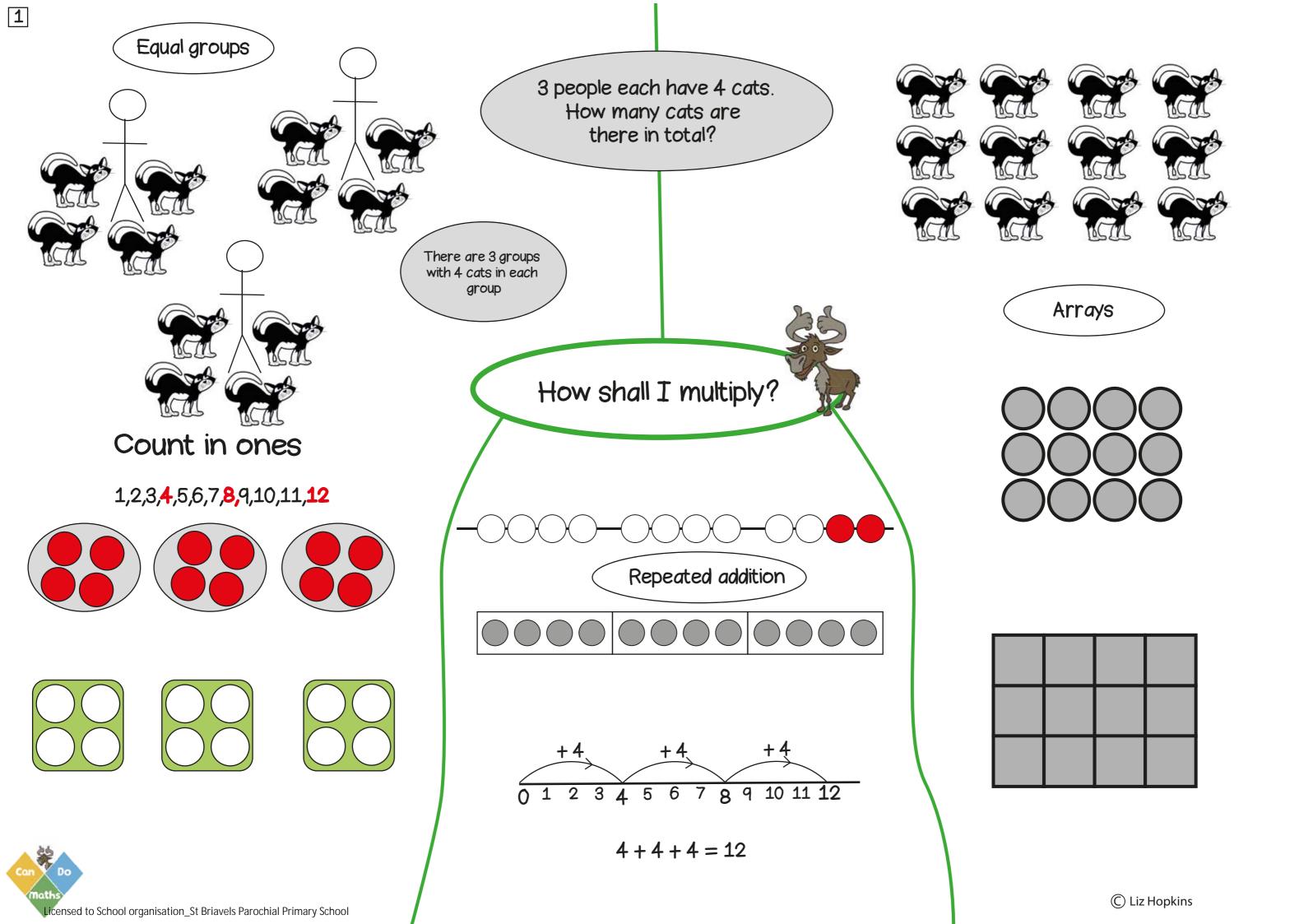


1 9-7 3 + 75 - 1, 7 - 3, 10 - 6 Find the difference between I just knew it! Use known addition facts Number facts two numbers to derive subtraction facts Single digit numbers 9 is 2 more than 7 Teens subtract single digits 7 is 2 less than 9 so If I know 3 + 7 = 10the difference then I know between 7 and 9 is 2 10 - 3 = 77 - 3 = 4Secure subtraction facts of single digits and ten +1 7 4 3 How shall I subtract? 9-3 3 Take away Notice the relationships 23 - 1 16 - 4 Counting back in 1s Find one less 17 - 10 Take away ten 1 less than 4 is 3 1 less than 14 is 13 1 less than 24 is 23 13 14 15 12 0 -10 2 5 17 0 © Liz Hopkins icensed to School organisation\_St Briavels Parochial Primary School



Sharing

12 shared into 3 equal groups

12 ÷ 3 = 4

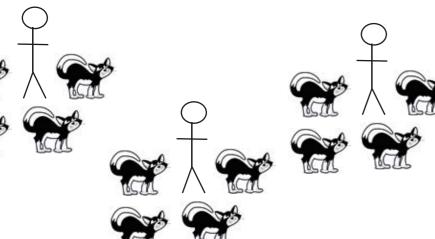
Grouping

How many groups of 3 are there in 12?

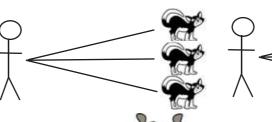
There are 12 cats.

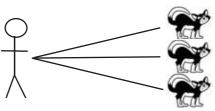
Three people each have the same number of cats. How many do they have each?

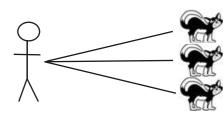




1 for you, 1 for you, 1 for you... There are 12 cats. Each person owns 3 cats. How many people are there?

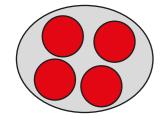


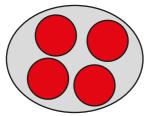


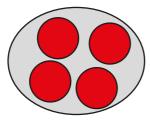




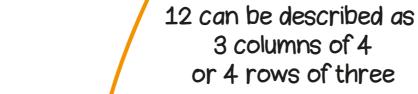


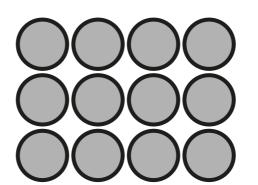


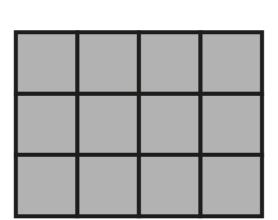


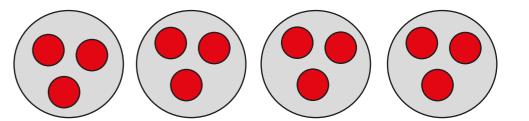


Bar model

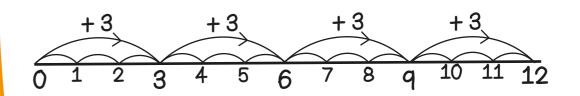


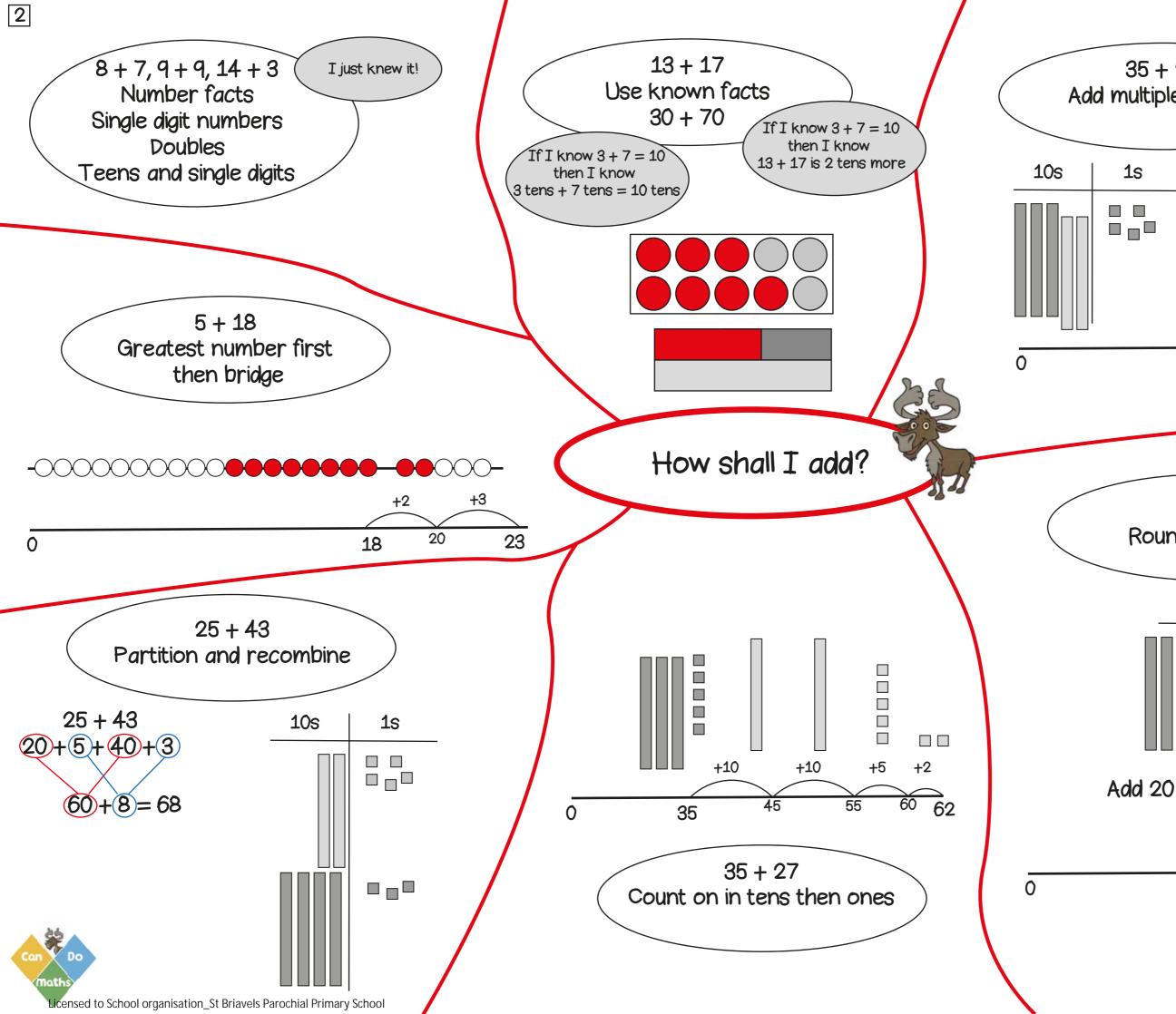


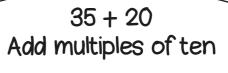


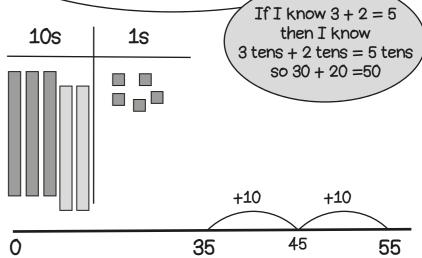


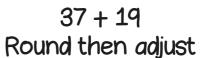


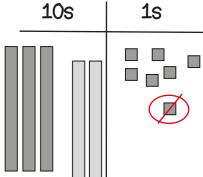




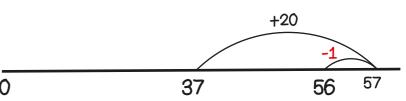








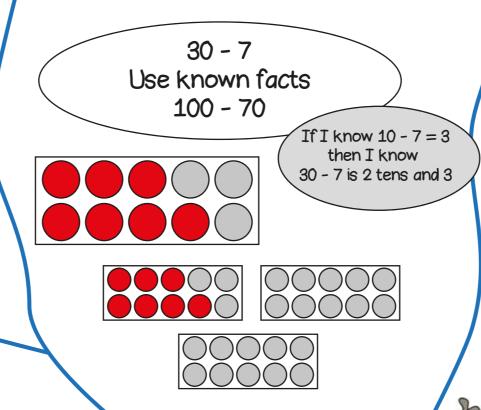
Add 20 then subtract 1





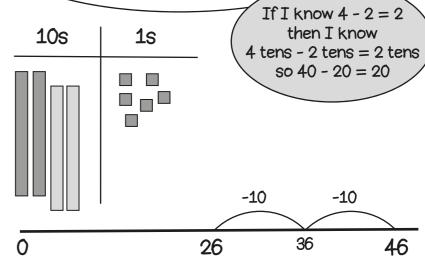
9 - 4, 13 - 5, 18 - 9 ( Number facts Single digit numbers Halves Teens and single digits I just knew it!

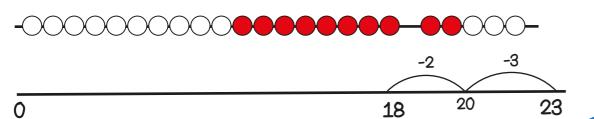
23 - 5 Count back: bridge through a multiple of ten



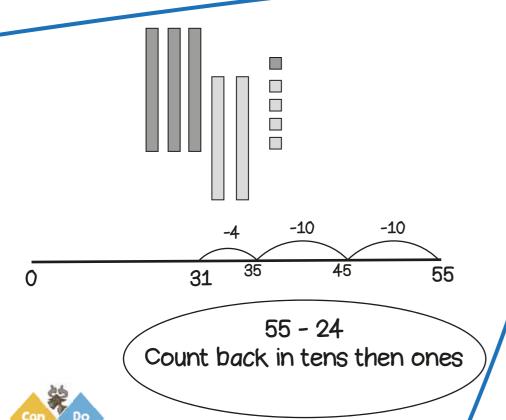
46 - 20 Count back: multiples of ten

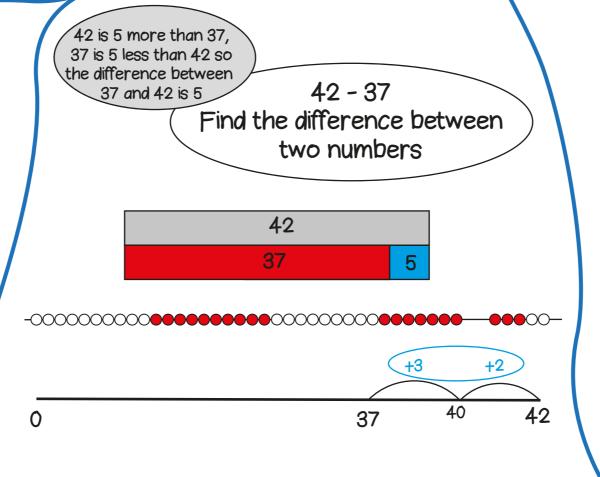
unt back: multiples of ten

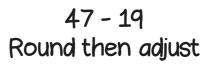


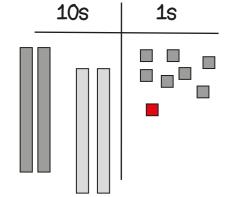


How shall I subtract?

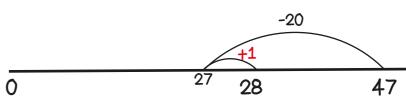






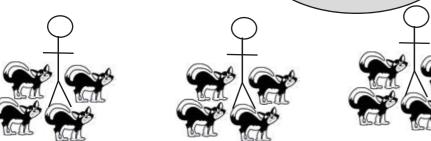


Take away 20 then add 1



Equal groups

There are 3 groups with 4 cats in each group

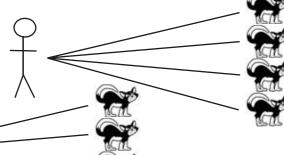


3 people each have 4 cats. How many cats are there in total?

Recall of 2x, 5x and 10x tables

One to many correspondence

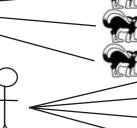
If each person has 4 cats, there are 4 times as many cats as people

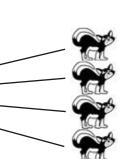




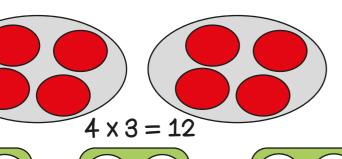


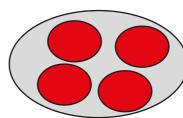






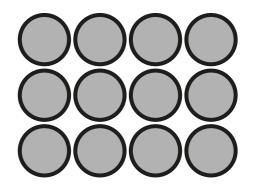
Four cats, multiplied by 3





People	Cats
1	4
2	8
3	12
	G

#### Arrays

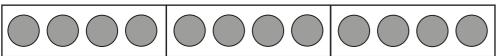


 $4 \times 3 = 12$ 

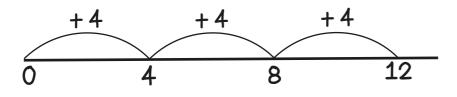
 $3 \times 4 = 4 \times 3$ 

How shall I multiply?

Repeated addition



4 4 4
-------



$$4 + 4 + 4 = 12$$

### Count in ones

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Count in twos

2, 4, 6, 8, 10,12

Use a known fact

If 2 x 3 is 6, then 4 x 3 is double 6. Sharing

12 shared into 3 equal groups

12 ÷ 3 = 4

Recall and use 2x, 5x and 10x tables

Grouping

How many groups of 3 are there in 12?

There are 12 cats.

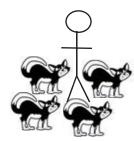
Three people each have the same number of cats.

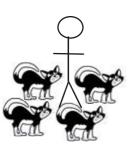
How many do they have each?

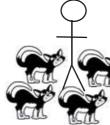


1 for you, 1 for you, 1 for you... Grab a group of 3, grab a group of 3...

There are 12 cats.
Each person owns 3 cats.
How many people are there?

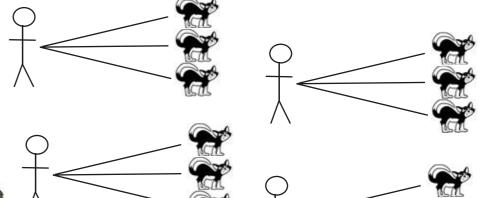


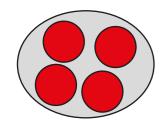


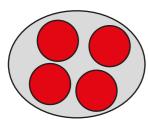


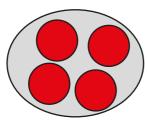
How shall I divide?



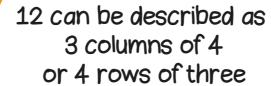


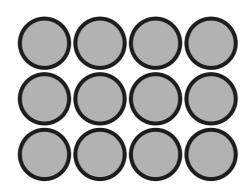


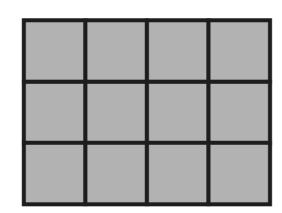




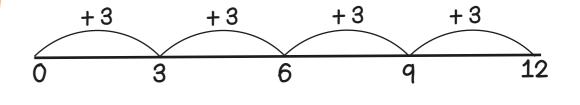
Bar model

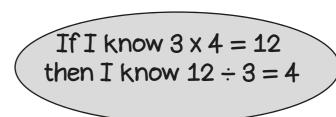


























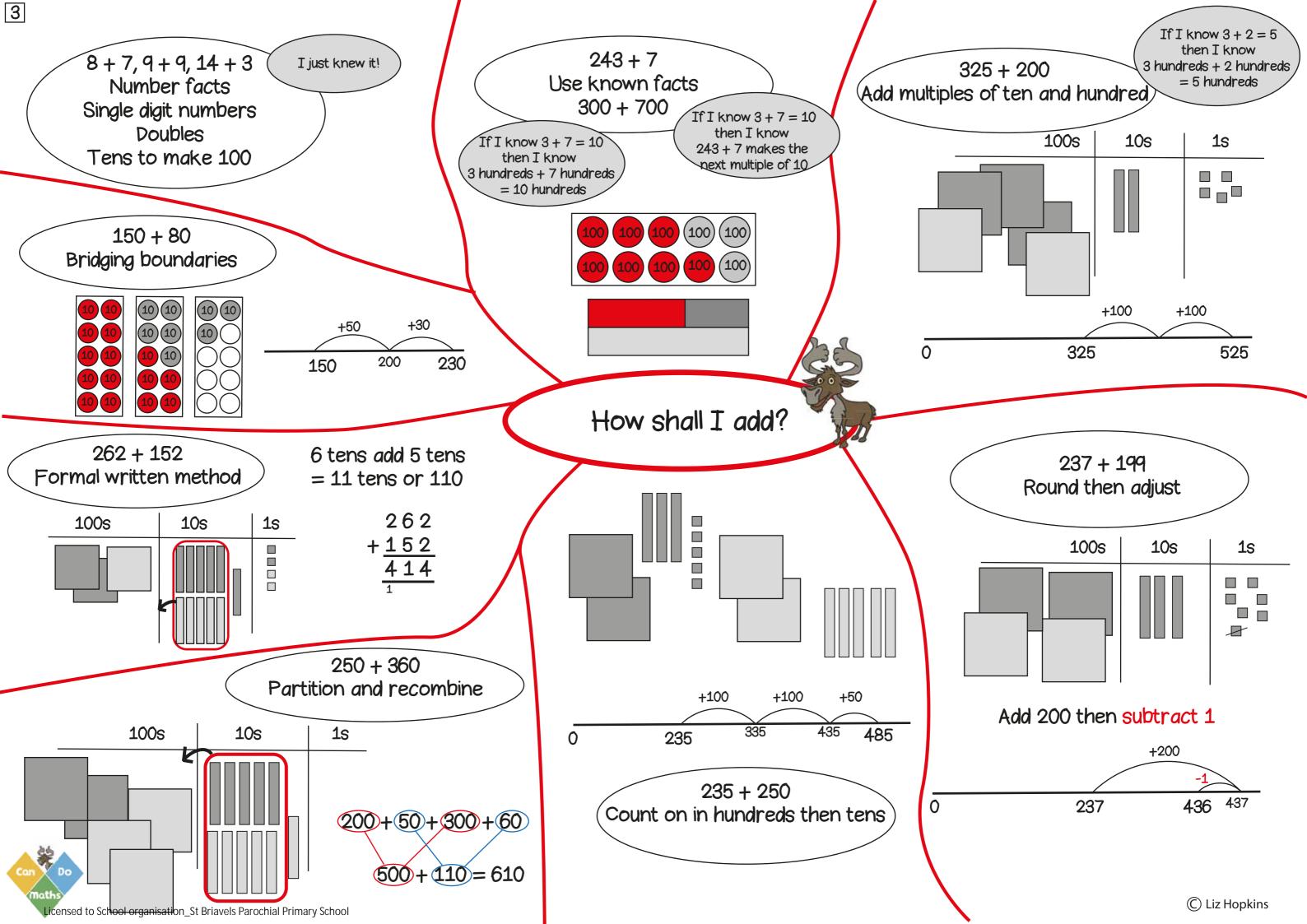


 12

 4
 4

 4
 4

Link to fractions. One third of 12 is 4





0

15 - 8, 18 - 5 Number facts Single digit numbers Teens and single digits

230 - 80

Bridging boundaries

by counting back in efficient steps

10 10

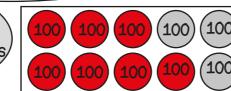
10 10

10 10

I just knew it!

240 - 7 Use known facts 1000 - 700

If I know 10 - 7 = 3then I know 10 hundreds - 7 hundreds = 3 hundreds



then I know 3 in the ones.

If I know 10 - 7 = 3any multiple of 10, take away 7 leaves

# How shall I subtract?



200

230

230 - 30 - 50 = 150

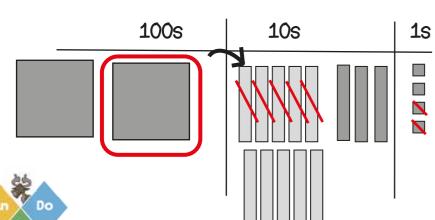
150

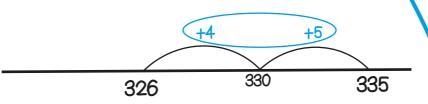
<sup>1</sup>2 <sup>1</sup>3 4 -<u>152</u> 182

$$234 = 100 + 130 + 4$$

234 - 152

Formal written method

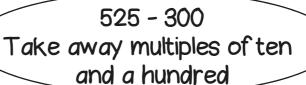


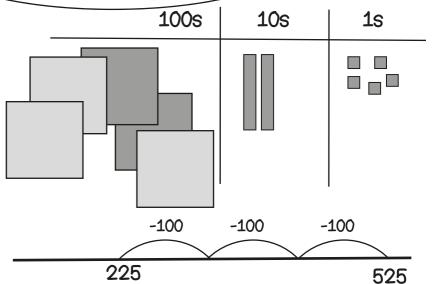


335 - 326 Find the difference between two numbers

> 335 is 9 more than 326 326 is 9 less than 335 so the difference between them is 9

335 326

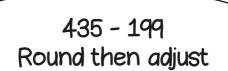


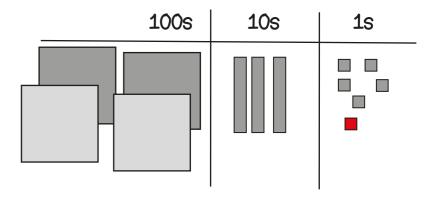


If I know 5 - 3 = 2then I know

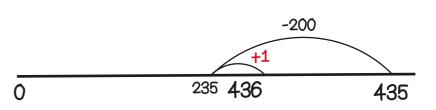
5 hundreds - 3 hundreds

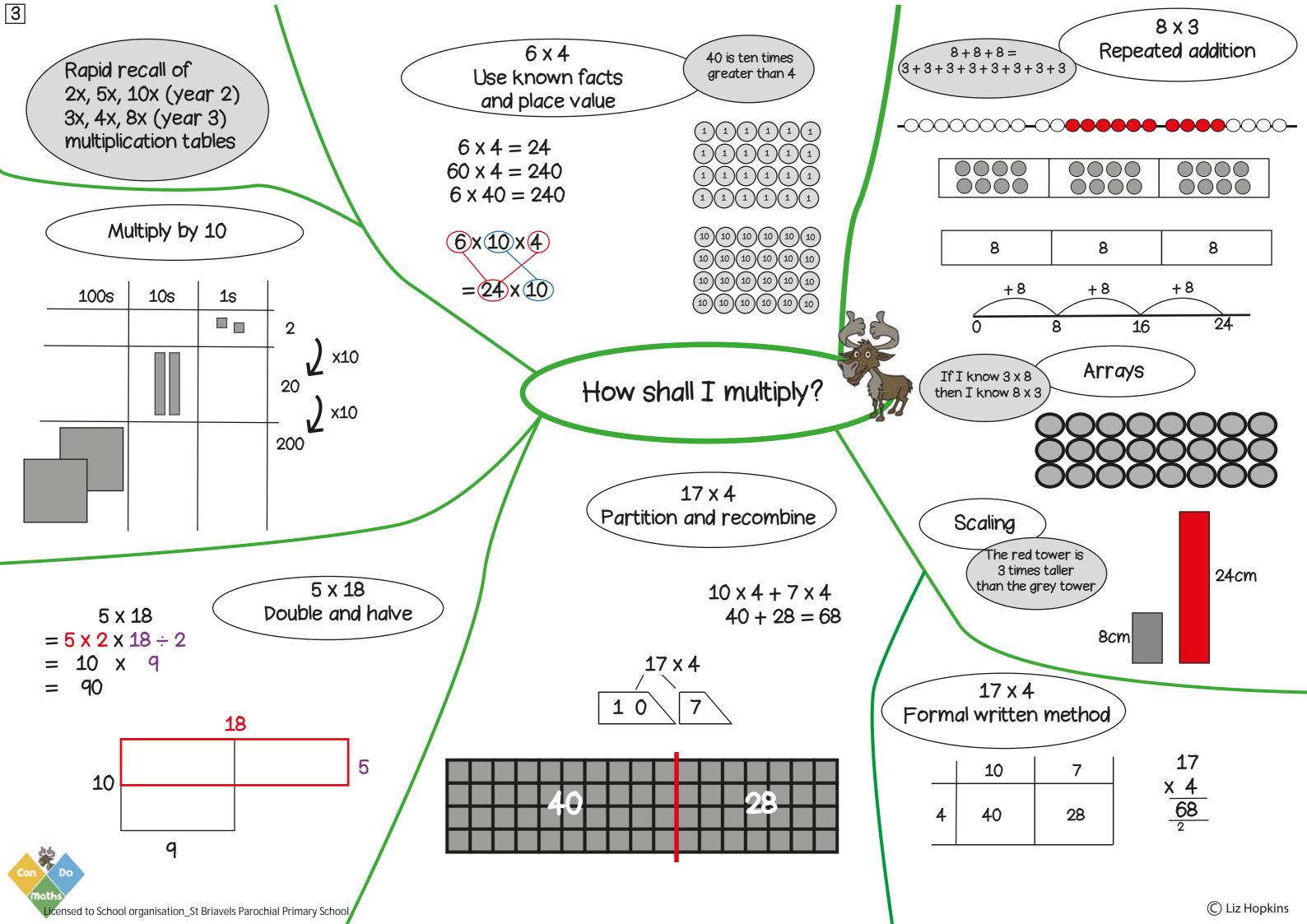
= 2 hundreds

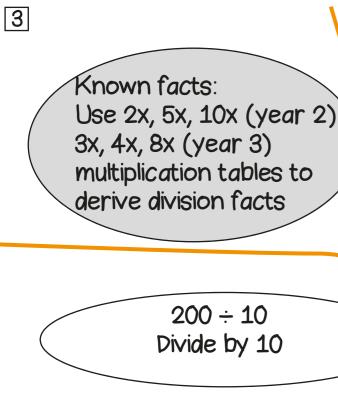




#### Take away 200 then add 1

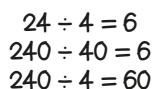






24 ÷ 4 Use known facts and place value

240 is ten times greater than 24

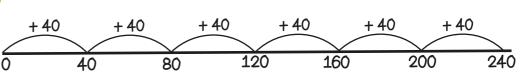


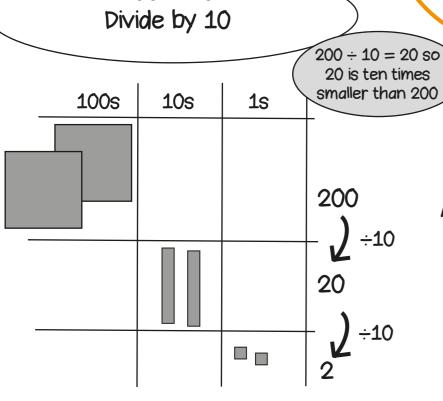
24 biscuits shared between 4 people means they will get 6 biscuits each.

If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?



 $240 \div 40 = 6$ How many steps of 40 make 240?



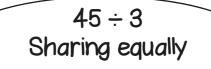


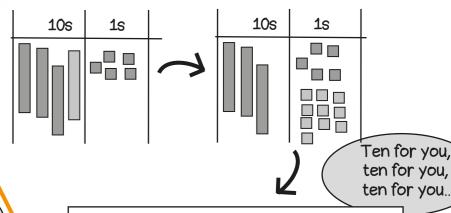
# How shall I divide?

A tenth of is

A tenth of 1 is 1 tenth

so  $1 \div 10 = \frac{1}{10}$ 



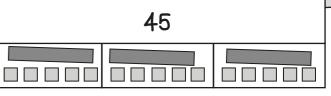


( ten lots and the rest)

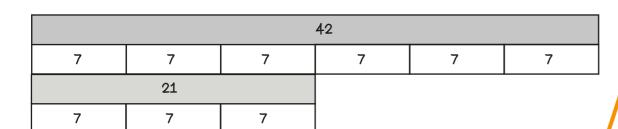
52 ÷ 4

Partition and recombine

$$52 \div 4$$
 $40$  12
 $\div 4$   $\div 4$ 
 $10$  + 3 = 13



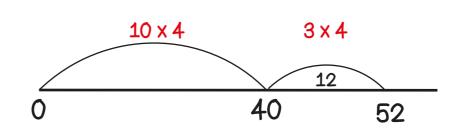
Link to fractions



If there are half as many

biscuits and half as many people...

 $42 \div 6 = 21 \div 3$ 



42 ÷ 6

Double and halve

4 1.6 + 0.7Bridge through boundaries by counting in efficient steps 0 Exchange ten of these for one of those! + 3,374 1000s Licensed to School organisation\_St Briavels Parochial Primary School

0.9 + 0.9, 74 + 26Number facts Single digit decimals Doubles Bonds of 100

I just knew it!

+0.3

Regroup and rename

2.3

2.0

1.6

10s

1s

5,748

9,122

1 1 1

100s

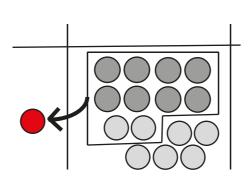
5,748 + 3,374

Formal written method

7 + 8Use known facts

> If I know 7 + 8 = 15then I know 0.7 + 0.8 = 1.5

$$70 + 80 = 150$$
  
 $700 + 800 = 1,500$ 



2,403 + 3,020Use place value to add

If I know 2+3=5then I know 2000 + 3000 = 5000

I have noticed, one number has no hundreds or ones, the other has no tens

1000s 100s 10s	s 1s

## How shall I add?

5,250 + 2,360Partition and recombine

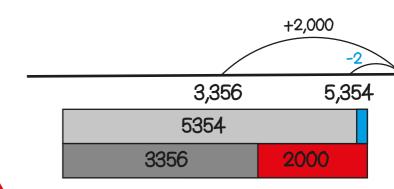
#### 3,356 + 1,998 Round then adjust

1000s	100s	10s	<b>1</b> s
			<b>Ø</b> Ø

5,356

© Liz Hopkins

Add 2,000 then take away 2 100s 10s **1**s



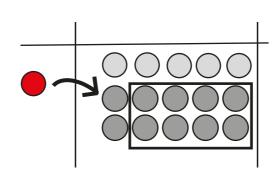
1000s

13 - 5, 1.8 - 0.8 Number facts Single digit numbers Halves Wholes and tenths

15 - 8 = 7I just knew it! Use known facts

> If I know 15 - 8 = 7then I know 1.5 - 0.8 = 0.7

$$150 - 80 = 70$$
  
 $1500 - 800 = 700$ 



6,342 - 3,020 Use place value to subtract

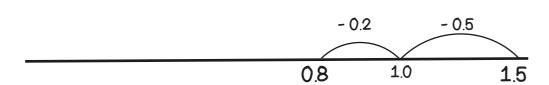
1000s

By using place value counters it is easy to see how to take away

1s

**10s** 

1.5 - 0.7Bridge through boundaries by counting in efficient steps



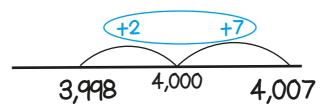
How shall I subtract?

4.56 - 1.99 Round then adjust

100s

<b>1</b> s	$\frac{1}{10}$ S	100 s

4007-3998 Find the difference between



4,007 3,998

two numbers



£0.01 2.56 2.57 4.56 0

Take away 2 then add one hundredth

5,352 - 2,136 Formal written method

Exchange ten of these for one of those!

5,352

Regroup and rename

2,436 2,916

1000s	100s	<b>10</b> s	<b>1</b> s

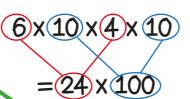


Known facts: Rapid recall of all multiplication tables up to 12 x 12

#### 6 x 4 Use known facts and place value

 $6 \times 4 = 24$  $60 \times 4 = 240$ 

 $60 \times 40 = 2400$ 



2.34

40 is ten times greater than 4



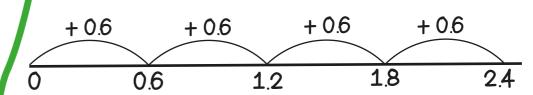
10 10 10 10 10
10 10 10 10 10
(10)(10)(10)(10)(10)

10 10 10 10 10

0.6 is ten times smaller than 6

6 x 4 Use known facts and place value

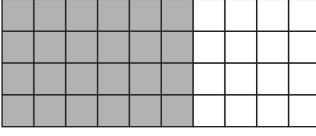
$$0.6 \times 4 = 2.4$$
  
4 jumps of  $0.6$ 



$$0.6 \times 4 = 24 \text{ tenths}$$
  
 $0.6 \times 4 = 2.4$ 

4

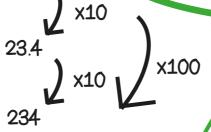
0.6



2.34 x 100 Multiply by 10, 100

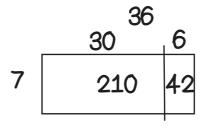
1000s	100s	10s	1s	10 S	100 s
	$\bigcirc\bigcirc$				

How shall I multiply?



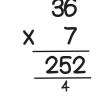
7 x 36 Use the distributive law



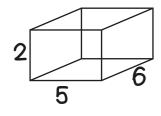


#### 36 x 7 Formal written method

	30	6
7	210	42



1



$$2 \times (5 \times 6) = (2 \times 5) \times 6$$
  
 $2 \times 30 = 10 \times 6$ 

$$2 \times 30 = (2 \times 5) \times 0$$
  
 $2 \times 30 = 10 \times 6$   
 $= 5 \times 9 \times 6$   
 $= 5 \times 6 \times 9$   
 $= 30 \times 9$ 

Write as factors then re-order

45 x 6

236 x 7 200 6 30 **x**7 **x**7 1400 210 42 = 1652

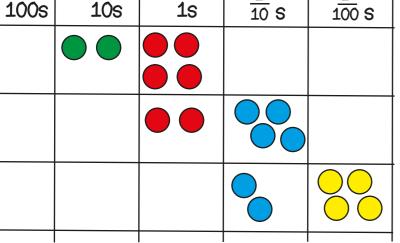
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= 270

4

Known facts: Use recall of all multiplication tables up to 12 x 12 to derive division facts

> 24 ÷ 100 Divide by 10, 100



 $24 \div 4 = 6$  $240 \div 40 = 6$  $2400 \div 400 = 6$  $2400 \div 400 = 24 \times 100$ 

 $\frac{24}{4} = 6$ 

24 ÷ 4 Use known facts and place value

240 is ten times greater than 24

24 biscuits shared between 4 people means they will get 6 biscuits each. If there are 100 times as many

people and 100 times as many biscuits, how many biscuits each now?

60 is ten times greater than 6

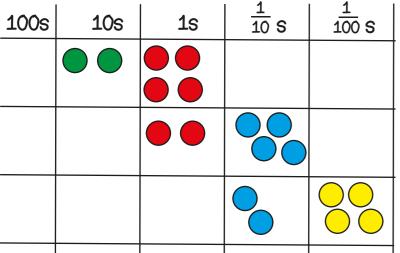
2400 ÷ 60 Use known facts and place value

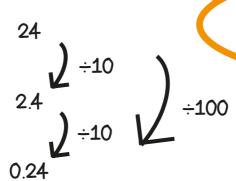
 $2400 \div 60 = 40$ How many steps of 60 make 2400?

10	x 60 10	0 x 60 10	0 x 60 10	x 60
0	600	1200	1800	2400

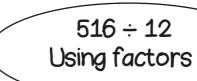
732 ÷ 6

Formal written method

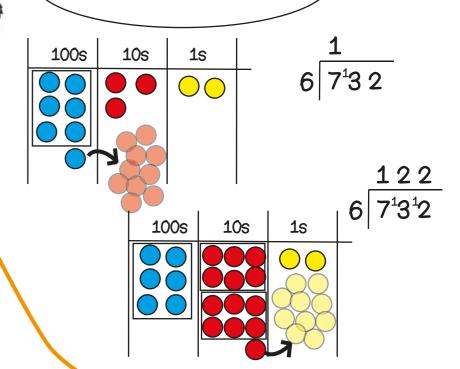




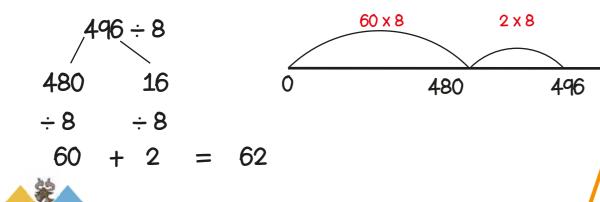
How shall I divide?

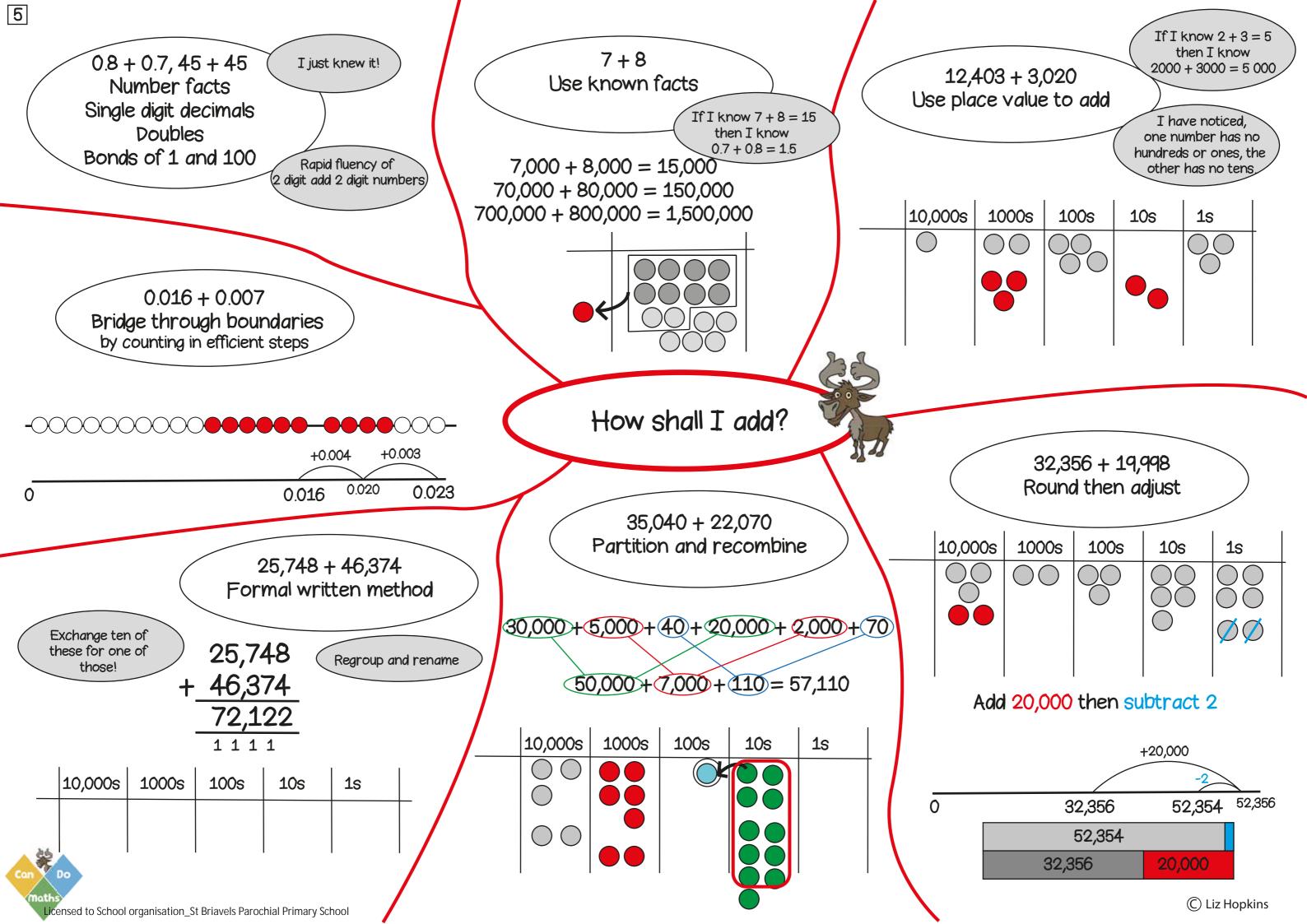


516										
172 172					17	'2				
43	43	43	43							



#### 496 ÷ 8 Partition and recombine





9-4, 13-5, 18-9 Number facts Single digit decimals Halves

I just knew it!

Subtract from 1 and 100

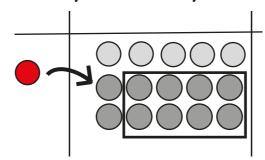
Rapid fluency of 2 digit subtract 2 digit numbers

15 - 8 = 7Use known facts

> If I know 15 - 8 = 7then I know 1.5 - 0.8 = 0.7

15,000 - 8,000 = 7,000

150,000 - 80,000 = 70,000 1,500,000 - 800,000 = 700,000



40,012 - 3,005 Use place value to subtract

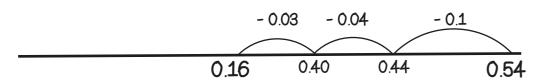
5 less than 12 is 7 Now it is easy to take away 3000

If I know 40 - 3 = 37then I know that 40 thousand take away 3 thousand is 37 thousand

40,000 = 4 tens of thousands or 40 thousands 12 = 1 ten and 2 ones or 12 ones

40,012 = 40 thousands and 12 ones take away 3 thousands and 5 ones equals 37 thousands and 7 ones.

0.54 - 0.17Bridge through boundaries by counting in efficient steps

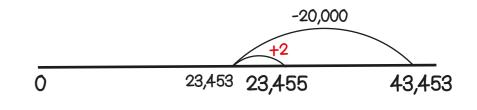


How shall I subtract?

43,453 - 19,998 Round then adjust

10,000s	1000s	100s	<b>10</b> s	1s

Take away 20,000 then add 2



45,748 - 26,374 Formal written method

Exchange ten of these for one of those!

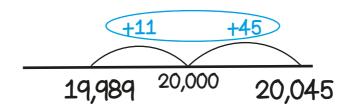
<sup>3</sup>45,748

Regroup and rename

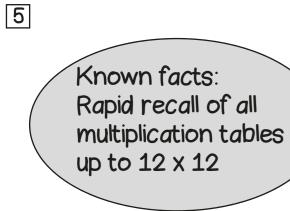
26,374 19,374

10,000s	1000s	100s	10s	<b>1</b> s	

20,045 - 19,989 Find the difference between two numbers



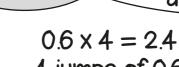
20,045	
19,989	56

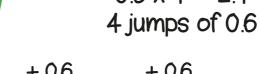


6 x 4 Use known facts and place value 40 is ten times greater than 4

1 1 1 1 1 1

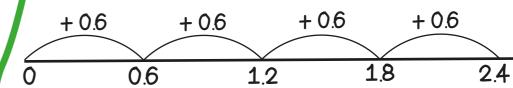






0.6 is ten times

smaller than 6



6 x 4

Use known facts

and place value

2.34 x 1000 Multiply by 10, 100, 1000



 $=24 \times 100$ 

x10

x10

**/** x10

x100

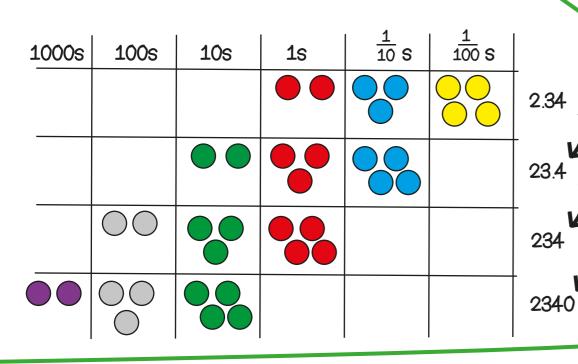
 $6 \times 4 = 24$ 

 $60 \times 4 = 240$ 

 $60 \times 40 = 2400$ 

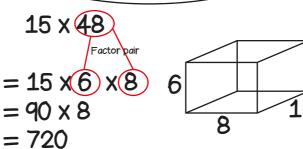
10 10

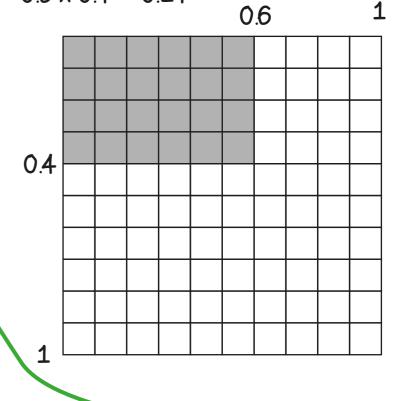
 $0.6 \times 0.4 = 24$  hundredths  $0.6 \times 0.4 = 0.24$ 



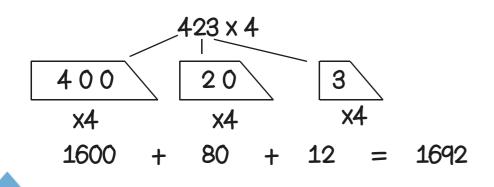
How shall I multiply?

15 x 42 Using factors and distributive law

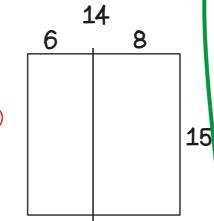




423 x 4 Partition and recombine



15 x 14 = 15 x 6 + 15 x 8 = 90 + 120 = 210



427 x 38 Formal written method

	400	20	7
30	12,000	600	210
8	3,200	160	56

427

© Liz Hopkins

5

Include calcuations where remainders occur

24 ÷ 4 Use known facts

÷1000

and place value

24,000 is a thousand times greater than 24

0.6 is ten times smaller than 6

 $2.4 \div 0.6$ Use known facts and place value

$$24 \div 4 = 6$$

 $2400 \div 400 = 6$ 

 $24,000 \div 4000 = 6$ 

÷10

24

2.4

2 x 8

496

$$24 \div 4 = 6$$
 4 people means they will get  $240 \div 40 = 6$  6 biscuits each.

How many steps of 0.6 make 2.4?

24 biscuits shared between

+ (	0.6 +	+ 0.6	0.6	- 0.6
0	0.6	1.2	1.8	2.4

5724 ÷ 4

Formal written method

 $2.4 \div 0.6 = 4$ 

24 ÷ 1000 Divide by 10, 100, 1000

Known facts:

Use recall of all

up to 12 x 12 to

multiplication tables

derive division facts

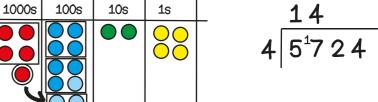
	ea
24,000 ÷ 400 =	24 x 1000
	4 x 100

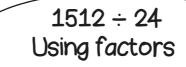
$$\frac{240}{4} = 60$$

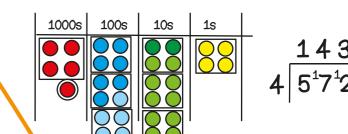
# 1 1000 S 1 100 S 1 10 S 100s **10**s 1s 0.24 0.024

How shall I divide?







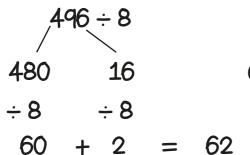


1512	÷6	÷	4
------	----	---	---

	1512																						
	252 252 252 252 252																						
63	63	63	63																				

#### 496 ÷ 8 Partition and recombine

60 x 8





44 + 56, 27 + 27 Number facts Single digit decimals Doubles Bonds of 1 and 100

I just knew it!

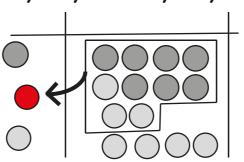
Rapid fluency of 2 digit add 2 digit numbers

17 + 17 Use known facts

> If I know 17 + 17 = 34 then I know 1.7 + 1.7 = 3.4

17,000 + 17,000 = 34,000 170,000 + 170,000 = 340,000

1,700,000 + 1,700,000 = 3,400,000



1,102,403 + 50,020 Use place value to add

I have noticed, one number has no hundreds or ones, the other has no tens,

1,000,000s	100,000s	10,000s	1000s	100s	10s	<b>1</b> s
			00	00	••	00

# 0.028 + 0.015 Bridge through boundaries by counting in efficient steps

# 

+0.01 +0.002 +0.003 0.028 0.038 0.040 0.043

> 325,748 + 246,374 Formal written method

> > Regroup and rename

Exchange ten of these for one of those!

0

325,748 + 246,374 572,122

<u> </u>		<u>/                                    </u>	
1	1	1	1

100,000s 10,000s 100s 10s 1s

#### How shall I add?

307,040 + 206,070 Partition and recombine

300,000 + 7,000 + 40 + 200,000 + 6,000 + 70

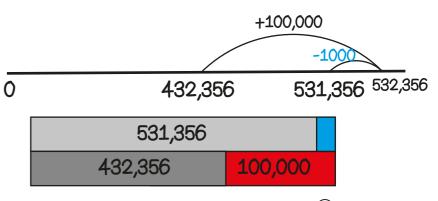
500,000 + 13,000 + 110 = 513,110

100,000s	10,000s	1000s	100s	10s	<b>1</b> s	
$\bigcirc$						
$\bigcirc$						
$\bigcirc$						

432,356 + 99,000 Round then *adjust* 

100,000s	10,000s	1000s	100s	10s	1s
	00	<b>Ø</b>			000

Add 100,000 then take away 1,000



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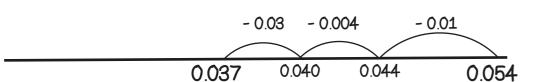
0.9 - 0.4, 100 - 65 ( Number facts Single digit decimals Halves

I just knew it!

Bonds of 1 and 100

Rapid fluency of 2 digit subtract 2 digit numbers

0.054 - 0.017
Bridge through boundaries
by counting in efficient steps



445,748 - 126,374 Formal written method

Regroup and rename

Exchange ten of these for one of those!

445,748

+ 126,374

319,374

100,000s	10,000s	1000s	100s	10s	<b>1</b> s

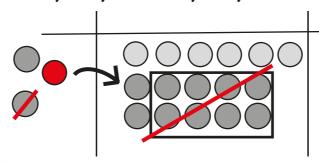
36 - 18 = 18Use known facts

> If I know 36 - 18 = 18 then I know 3.6 - 1.8 = 1.8

36,000 - 18,000 = 18,000

360,000 - 180,000 = 180,000

3,600,000 - 1,800,000 = 1,800,000



400,032 - 30,005 ( Use place value to subtract 5 less than 32 is 27

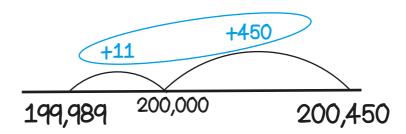
400,000 = 4 hundreds of thousands or 400 thousands

400 - 30 = 370 so 400,000 - 3,000 = 370,000

400,032 = 400 thousands and 32 ones take away 30 thousands and 5 ones = 370,027

#### How shall I subtract?

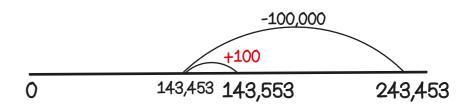
200,450 - 199,989 Find the difference between two numbers

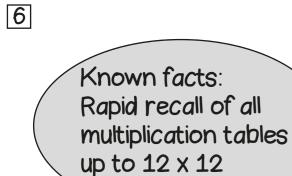


200,450 199,989 461 243,453 - 99,900 Round then adjust

100,000s	10,000s	1000s	100s	10s	<b>1</b> s
				000	

Take away 100,000 then add 100

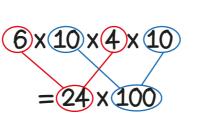


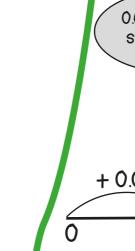


6 x 4 Use known facts and place value

40 is ten times greater than 4

$$60 \times 40 = 2400$$
  
 $600 \times 400 = 240,000$   
 $6000 \times 4000 = 24,000,000$ 





15

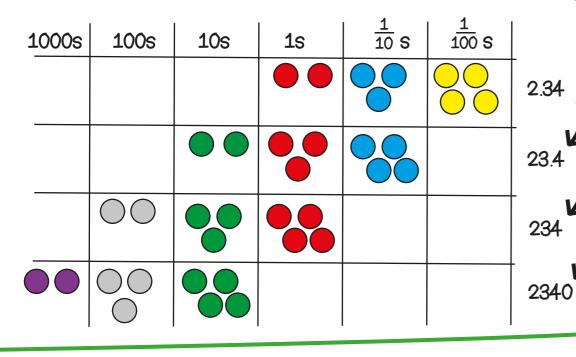
2.34 x 1000 Multiply by 10, 100, 1000



**x10** 

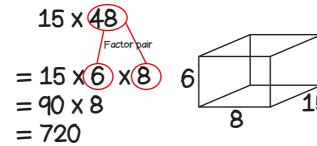
x10

**/** x10

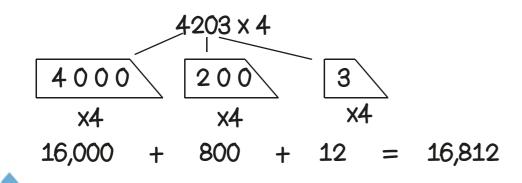


How shall I multiply?

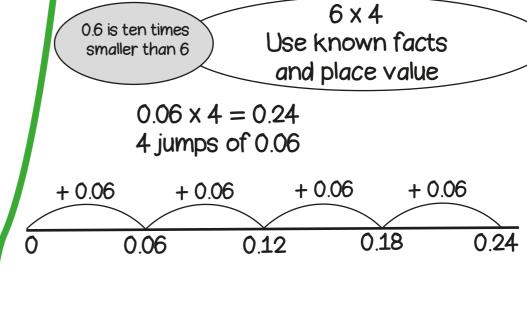




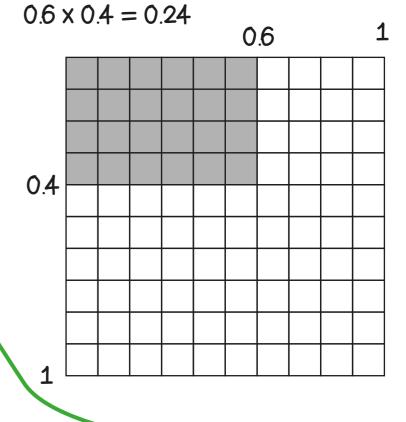
#### 4203 x 4 Partition and recombine

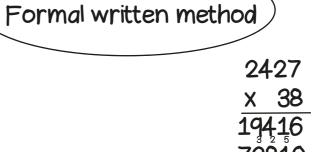


14 8 6 15 x 14)  $= 15 \times 6 + 15 \times 8$ = 90 + 120= 210



 $0.6 \times 0.4 = 24$  hundredths





2427 x 38

6 Known facts: Use recall of all multiplication tables up to 12 x 12 to

Include calcuations where remainders occur

## 24 ÷ 4

Use known facts and place value

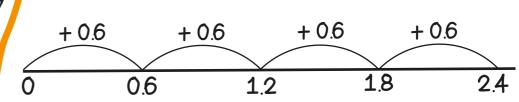
240 is ten times greater than 24

0.6 is ten times smaller than 6

 $2.4 \div 0.6$ Use known facts and place value

$$2.4 \div 0.6 = 4$$

How many steps of 0.6 make 2.4?

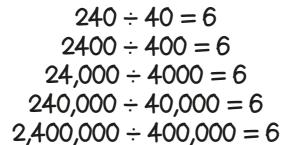


7182 ÷ 21

Formal written method

24 ÷ 1000 Divide by 10, 100, 1000

derive division facts



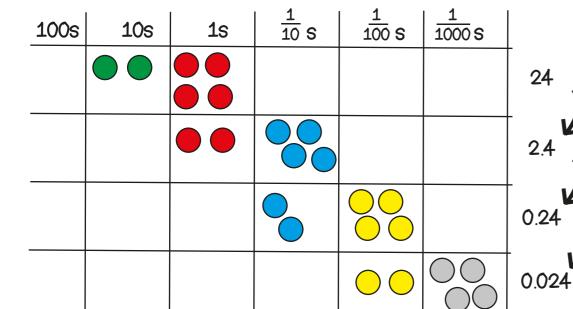
÷10

4 people means they will get 6 biscuits each. If there are 10 times as many people and 10 times as many biscuits, how many biscuits each now?

24 biscuits shared between

 $240,000 \div 400 = 24 \times 10,000$ 4 x 100 2400 = 600

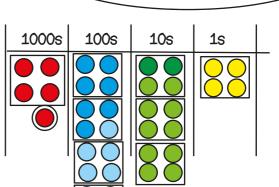
÷1000



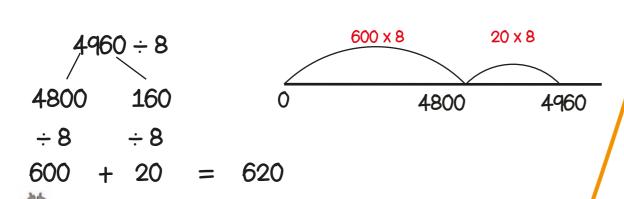
How shall I divide?

1512 ÷ 24

Using factors



#### 4960 ÷ 8 Partition and recombine



 $1512 \div 6 \div 4$ 

	1512																						
252				252				252			252			252				252					
63	63	63	63																				