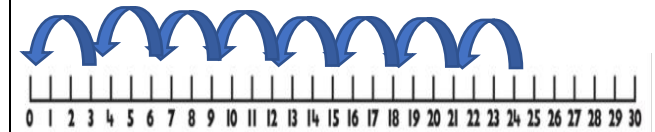
Represent using arrays

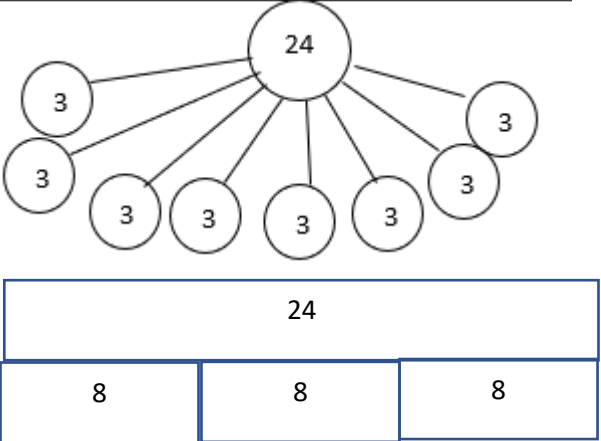
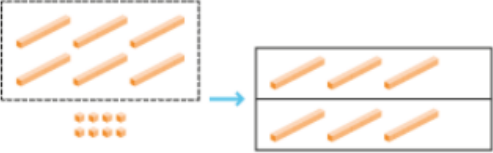
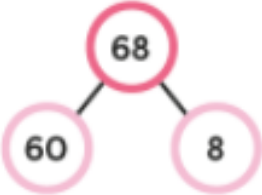
Abstract

Using known facts

I know $3 \times 8 = 24$ so $24 \div 3 = 8$.

I know $8 \times 3 = 24$ so $24 \div 8 = 3$



		
<p>Dividing by 4 Follow similar concepts to dividing by 3</p>		
<p>Dividing by 8 Follow similar concepts to dividing by 3</p>		
<p>Simple dividing Using dienes 6 tens divided by 2 is 3 tens. $68 \div 2 = \square$ Step 1 Divide 6 tens by 2.</p> 	<p>Represent pictorially</p>	<p>Using known facts</p>  <p>60 dividing by 2 = 30 8 divided by 2 = 4</p>

8 ones divided by 2 is 4 ones

Step 2 Divide 8 ones by 2.

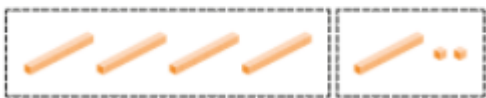


Dividing with regrouping

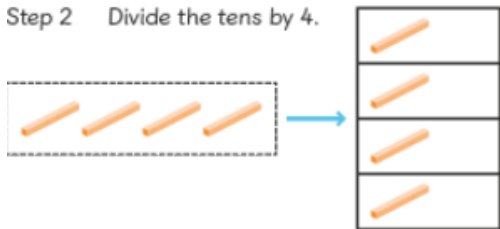
Children to use known facts from the each times table to support them in recognising known multiples

$$52 \div 4 = \square$$

Step 1 Split 52 into 40 and 12.



Step 2 Divide the tens by 4.

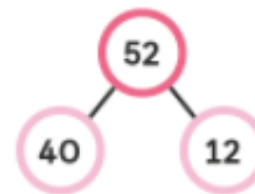


Step 3 Regroup 1 ten into 10 ones.



Represent pictorially

Using known facts to support with partitioning the dividend.



40 divided by 4 = 10

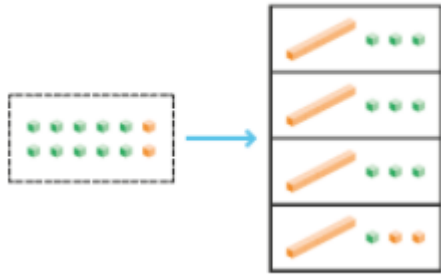
12 divided by 4 = 3

10 + 3 = 13

So

52 divided by 4 = 13

Step 4 Divide the ones by 4.



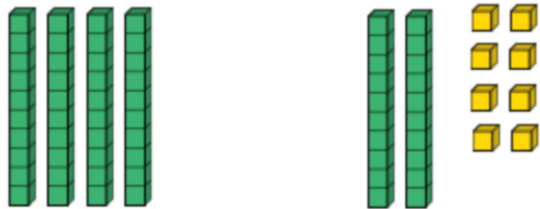
Conceptual Variation: 68 people need to be placed on a ride. Each cart seats 4 people. How many carts are needed to fit everyone on the ride?

Partition 68 into 2 multiples of 4 and divide

$$40 \div 4 = 10$$
$$28 \div 4 = 7$$
$$10 + 7 = 17$$

Represent pictorially

$$40 \div 4 = 10$$
$$28 \div 4 = 7$$
$$10 + 7 = 17$$



Division

Key Language:

groups, equal, fair, unfair, unequal, odd, even, sharing, grouping, dividing, dividend, divisor, quotient, fact families, related facts, remainders, long division, short division

Year 4

Year 4

- recall multiplication and division facts for multiplication tables up to 12×12
- 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.

Resources

- dienes
- counters
- place value counters
- number lines
- part whole models
- bar models
- bus stop models

Concrete

Pictorial

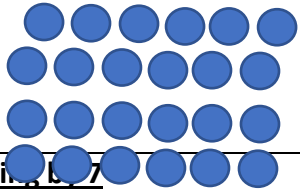
Abstract

Dividing by 6

Sharing
 $24 \text{ divided by } 6 = 4$



grouping



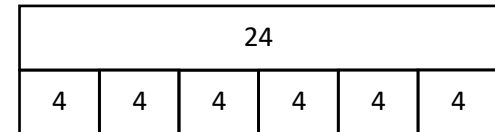
Dividing by 7

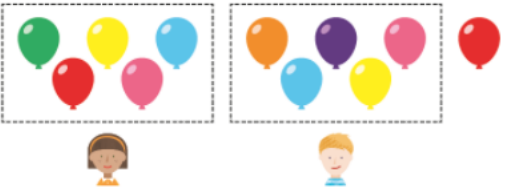

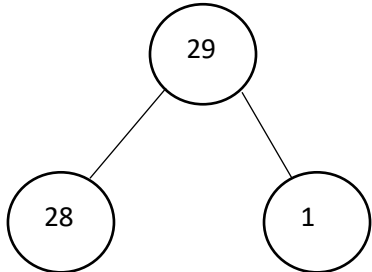
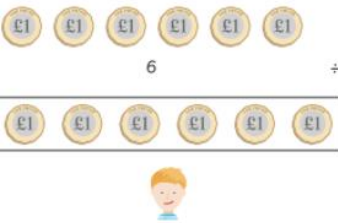
Represent pictorially

Use related facts to support understanding of dividing by 6

$4 \times 6 = 24$ so 24 divided by 6 = 4
 $6 \times 4 = 24$ so 24 divided by 4 = 6

Or

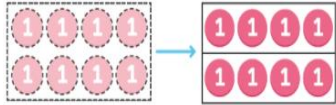


<p>Follow similar concepts to dividing by 3</p>		
<p>Dividing 9 Follow similar concepts to dividing by 3</p>		
<p>Dividing by 11 and 12 Follow similar concepts to dividing by 3</p>		
<p>Dividing with a remainder</p>  <p>Divide ones then tens 29 divided by 2 = 14 remainder 1 Children to keep groups equal</p> 	<p>Represent pictorially</p>	<p>Using known multiples and partitioning to divide</p>  <p>28 divided by 2 is 14- remainder one</p>
<p>Dividing by 1</p> 	<p>Use pictorially</p>	<p>Stem sentence:</p> <p><i>When the divisor is 1 the quotient and the dividend will always be the same.</i></p>

Dividing 2 digit numbers

$68 = 60 + 8$

$8 \div 2 = \square$



Divide 8 ones by 2.



$8 \div 2 = 4$

$60 \div 2 = \square$

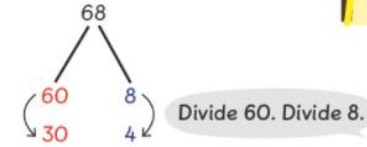
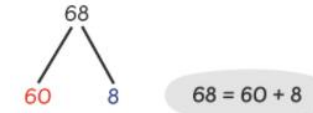


Divide 6 tens by 2.

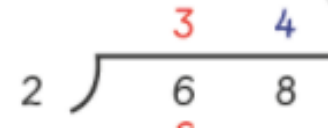


Represent pictorially.

Method 1

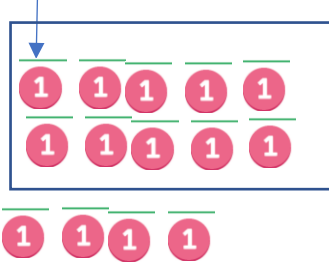


Or bus stop method

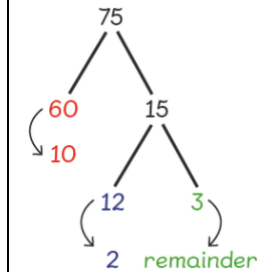


60 divided by 2 = 30
8 divided by 2 = 4
30 + 4 = 34


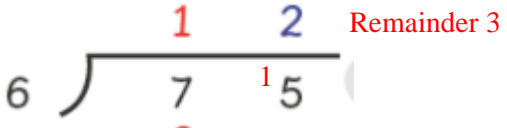



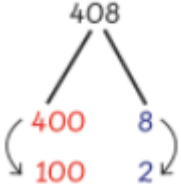
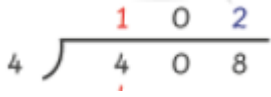
Dividing 2 digit numbers with remainders



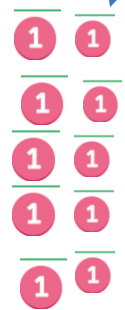
Represent pictorially



60 divided by 6 = 10
12 divided by 6 = 2
Remainder 3

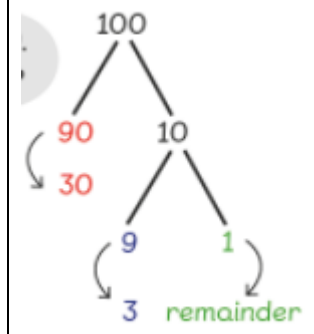
		
<p>Dividing 3 digit numbers 444 divided by 4 = 111</p> <p>$4 \div 4 = \square$</p>  <p>$4 \div 4 = 1$</p> <p>$40 \div 4 = \square$</p>  <p>$40 \div 4 = 10$</p> <p>$400 \div 4 = \square$</p>  <p>$400 \div 4 = 100$</p>	<p>Represent pictorially</p>	<p>Partition into multiples of the divisor</p>  <p>Or bus stop method</p> 
<p>Dividing 3 digit numbers with remainders</p>	<p>Represent pictorially</p>	<p>Use known facts</p> <p>$100 = 90 + 9 + 1$ 90 divided by 3 = 30</p>

$100 \div 3 = \square$ $100 \rightarrow$ 10 10 10 10 10 10 10 10 10 10

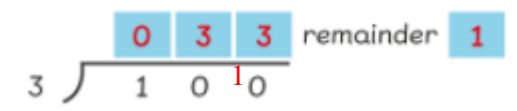


Remainder
1

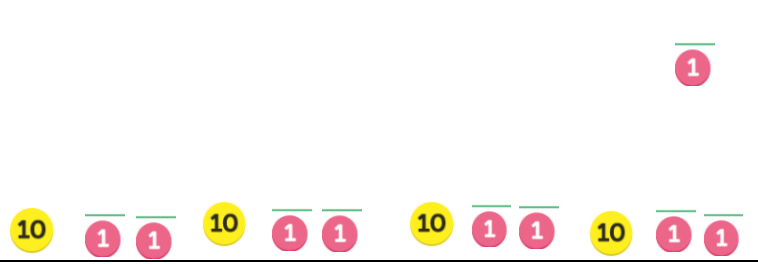
9 divided by 3 = 3
30 + 3 = 33 remainder 1



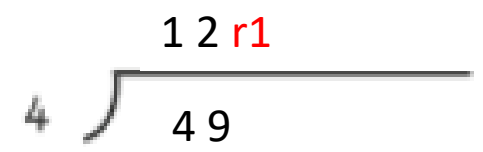
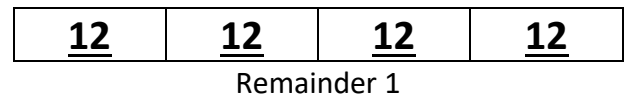
Or bus stop



Conceptual Vairation: 49 sweets are shared between 4 friends. How many sweets are left over?



Represent pictorially



Division

Key Language: groups, equal, fair, unfair, unequal, odd, even, sharing, grouping, dividing, dividend, divisor, quotient, fact families, related facts, remainders

Year 5

Year 5

- 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

Resources

- place value grid
- part whole models
- bar models
- place value counters
- long division calculation frame
- multiplication grid

Concrete

Dividing by 10, 100 and 1000

4000 divided by 1000



4000 divided by 100



Pictorial

Represent pictorially

Abstract

Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.

Th	H	T	O
3	2	0	0

$3,200 \div 100 = ?$

3,200 is 3 thousands and 2 hundreds.

$200 \div 100 = 2$

$3,000 \div 100 = 30$

$3,200 \div 100 = 32$

So, the digits will move two places to the right.

4000 divided by 10

$\times 40$

Dividing 3 digit and 4 digit numbers

$930 \div 3$

Represent pictorially

900 divided by 3 = 300
 30 divided by 3 = 10
 930 divided by 3 = 310

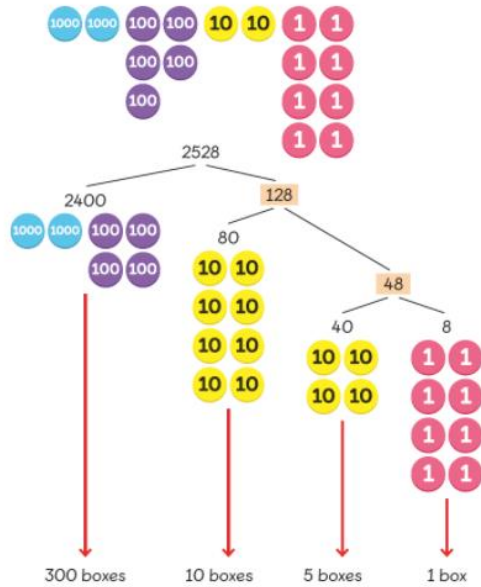
Or long division

$$\begin{array}{r}
 310 \\
 3 \overline{) 930} \\
 \underline{- 900} \quad \rightarrow 300 \\
 30 \\
 \underline{- 30} \quad \rightarrow 10 \\
 0
 \end{array}$$

Dividing 4 digit numbers

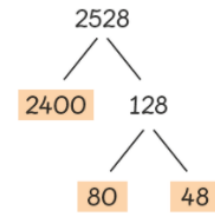
2528 divided by 8 = 316

Find multiples of 8



Represent pictorially

Known multiples



2400 divided by 8 = 300

80 divided by 8 = 10

48 divided by 8 = 6

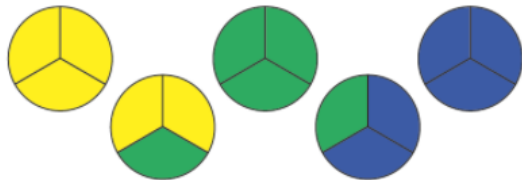
300 + 10 + 6 = 316

70 + 5 = 75 Remainder 1

Dividing a fraction by a whole number

5 apples divided by 3

Method 1



Method 2



3 apples shared equally among 3 friends.

The remaining 2 apples are shared equally among 3 friends.

Represent pictorially

5 apples shared equally among 3 friends.

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

$\frac{5}{3}$ is an improper fraction.

$$5 \div 3 = 1\frac{2}{3}$$

$1\frac{2}{3}$ is a mixed number.



Each friend gets $\frac{5}{3}$ of an apple which is an apple and $\frac{2}{3}$ of an apple.

Conceptual Vairation:

Jack is calculating $2,240 \div 7$

He says you can't do it because 7 is larger than all of the digits in the number.

Do you agree with Jack?
Explain your answer.

2240

 divided by 7 = 300

 divided by 7 = 20

Represent pictorially

$$\begin{array}{r} 320 \\ 7 \overline{) 2240} \end{array}$$

$$300 + 20 = 320$$



Division

Key Language:

groups, equal, fair, unfair, unequal, odd, even, sharing, grouping, dividing, dividend, divisor, quotient, fact families, related facts, remainders

Year 6

Year 6

- 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
- solve problems involving addition, subtraction, multiplication and division
- divide proper fractions by whole numbers [for example, $3\frac{1}{2} \div 2 = 6\frac{1}{4}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{8}{3}$]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal place
- use written division methods in cases where the answer has up to two decimal places
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Resources

- place value counters
- bar models
- place value grids
- part wholes
- dienes

Concrete

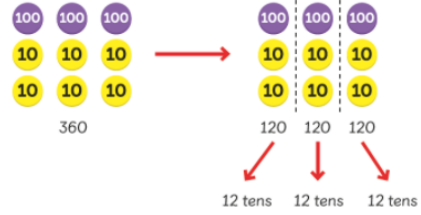
Pictorial

Abstract

dividing by 2 digit numbers

grouping:

$360 \div 12 =$



$360 \div 12 = 30$

Represent pictorially

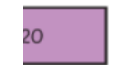
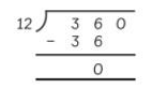
using bar models to partition the dividend in steps

$360 \div 12 =$

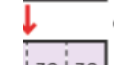


Long division

$360 \div 12 =$
 $360 = 36 \text{ tens}$

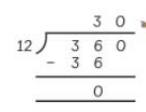


divided by 3



divided by 4

$360 = 36 \text{ tens}$
 \downarrow
 3 tens



Share equally by 12.

$36 \text{ tens} \div 12 = 3 \text{ tens}$
 $360 \div 12 = 30$

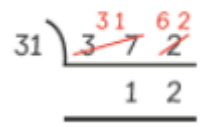
4 digit by 2 digit example:



$3200 \div 32 = 100$

$96 \div 32 = 3$

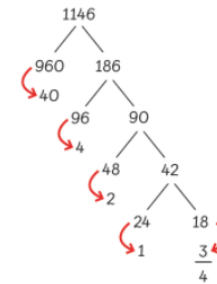
Short division



Dividing by 2 digit numbers with remainders
 Use similar processes to dividing by 2 digit numbers

Partitioning

$$£1146 \div 24 = \text{[]}$$



$$£1146 \div 24 = £47.75$$

Long division

$$£1146 \div 24 = \text{[} £47.75 \text{]}$$

$$\begin{array}{r} \text{[} 4 \text{ [} 7 \text{ [} . \text{ [} 7 \text{ [} 5 \text{]} \\ 24 \overline{) 1146} \\ \underline{- 960} \quad \rightarrow 960 \div 24 = \text{[} 40 \text{]} \\ 186 \\ \underline{- 168} \quad \rightarrow 168 \div 24 = \text{[} 7 \text{]} \\ 18 \\ \underline{- 18} \quad \rightarrow 18 \div 24 = \text{[} 0.75 \text{]} \\ 0 \end{array}$$

Finding common factors

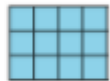
Understand that division by factors can be used when dividing by a number that is not prime.



$$12 = 1 \times 12$$



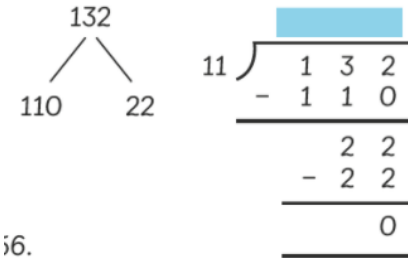
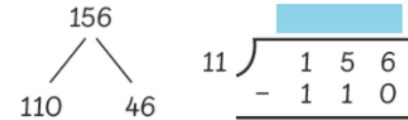
$$12 = 2 \times 6$$



$$12 = 3 \times 4$$

Represent pictorially

knowing that in order to find a factor of a number it must be able to divide equally by that number



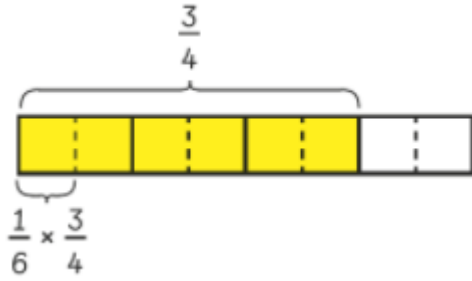
Dividing a fraction by a whole number

show the fraction using a bar a divide by the divisor:

$$\frac{3}{4} \div 6 = \frac{6}{8} \div 6$$
$$= \frac{1}{8}$$

$$\frac{3}{4} \div 6 = \frac{1}{6} \times \frac{3}{4}$$
$$= \frac{1}{8}$$

$\frac{3}{4}$ divided by 6



Dividing whole numbers 10, 100 and 1000 up to three decimal places

Represent pictorially

partition the dividend

$$32 \div 10 = 3 + 2 \text{ tenths} = 3.2$$

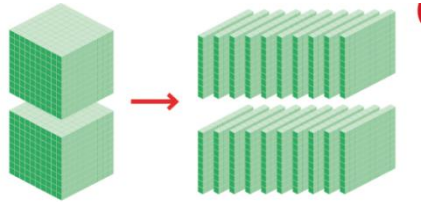
30 2 = 20 tenths

$$32 \div 100 = 3200 \text{ hundredths} \div 100$$
$$= 32 \text{ hundredths}$$
$$= 0.32$$

$2 \div 10 = \square$



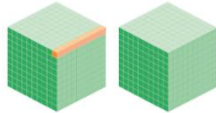
2 = 20 tenths



$2 \div 100 = \square$



2 = 200 hundredths

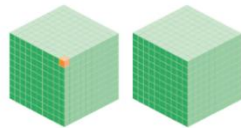


$$\begin{aligned} 2 \div 100 &= 200 \text{ hundredths} \div 100 \\ &= 2 \text{ hundredths} \\ &= 0.02 \end{aligned}$$

$2 \div 1000 = \square$



2 = 2000 thousandths

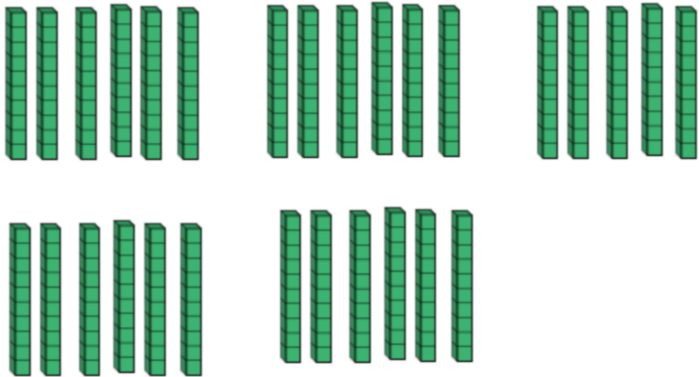


$$\begin{aligned} 2 \div 1000 &= 2000 \text{ thousandths} \div 1000 \\ &= 2 \text{ thousandths} \\ &= 0.002 \end{aligned}$$

Dividing whole numbers

Understanding the relationship between how much each part is worth when dividing 100 (seeing 100 as 1 whole)
e.g 100 divided by 8= 12.5 so 1 divided by 8= 0.125

Dividing decimals



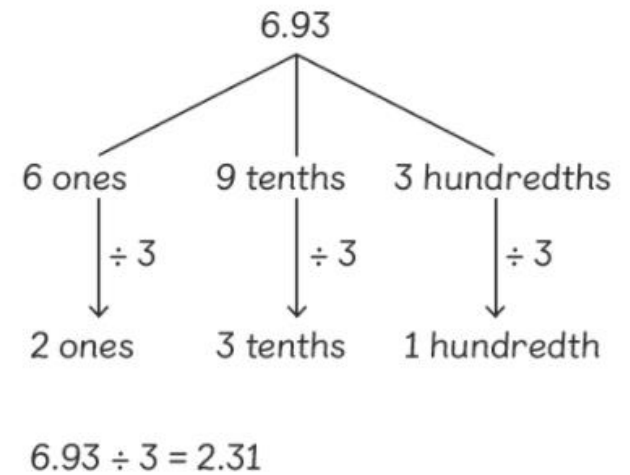
Represent pictorially

Method 2

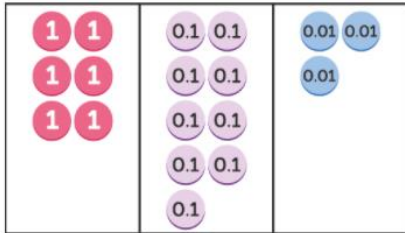
$$\begin{aligned}\frac{3}{5} &= 3 \div 5 \\ &= 30 \text{ tenths} \div 5 \\ &= 6 \text{ tenths} \\ &= 0.6 \\ \frac{3}{5} \text{ kg} &= 0.6 \text{ kg}\end{aligned}$$

Dividing decimals

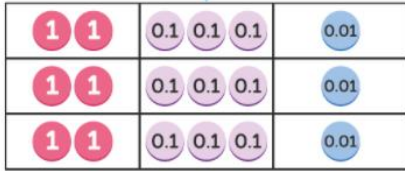
Represent pictorially



$6.93 \div 3 =$



6 \div 3
 9 tenths \div 3
 3 hundredths \div 3



2.31
 2.31
 2.31

$3 \times 2.31 = 6.93$

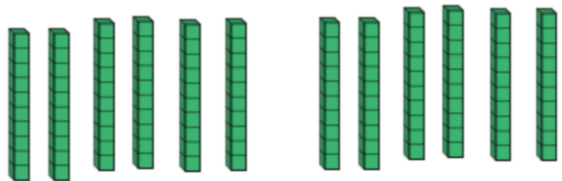
$6.93 \div 3 = 2.31$

Dividing decimals by a 2 digit number

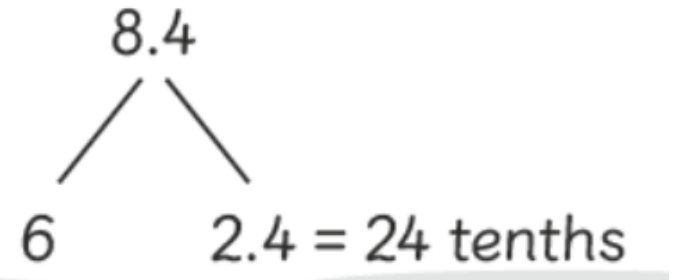
8.4 divided by 12

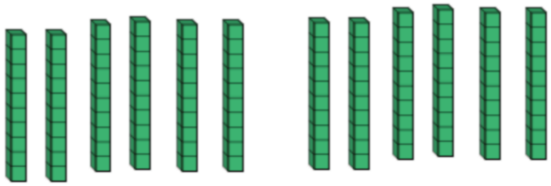
1 ten = 0.1

6 divide by 12



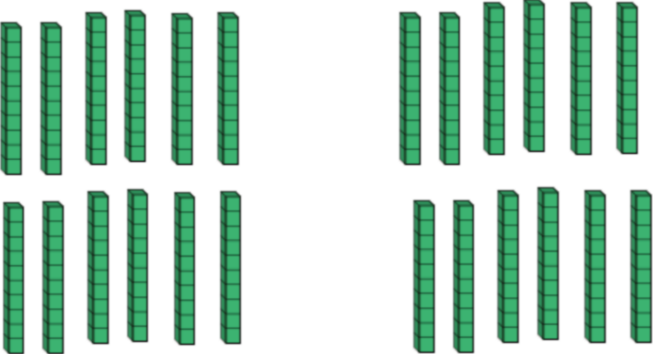
Represent pictorially



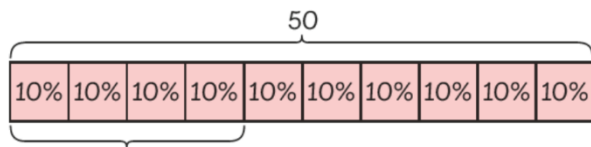


(repeat process to show that $6 \text{ divided by } 12 = 0.5$)

2.4 divided by 12



Finding the percentage of a number

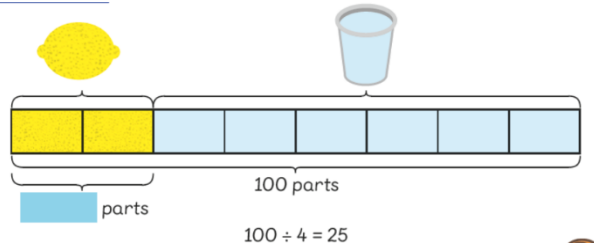


Represent pictorially

$$10\% \rightarrow 50 \div 10 = 5$$

$$40\% \rightarrow 4 \times 5 = 20$$

Finding percentage of a quantity



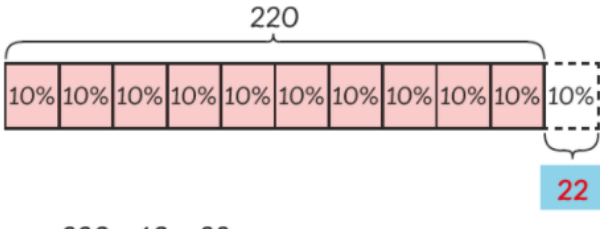
Method 3

$$25\% \text{ of } 2 \text{ l} = \frac{25}{100} \times 2000 \text{ ml}$$

$$= \frac{1}{4} \times 2000 \text{ ml}$$

$$= 500 \text{ ml}$$

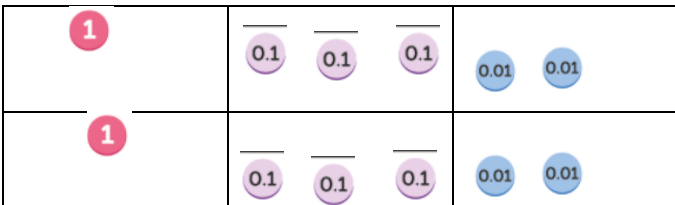
Finding percentage of change



Represent pictorially

$$220 \div 10 = 22$$

Conceptual Vairation: $3.96 \div 3$



Represent pictorially

$$3.96 \div 3 =$$

$$3 \div 3 = 1$$

$$0.9 \div 3 = 0.3$$

$$0.06 \div 3 = 0.02$$

1

0.1

0.1

0.1

0.01

0.01

$$1 + 0.3 + 0.02 = 1.32$$